wwPDB EM Validation Summary Report (i)

Nov 15, 2022 – 12:07 AM EST

PDB ID	:	7KJ3
EMDB ID	:	EMD-22892
Title	:	SARS-CoV-2 Spike Glycoprotein with two ACE2 Bound
Authors	:	Zhang, J.; Xiao, T.S.; Cai, Y.F.; Chen, B.
Deposited on	:	2020-10-25
Resolution	:	3.70 Å(reported)
Based on initial models	:	6M17, 6VYB

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

We welcome your comments at *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 (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references (1)) were used in the production of this report:

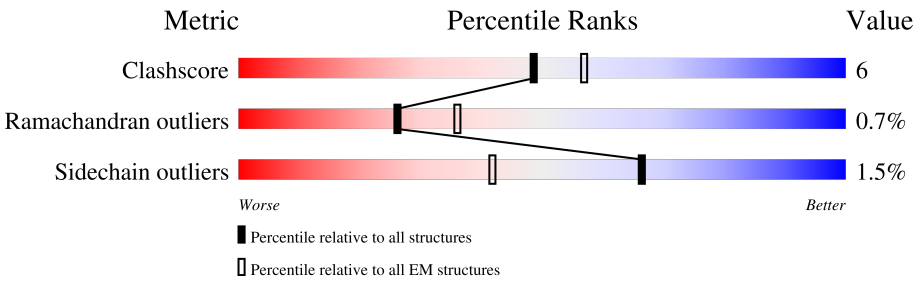
EMDB validation analysis	:	0.0.1.dev43
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.9
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry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

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.70 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
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 >=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 <=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	1234	74% 6% 21%
1	B	1234	72% 7% • 21%
1	C	1234	73% 5% 22%
2	D	615	11% 90% 6% • •
2	E	615	25% 88% 7% • •
3	F	2	50% 50%
3	G	2	100%
3	H	2	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	100%
3	N	2	50% 50%
3	O	2	100%
3	P	2	50% 100%
3	Q	2	100% 50% 50%
3	R	2	100% 100%
3	S	2	100% 100%
3	T	2	100% 50% 50%
3	U	2	50% 50% 50%
3	V	2	100% 50% 50%
3	W	2	50% 100%
3	X	2	100% 100%
3	Y	2	100% 100%

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 33643 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	981	7661	4891	1271	1464	35	0	0
1	B	981	7665	4893	1271	1466	35	0	0
1	C	961	7509	4795	1246	1435	33	0	0

There are 135 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	682	GLY	ARG	conflict	UNP P0DTC2
A	683	GLY	ARG	conflict	UNP P0DTC2
A	684	SER	ALA	conflict	UNP P0DTC2
A	685	GLY	ARG	conflict	UNP P0DTC2
A	986	PRO	LYS	engineered mutation	UNP P0DTC2
A	987	PRO	VAL	engineered mutation	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
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

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Chain	Residue	Modelled	Actual	Comment	Reference
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	GLY	-	expression tag	UNP P0DTC2
A	1240	GLY	-	expression tag	UNP P0DTC2
A	1241	SER	-	expression tag	UNP P0DTC2
A	1242	HIS	-	expression tag	UNP P0DTC2
A	1243	HIS	-	expression tag	UNP P0DTC2
A	1244	HIS	-	expression tag	UNP P0DTC2
A	1245	HIS	-	expression tag	UNP P0DTC2
A	1246	HIS	-	expression tag	UNP P0DTC2
A	1247	HIS	-	expression tag	UNP P0DTC2
B	682	GLY	ARG	conflict	UNP P0DTC2
B	683	GLY	ARG	conflict	UNP P0DTC2
B	684	SER	ALA	conflict	UNP P0DTC2
B	685	GLY	ARG	conflict	UNP P0DTC2
B	986	PRO	LYS	engineered mutation	UNP P0DTC2
B	987	PRO	VAL	engineered mutation	UNP P0DTC2
B	1209	GLY	-	expression tag	UNP P0DTC2
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

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Chain	Residue	Modelled	Actual	Comment	Reference
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	GLY	-	expression tag	UNP P0DTC2
B	1240	GLY	-	expression tag	UNP P0DTC2
B	1241	SER	-	expression tag	UNP P0DTC2
B	1242	HIS	-	expression tag	UNP P0DTC2
B	1243	HIS	-	expression tag	UNP P0DTC2
B	1244	HIS	-	expression tag	UNP P0DTC2
B	1245	HIS	-	expression tag	UNP P0DTC2
B	1246	HIS	-	expression tag	UNP P0DTC2
B	1247	HIS	-	expression tag	UNP P0DTC2
C	682	GLY	ARG	conflict	UNP P0DTC2
C	683	GLY	ARG	conflict	UNP P0DTC2
C	684	SER	ALA	conflict	UNP P0DTC2
C	685	GLY	ARG	conflict	UNP P0DTC2
C	986	PRO	LYS	engineered mutation	UNP P0DTC2
C	987	PRO	VAL	engineered mutation	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

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Chain	Residue	Modelled	Actual	Comment	Reference
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	GLY	-	expression tag	UNP P0DTC2
C	1240	GLY	-	expression tag	UNP P0DTC2
C	1241	SER	-	expression tag	UNP P0DTC2
C	1242	HIS	-	expression tag	UNP P0DTC2
C	1243	HIS	-	expression tag	UNP P0DTC2
C	1244	HIS	-	expression tag	UNP P0DTC2
C	1245	HIS	-	expression tag	UNP P0DTC2
C	1246	HIS	-	expression tag	UNP P0DTC2
C	1247	HIS	-	expression tag	UNP P0DTC2

- Molecule 2 is a protein called Angiotensin-converting enzyme 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	D	593	4844	3101	802	912	29	0	0
			Total	C	N	O	S		
2	E	593	4844	3101	802	912	29	0	0

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	616	SER	-	expression tag	UNP Q9BYF1
D	617	GLY	-	expression tag	UNP Q9BYF1
D	618	GLY	-	expression tag	UNP Q9BYF1

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Chain	Residue	Modelled	Actual	Comment	Reference
D	619	SER	-	expression tag	UNP Q9BYF1
D	620	HIS	-	expression tag	UNP Q9BYF1
D	621	HIS	-	expression tag	UNP Q9BYF1
D	622	HIS	-	expression tag	UNP Q9BYF1
D	623	HIS	-	expression tag	UNP Q9BYF1
D	624	HIS	-	expression tag	UNP Q9BYF1
D	625	HIS	-	expression tag	UNP Q9BYF1
E	616	SER	-	expression tag	UNP Q9BYF1
E	617	GLY	-	expression tag	UNP Q9BYF1
E	618	GLY	-	expression tag	UNP Q9BYF1
E	619	SER	-	expression tag	UNP Q9BYF1
E	620	HIS	-	expression tag	UNP Q9BYF1
E	621	HIS	-	expression tag	UNP Q9BYF1
E	622	HIS	-	expression tag	UNP Q9BYF1
E	623	HIS	-	expression tag	UNP Q9BYF1
E	624	HIS	-	expression tag	UNP Q9BYF1
E	625	HIS	-	expression tag	UNP Q9BYF1

- 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	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

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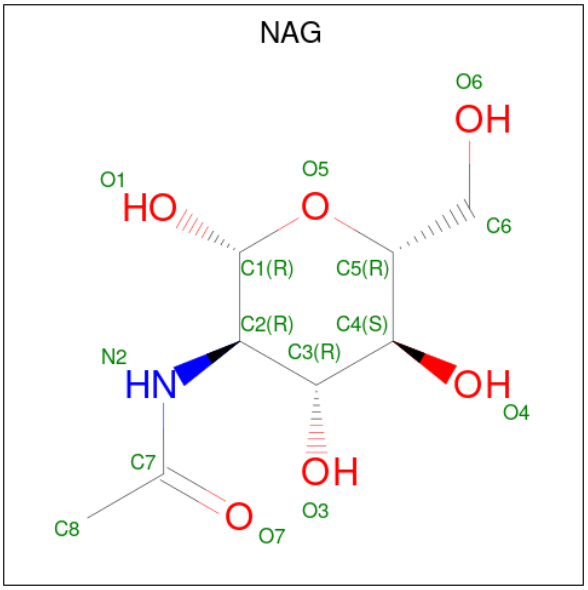
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
3	N	2	28	16	2	10	0	0
3	O	2	28	16	2	10	0	0
3	P	2	28	16	2	10	0	0
3	Q	2	28	16	2	10	0	0
3	R	2	28	16	2	10	0	0
3	S	2	28	16	2	10	0	0
3	T	2	28	16	2	10	0	0
3	U	2	28	16	2	10	0	0
3	V	2	28	16	2	10	0	0
3	W	2	28	16	2	10	0	0
3	X	2	28	16	2	10	0	0
3	Y	2	28	16	2	10	0	0

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
4	A	1	182	104	13	65	0
4	A	1	182	104	13	65	0
4	A	1	182	104	13	65	0
4	A	1	182	104	13	65	0
4	A	1	182	104	13	65	0
4	A	1	182	104	13	65	0
4	A	1	182	104	13	65	0
4	A	1	182	104	13	65	0
4	A	1	182	104	13	65	0
4	A	1	182	104	13	65	0
4	A	1	182	104	13	65	0
4	A	1	182	104	13	65	0
4	A	1	182	104	13	65	0
4	A	1	182	104	13	65	0
4	B	1	182	104	13	65	0
4	B	1	182	104	13	65	0
4	B	1	182	104	13	65	0
4	B	1	182	104	13	65	0
4	B	1	182	104	13	65	0
4	B	1	182	104	13	65	0
4	B	1	182	104	13	65	0
4	B	1	182	104	13	65	0

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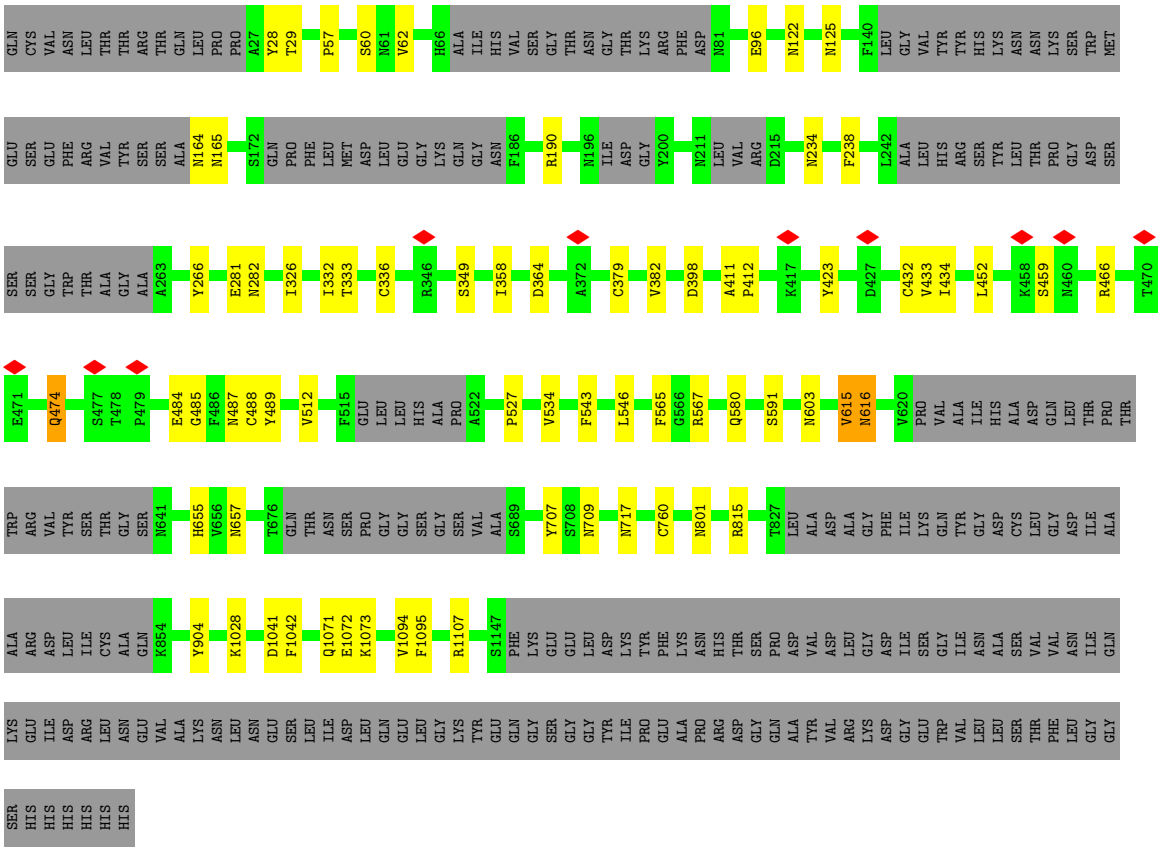
Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
4	B	1	182	104	13	65	0
			Total	C	N	O	
4	B	1	182	104	13	65	0
			Total	C	N	O	
4	B	1	182	104	13	65	0
			Total	C	N	O	
4	B	1	182	104	13	65	0
			Total	C	N	O	
4	C	1	168	96	12	60	0
			Total	C	N	O	
4	C	1	168	96	12	60	0
			Total	C	N	O	
4	C	1	168	96	12	60	0
			Total	C	N	O	
4	C	1	168	96	12	60	0
			Total	C	N	O	
4	C	1	168	96	12	60	0
			Total	C	N	O	
4	C	1	168	96	12	60	0
			Total	C	N	O	
4	C	1	168	96	12	60	0
			Total	C	N	O	
4	C	1	168	96	12	60	0
			Total	C	N	O	
4	C	1	168	96	12	60	0
			Total	C	N	O	
4	C	1	168	96	12	60	0
			Total	C	N	O	
4	C	1	168	96	12	60	0
			Total	C	N	O	
4	D	1	14	8	1	5	0
			Total	C	N	O	
4	E	1	14	8	1	5	0

3 Residue-property plots (i)

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

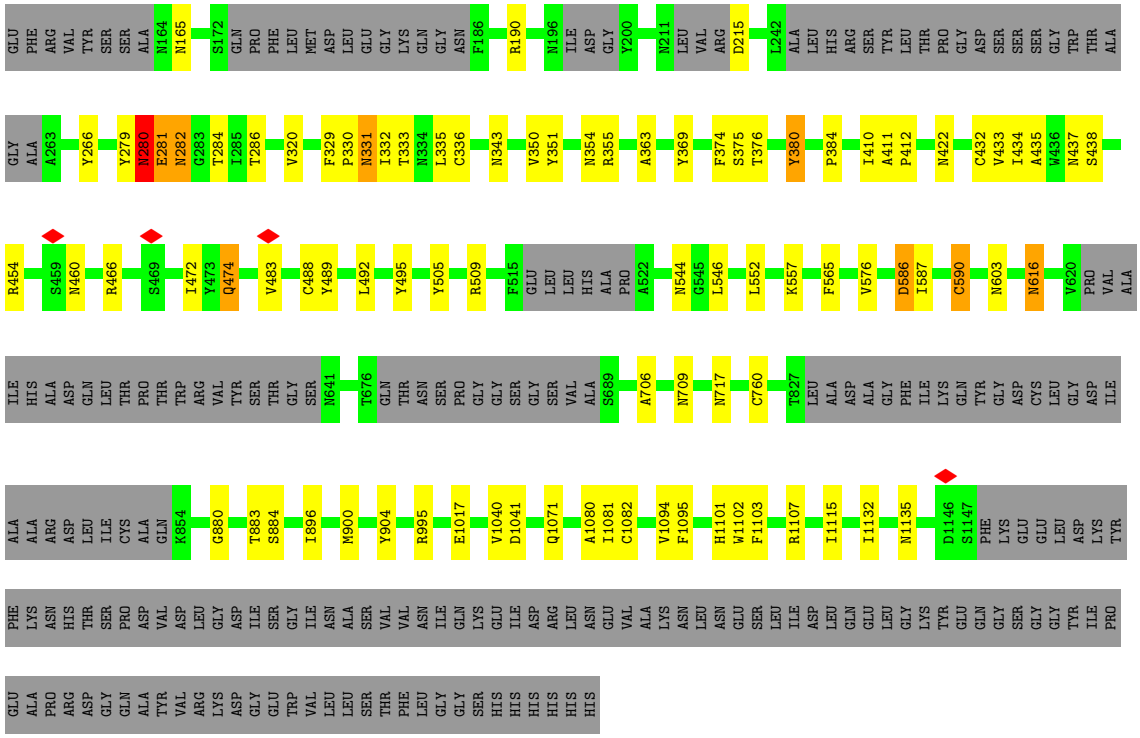
- Molecule 1: Spike glycoprotein

Chain A:



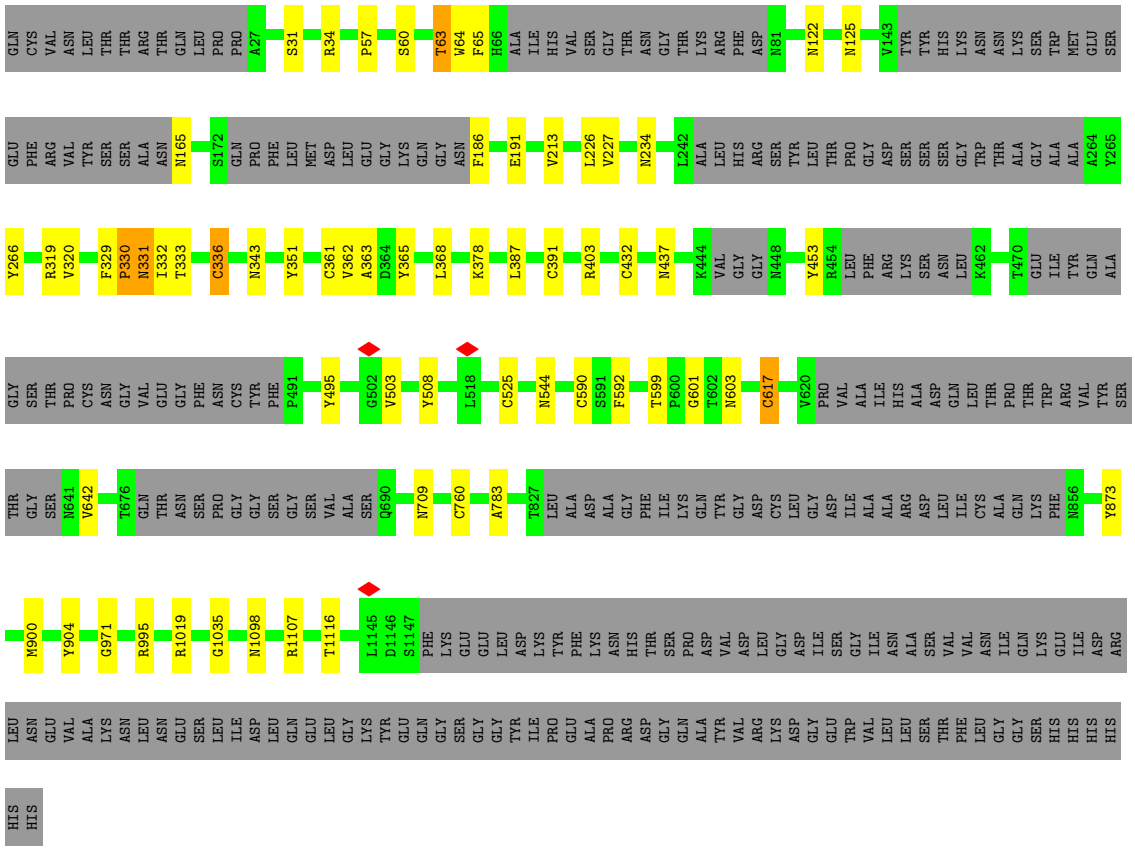
- Molecule 1: Spike glycoprotein

Chain B:



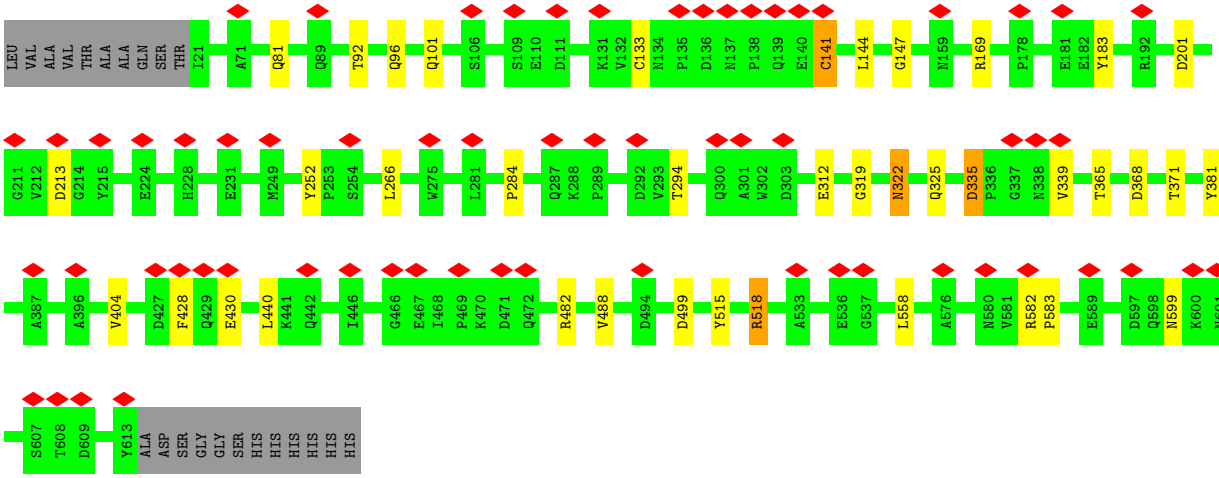
- Molecule 1: Spike glycoprotein

Chain C: 73% 5% 22%



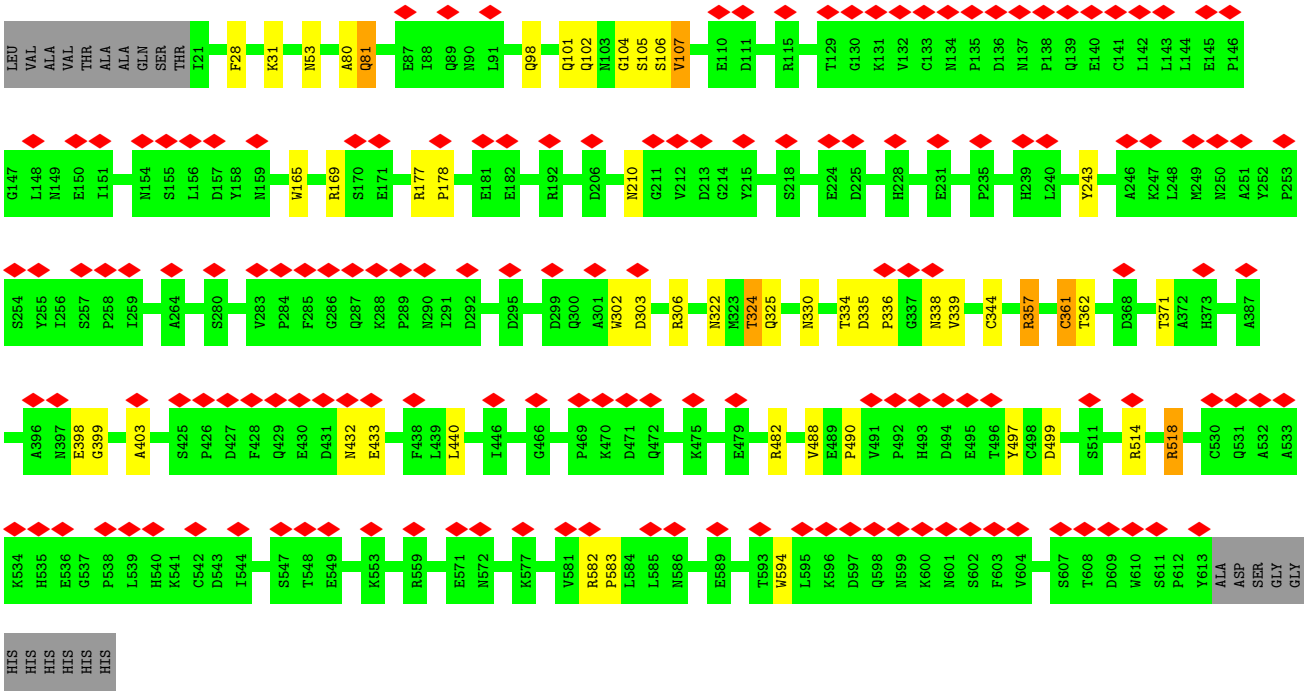
• Molecule 2: Angiotensin-converting enzyme 2

Chain D:



• Molecule 2: Angiotensin-converting enzyme 2

Chain E:



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

Chain F:

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

Chain G: 100%

NAG1
NAG2

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

Chain H: 100%

NAG1
NAG2

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

Chain I: 100%

NAG1
NAG2

• 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

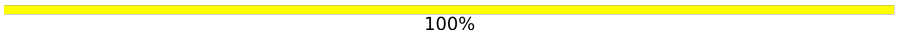
Chain M: 100%

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

Chain N:

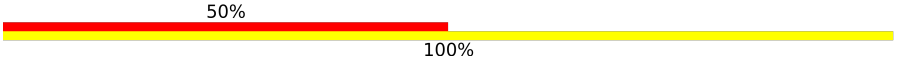
• Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain O:



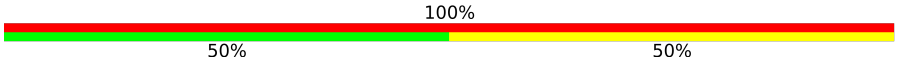
• Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain P:



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

Chain Q:



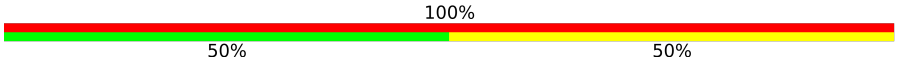
• Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain R:

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

Chain S:

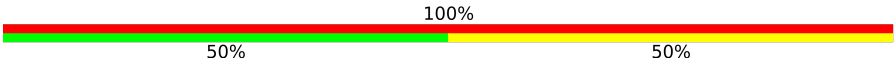
• Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain T: 

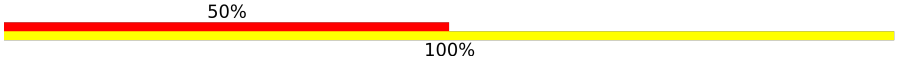
• Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain U:

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

Chain V: 

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

Chain W: 

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

Chain X:

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

Chain Y:

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	13515	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 ($e^-/Å^2$)	50.05	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.077	Depositor
Minimum map value	-0.043	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.002	Depositor
Recommended contour level	0.005	Depositor
Map size (Å)	396.0, 396.0, 396.0	wwPDB
Map dimensions	480, 480, 480	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.825, 0.825, 0.825	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	0.64	0/7830	0.89	0/10649
1	B	0.62	0/7834	0.88	0/10654
1	C	0.62	0/7673	0.89	0/10439
2	D	0.68	0/4981	0.90	0/6767
2	E	0.70	0/4981	0.92	0/6767
All	All	0.64	0/33299	0.90	0/45276

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	7661	0	7459	98	0
1	B	7665	0	7460	157	0
1	C	7509	0	7337	93	0
2	D	4844	0	4614	23	0
2	E	4844	0	4613	47	0
3	F	28	0	25	4	0
3	G	28	0	25	0	0
3	H	28	0	25	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	I	28	0	25	0	0
3	J	28	0	25	0	0
3	K	28	0	25	0	0
3	L	28	0	25	0	0
3	M	28	0	25	0	0
3	N	28	0	25	5	0
3	O	28	0	25	0	0
3	P	28	0	25	0	0
3	Q	28	0	25	0	0
3	R	28	0	25	6	0
3	S	28	0	25	0	0
3	T	28	0	25	0	0
3	U	28	0	25	5	0
3	V	28	0	25	0	0
3	W	28	0	25	5	0
3	X	28	0	25	1	0
3	Y	28	0	25	0	0
4	A	182	0	169	36	0
4	B	182	0	169	24	0
4	C	168	0	155	22	0
4	D	14	0	13	0	0
4	E	14	0	13	0	0
All	All	33643	0	32502	403	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 6.

The worst 5 of 403 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:122:ASN:HD21	4:C:1302:NAG:C1	1.07	1.67
1:B:709:ASN:HD21	4:B:1303:NAG:C1	1.09	1.62
1:C:343:ASN:HD21	4:C:1306:NAG:C1	1.02	1.62
1:A:709:ASN:HD21	4:A:1310:NAG:C1	1.15	1.60
1:C:603:ASN:HD21	4:C:1307:NAG:C1	0.99	1.55

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	959/1234 (78%)	870 (91%)	84 (9%)	5 (0%)	29	66
1	B	959/1234 (78%)	884 (92%)	67 (7%)	8 (1%)	19	56
1	C	939/1234 (76%)	870 (93%)	65 (7%)	4 (0%)	34	69
2	D	591/615 (96%)	566 (96%)	19 (3%)	6 (1%)	15	51
2	E	591/615 (96%)	560 (95%)	26 (4%)	5 (1%)	19	56
All	All	4039/4932 (82%)	3750 (93%)	261 (6%)	28 (1%)	26	59

5 of 28 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	332	ILE
1	C	331	ASN
1	A	1041	ASP
1	B	281	GLU
1	C	332	ILE

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	859/1069 (80%)	847 (99%)	12 (1%)	67	82
1	B	860/1069 (80%)	844 (98%)	16 (2%)	57	76
1	C	844/1069 (79%)	835 (99%)	9 (1%)	73	85
2	D	524/540 (97%)	515 (98%)	9 (2%)	60	79

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	E	524/540 (97%)	515 (98%)	9 (2%)	60	79
All	All	3611/4287 (84%)	3556 (98%)	55 (2%)	66	81

5 of 55 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	63	THR
1	C	760	CYS
2	E	518	ARG
2	E	322	ASN
1	C	226	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 21 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	343	ASN
2	D	58	ASN
2	E	63	ASN
2	D	81	GLN
1	C	913	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)

40 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	F	1	3	14,14,15	1.12	1 (7%)	17,19,21	0.92	1 (5%)
3	NAG	F	2	3	14,14,15	1.16	1 (7%)	17,19,21	1.03	2 (11%)
3	NAG	G	1	1,3	14,14,15	1.29	3 (21%)	17,19,21	1.06	2 (11%)
3	NAG	G	2	3	14,14,15	1.17	1 (7%)	17,19,21	0.66	0
3	NAG	H	1	3	14,14,15	1.56	2 (14%)	17,19,21	0.71	0
3	NAG	H	2	3	14,14,15	1.41	2 (14%)	17,19,21	0.59	0
3	NAG	I	1	1,3	14,14,15	1.19	2 (14%)	17,19,21	0.81	0
3	NAG	I	2	3	14,14,15	1.16	1 (7%)	17,19,21	0.76	0
3	NAG	J	1	3	14,14,15	1.44	2 (14%)	17,19,21	0.76	0
3	NAG	J	2	3	14,14,15	1.43	2 (14%)	17,19,21	0.57	0
3	NAG	K	1	1,3	14,14,15	1.43	2 (14%)	17,19,21	0.69	0
3	NAG	K	2	3	14,14,15	1.36	2 (14%)	17,19,21	0.62	0
3	NAG	L	1	1,3	14,14,15	1.23	2 (14%)	17,19,21	0.84	0
3	NAG	L	2	3	14,14,15	1.22	2 (14%)	17,19,21	0.91	1 (5%)
3	NAG	M	1	1,3	14,14,15	1.28	3 (21%)	17,19,21	0.83	0
3	NAG	M	2	3	14,14,15	1.35	2 (14%)	17,19,21	0.78	0
3	NAG	N	1	3	14,14,15	1.45	2 (14%)	17,19,21	0.83	0
3	NAG	N	2	3	14,14,15	1.32	2 (14%)	17,19,21	0.79	1 (5%)
3	NAG	O	1	1,3	14,14,15	1.30	2 (14%)	17,19,21	0.53	0
3	NAG	O	2	3	14,14,15	1.27	2 (14%)	17,19,21	0.93	1 (5%)
3	NAG	P	1	2,3	14,14,15	1.36	3 (21%)	17,19,21	0.98	0
3	NAG	P	2	3	14,14,15	1.23	2 (14%)	17,19,21	0.83	1 (5%)
3	NAG	Q	1	2,3	14,14,15	0.42	0	17,19,21	0.65	0
3	NAG	Q	2	3	14,14,15	0.27	0	17,19,21	0.68	1 (5%)
3	NAG	R	1	2,3	14,14,15	0.31	0	17,19,21	0.63	0
3	NAG	R	2	3	14,14,15	0.30	0	17,19,21	0.61	0
3	NAG	S	1	2,3	14,14,15	0.30	0	17,19,21	0.52	0
3	NAG	S	2	3	14,14,15	0.36	0	17,19,21	0.47	0
3	NAG	T	1	2,3	14,14,15	0.25	0	17,19,21	0.63	0
3	NAG	T	2	3	14,14,15	1.05	1 (7%)	17,19,21	0.65	0
3	NAG	U	1	3	14,14,15	0.61	1 (7%)	17,19,21	0.72	0
3	NAG	U	2	3	14,14,15	1.19	1 (7%)	17,19,21	1.10	1 (5%)
3	NAG	V	1	2,3	14,14,15	0.42	0	17,19,21	0.64	0
3	NAG	V	2	3	14,14,15	1.11	1 (7%)	17,19,21	1.42	1 (5%)
3	NAG	W	1	2,3	14,14,15	0.30	0	17,19,21	0.63	0
3	NAG	W	2	3	14,14,15	0.30	0	17,19,21	0.61	0
3	NAG	X	1	2,3	14,14,15	0.30	0	17,19,21	0.53	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	NAG	X	2	3	14,14,15	1.14	1 (7%)	17,19,21	0.64	0
3	NAG	Y	1	2,3	14,14,15	1.41	4 (28%)	17,19,21	0.91	1 (5%)
3	NAG	Y	2	3	14,14,15	1.24	1 (7%)	17,19,21	0.64	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	F	1	3	-	0/6/23/26	0/1/1/1
3	NAG	F	2	3	-	0/6/23/26	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	3	-	0/6/23/26	0/1/1/1
3	NAG	H	2	3	-	0/6/23/26	0/1/1/1
3	NAG	I	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	I	2	3	-	0/6/23/26	0/1/1/1
3	NAG	J	1	3	-	0/6/23/26	0/1/1/1
3	NAG	J	2	3	-	0/6/23/26	0/1/1/1
3	NAG	K	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	K	2	3	-	0/6/23/26	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	3	-	0/6/23/26	0/1/1/1
3	NAG	N	2	3	-	0/6/23/26	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	2,3	-	0/6/23/26	0/1/1/1
3	NAG	P	2	3	-	0/6/23/26	0/1/1/1
3	NAG	Q	1	2,3	-	2/6/23/26	0/1/1/1
3	NAG	Q	2	3	-	2/6/23/26	0/1/1/1
3	NAG	R	1	2,3	-	2/6/23/26	0/1/1/1
3	NAG	R	2	3	-	4/6/23/26	0/1/1/1
3	NAG	S	1	2,3	-	0/6/23/26	0/1/1/1
3	NAG	S	2	3	-	0/6/23/26	0/1/1/1
3	NAG	T	1	2,3	-	0/6/23/26	0/1/1/1
3	NAG	T	2	3	-	0/6/23/26	0/1/1/1
3	NAG	U	1	3	-	2/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	U	2	3	-	0/6/23/26	0/1/1/1
3	NAG	V	1	2,3	-	2/6/23/26	0/1/1/1
3	NAG	V	2	3	-	0/6/23/26	0/1/1/1
3	NAG	W	1	2,3	-	2/6/23/26	0/1/1/1
3	NAG	W	2	3	-	4/6/23/26	0/1/1/1
3	NAG	X	1	2,3	-	0/6/23/26	0/1/1/1
3	NAG	X	2	3	-	0/6/23/26	0/1/1/1
3	NAG	Y	1	2,3	-	0/6/23/26	0/1/1/1
3	NAG	Y	2	3	-	0/6/23/26	0/1/1/1

The worst 5 of 53 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	H	1	NAG	C1-C2	4.06	1.58	1.52
3	N	1	NAG	C1-C2	3.91	1.58	1.52
3	K	1	NAG	C1-C2	3.65	1.57	1.52
3	J	1	NAG	C1-C2	3.61	1.57	1.52
3	H	2	NAG	C1-C2	3.49	1.57	1.52

The worst 5 of 13 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	V	2	NAG	C1-O5-C5	4.66	118.51	112.19
3	U	2	NAG	C1-O5-C5	3.11	116.41	112.19
3	O	2	NAG	C1-O5-C5	2.70	115.85	112.19
3	Y	1	NAG	C1-O5-C5	2.60	115.72	112.19
3	N	2	NAG	C1-O5-C5	2.46	115.52	112.19

There are no chirality outliers.

5 of 20 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	R	1	NAG	O7-C7-N2-C2
3	R	2	NAG	C3-C2-N2-C7
3	R	2	NAG	C8-C7-N2-C2
3	R	2	NAG	O7-C7-N2-C2
3	W	1	NAG	O7-C7-N2-C2

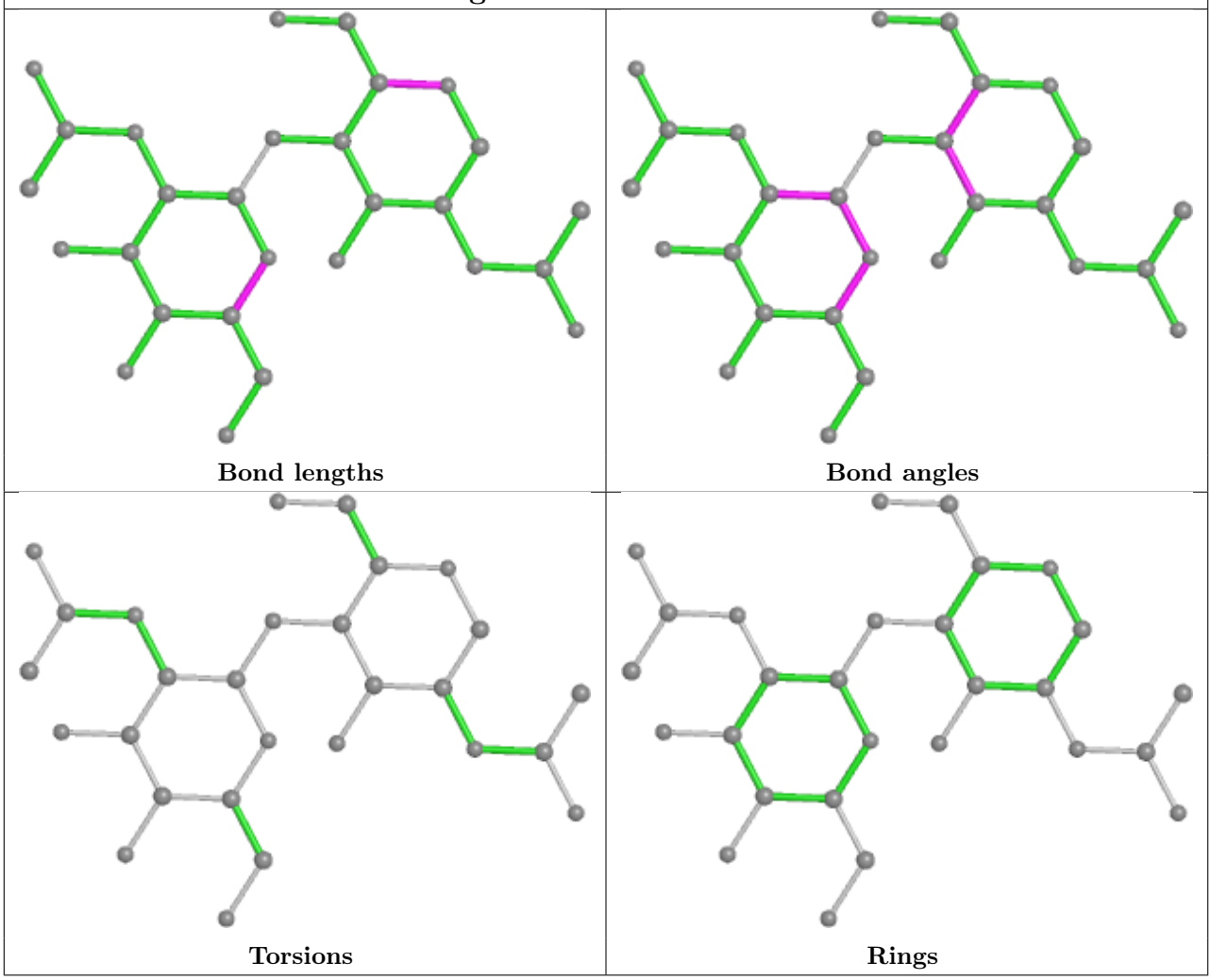
There are no ring outliers.

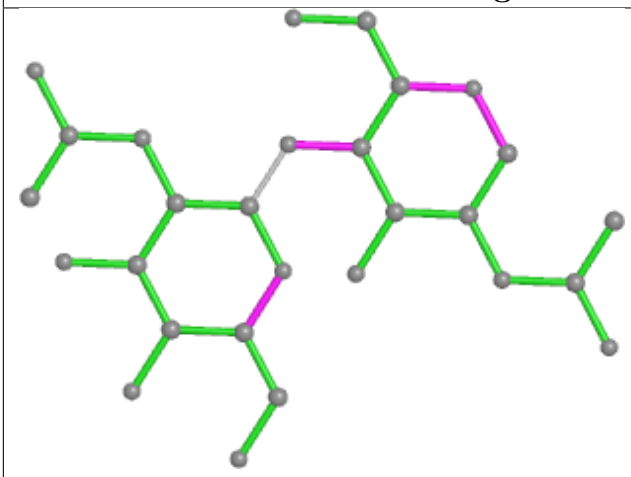
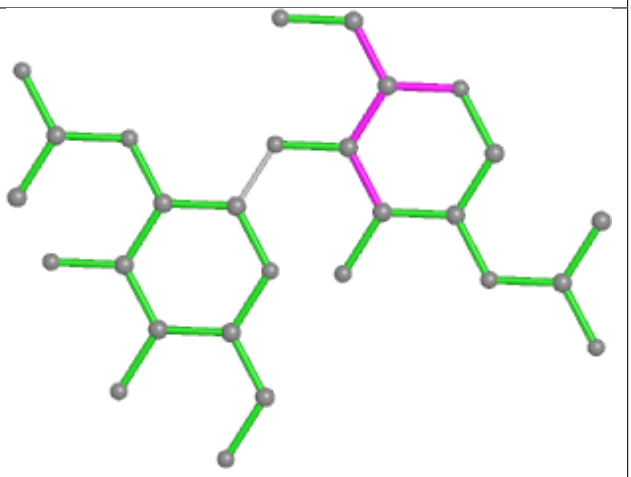
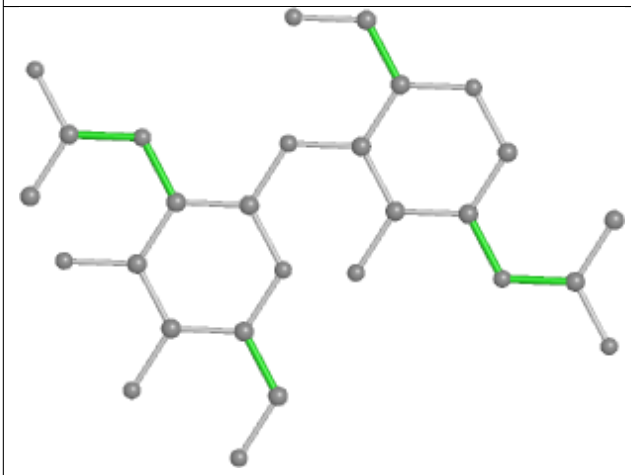
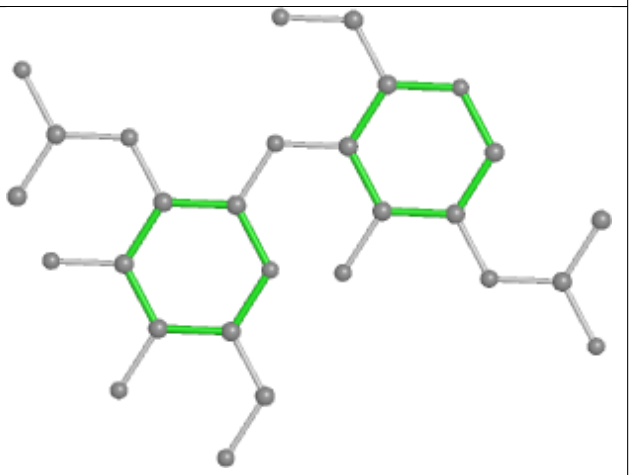
8 monomers are involved in 26 short contacts:

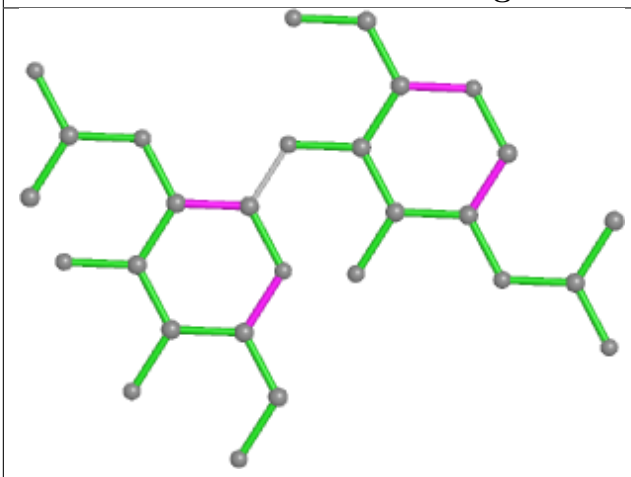
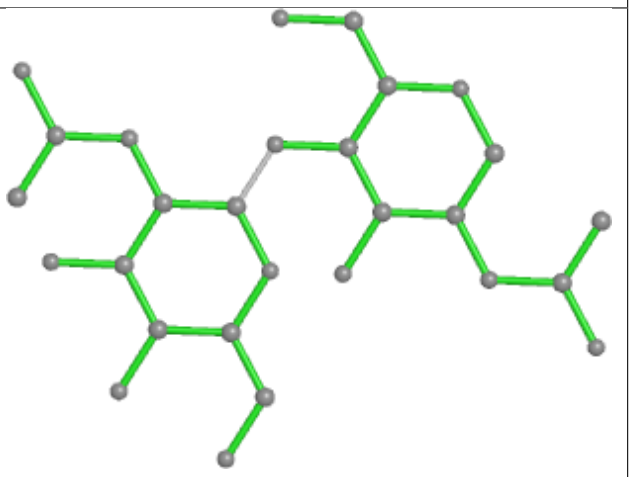
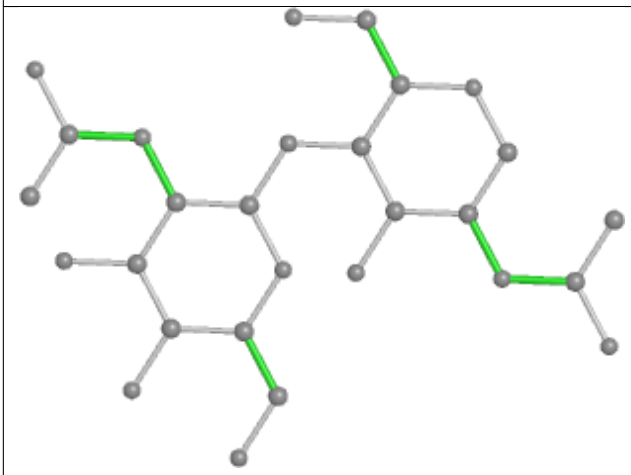
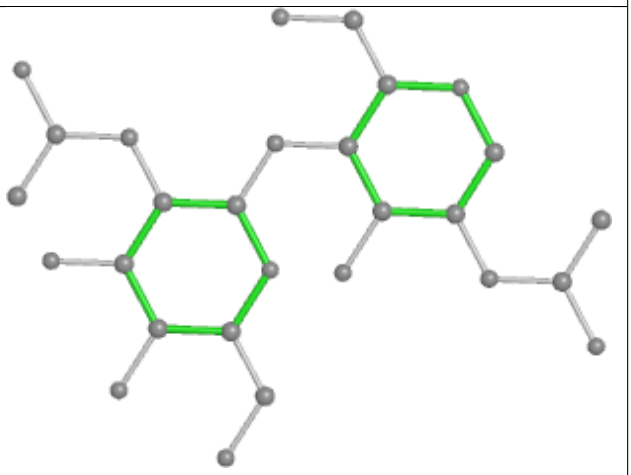
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	W	2	NAG	5	0
3	R	1	NAG	4	0
3	W	1	NAG	3	0
3	X	1	NAG	1	0
3	U	1	NAG	5	0
3	N	1	NAG	5	0
3	R	2	NAG	6	0
3	F	1	NAG	4	0

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

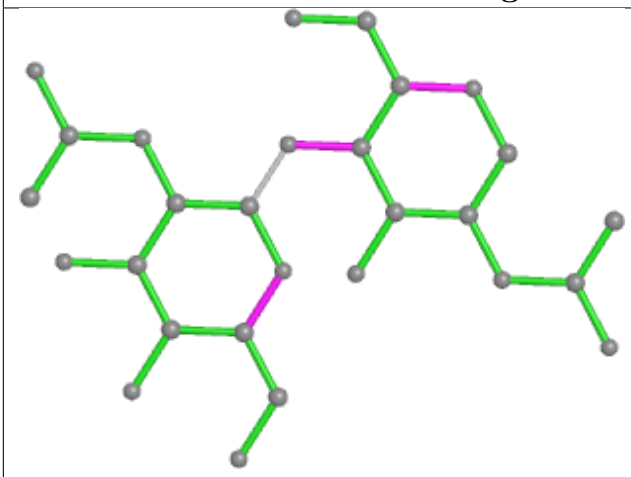
Oligosaccharide Chain F



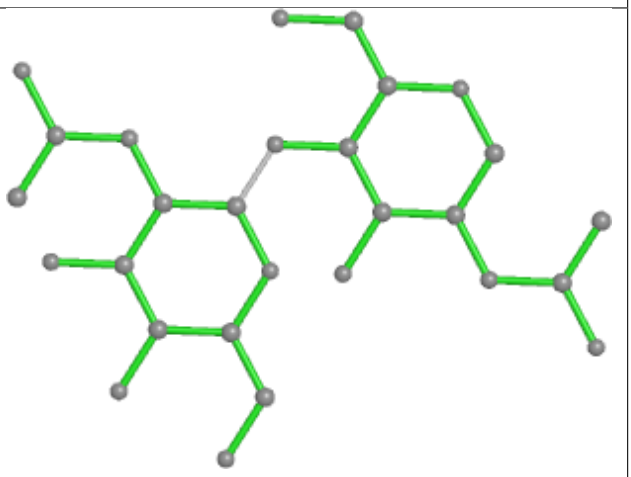
Oligosaccharide Chain G	
 Bond lengths	 Bond angles
 Torsions	 Rings

Oligosaccharide Chain H	
 Bond lengths	 Bond angles
 Torsions	 Rings

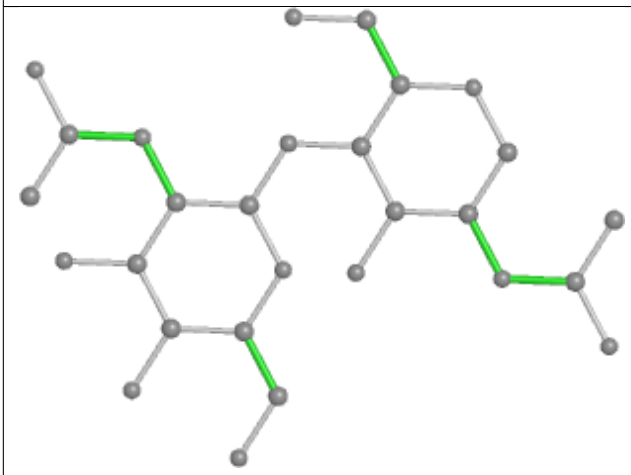
Oligosaccharide Chain I



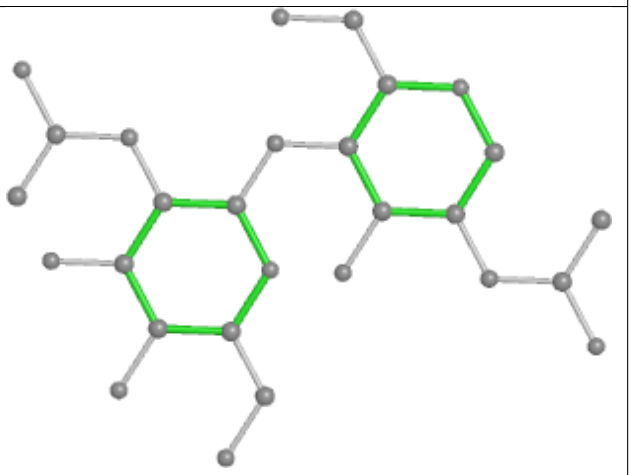
Bond lengths



Bond angles

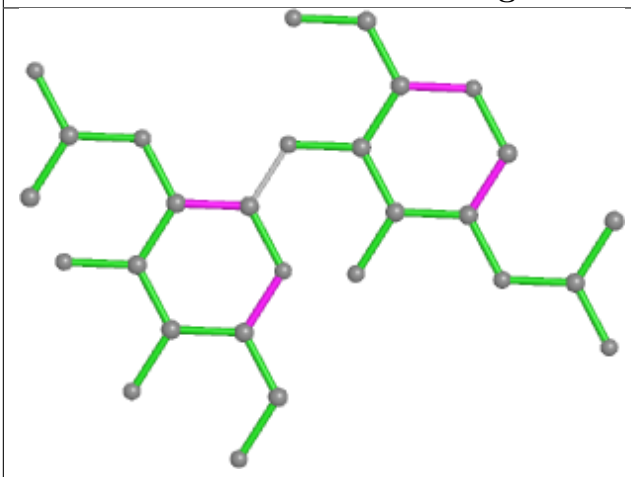


Torsions



Rings

Oligosaccharide Chain J



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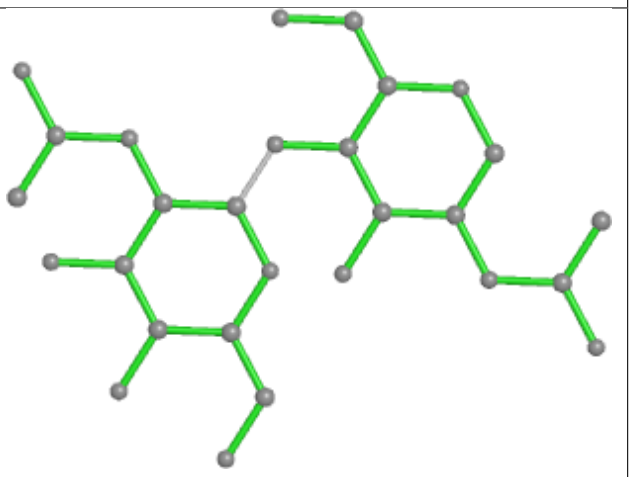
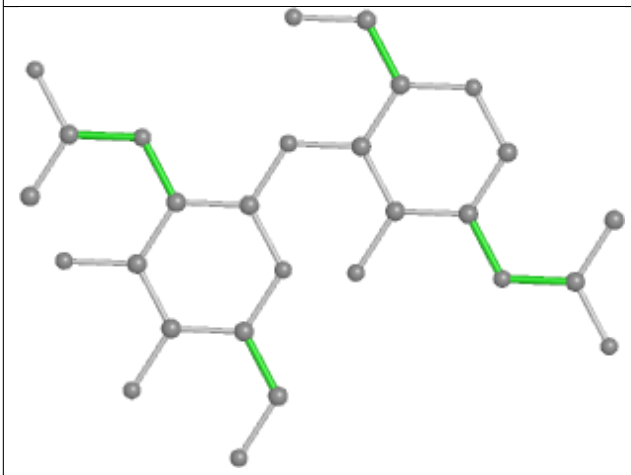
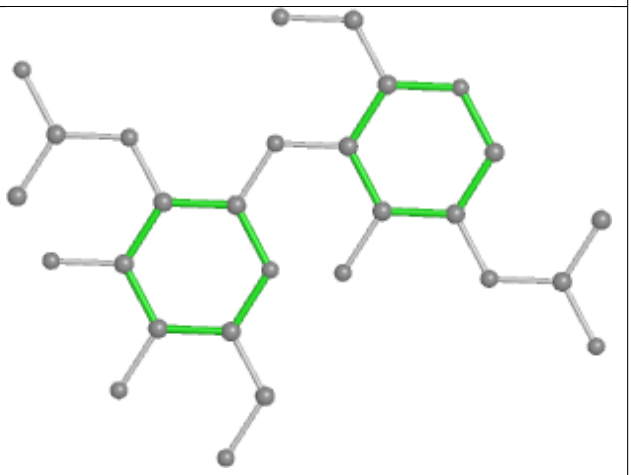


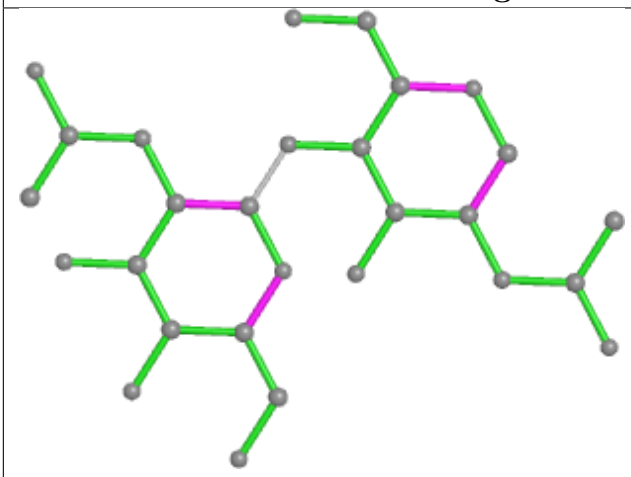
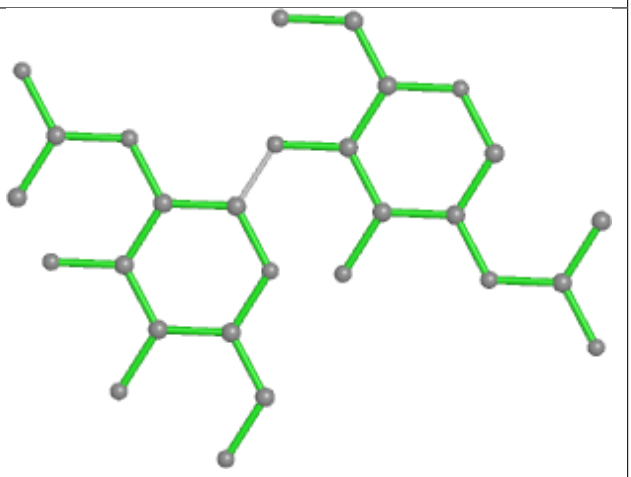
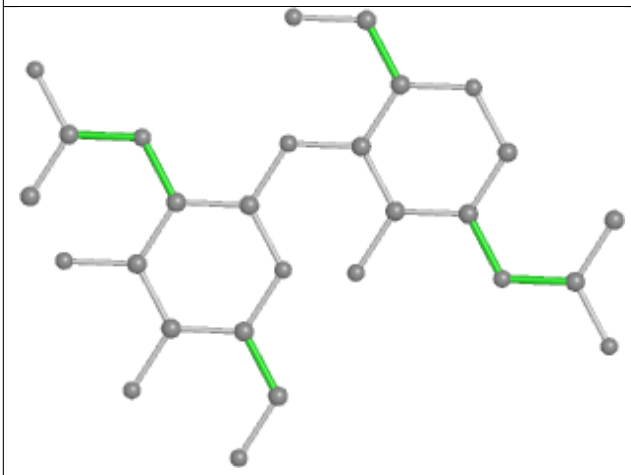
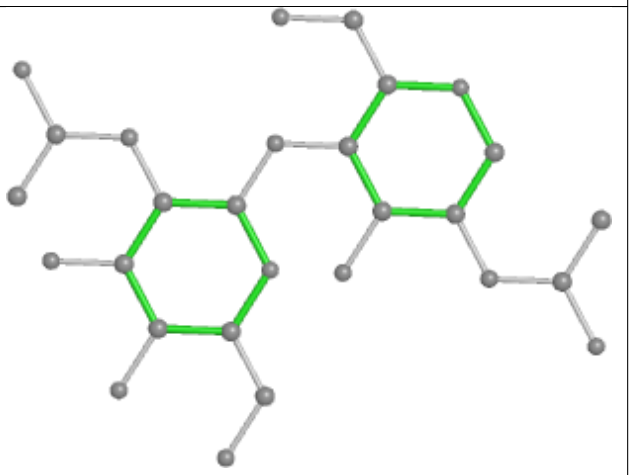
Bond angles

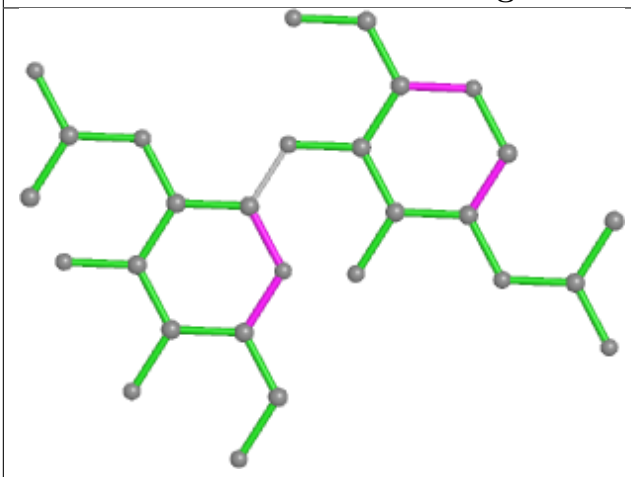
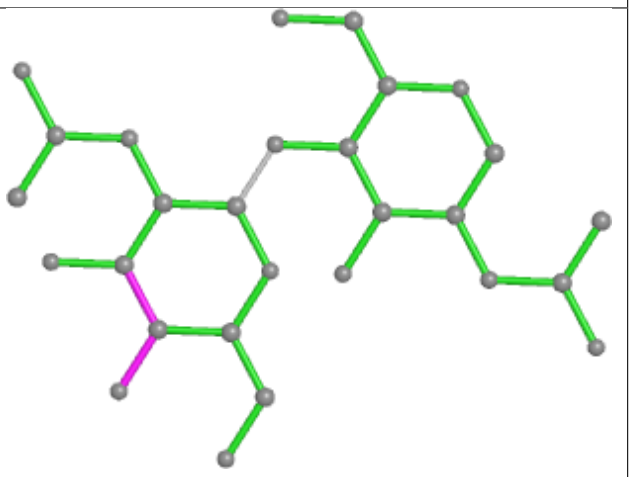
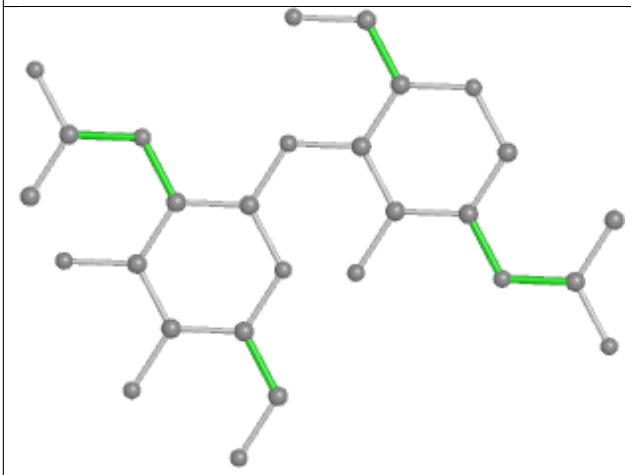
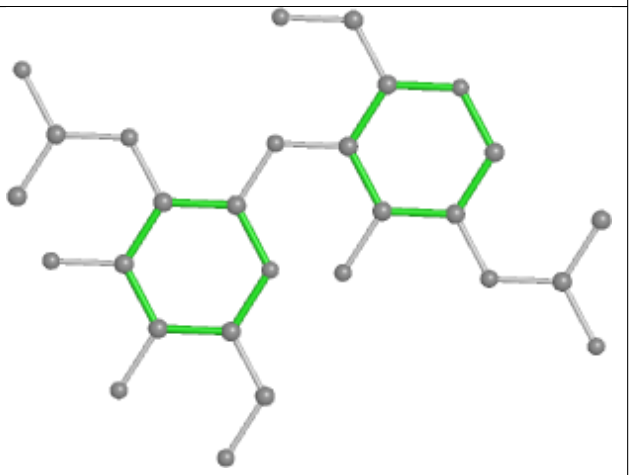


Torsions

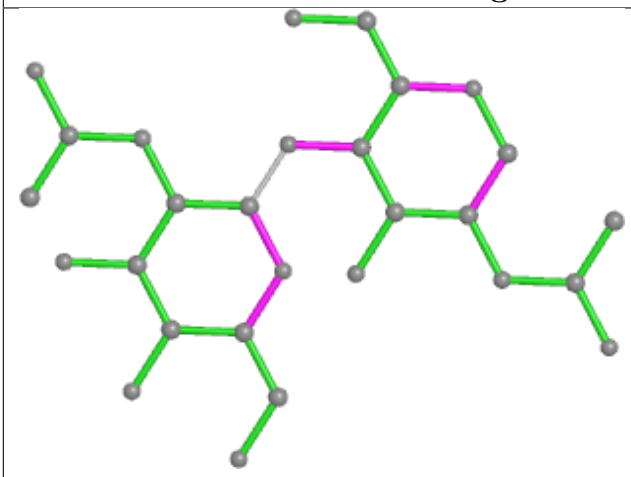


Rings

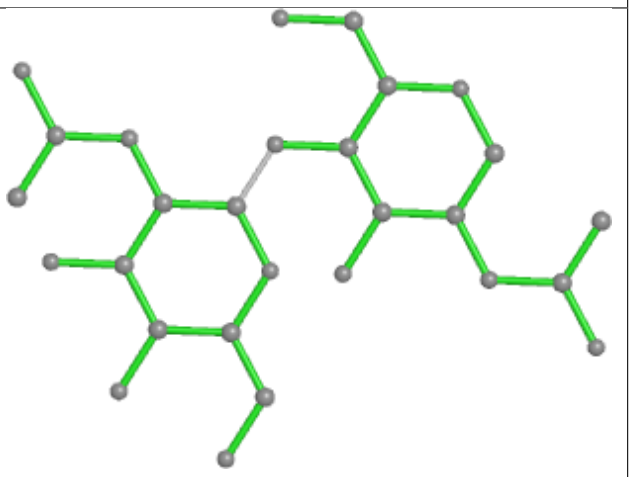
Oligosaccharide Chain K	
 Bond lengths	 Bond angles
 Torsions	 Rings

Oligosaccharide Chain L	
 Bond lengths	 Bond angles
 Torsions	 Rings

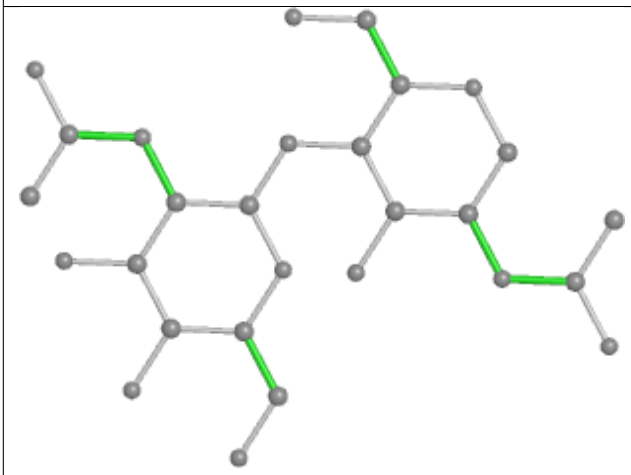
Oligosaccharide Chain M



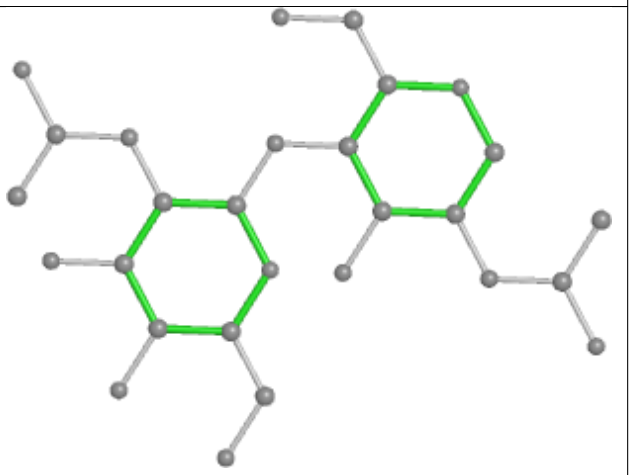
Bond lengths



Bond angles

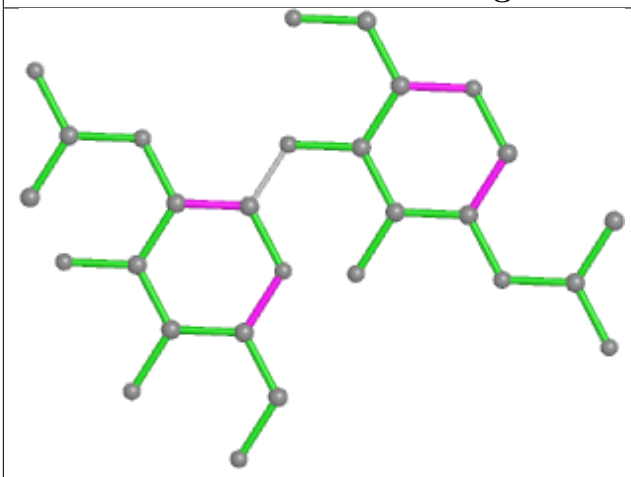


Torsions

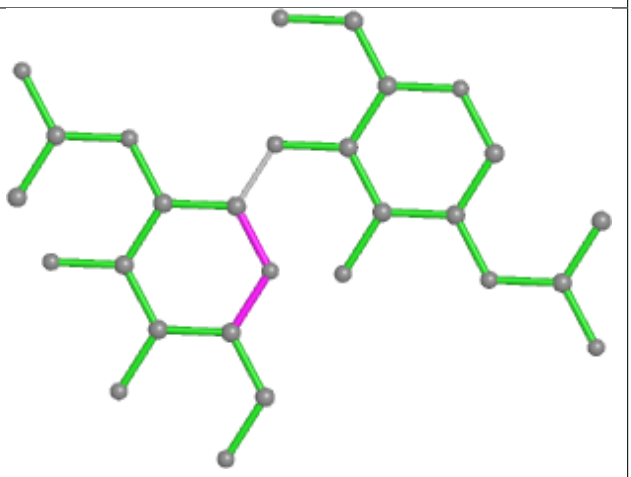


Rings

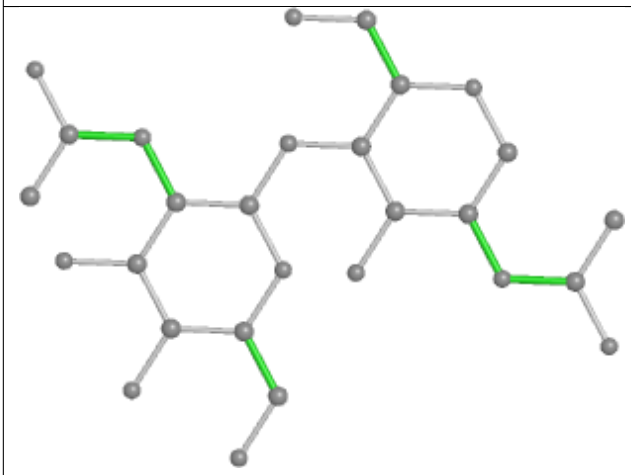
Oligosaccharide Chain N



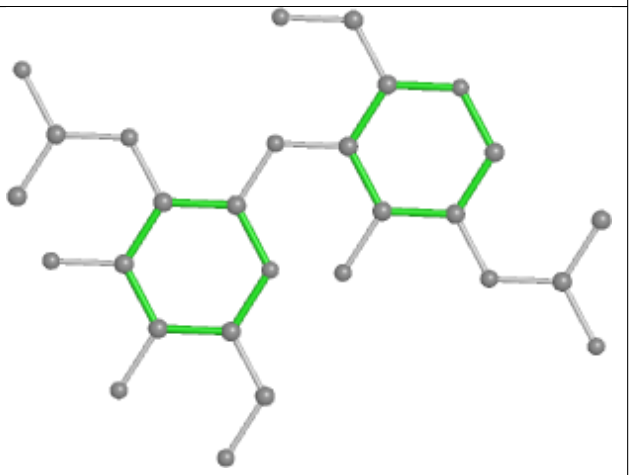
Bond lengths



Bond angles

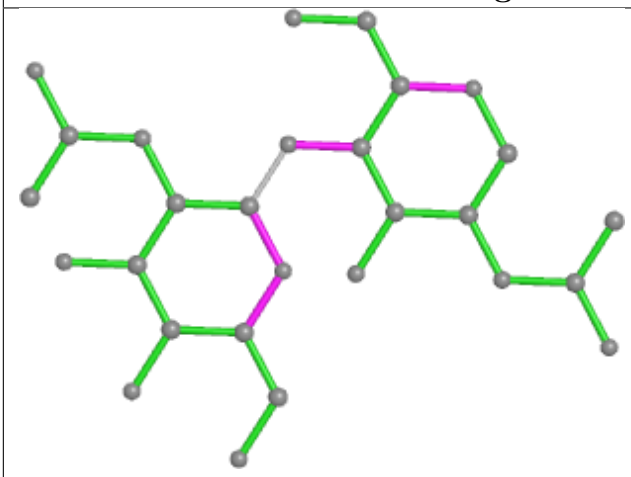


Torsions

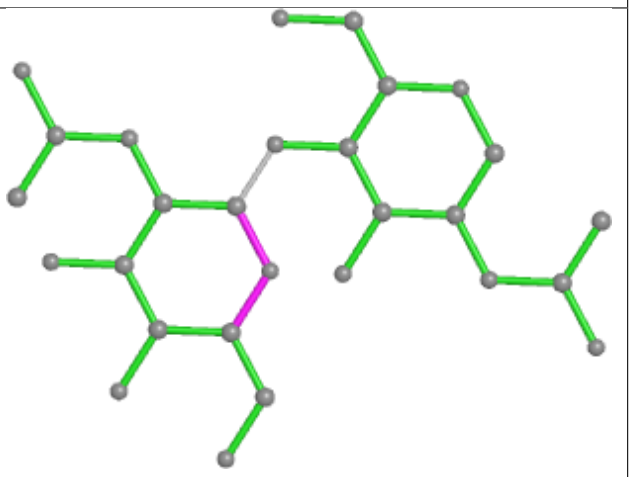


Rings

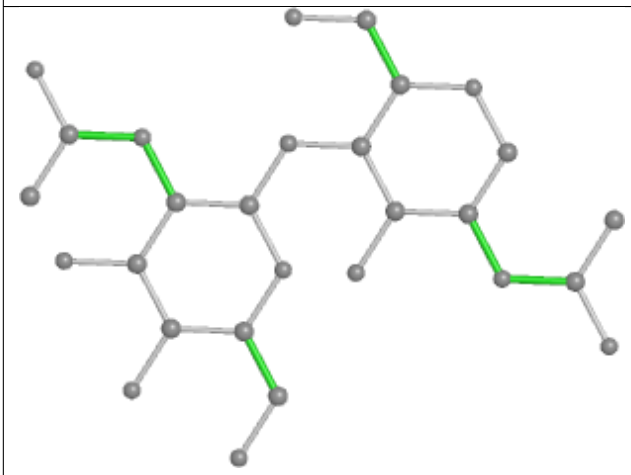
Oligosaccharide Chain O



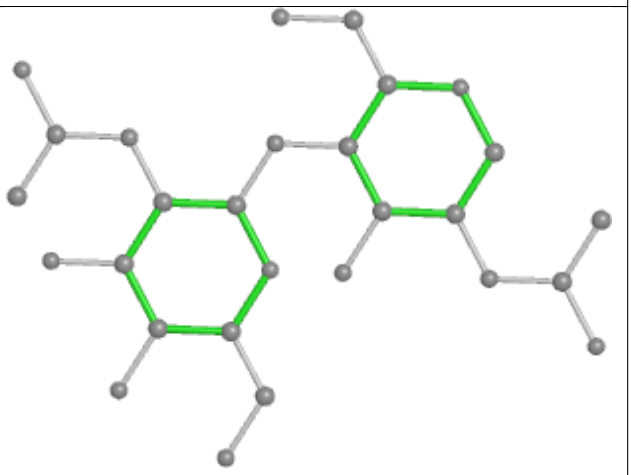
Bond lengths



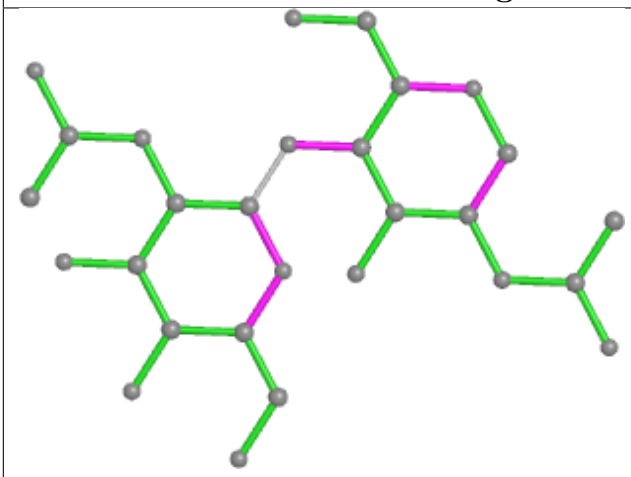
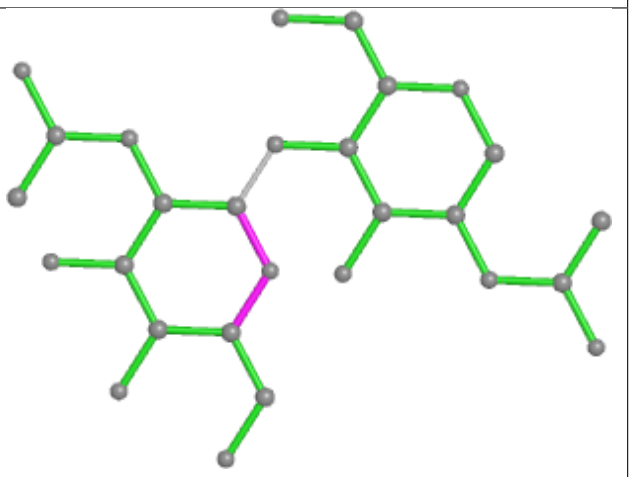
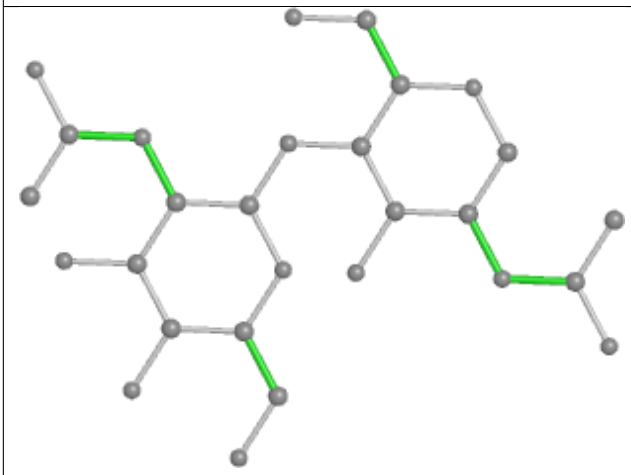
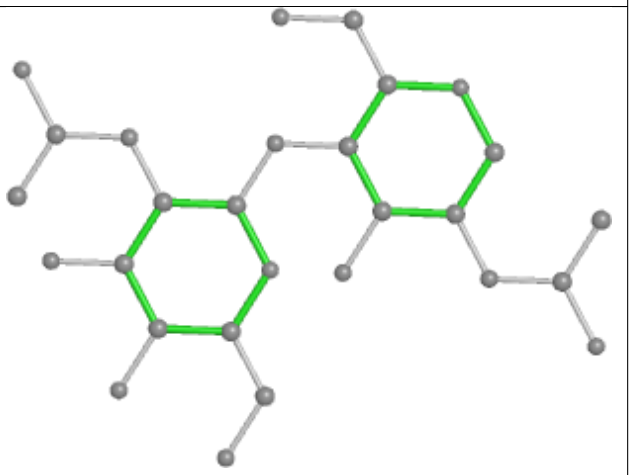
Bond angles



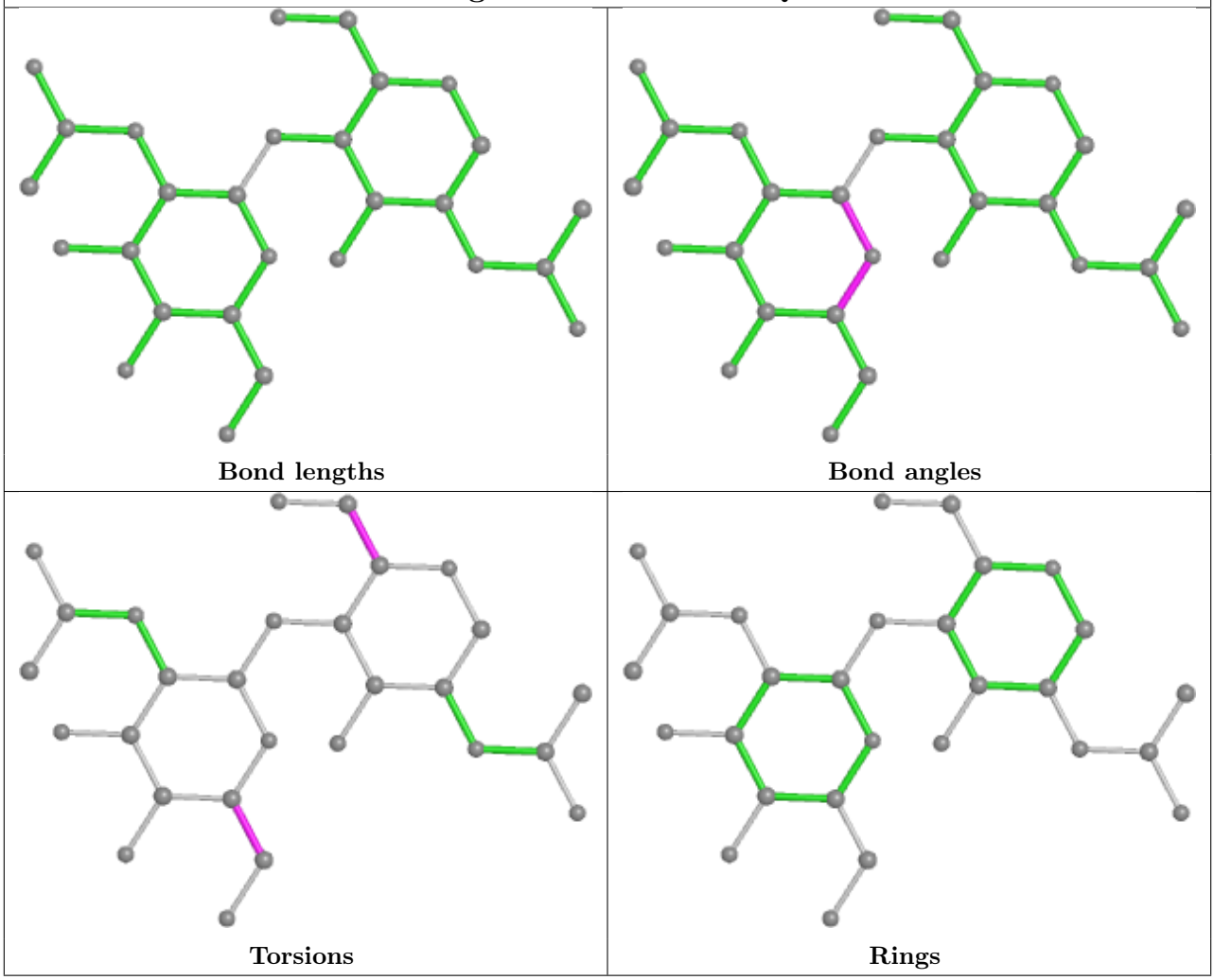
Torsions



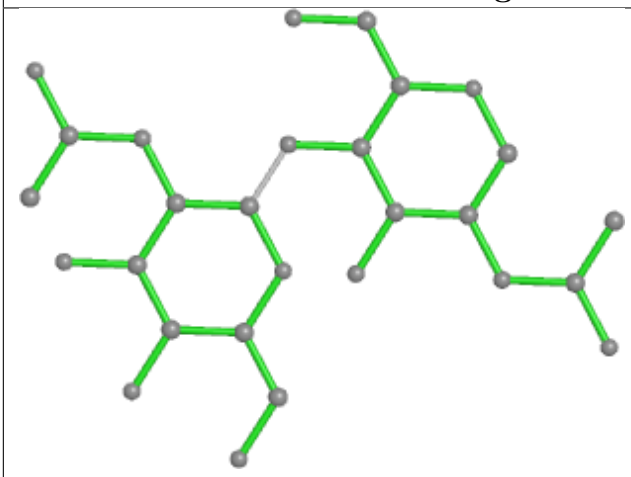
Rings

Oligosaccharide Chain P	
 Bond lengths	 Bond angles
 Torsions	 Rings

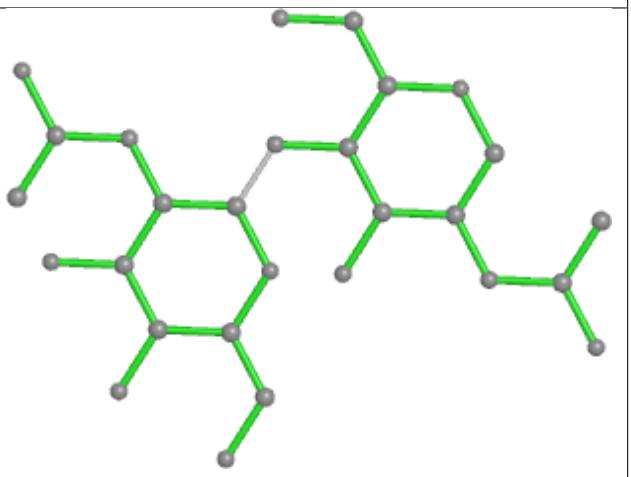
Oligosaccharide Chain Q



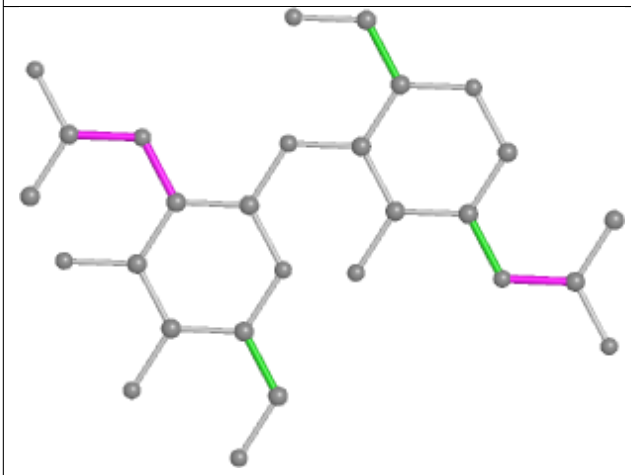
Oligosaccharide Chain R



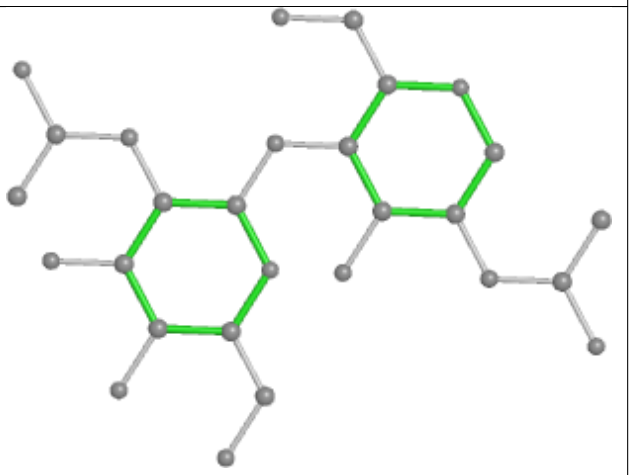
Bond lengths



Bond angles

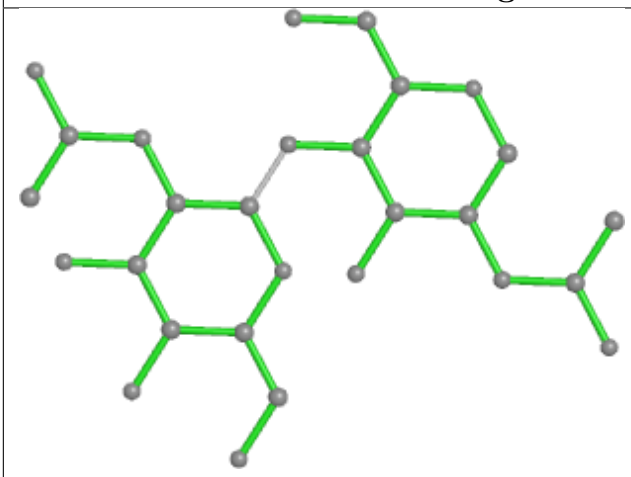


Torsions

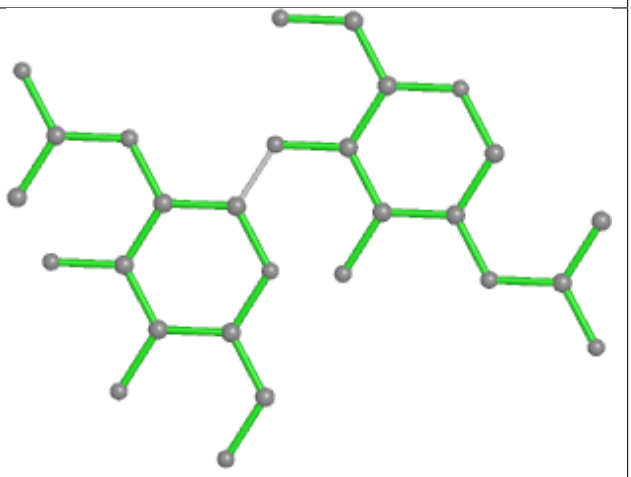


Rings

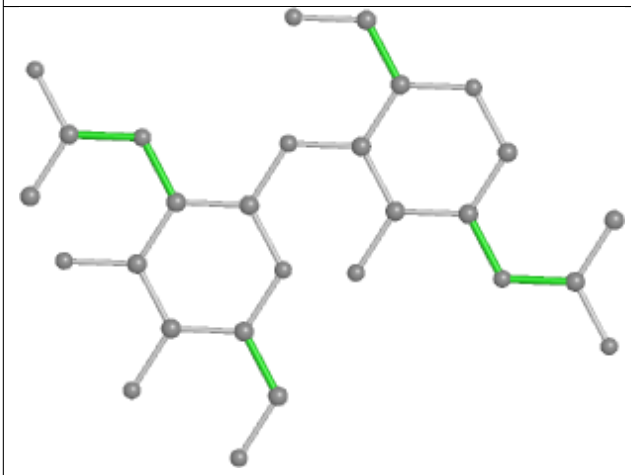
Oligosaccharide Chain S



Bond lengths



Bond angles



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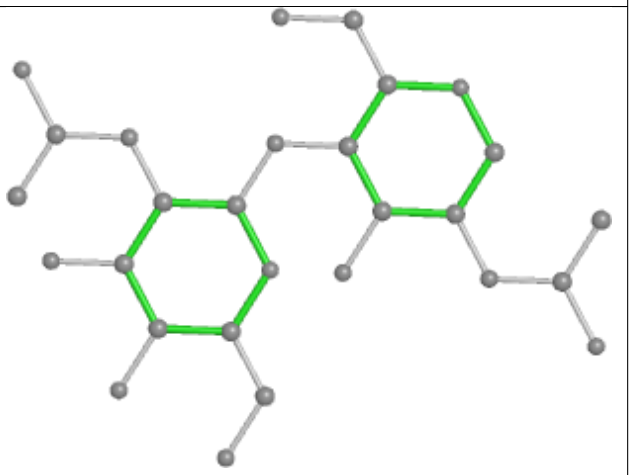
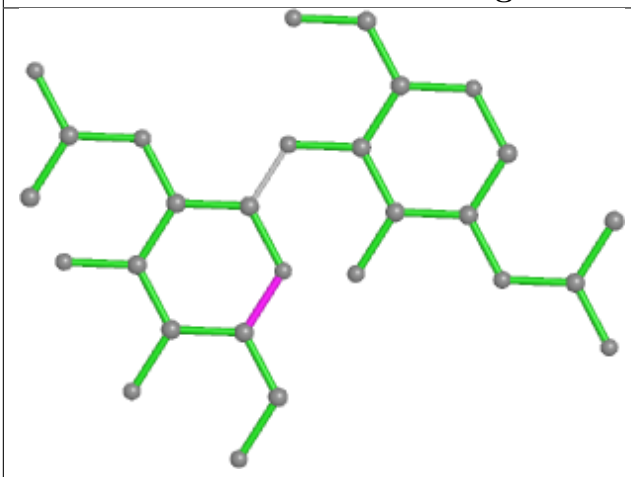
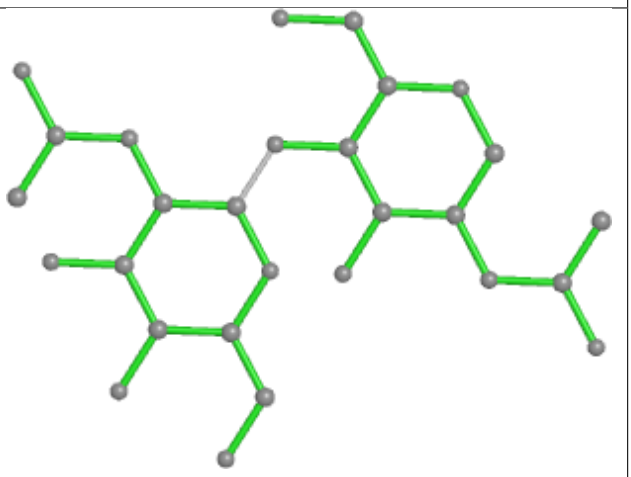
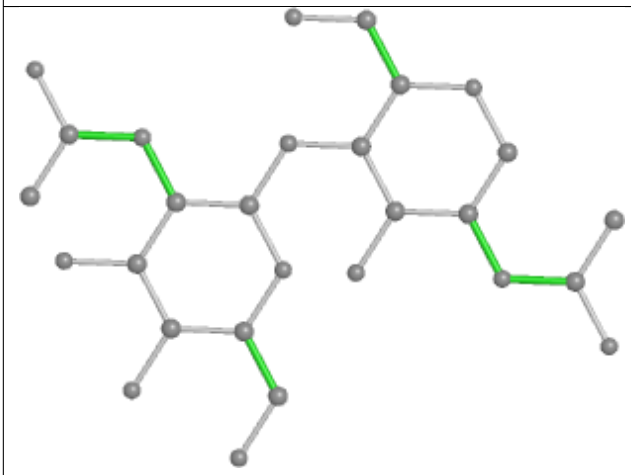
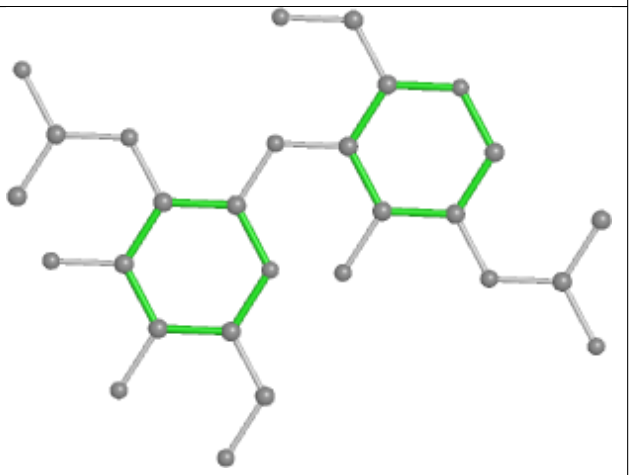
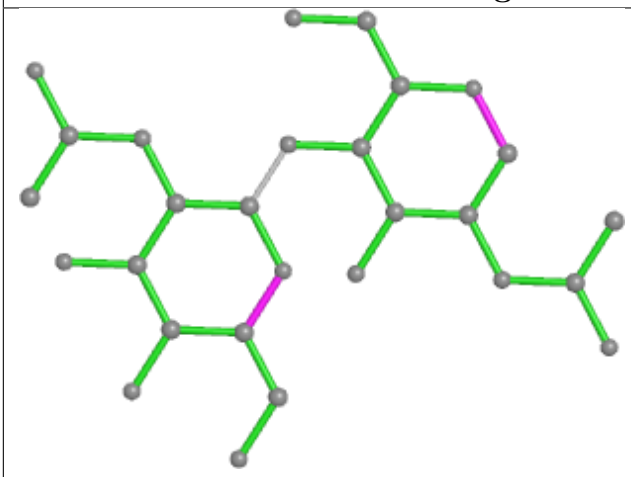


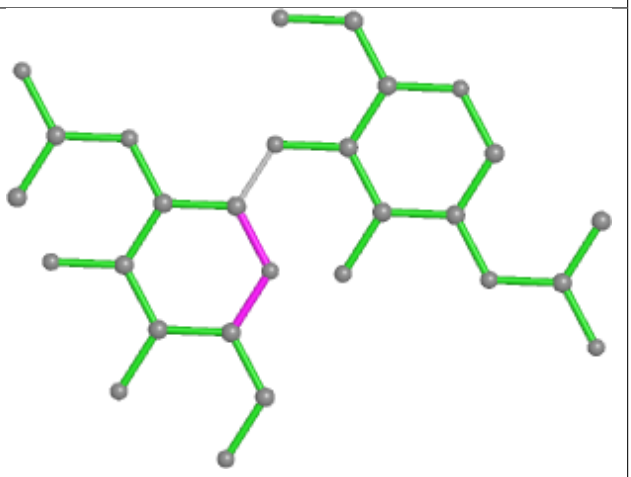
Rings

Oligosaccharide Chain T	
 Bond lengths	 Bond angles
 Torsions	 Rings

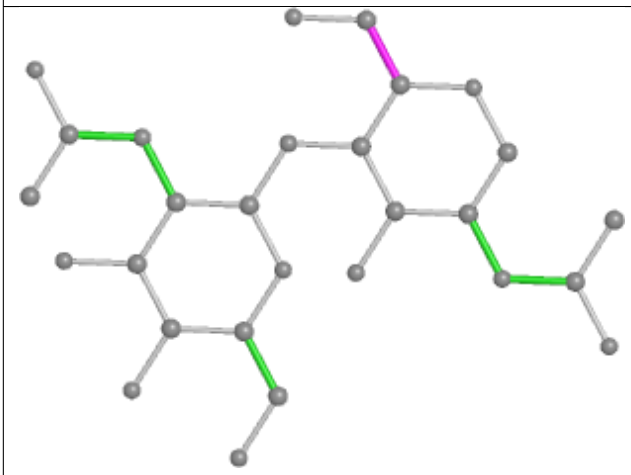
Oligosaccharide Chain U



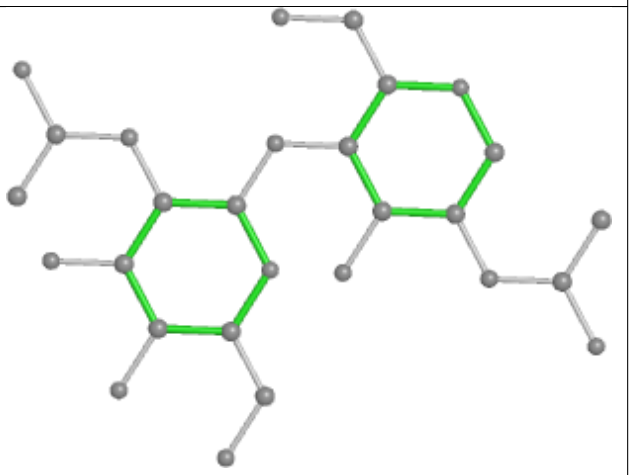
Bond lengths



Bond angles

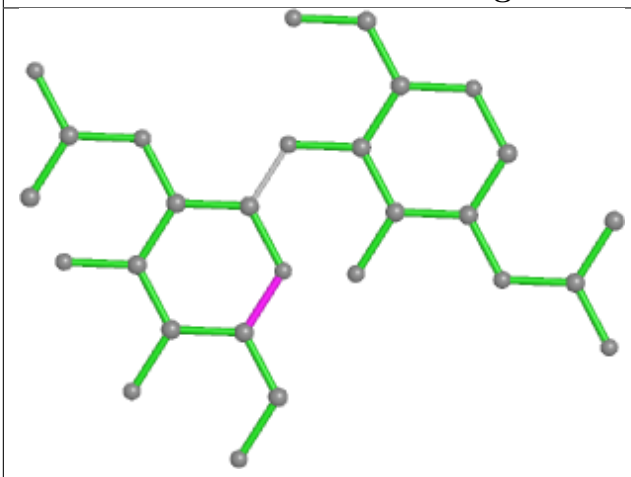


Torsions

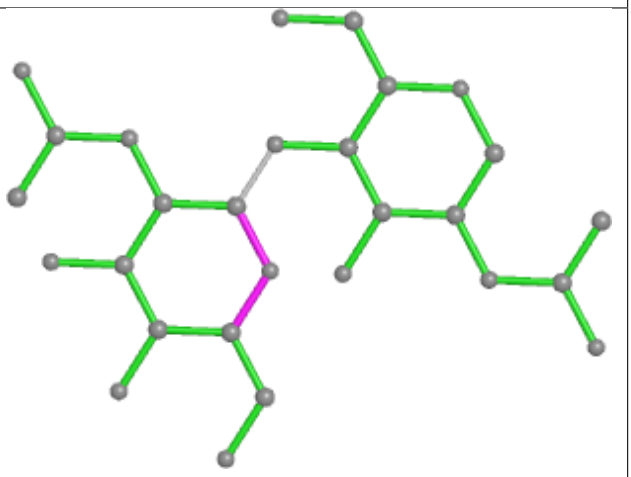


Rings

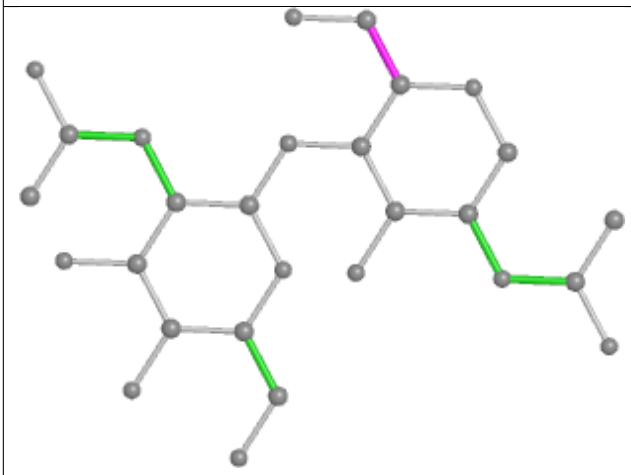
Oligosaccharide Chain V



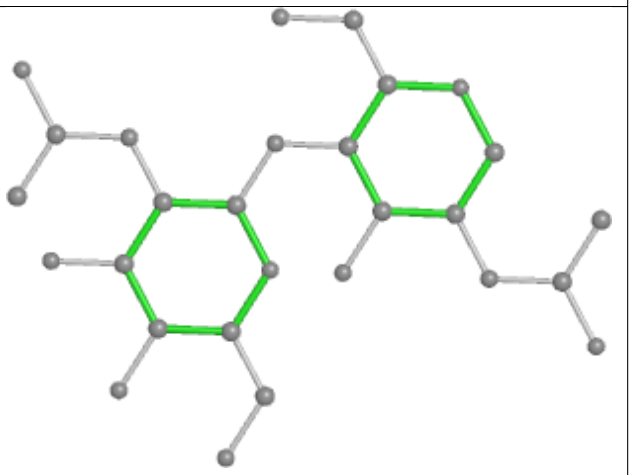
Bond lengths



Bond angles

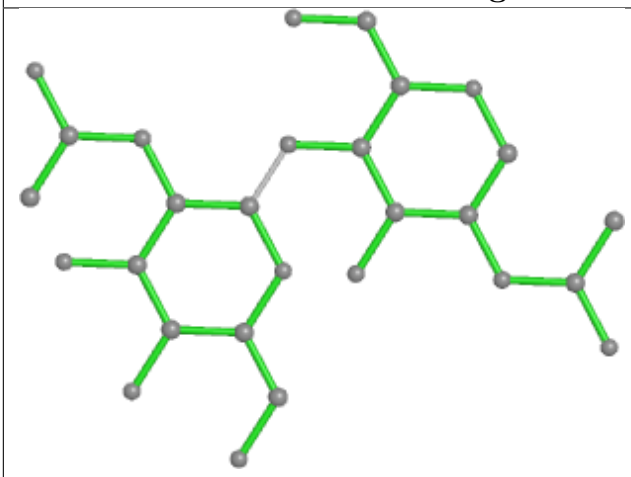


Torsions

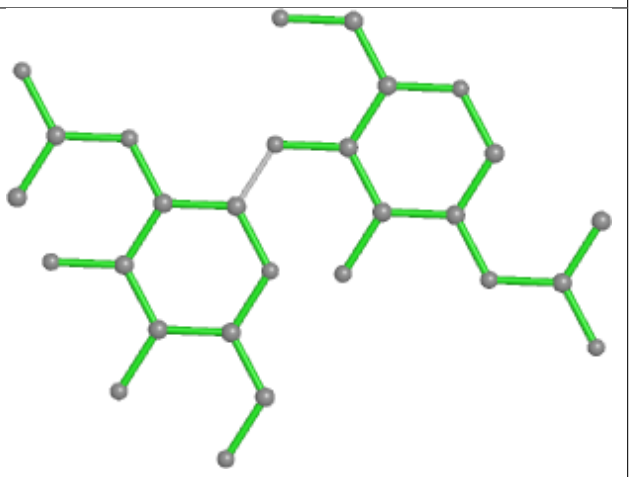


Rings

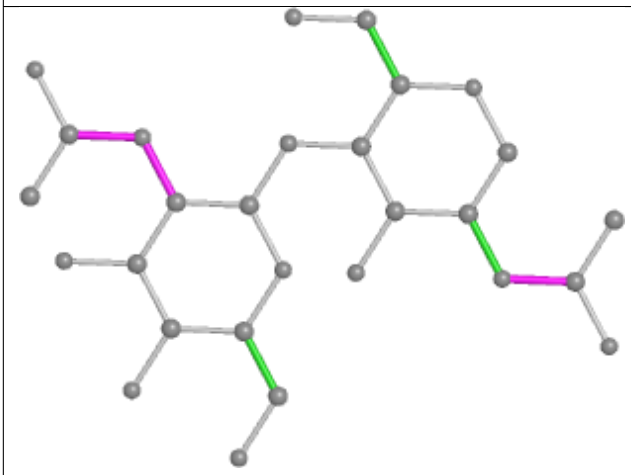
Oligosaccharide Chain W



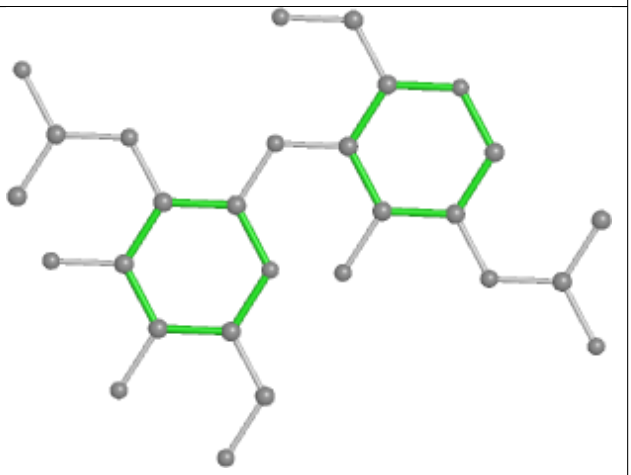
Bond lengths



Bond angles

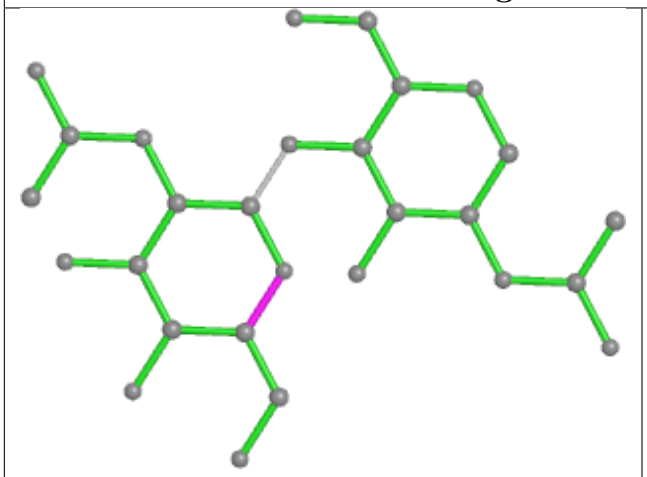


Torsions

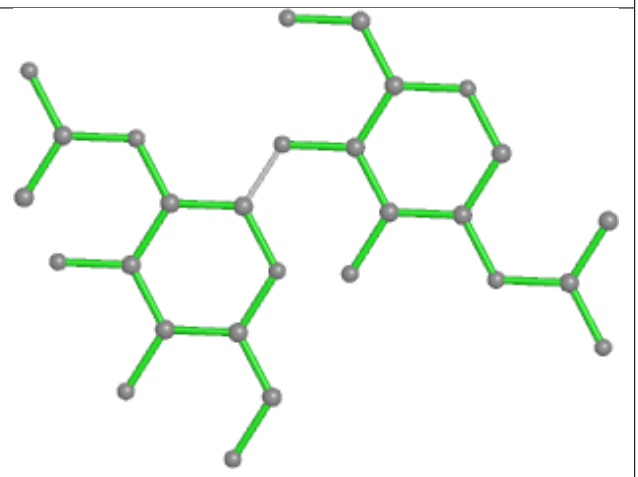


Rings

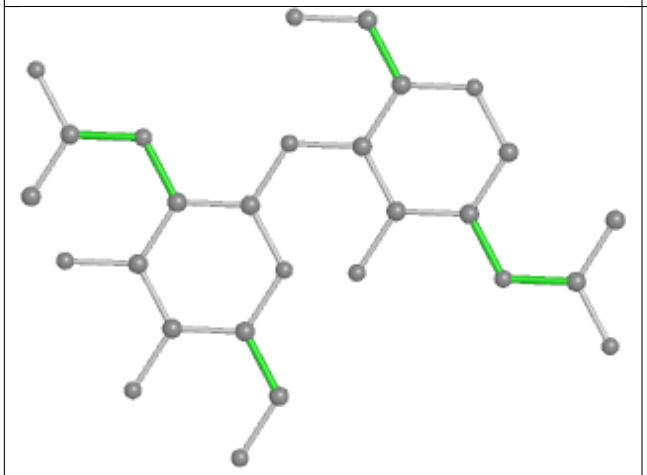
Oligosaccharide Chain X



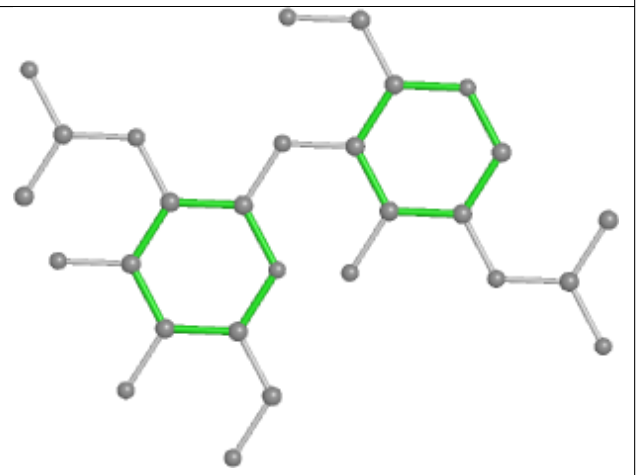
Bond lengths



Bond angles

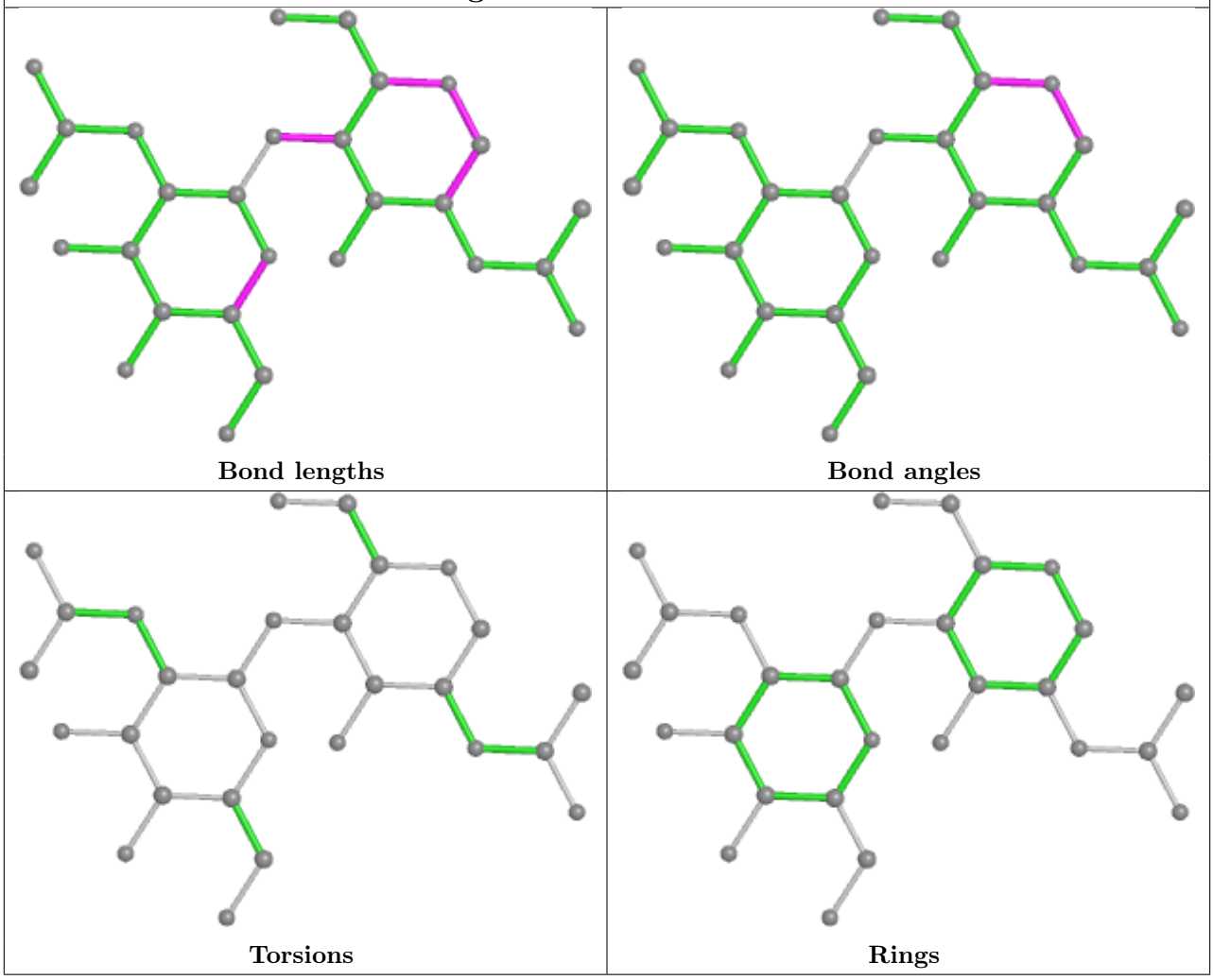


Torsions



Rings

Oligosaccharide Chain Y



5.6 Ligand geometry (i)

40 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	C	1301	1	14,14,15	1.52	2 (14%)	17,19,21	0.64	0
4	NAG	C	1302	-	14,14,15	1.50	2 (14%)	17,19,21	0.70	0
4	NAG	B	1308	1	14,14,15	1.85	3 (21%)	17,19,21	0.91	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
4	NAG	C	1303	-	14,14,15	1.55	2 (14%)	17,19,21	0.70	0
4	NAG	A	1305	-	14,14,15	1.57	2 (14%)	17,19,21	0.70	0
4	NAG	A	1310	-	14,14,15	1.48	3 (21%)	17,19,21	0.63	0
4	NAG	C	1306	-	14,14,15	1.53	2 (14%)	17,19,21	0.69	0
4	NAG	A	1304	1	14,14,15	1.53	2 (14%)	17,19,21	0.69	0
4	NAG	A	1313	-	14,14,15	1.57	3 (21%)	17,19,21	0.73	0
4	NAG	A	1303	-	14,14,15	1.55	2 (14%)	17,19,21	0.65	0
4	NAG	B	1303	-	14,14,15	1.47	3 (21%)	17,19,21	0.64	0
4	NAG	A	1301	1	14,14,15	1.56	2 (14%)	17,19,21	0.64	0
4	NAG	B	1302	1	14,14,15	1.60	2 (14%)	17,19,21	0.71	0
4	NAG	D	701	-	14,14,15	0.39	0	17,19,21	0.58	0
4	NAG	B	1305	1	14,14,15	1.52	2 (14%)	17,19,21	0.68	0
4	NAG	B	1309	1	14,14,15	1.40	3 (21%)	17,19,21	0.86	1 (5%)
4	NAG	C	1312	-	14,14,15	1.50	2 (14%)	17,19,21	0.71	0
4	NAG	B	1312	-	14,14,15	1.65	2 (14%)	17,19,21	0.88	1 (5%)
4	NAG	B	1306	-	14,14,15	1.61	3 (21%)	17,19,21	0.71	0
4	NAG	C	1308	1	14,14,15	1.33	2 (14%)	17,19,21	1.38	1 (5%)
4	NAG	C	1305	-	14,14,15	1.59	2 (14%)	17,19,21	0.63	0
4	NAG	A	1302	-	14,14,15	1.83	3 (21%)	17,19,21	0.89	0
4	NAG	A	1309	-	14,14,15	1.57	2 (14%)	17,19,21	0.70	0
4	NAG	B	1301	-	14,14,15	0.29	0	17,19,21	0.62	0
4	NAG	A	1312	1	14,14,15	1.50	2 (14%)	17,19,21	0.69	0
4	NAG	B	1310	-	14,14,15	1.51	2 (14%)	17,19,21	0.69	0
4	NAG	A	1308	-	14,14,15	1.53	2 (14%)	17,19,21	0.63	0
4	NAG	C	1304	1	14,14,15	1.56	2 (14%)	17,19,21	0.71	0
4	NAG	C	1311	1	14,14,15	1.52	2 (14%)	17,19,21	0.67	0
4	NAG	B	1311	1	14,14,15	2.05	1 (7%)	17,19,21	2.07	1 (5%)
4	NAG	A	1306	1	14,14,15	1.68	4 (28%)	17,19,21	0.90	1 (5%)
4	NAG	C	1307	-	14,14,15	1.55	2 (14%)	17,19,21	0.70	0
4	NAG	E	701	-	14,14,15	0.38	0	17,19,21	0.58	0
4	NAG	C	1309	-	14,14,15	1.61	2 (14%)	17,19,21	0.65	0
4	NAG	A	1307	1	14,14,15	1.51	2 (14%)	17,19,21	0.66	0
4	NAG	B	1307	-	14,14,15	1.53	2 (14%)	17,19,21	0.66	0
4	NAG	C	1310	-	14,14,15	1.47	2 (14%)	17,19,21	0.68	0
4	NAG	B	1304	1	14,14,15	1.55	2 (14%)	17,19,21	0.90	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
4	NAG	B	1313	-	14,14,15	1.54	2 (14%)	17,19,21	0.62	0
4	NAG	A	1311	-	14,14,15	1.49	2 (14%)	17,19,21	0.79	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	C	1301	1	-	0/6/23/26	0/1/1/1
4	NAG	C	1302	-	-	0/6/23/26	0/1/1/1
4	NAG	B	1308	1	-	0/6/23/26	0/1/1/1
4	NAG	C	1303	-	-	0/6/23/26	0/1/1/1
4	NAG	A	1305	-	-	0/6/23/26	0/1/1/1
4	NAG	A	1310	-	-	0/6/23/26	0/1/1/1
4	NAG	C	1306	-	-	0/6/23/26	0/1/1/1
4	NAG	A	1304	1	-	0/6/23/26	0/1/1/1
4	NAG	A	1313	-	-	0/6/23/26	0/1/1/1
4	NAG	A	1303	-	-	0/6/23/26	0/1/1/1
4	NAG	B	1303	-	-	0/6/23/26	0/1/1/1
4	NAG	A	1301	1	-	0/6/23/26	0/1/1/1
4	NAG	B	1302	1	-	0/6/23/26	0/1/1/1
4	NAG	D	701	-	-	2/6/23/26	0/1/1/1
4	NAG	B	1305	1	-	0/6/23/26	0/1/1/1
4	NAG	B	1309	1	-	2/6/23/26	0/1/1/1
4	NAG	C	1312	-	-	0/6/23/26	0/1/1/1
4	NAG	B	1312	-	-	2/6/23/26	0/1/1/1
4	NAG	B	1306	-	-	0/6/23/26	0/1/1/1
4	NAG	C	1308	1	-	0/6/23/26	0/1/1/1
4	NAG	C	1305	-	-	0/6/23/26	0/1/1/1
4	NAG	A	1302	-	-	0/6/23/26	0/1/1/1
4	NAG	A	1309	-	-	0/6/23/26	0/1/1/1
4	NAG	B	1301	-	-	0/6/23/26	0/1/1/1
4	NAG	A	1312	1	-	0/6/23/26	0/1/1/1
4	NAG	B	1310	-	-	0/6/23/26	0/1/1/1
4	NAG	A	1308	-	-	0/6/23/26	0/1/1/1
4	NAG	C	1304	1	-	0/6/23/26	0/1/1/1
4	NAG	C	1311	1	-	0/6/23/26	0/1/1/1
4	NAG	B	1311	1	-	2/6/23/26	0/1/1/1
4	NAG	A	1306	1	-	2/6/23/26	0/1/1/1
4	NAG	C	1307	-	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	E	701	-	-	2/6/23/26	0/1/1/1
4	NAG	C	1309	-	-	0/6/23/26	0/1/1/1
4	NAG	A	1307	1	-	0/6/23/26	0/1/1/1
4	NAG	B	1307	-	-	0/6/23/26	0/1/1/1
4	NAG	C	1310	-	-	0/6/23/26	0/1/1/1
4	NAG	B	1304	1	-	0/6/23/26	0/1/1/1
4	NAG	B	1313	-	-	0/6/23/26	0/1/1/1
4	NAG	A	1311	-	-	1/6/23/26	0/1/1/1

The worst 5 of 82 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	1311	NAG	C1-C2	7.61	1.63	1.52
4	B	1308	NAG	C1-C2	5.20	1.60	1.52
4	A	1302	NAG	C1-C2	5.10	1.60	1.52
4	B	1302	NAG	C1-C2	4.47	1.59	1.52
4	A	1305	NAG	C1-C2	4.44	1.59	1.52

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	B	1311	NAG	O5-C1-C2	-8.23	98.30	111.29
4	C	1308	NAG	C1-O5-C5	4.91	118.85	112.19
4	B	1309	NAG	C1-O5-C5	2.56	115.67	112.19
4	A	1306	NAG	O5-C1-C2	-2.42	107.47	111.29
4	B	1312	NAG	O5-C1-C2	-2.35	107.57	111.29

There are no chirality outliers.

5 of 13 torsion outliers are listed below:

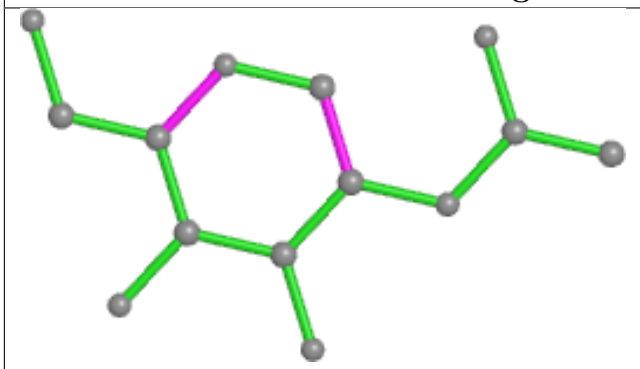
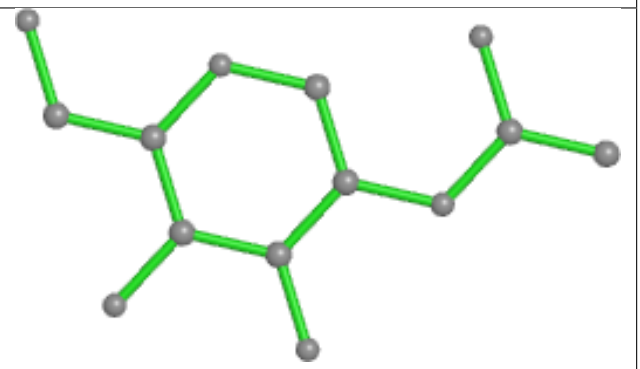
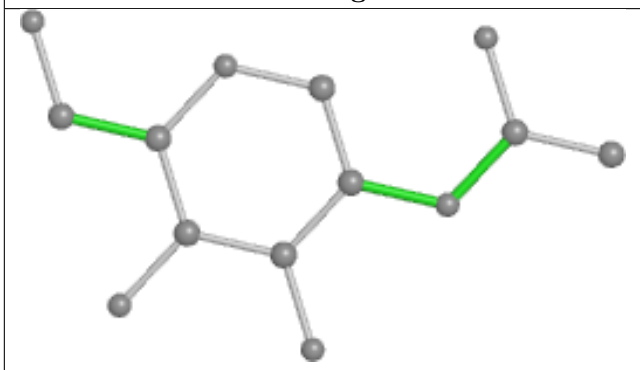
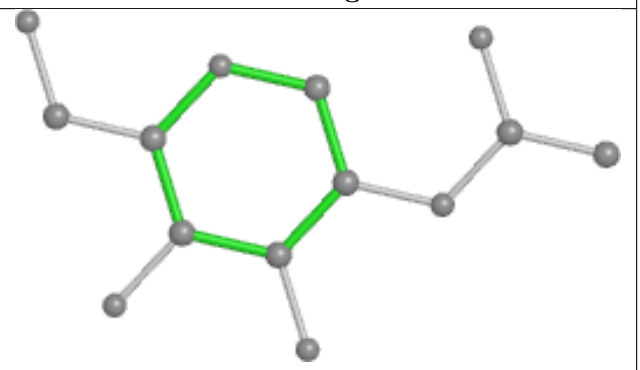
Mol	Chain	Res	Type	Atoms
4	A	1306	NAG	O5-C5-C6-O6
4	B	1312	NAG	O5-C5-C6-O6
4	B	1312	NAG	C4-C5-C6-O6
4	A	1306	NAG	C4-C5-C6-O6
4	D	701	NAG	O5-C5-C6-O6

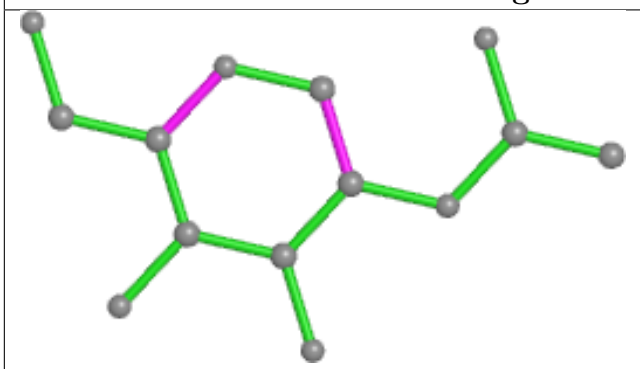
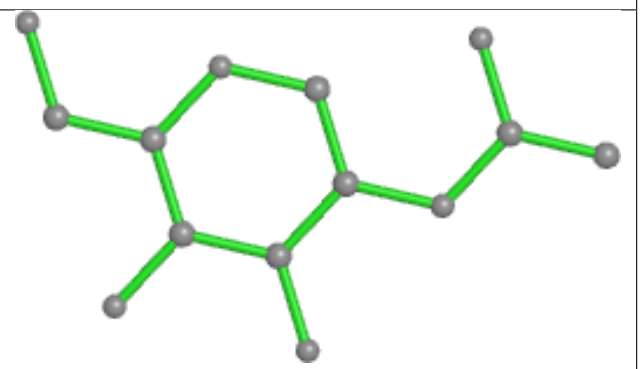
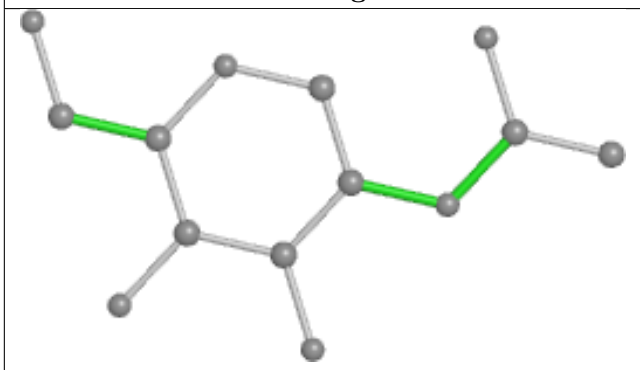
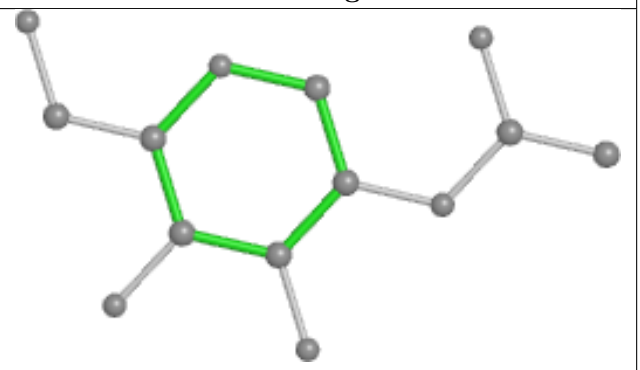
There are no ring outliers.

22 monomers are involved in 82 short contacts:

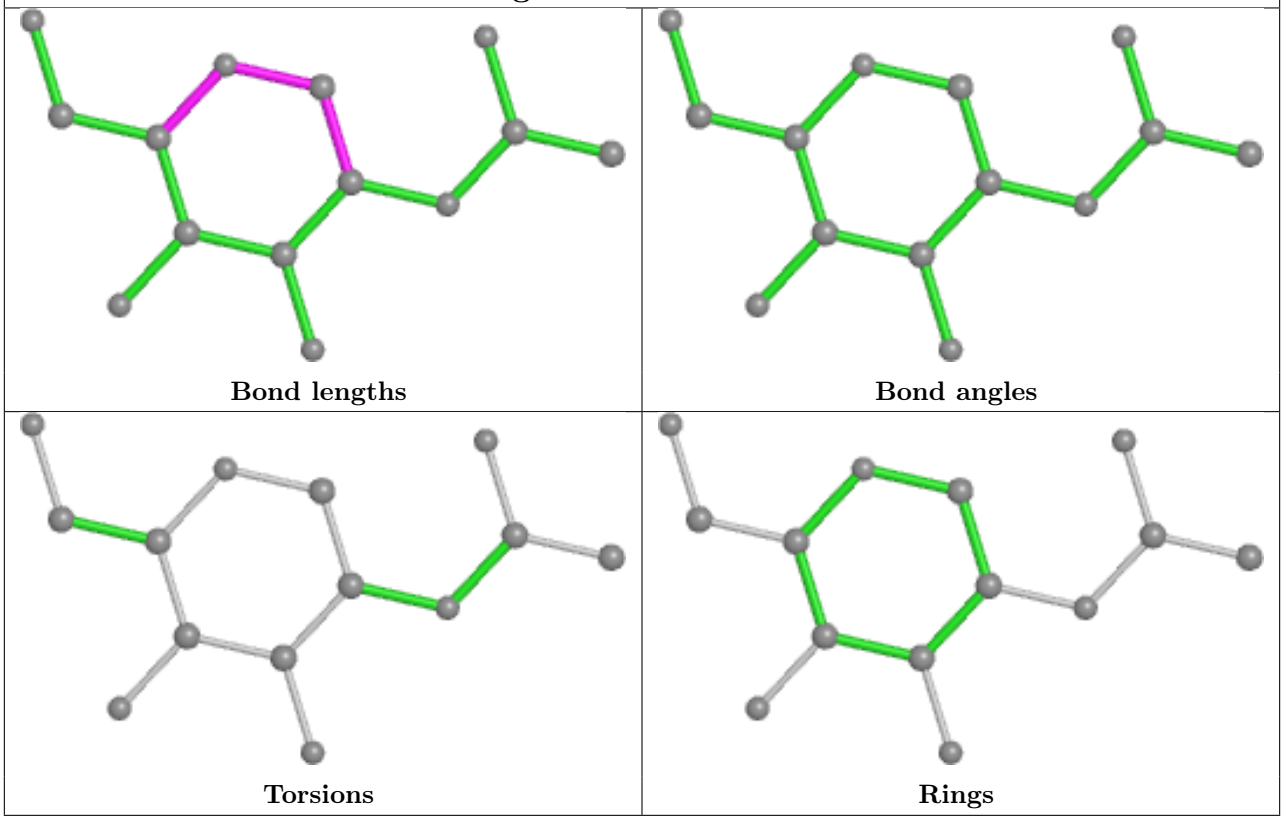
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	1302	NAG	3	0
4	C	1303	NAG	4	0
4	A	1305	NAG	4	0
4	A	1310	NAG	4	0
4	C	1306	NAG	6	0
4	A	1313	NAG	6	0
4	A	1303	NAG	2	0
4	B	1303	NAG	5	0
4	A	1301	NAG	2	0
4	B	1305	NAG	2	0
4	C	1312	NAG	2	0
4	B	1312	NAG	3	0
4	B	1306	NAG	3	0
4	C	1305	NAG	3	0
4	A	1302	NAG	5	0
4	A	1309	NAG	4	0
4	B	1301	NAG	5	0
4	A	1312	NAG	4	0
4	B	1310	NAG	1	0
4	A	1308	NAG	5	0
4	C	1307	NAG	4	0
4	B	1313	NAG	5	0

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

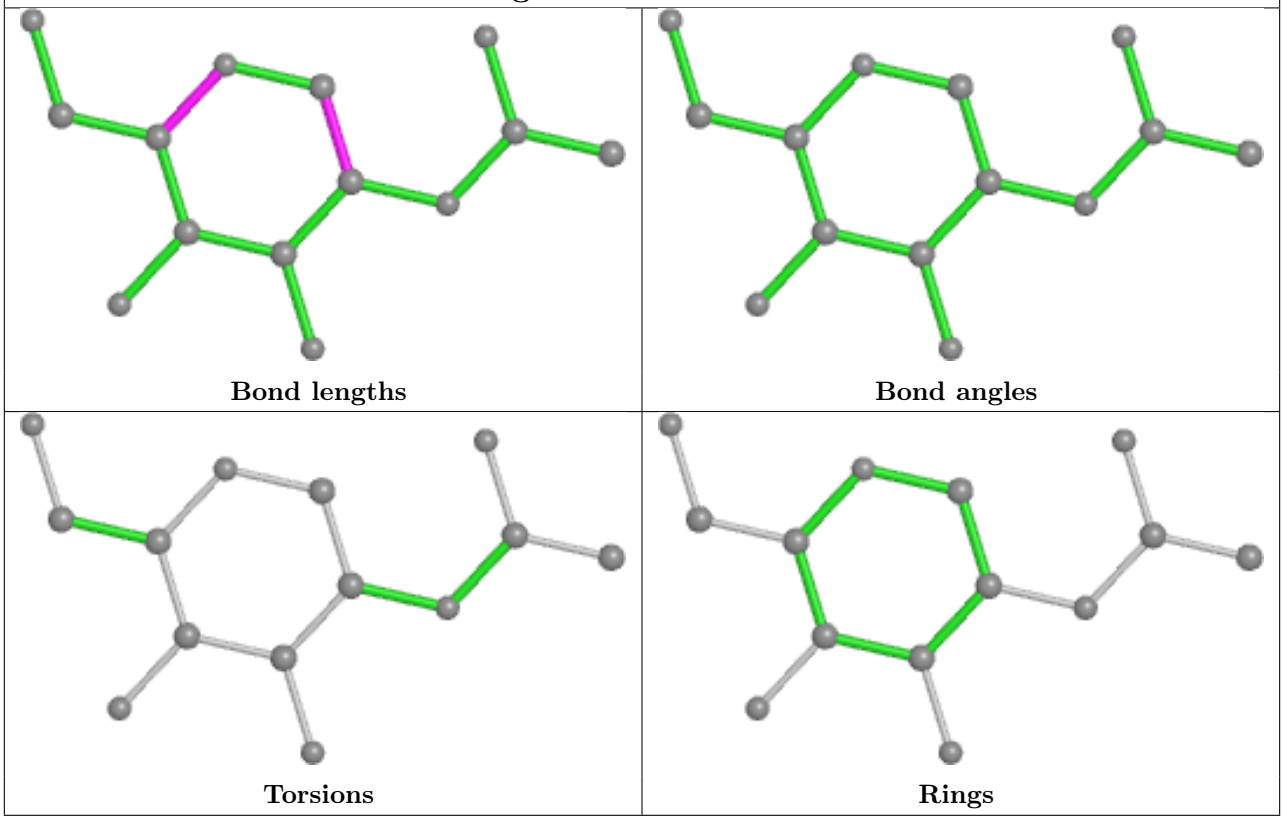
Ligand NAG C 1301	
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand NAG C 1302	
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand NAG B 1308



Ligand NAG C 1303



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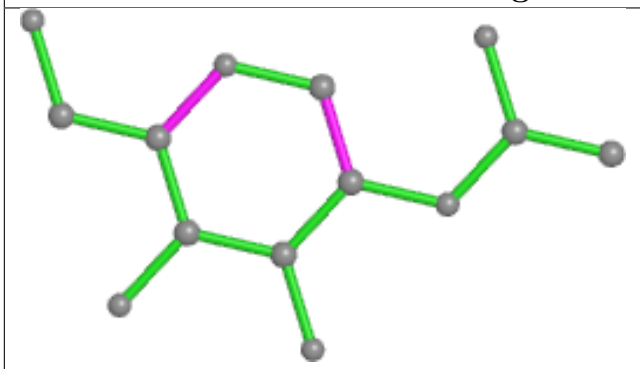
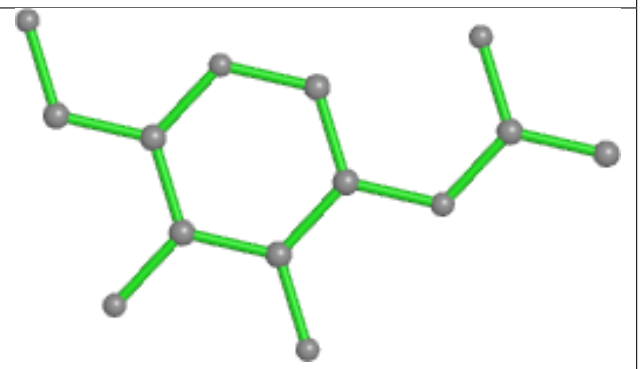
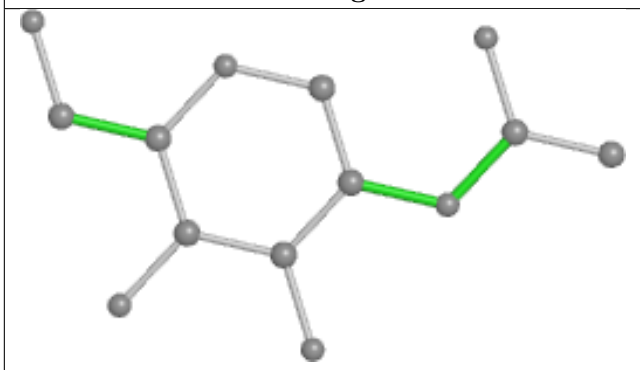
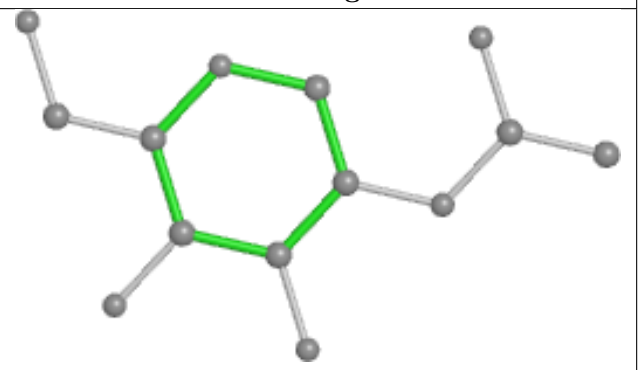
 Bond lengths	 Bond angles
 Torsions	 Rings

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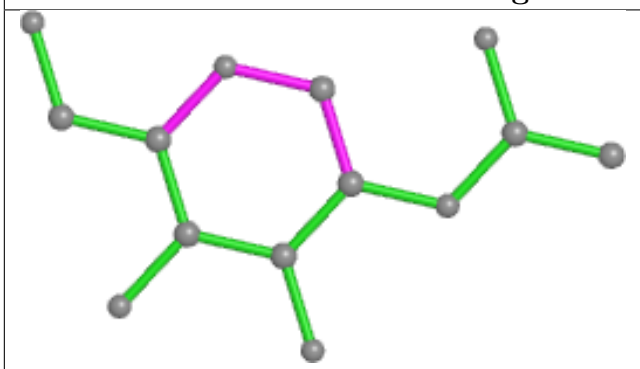
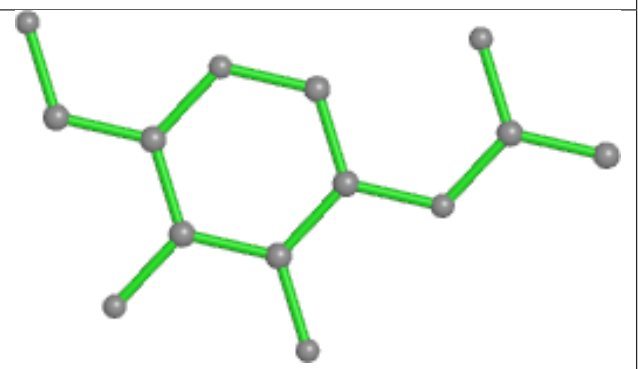
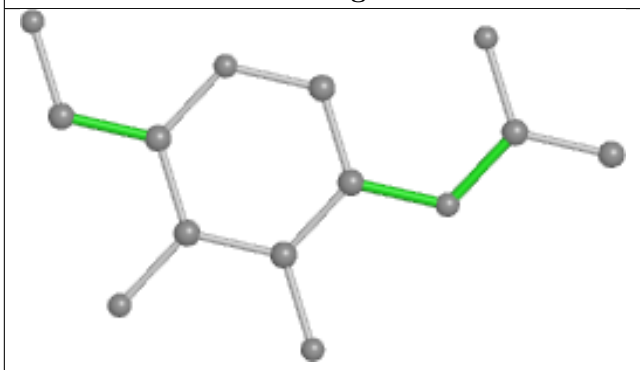
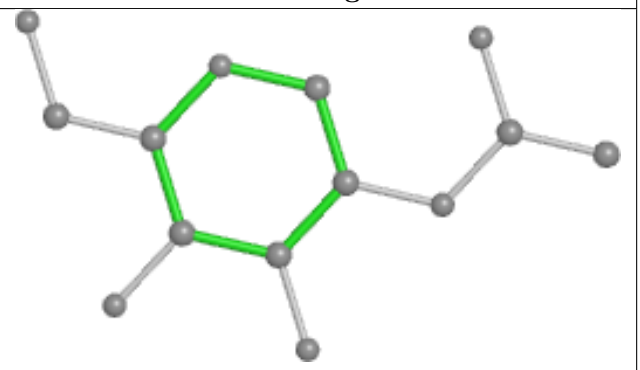
 Bond lengths	 Bond angles
 Torsions	 Rings

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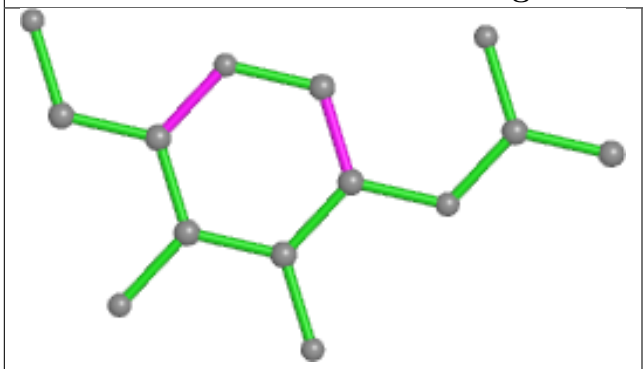
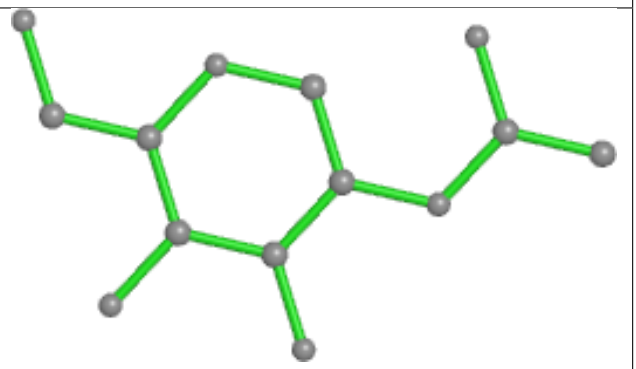
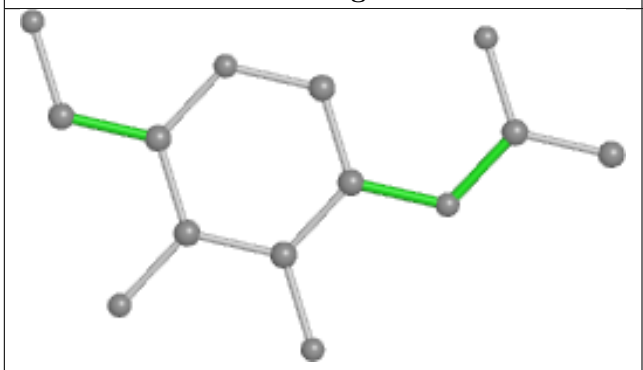


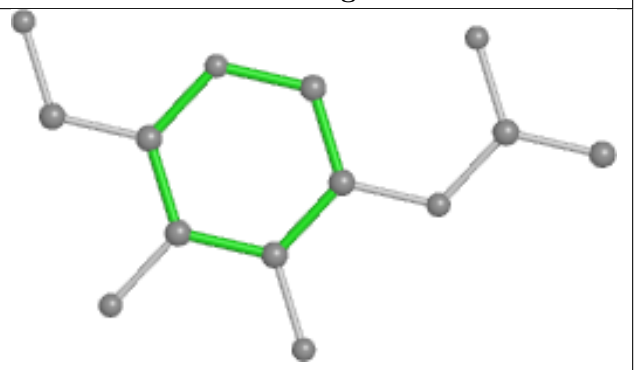
Bond lengths



Bond angles

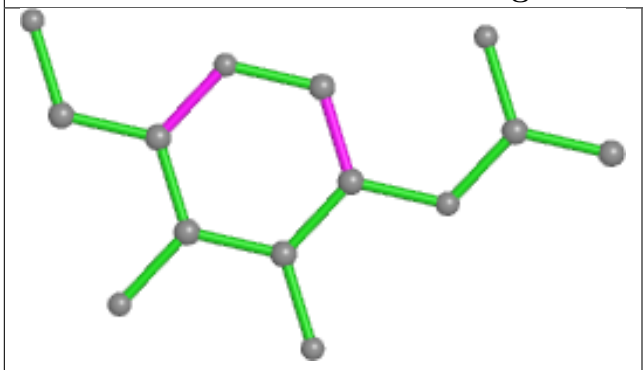


Torsions



Rings

Ligand NAG A 1304



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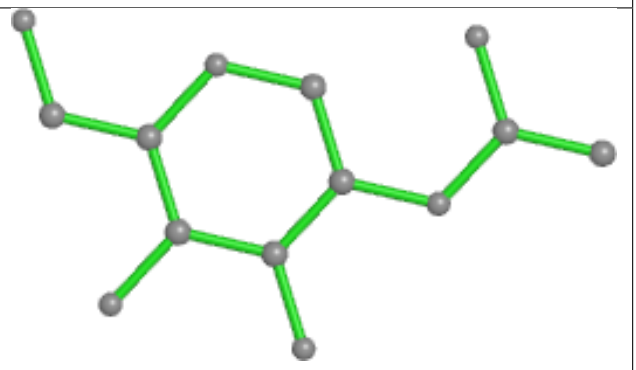

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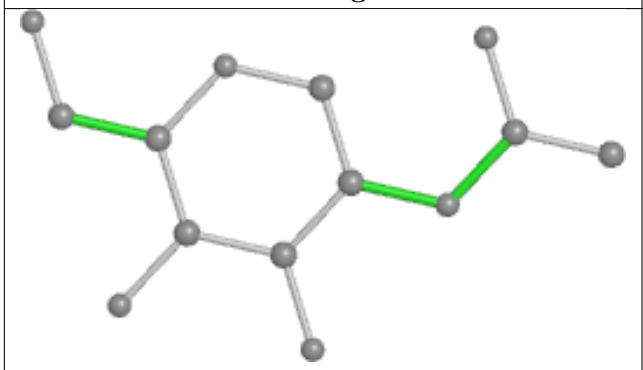

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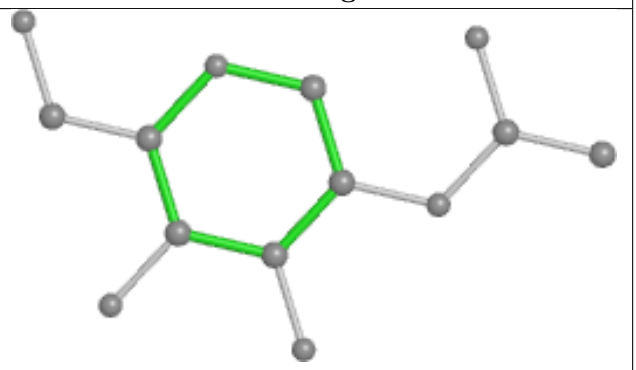

Rings

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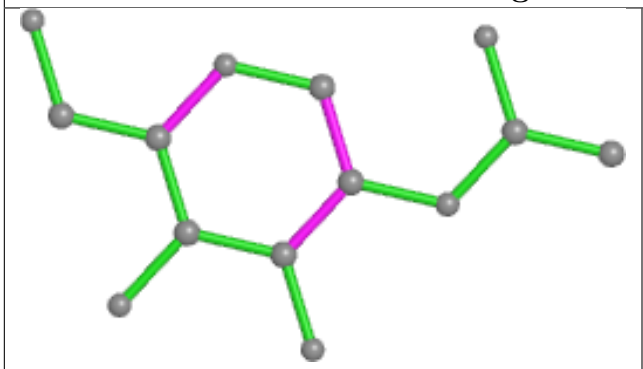
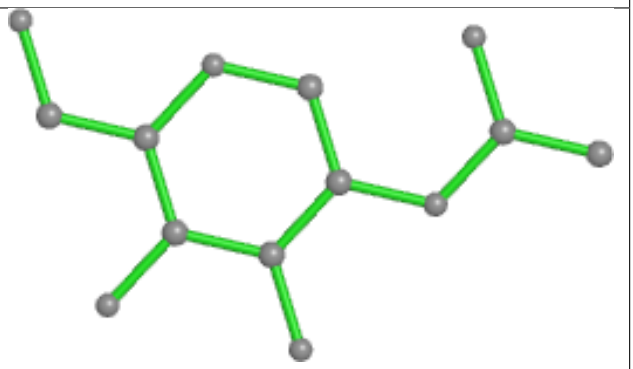
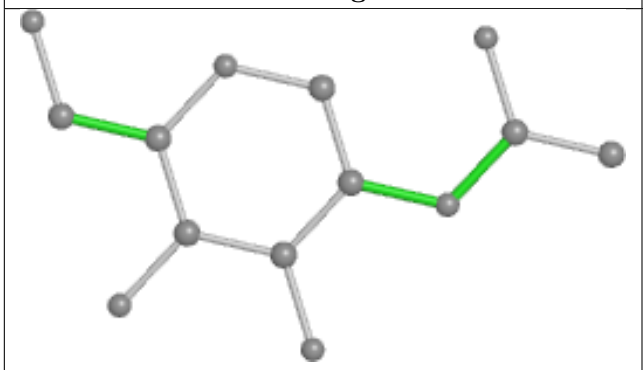
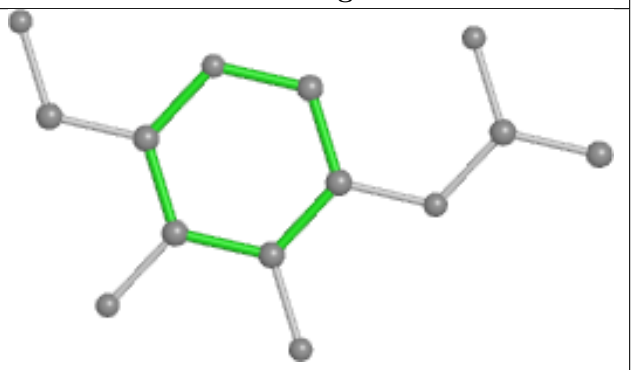
 Bond lengths	 Bond angles
 Torsions	 Rings

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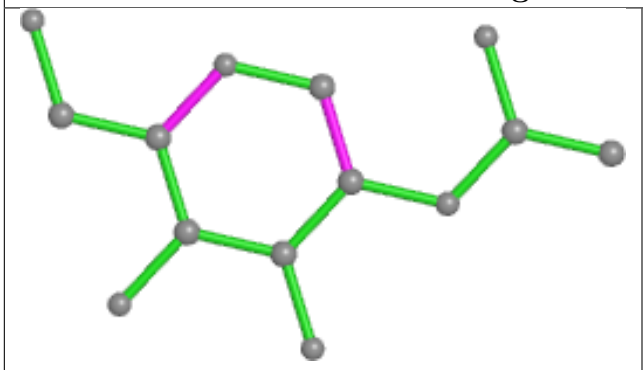
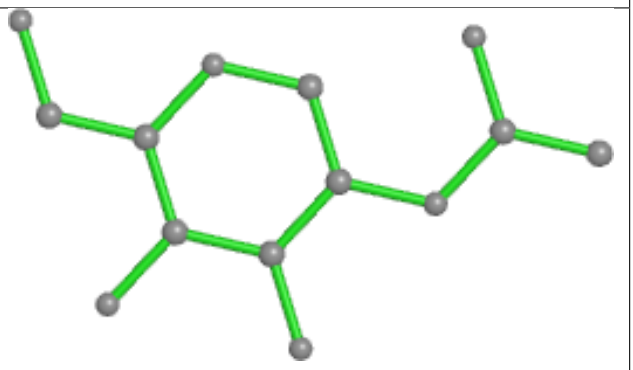
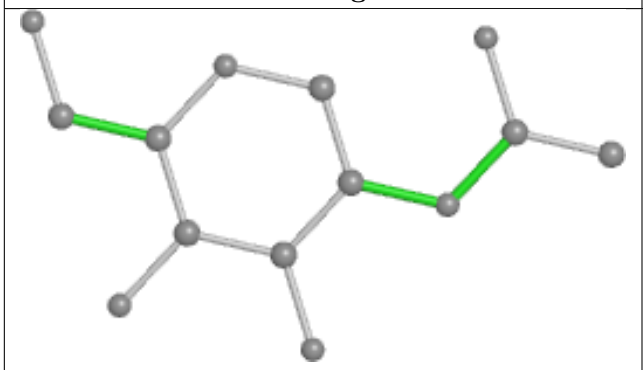
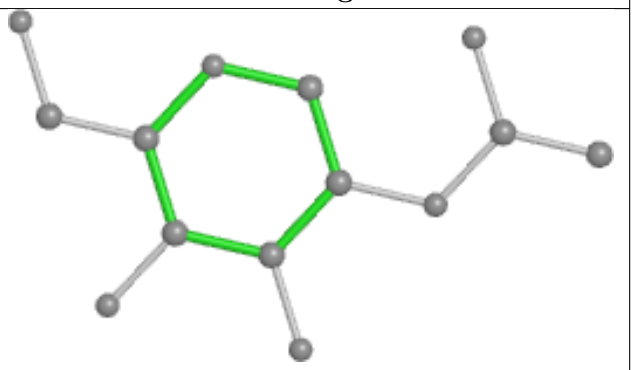
 Bond lengths	 Bond angles
 Torsions	 Rings

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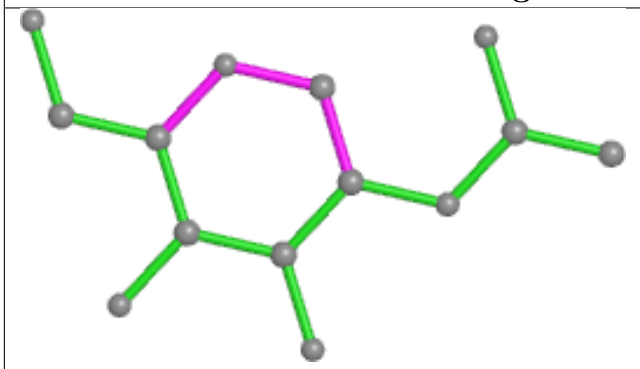
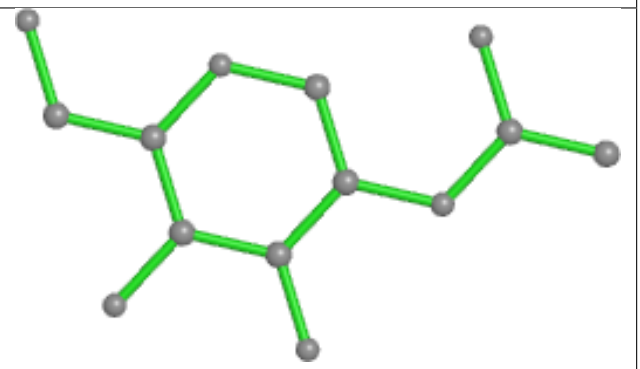
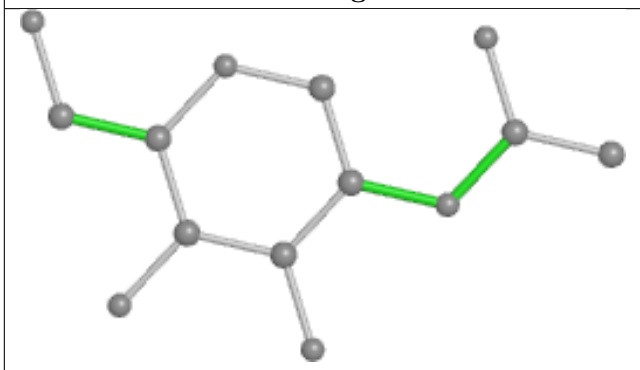
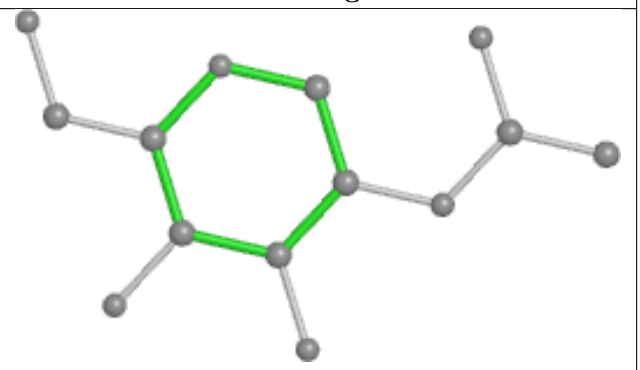
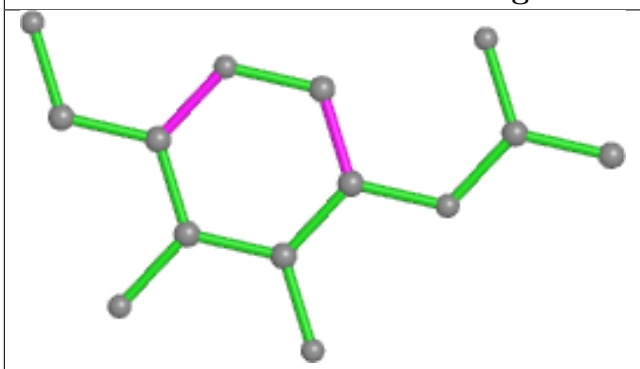
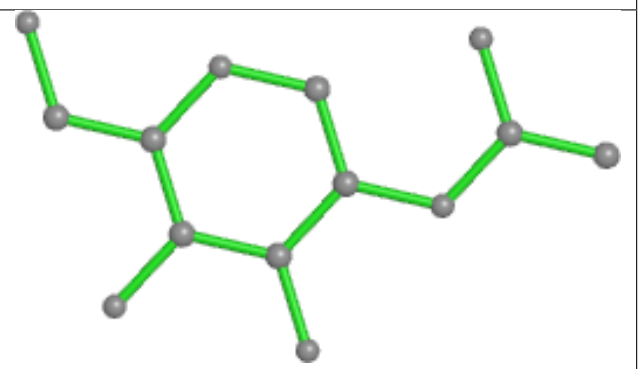
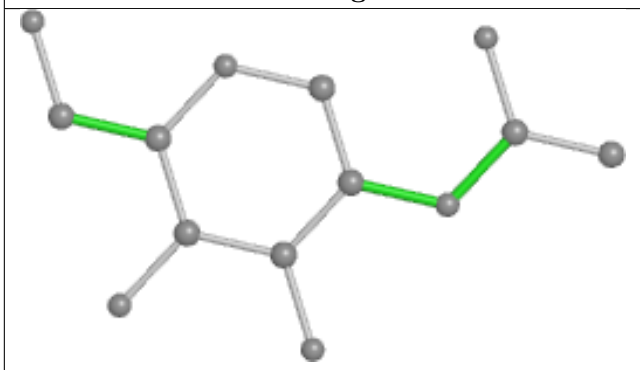
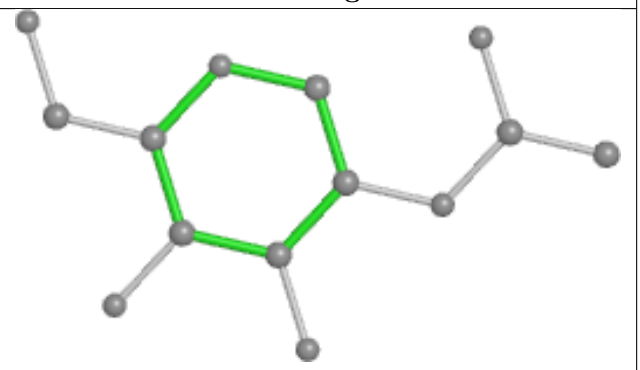
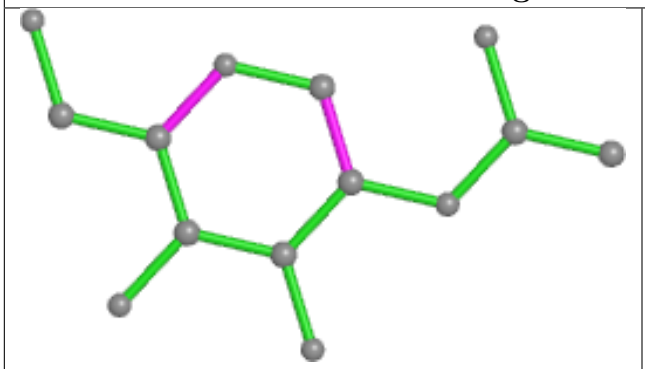
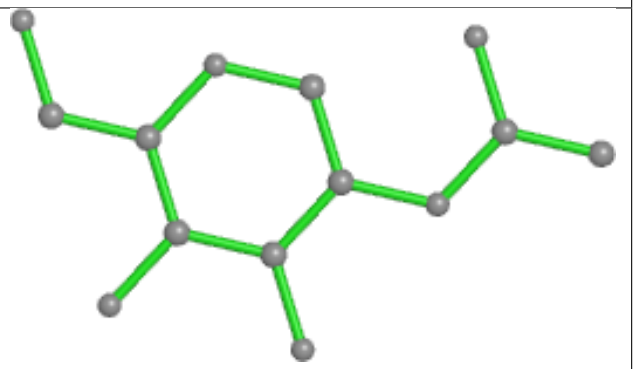
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand NAG A 1301	
 Bond lengths	 Bond angles
 Torsions	 Rings

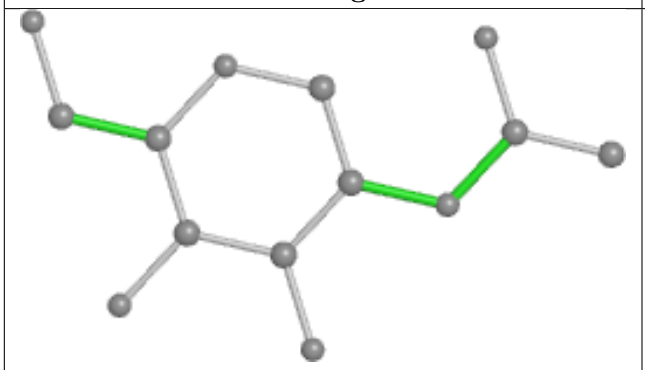
Ligand NAG B 1302



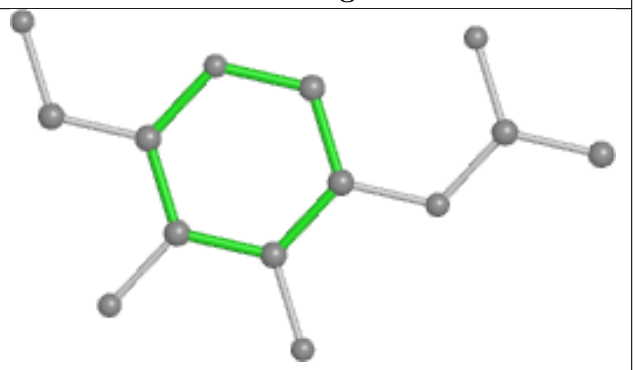
Bond lengths



Bond angles

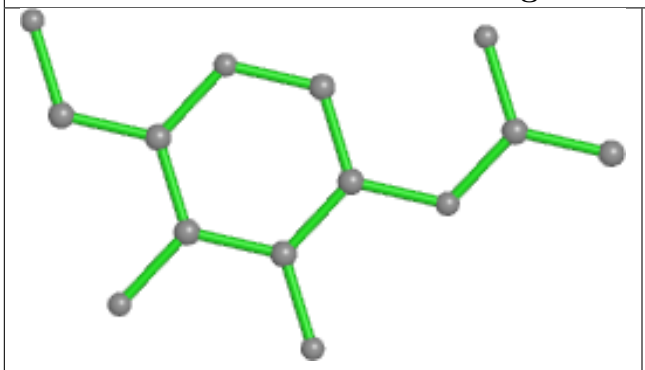


Torsions

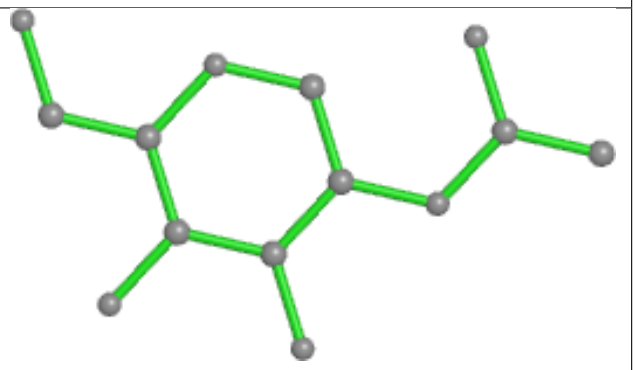


Rings

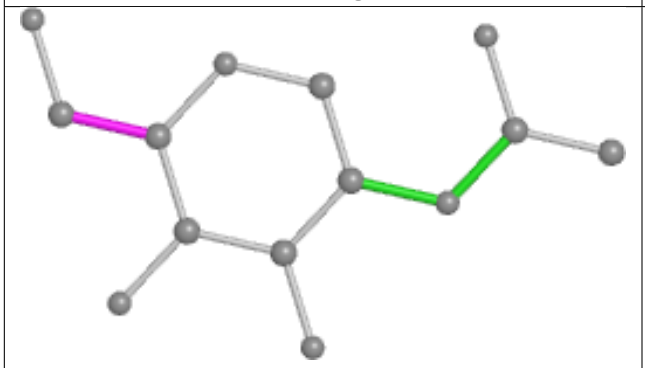
Ligand NAG D 701



Bond lengths



Bond angles



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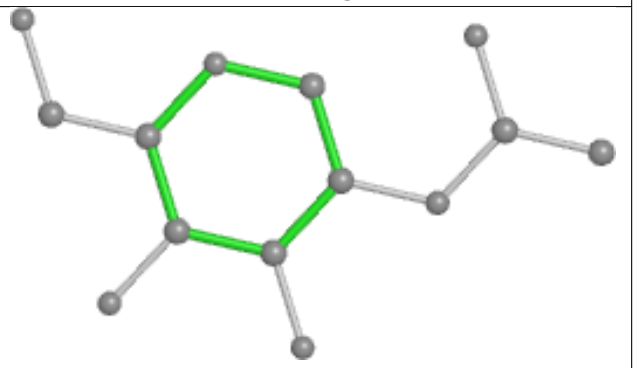
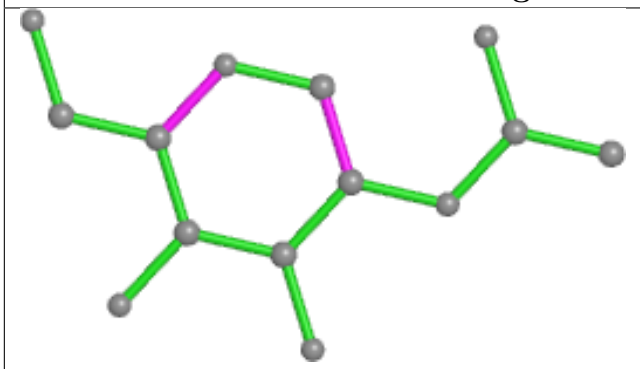
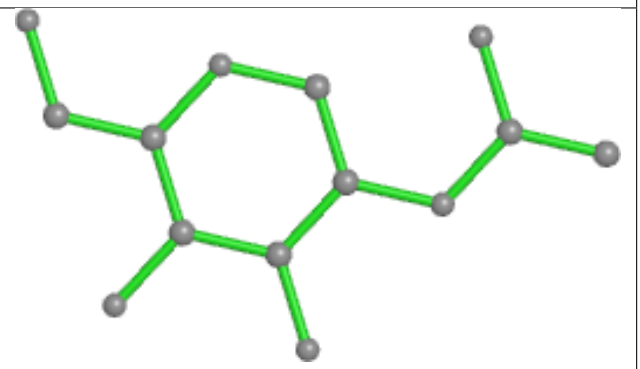
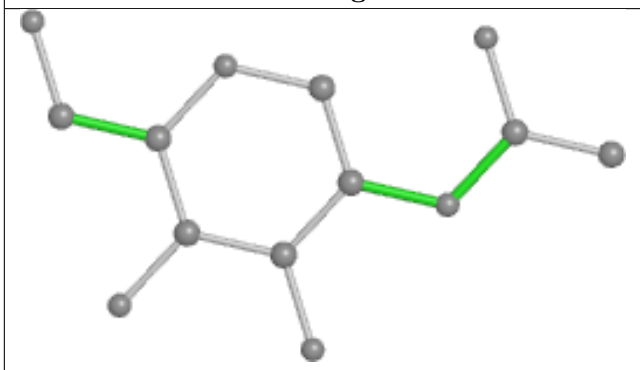
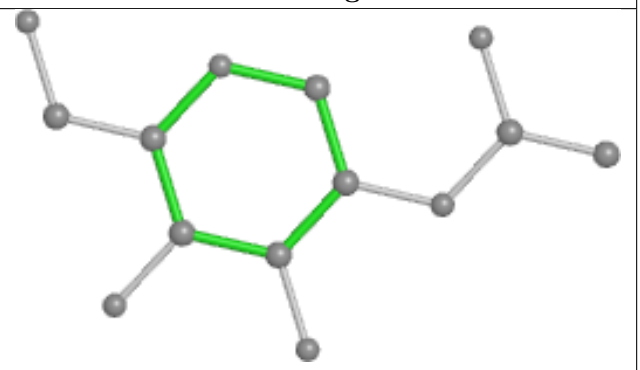


Rings

Ligand NAG B 1305	
 Bond lengths	 Bond angles
 Torsions	 Rings

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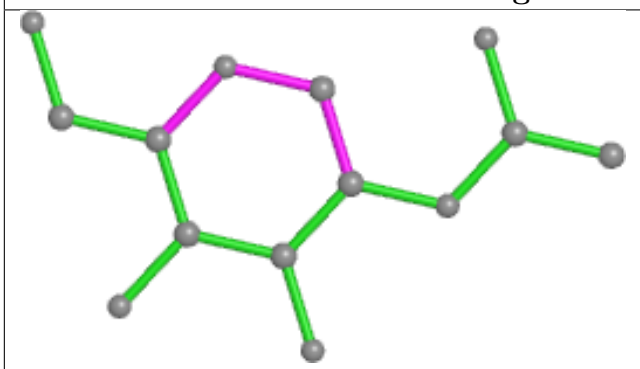
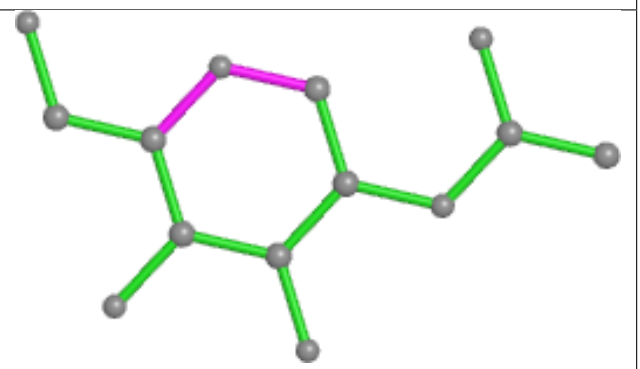
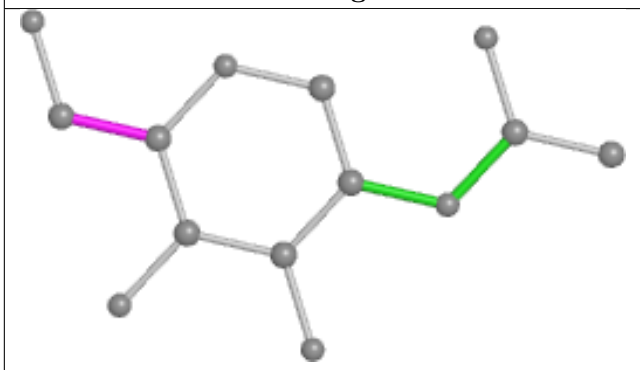
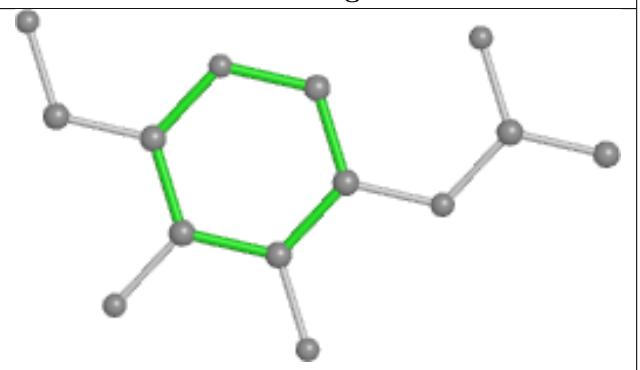
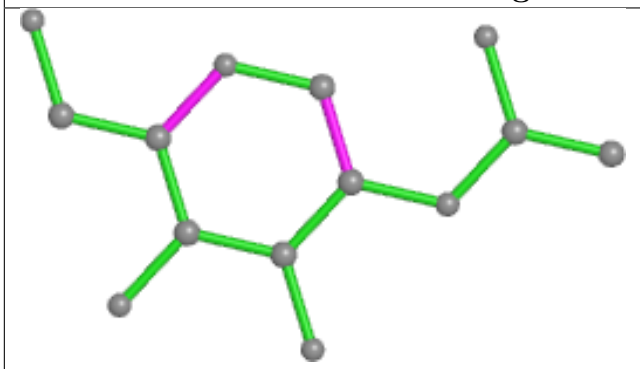
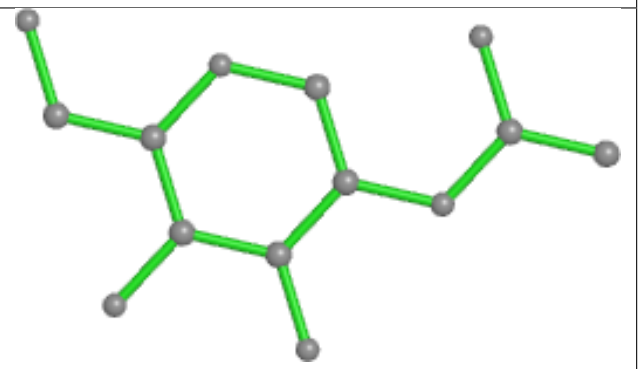
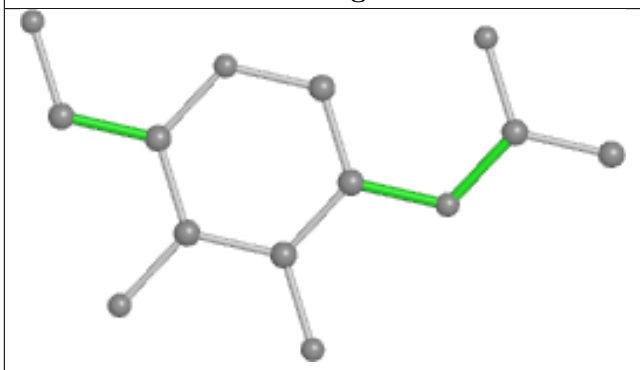
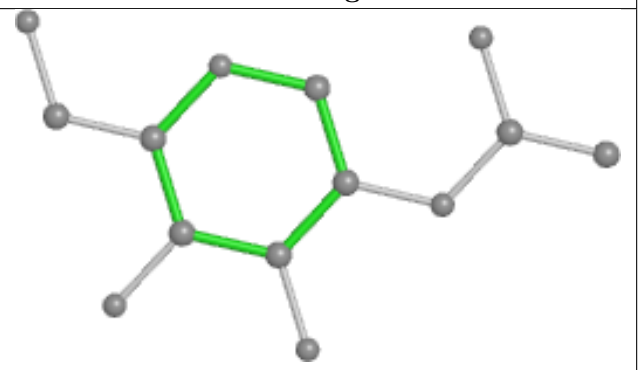
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand NAG C 1312	
 Bond lengths	 Bond angles
 Torsions	 Rings

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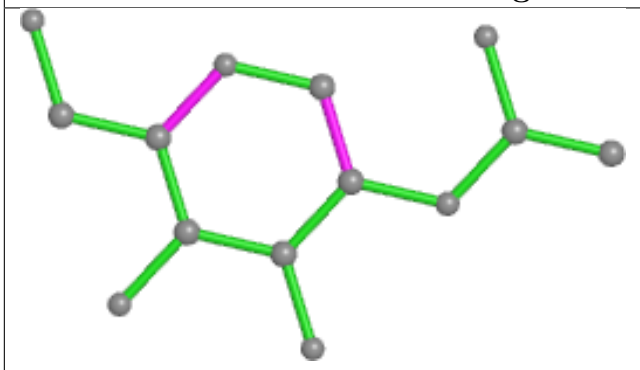
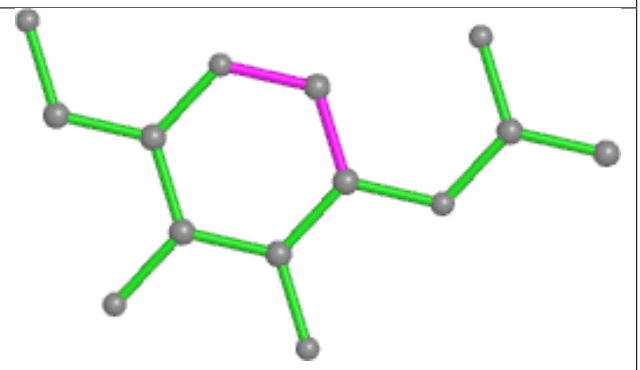
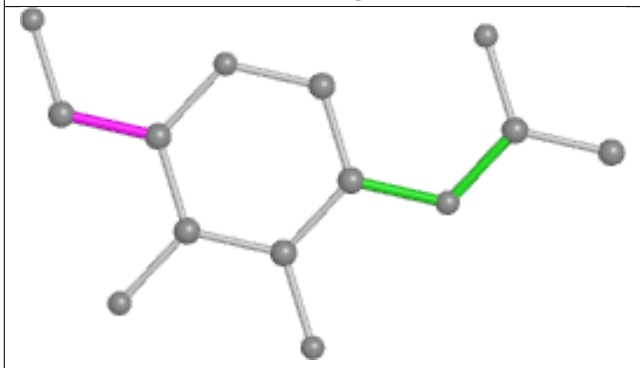
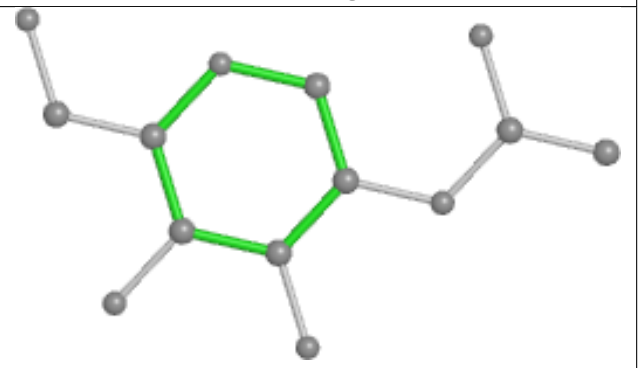
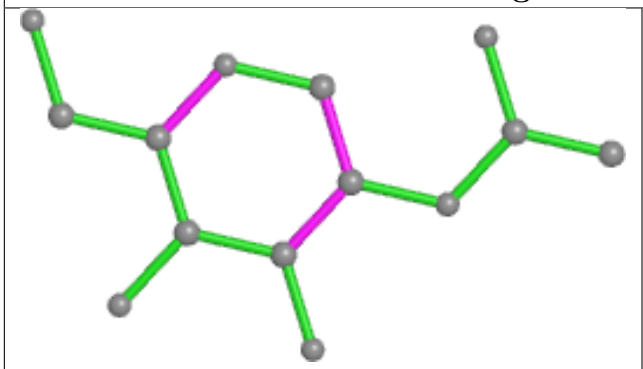
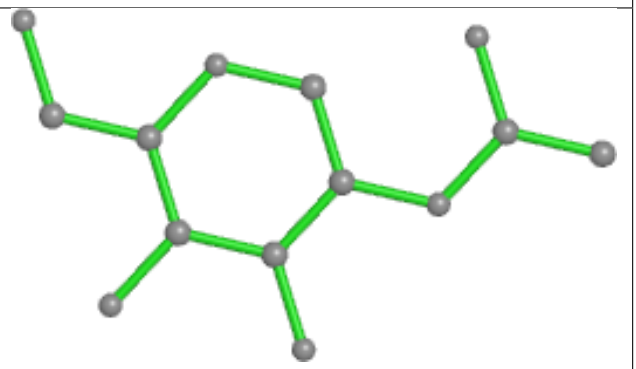
 Bond lengths	 Bond angles
 Torsions	 Rings

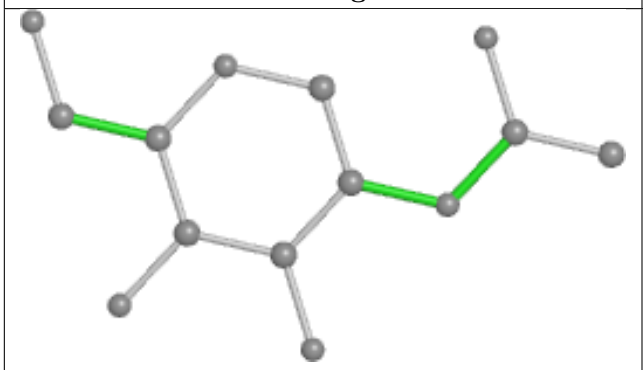
Ligand NAG B 1306



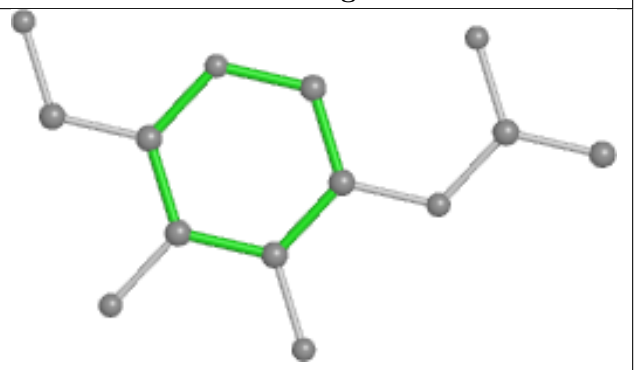
Bond lengths



Bond angles

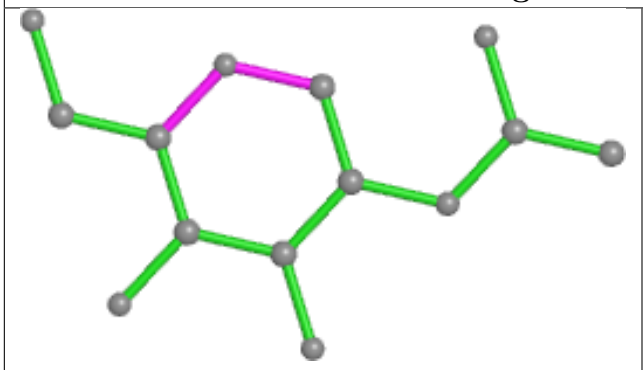


Torsions

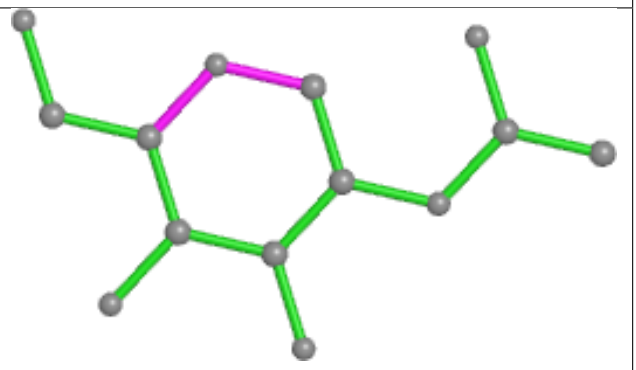


Rings

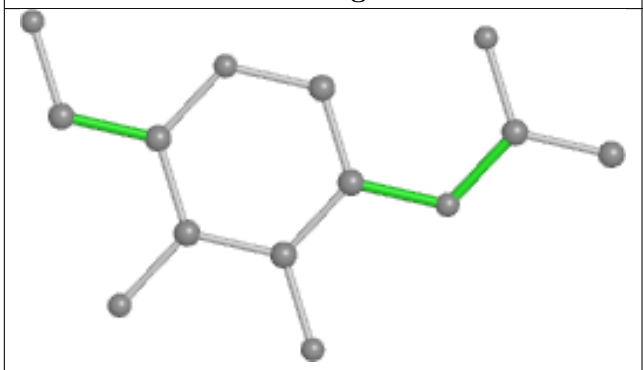
Ligand NAG C 1308



Bond lengths



Bond angles



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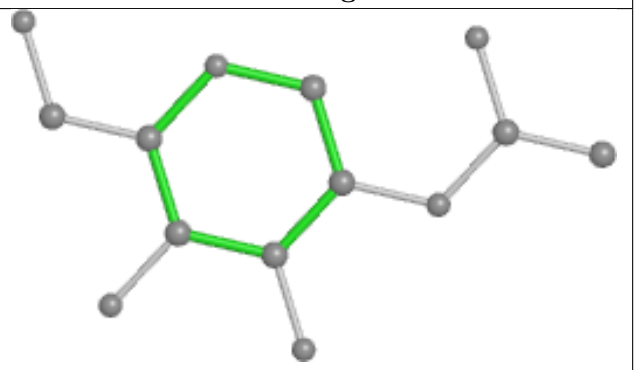
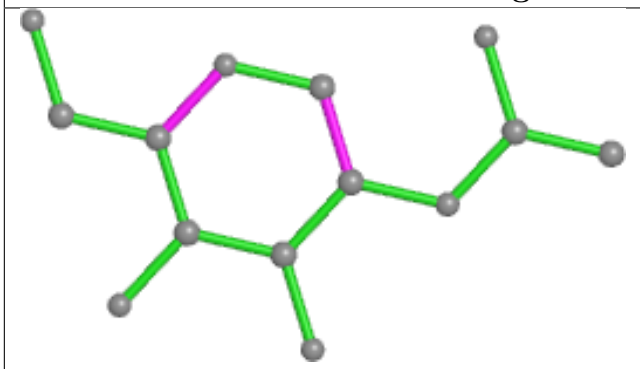
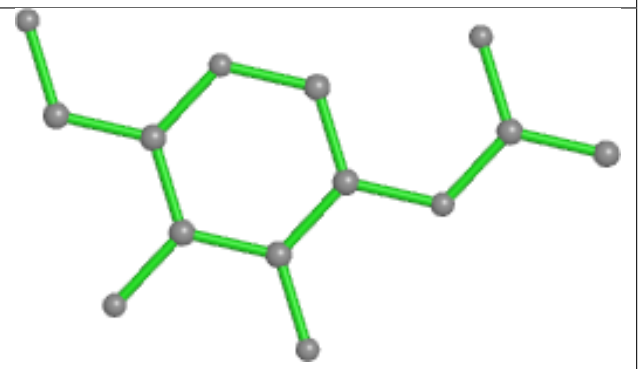
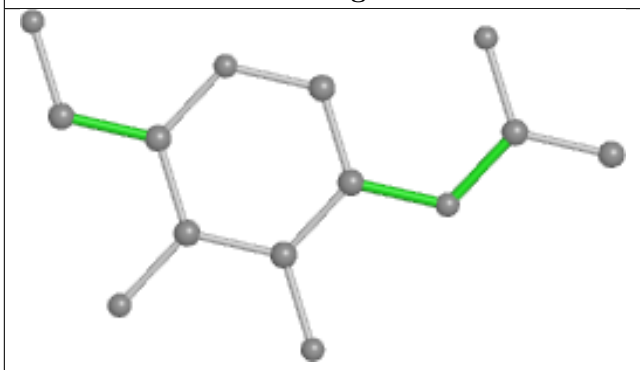
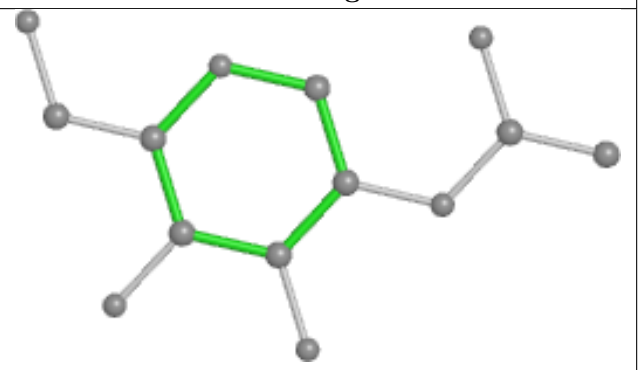


Rings

Ligand NAG C 1305	
 Bond lengths	 Bond angles
 Torsions	 Rings

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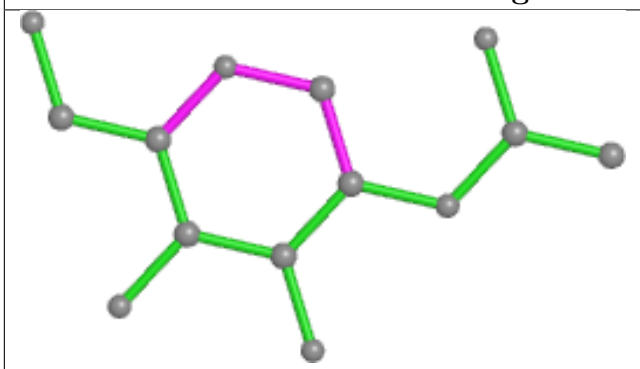
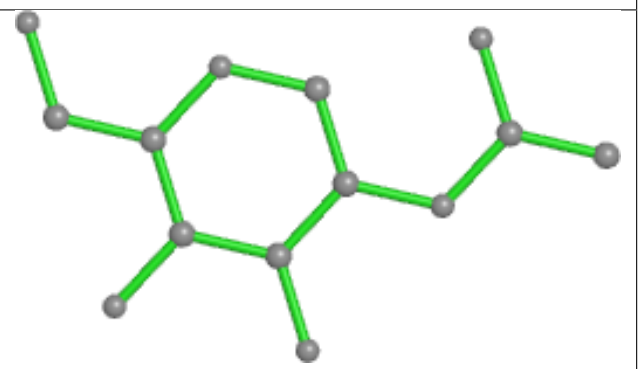
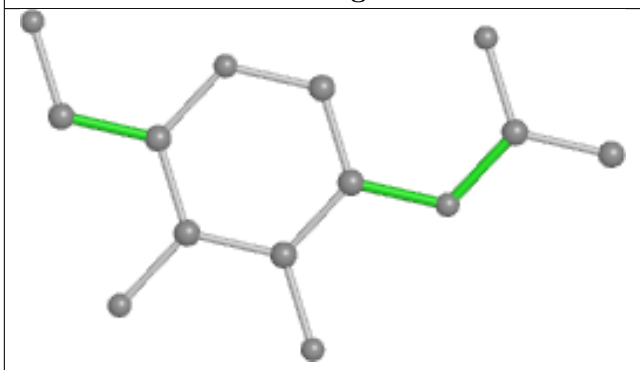
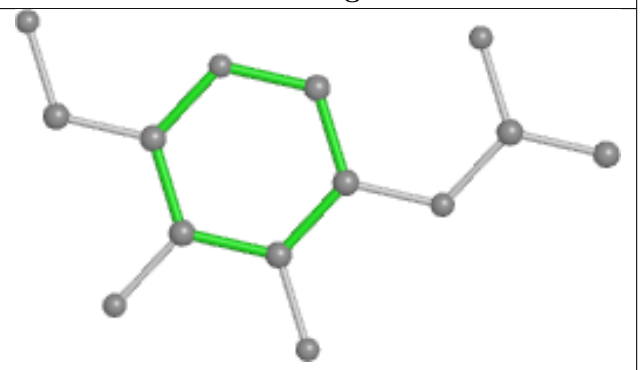
 Bond lengths	 Bond angles
 Torsions	 Rings

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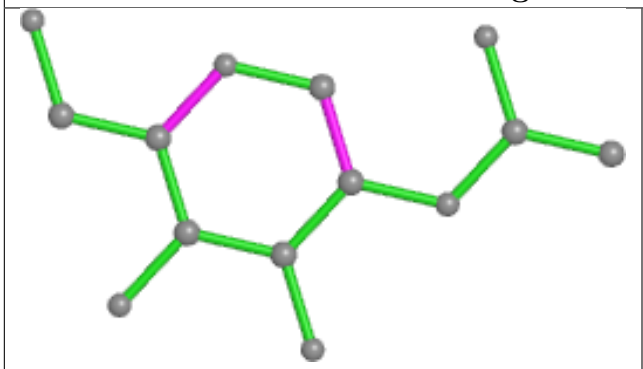
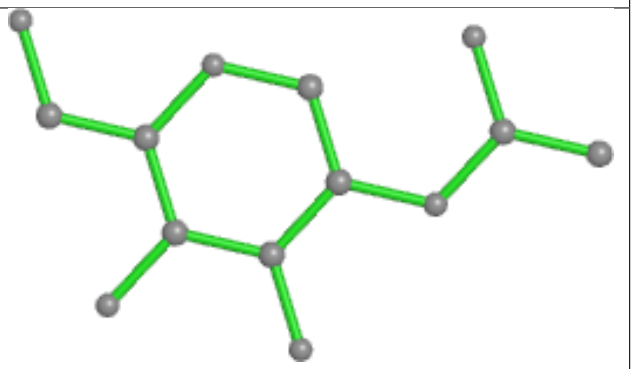
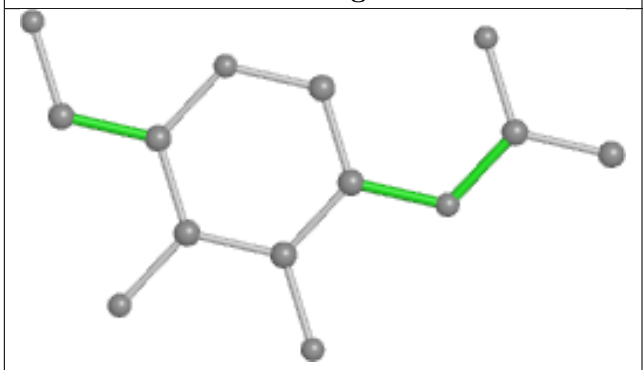
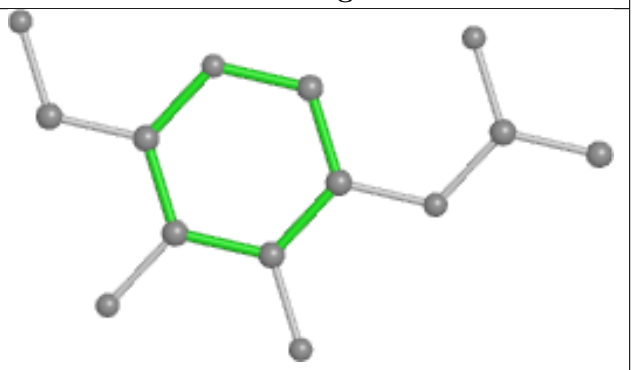
 Bond lengths	 Bond angles
 Torsions	 Rings

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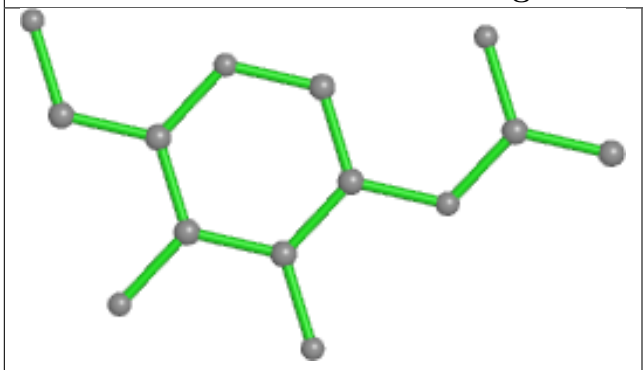
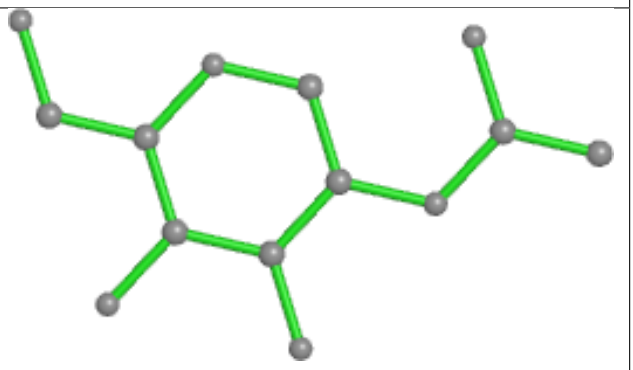
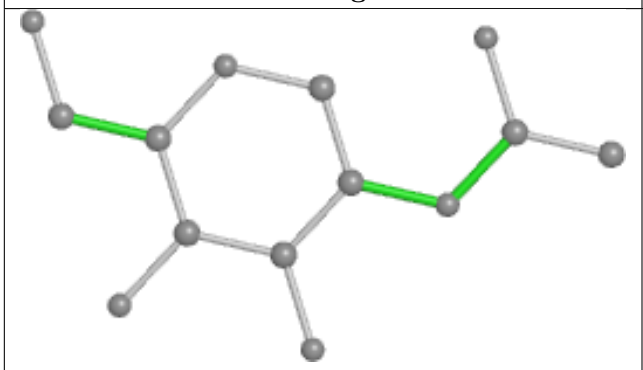
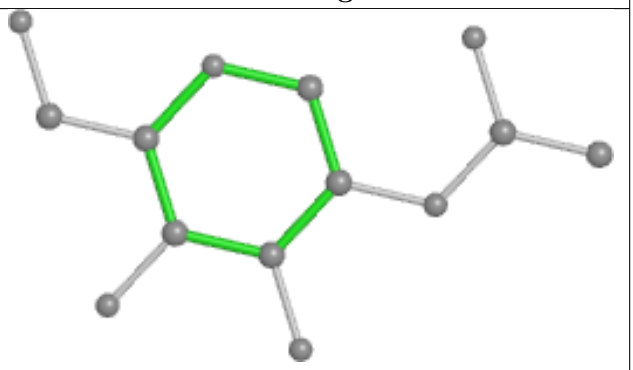
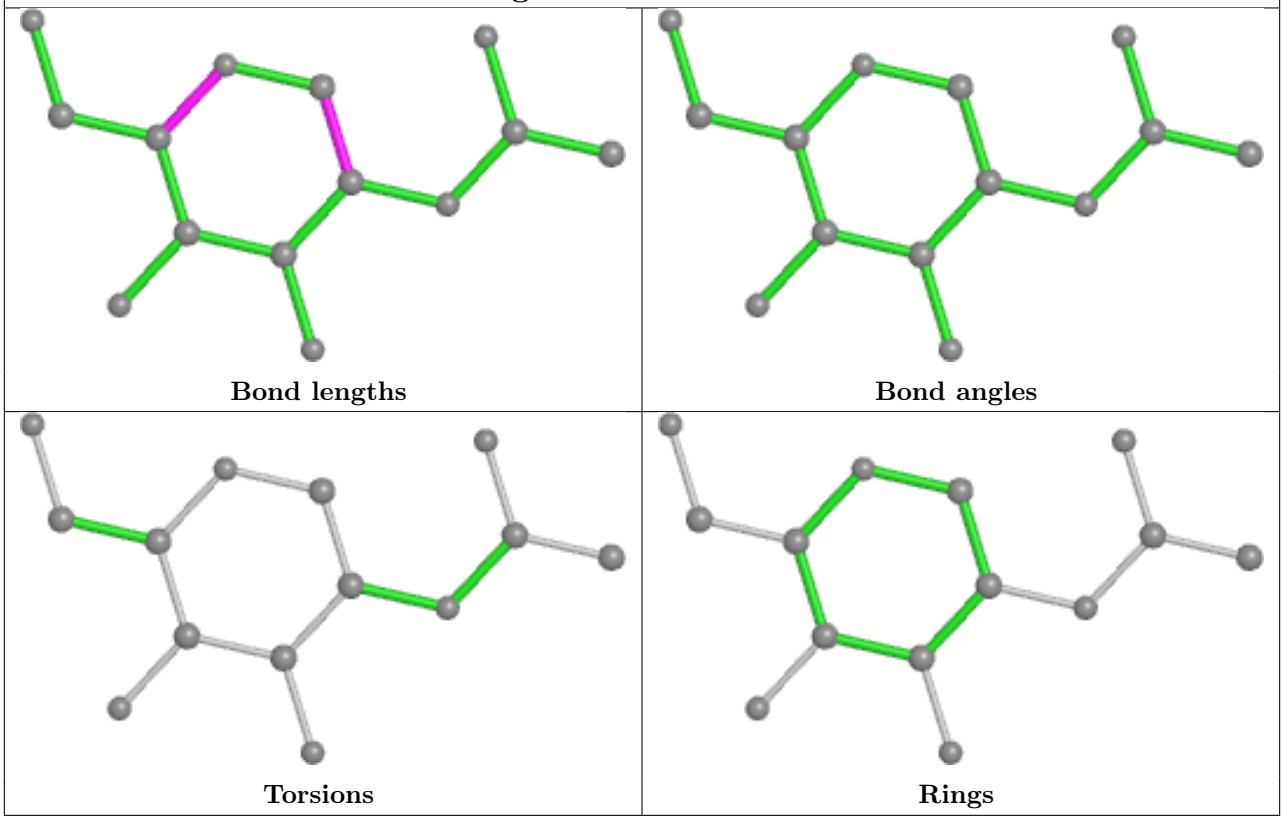
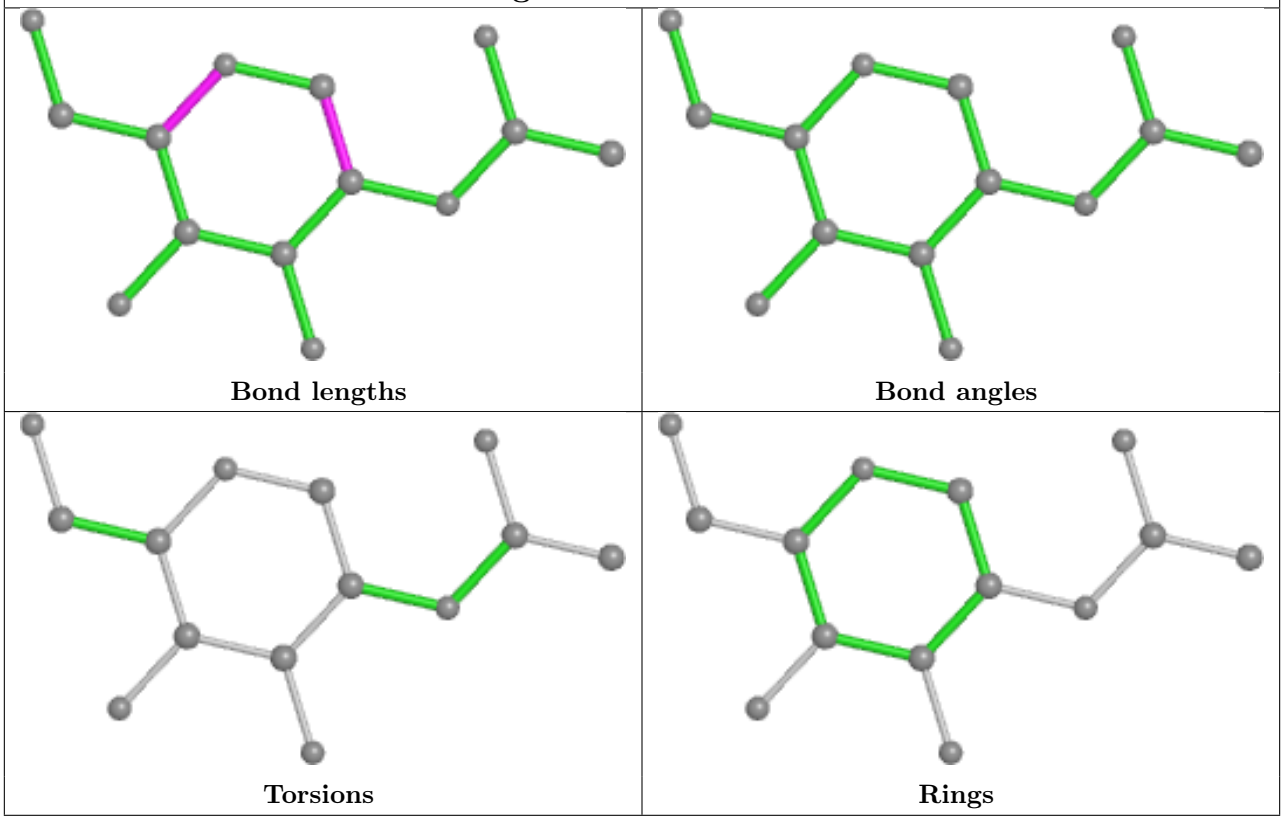
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand NAG A 1312



Ligand NAG B 1310



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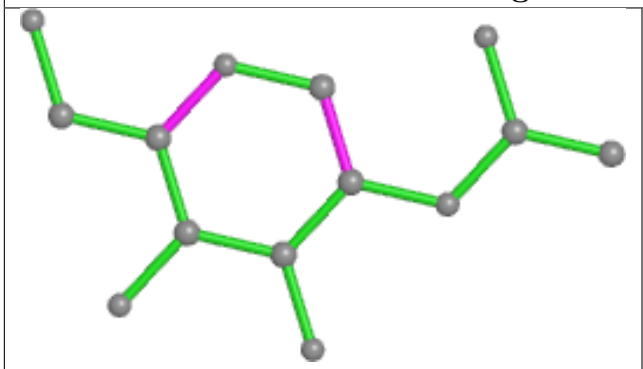
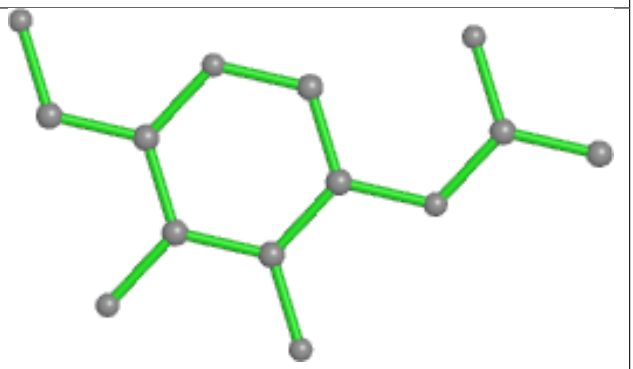
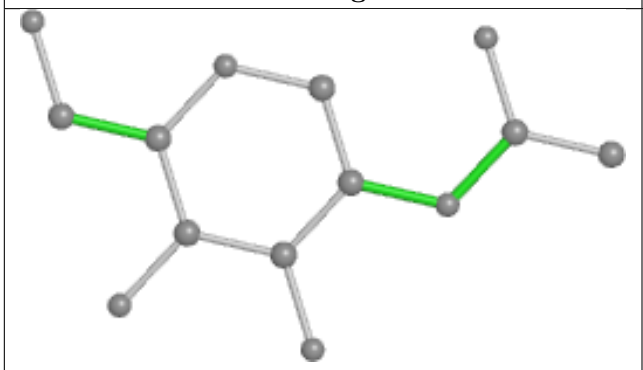
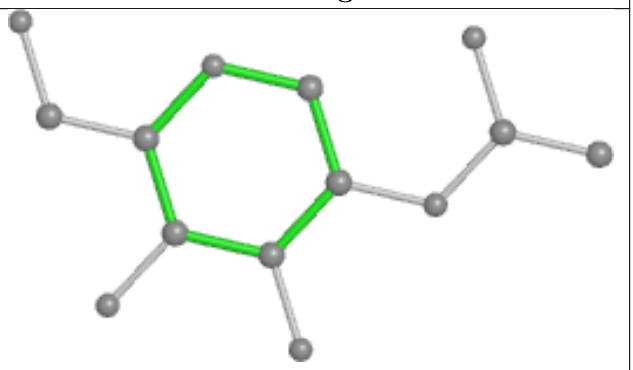
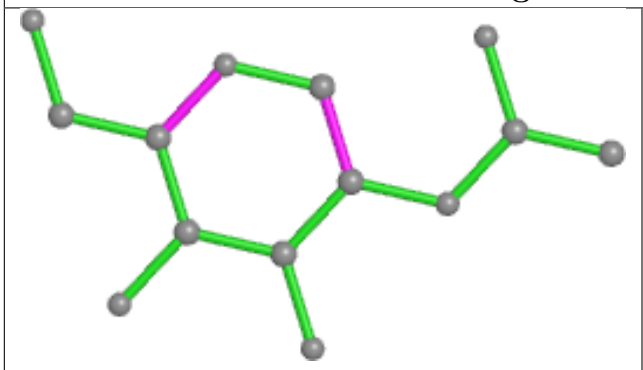
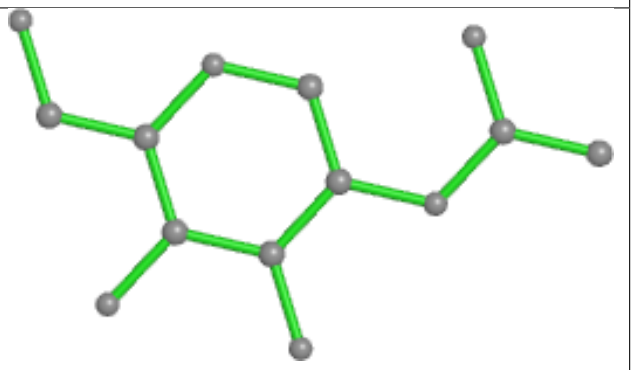
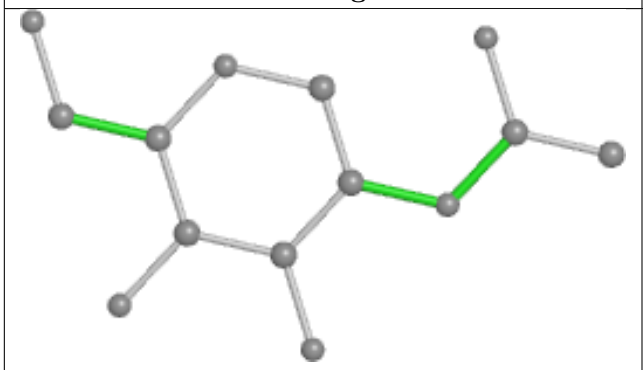
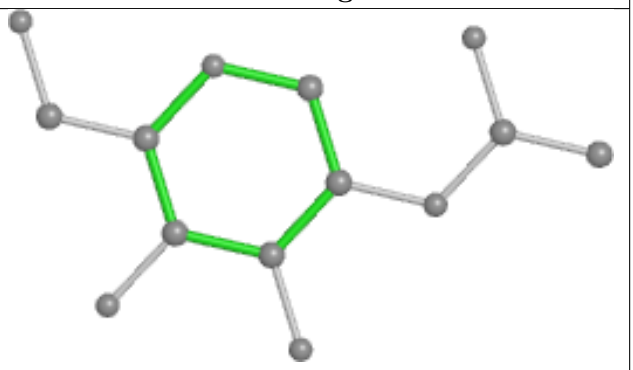
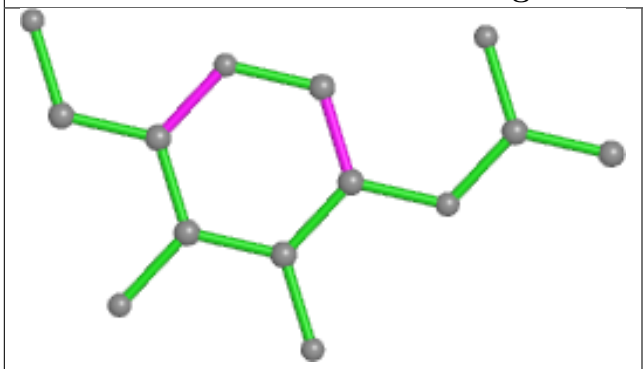
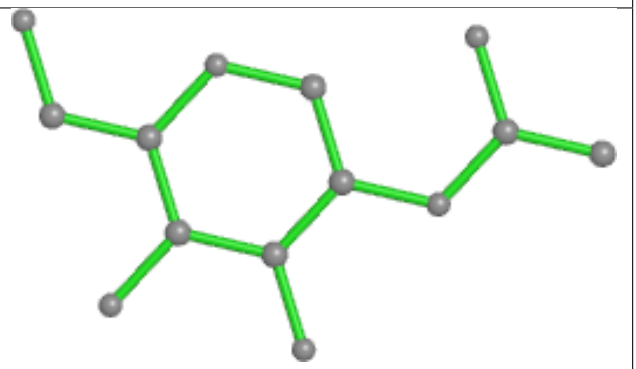
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand NAG C 1304	
 Bond lengths	 Bond angles
 Torsions	 Rings

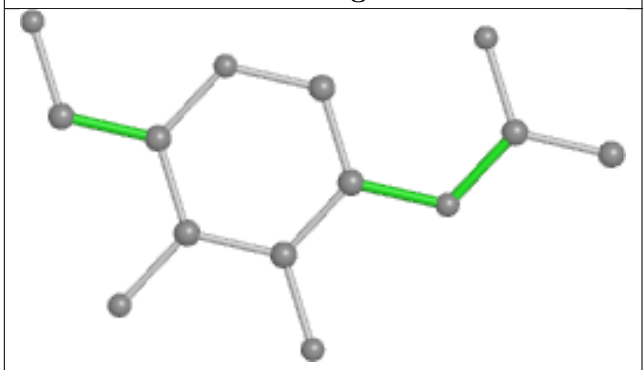
Ligand NAG C 1311



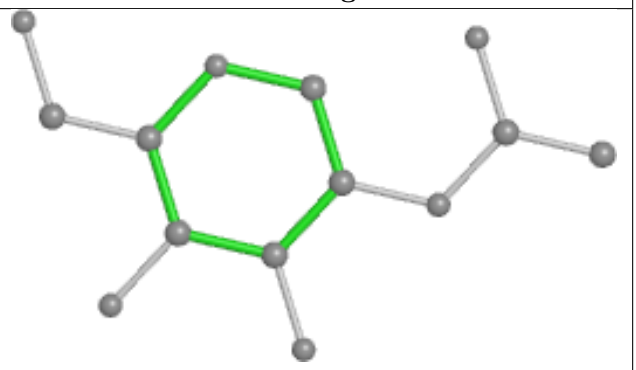
Bond lengths



Bond angles

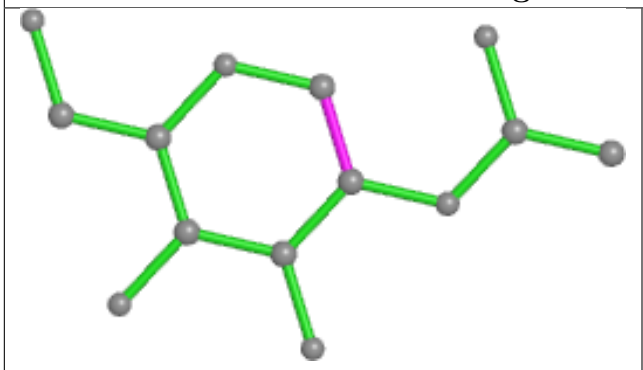


Torsions

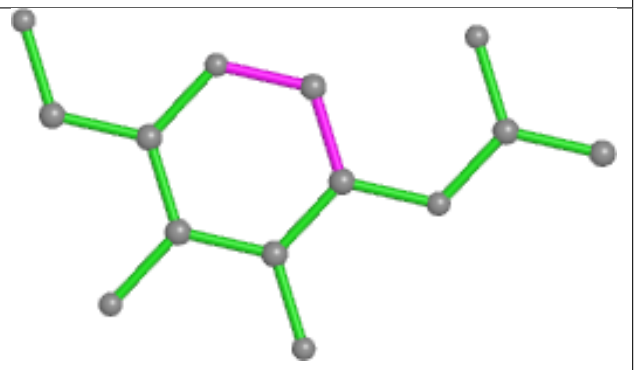


Rings

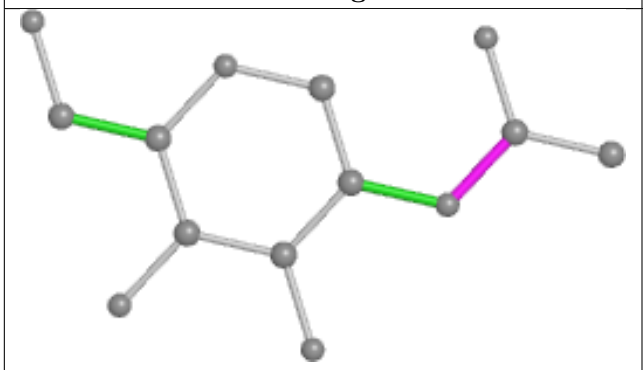
Ligand NAG B 1311



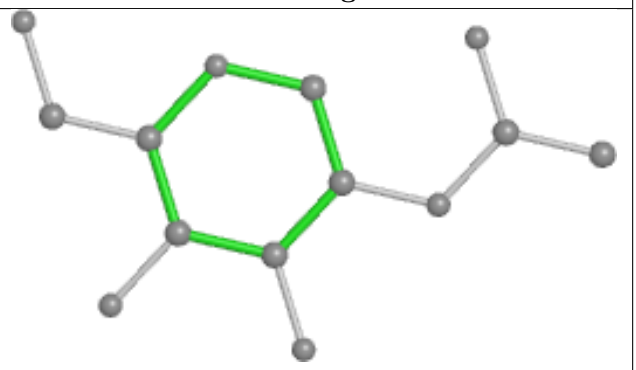
Bond lengths



Bond angles

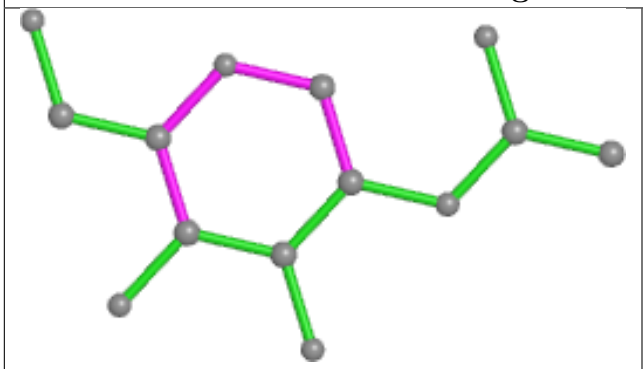


Torsions

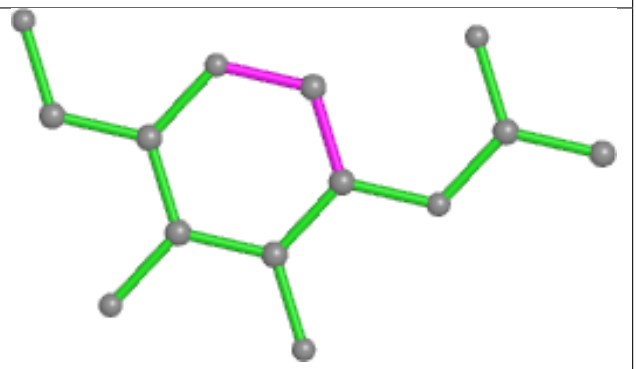


Rings

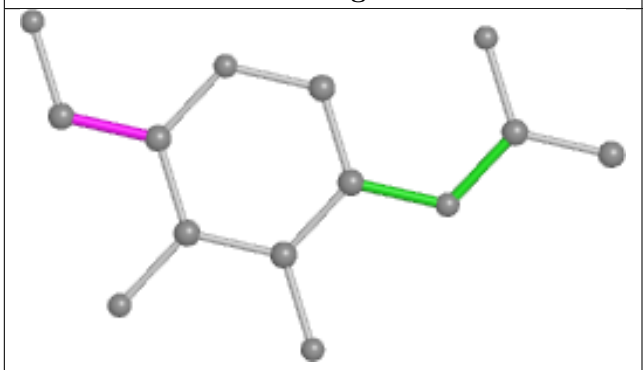
Ligand NAG A 1306



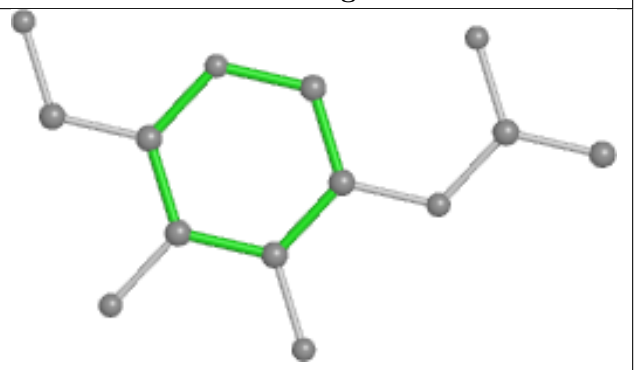
Bond lengths



Bond angles

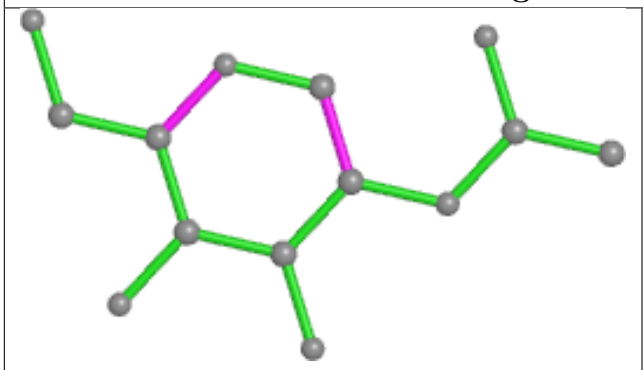


Torsions

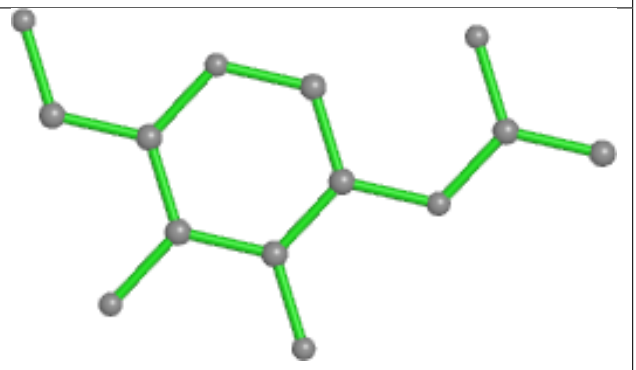


Rings

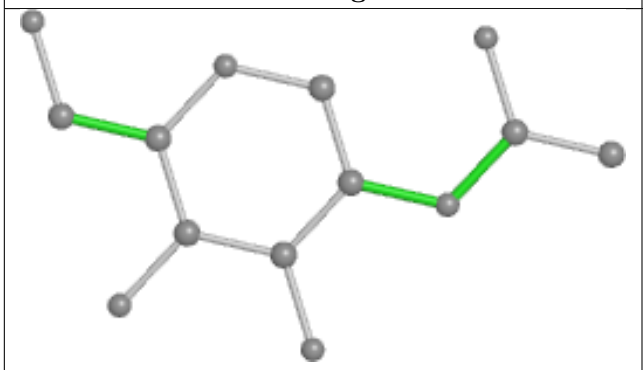
Ligand NAG C 1307



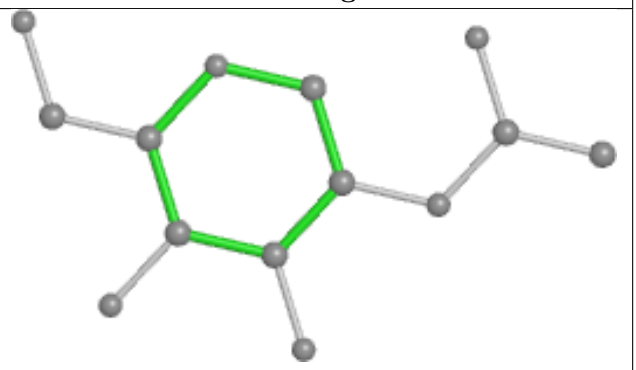
Bond lengths



Bond angles

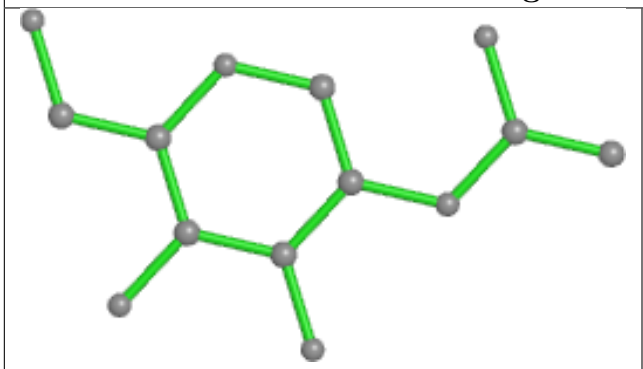


Torsions

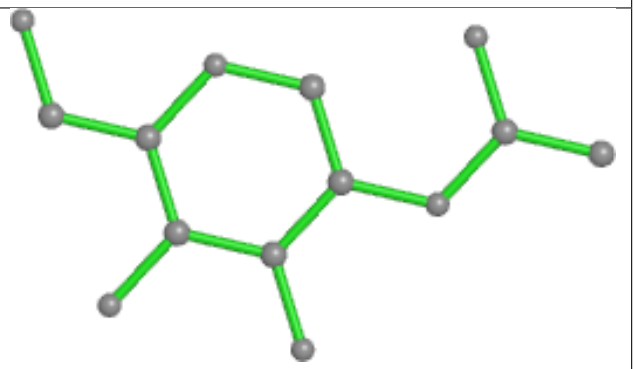


Rings

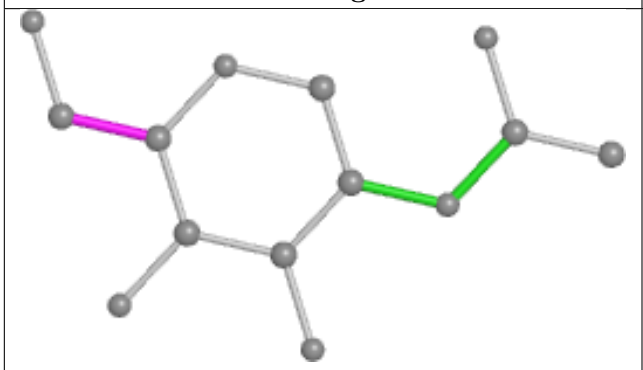
Ligand NAG E 701



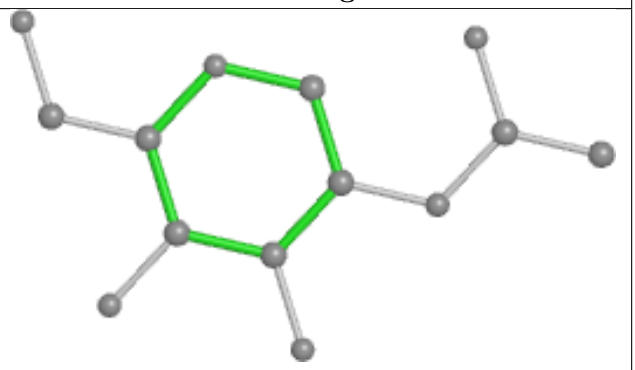
Bond lengths



Bond angles

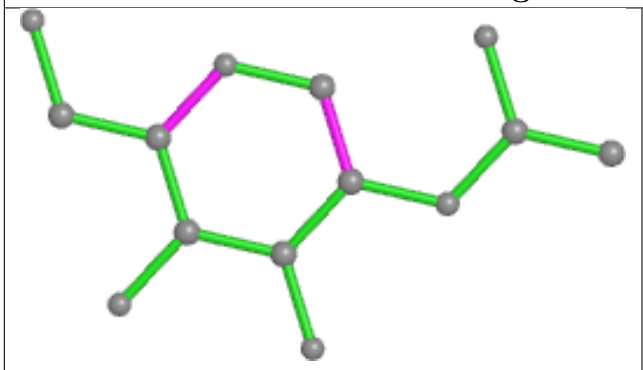


Torsions

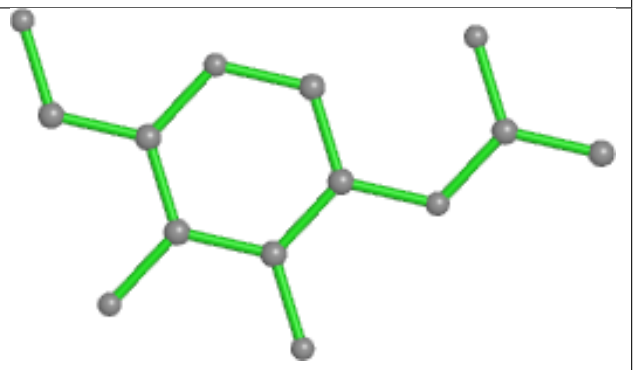


Rings

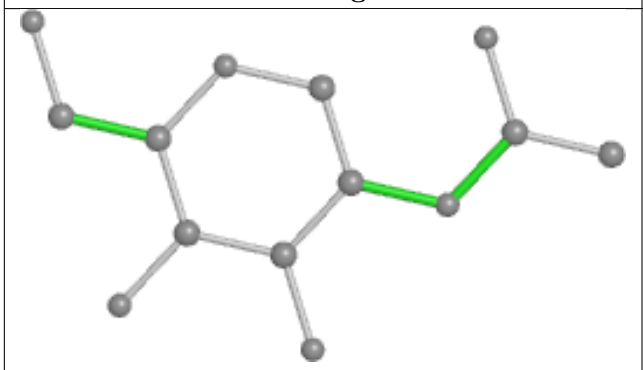
Ligand NAG C 1309



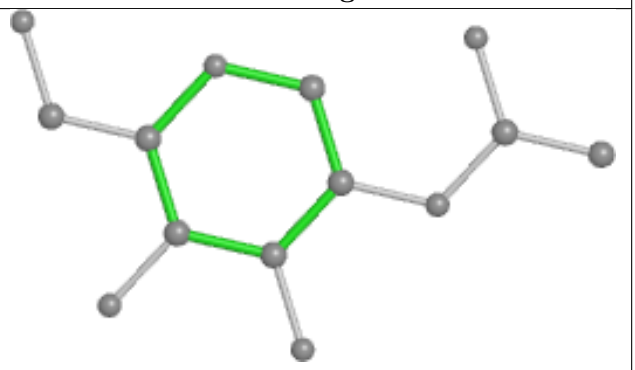
Bond lengths



Bond angles

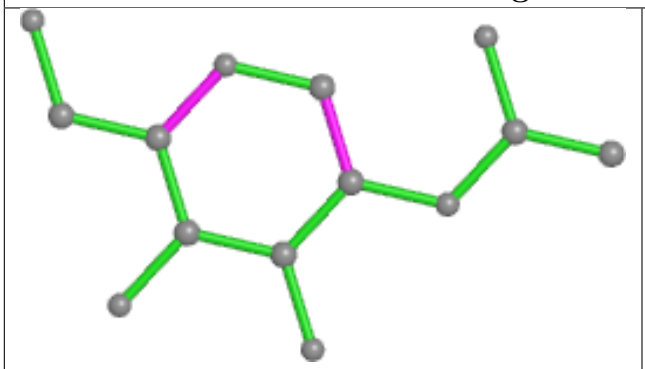


Torsions

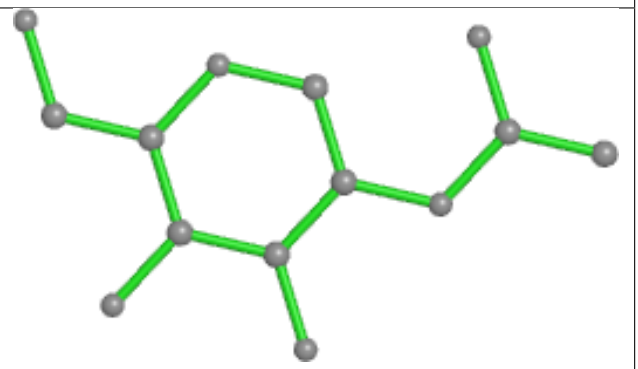


Rings

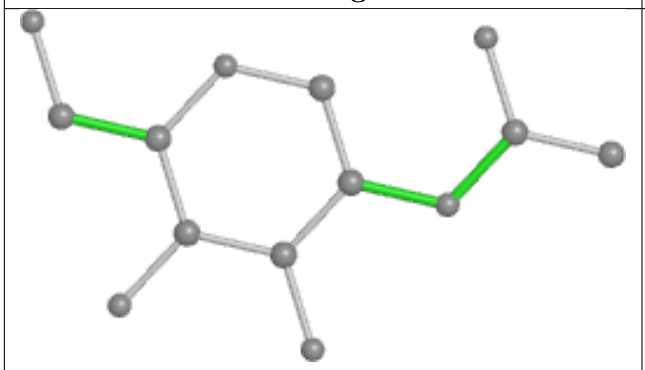
Ligand NAG A 1307



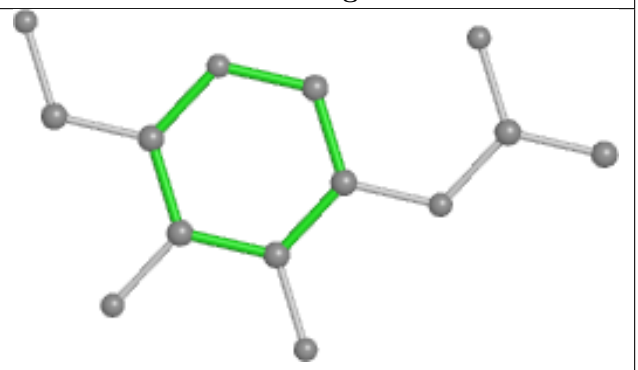
Bond lengths



Bond angles

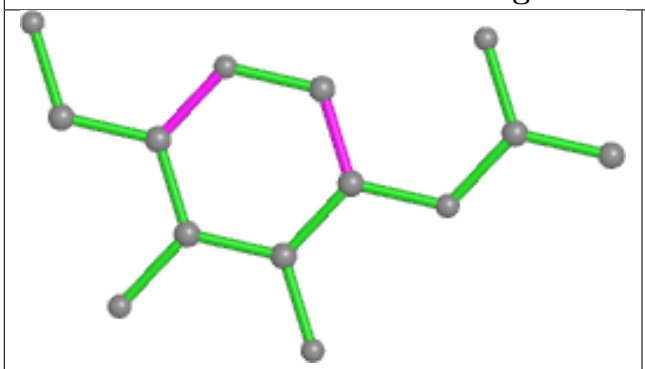


Torsions

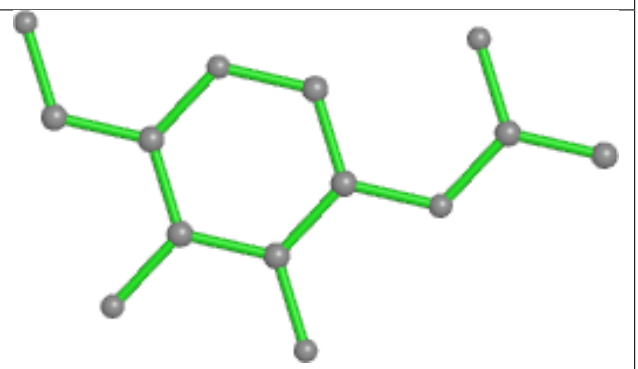


Rings

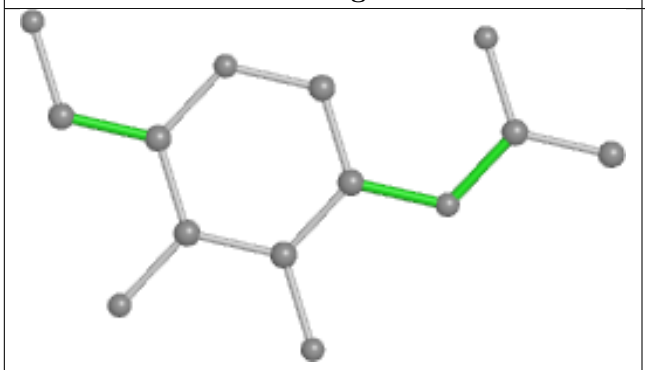
Ligand NAG B 1307



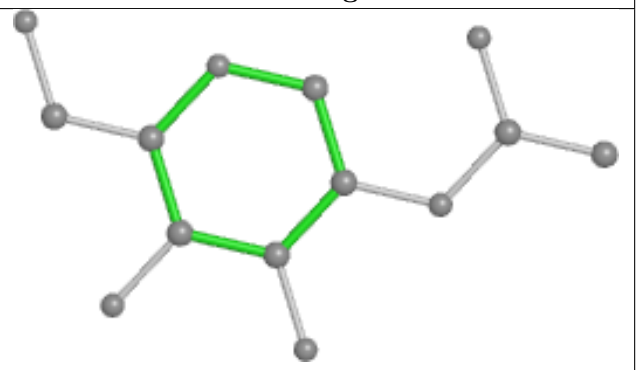
Bond lengths



Bond angles

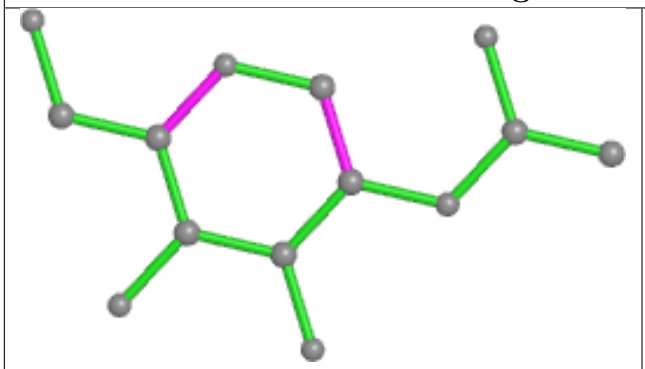


Torsions

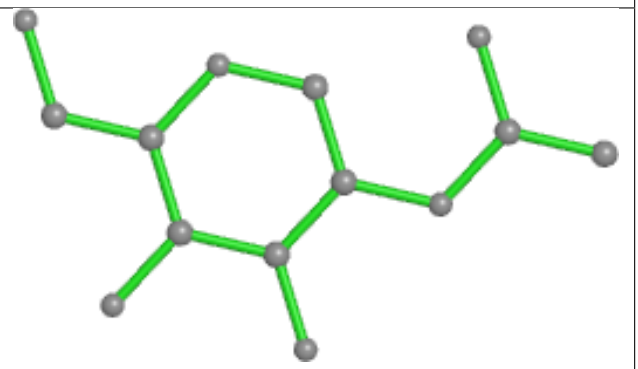


Rings

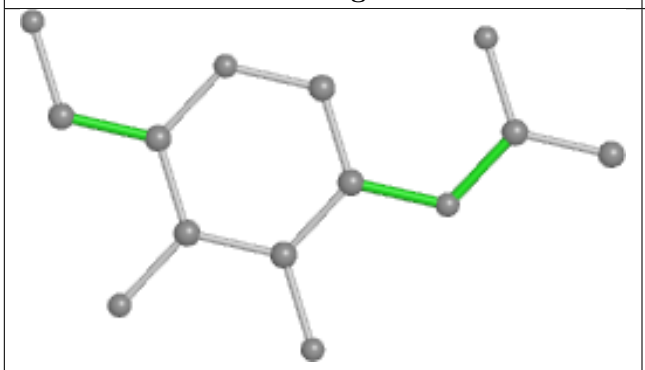
Ligand NAG C 1310



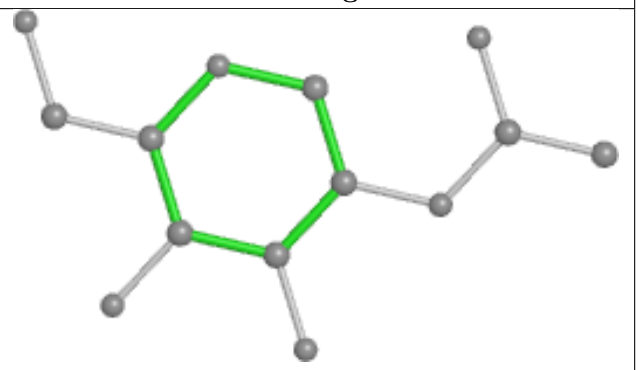
Bond lengths



Bond angles

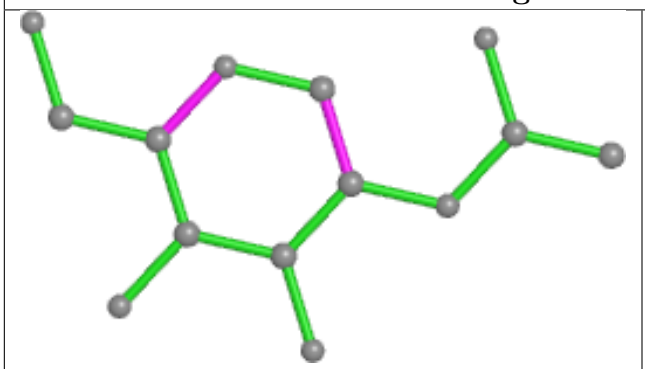


Torsions

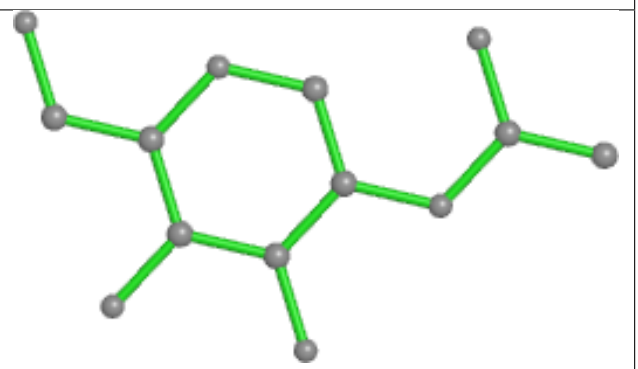


Rings

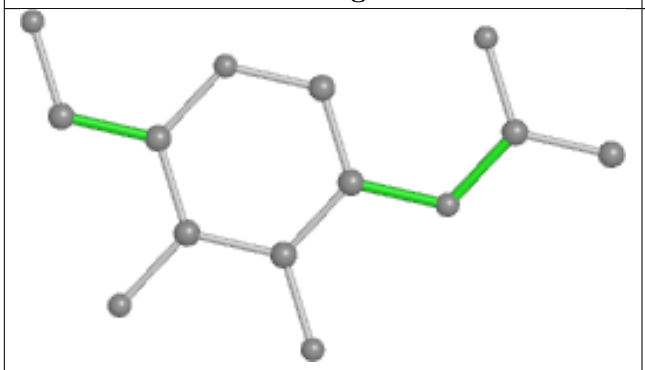
Ligand NAG B 1304



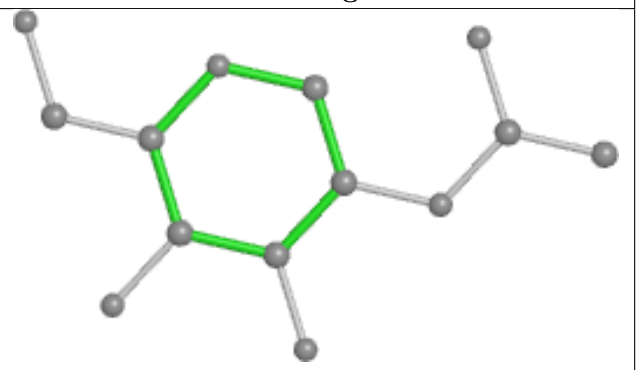
Bond lengths



Bond angles

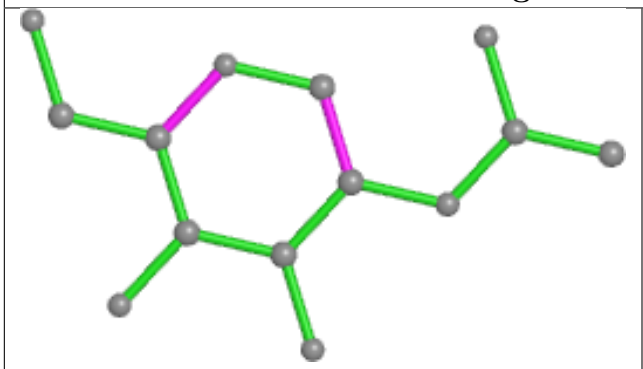


Torsions

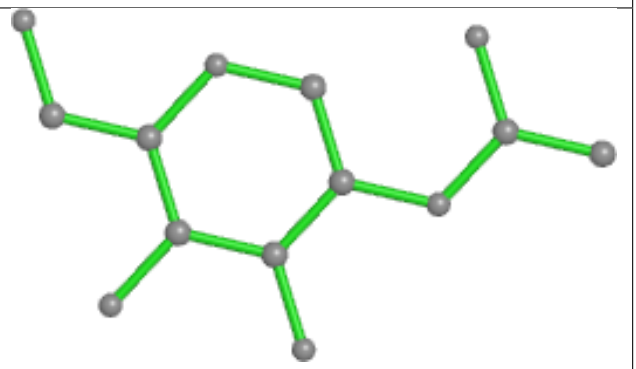


Rings

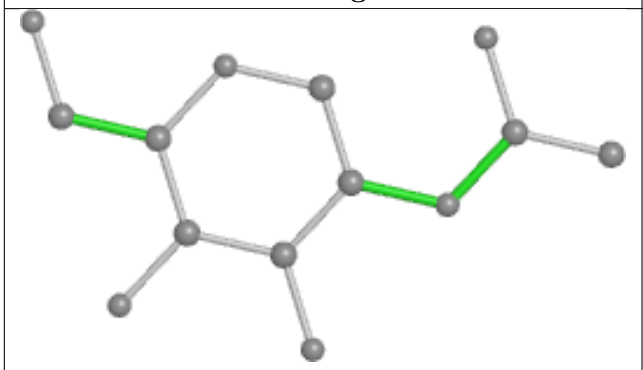
Ligand NAG B 1313



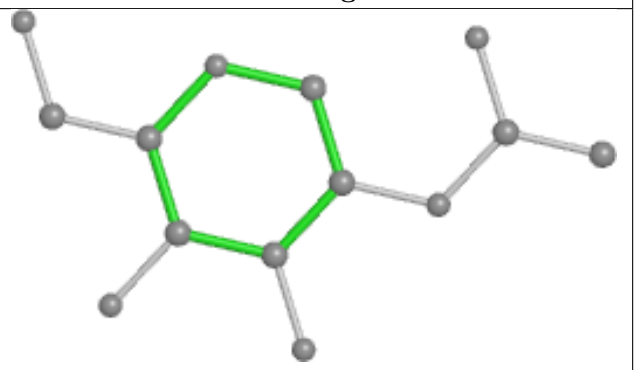
Bond lengths



Bond angles

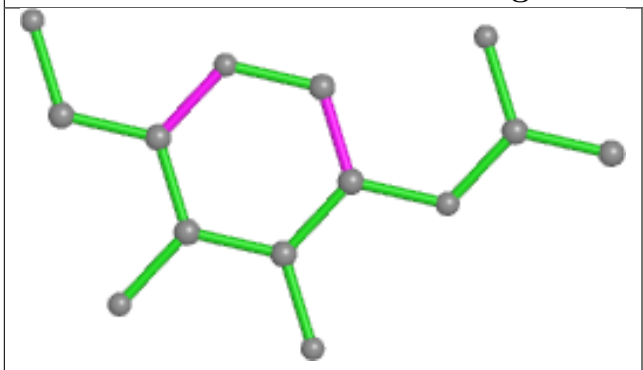


Torsions

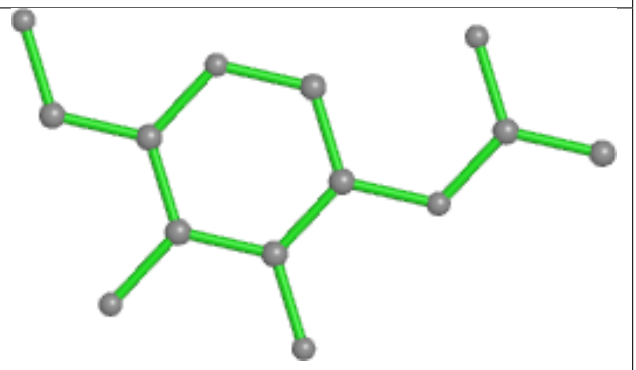


Rings

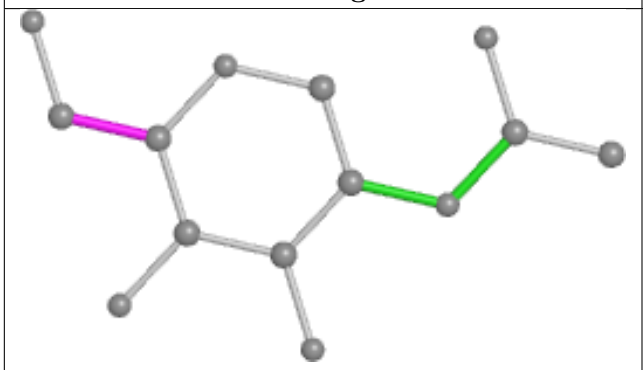
Ligand NAG A 1311



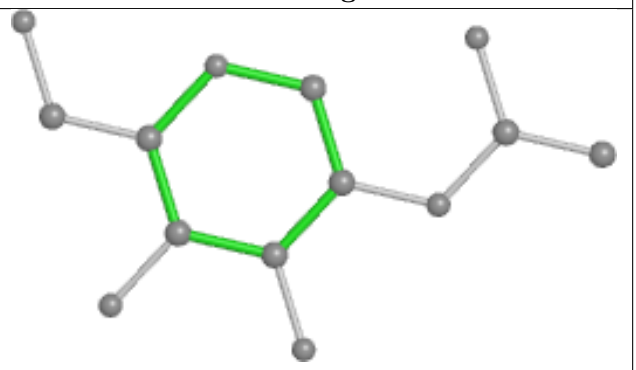
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

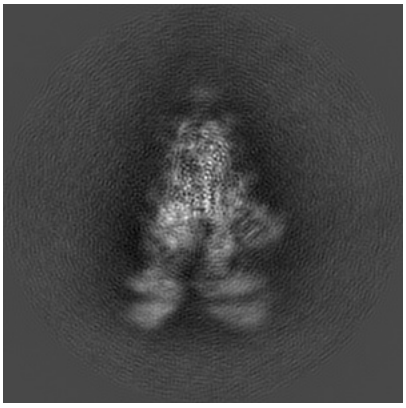
6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-22892. These allow visual inspection of the internal detail of the map and identification of artifacts.

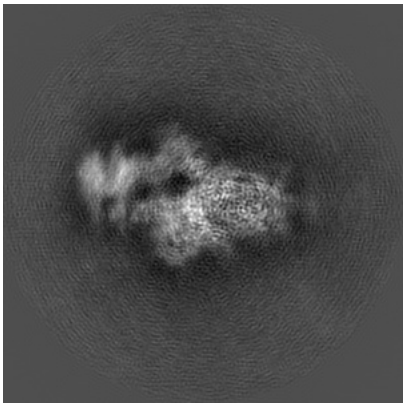
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections (i)

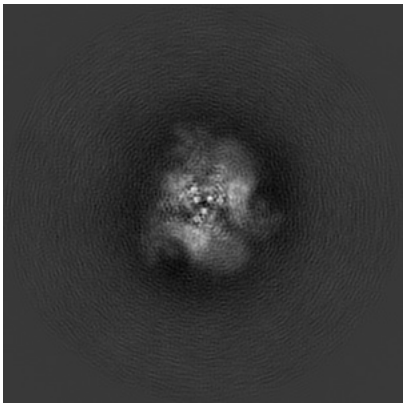
6.1.1 Primary map



X



Y

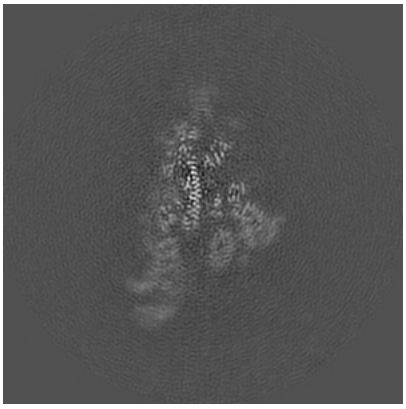


Z

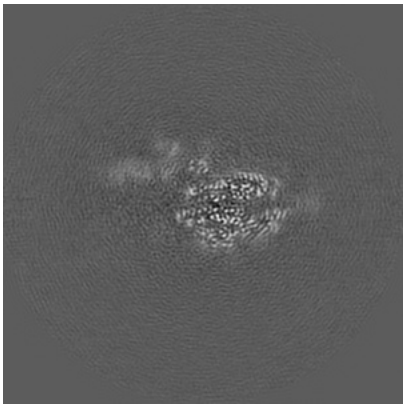
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

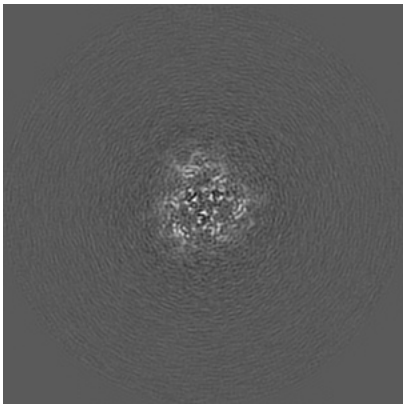
6.2.1 Primary map



X Index: 240



Y Index: 240



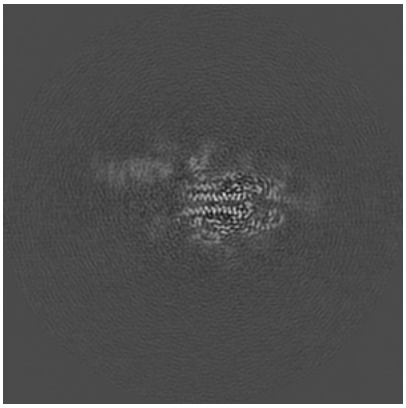
Z Index: 240

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

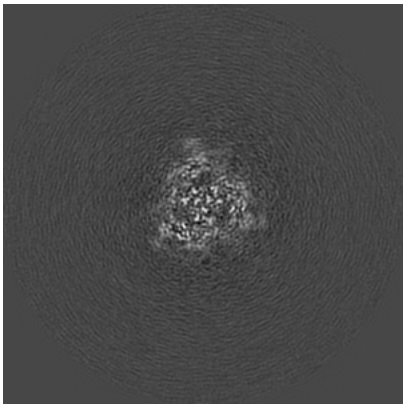
6.3 Largest variance slices (i)

6.3.1 Primary map

X Index: 231



Y Index: 245



Z Index: 236

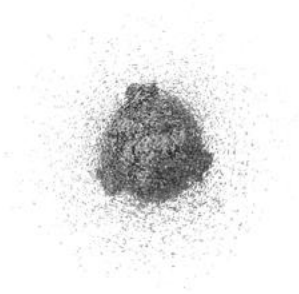
The images above show the largest variance slices of the map in three orthogonal directions.

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

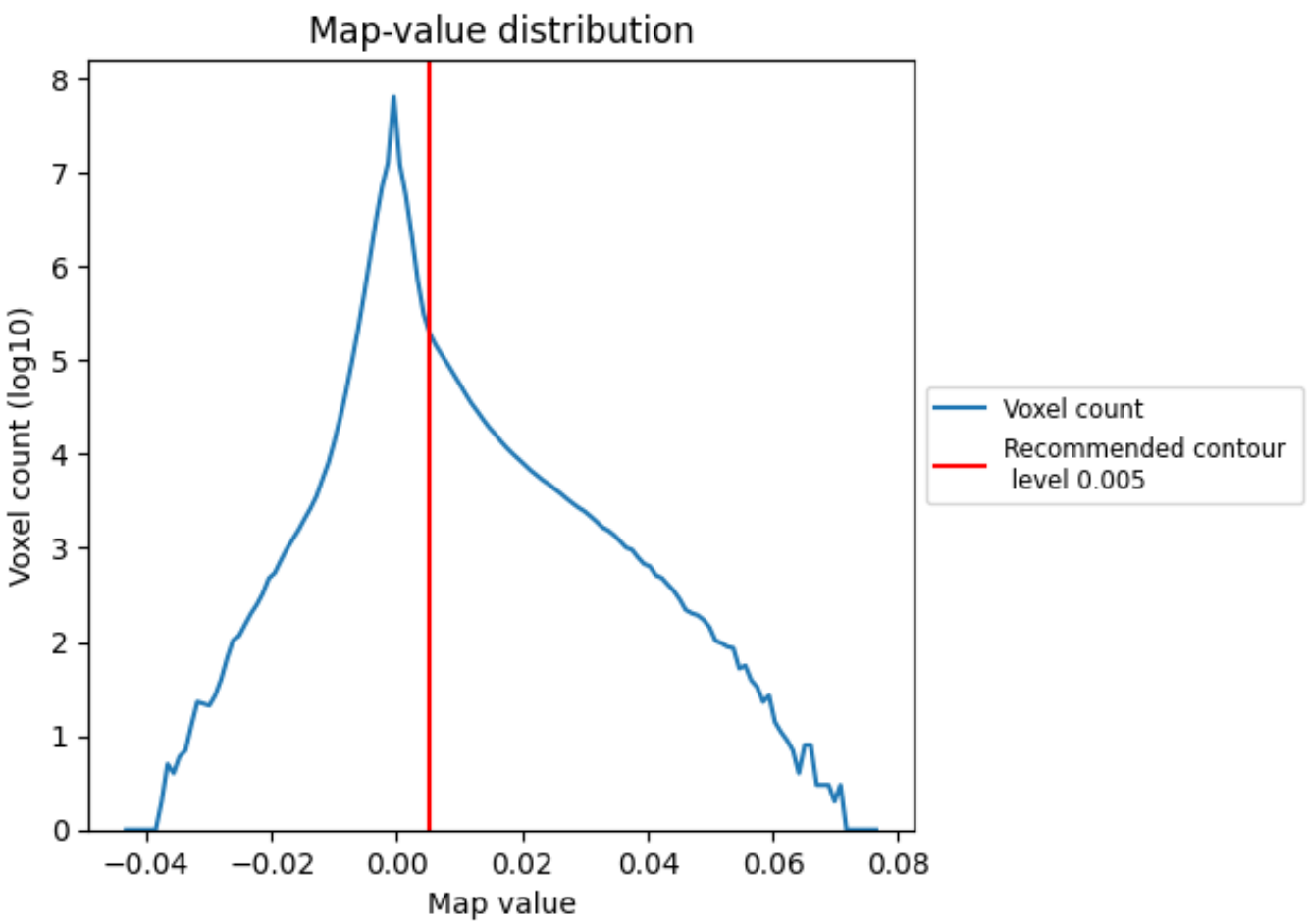
6.5 Mask visualisation (i)

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

7 Map analysis (i)

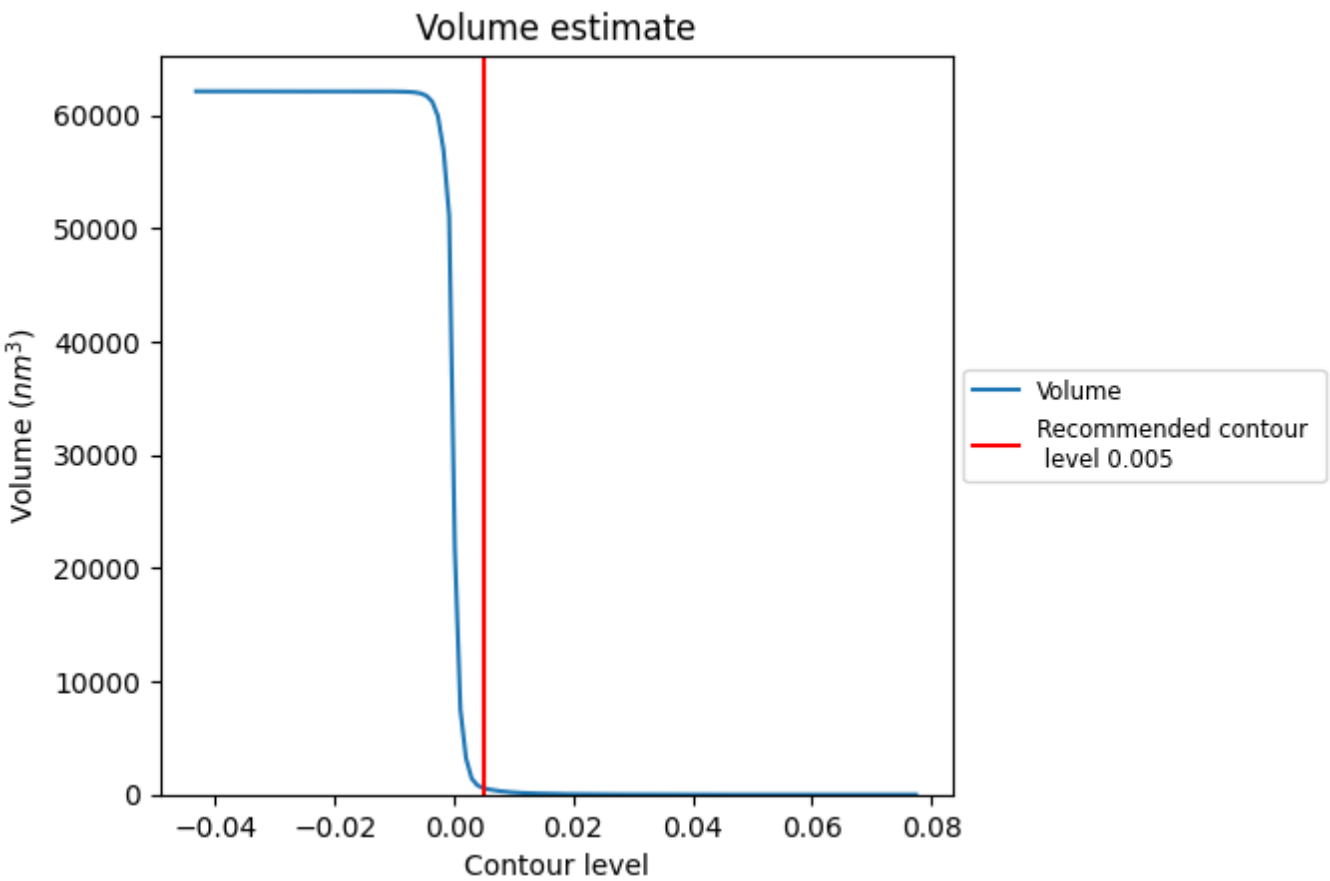
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution (i)



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

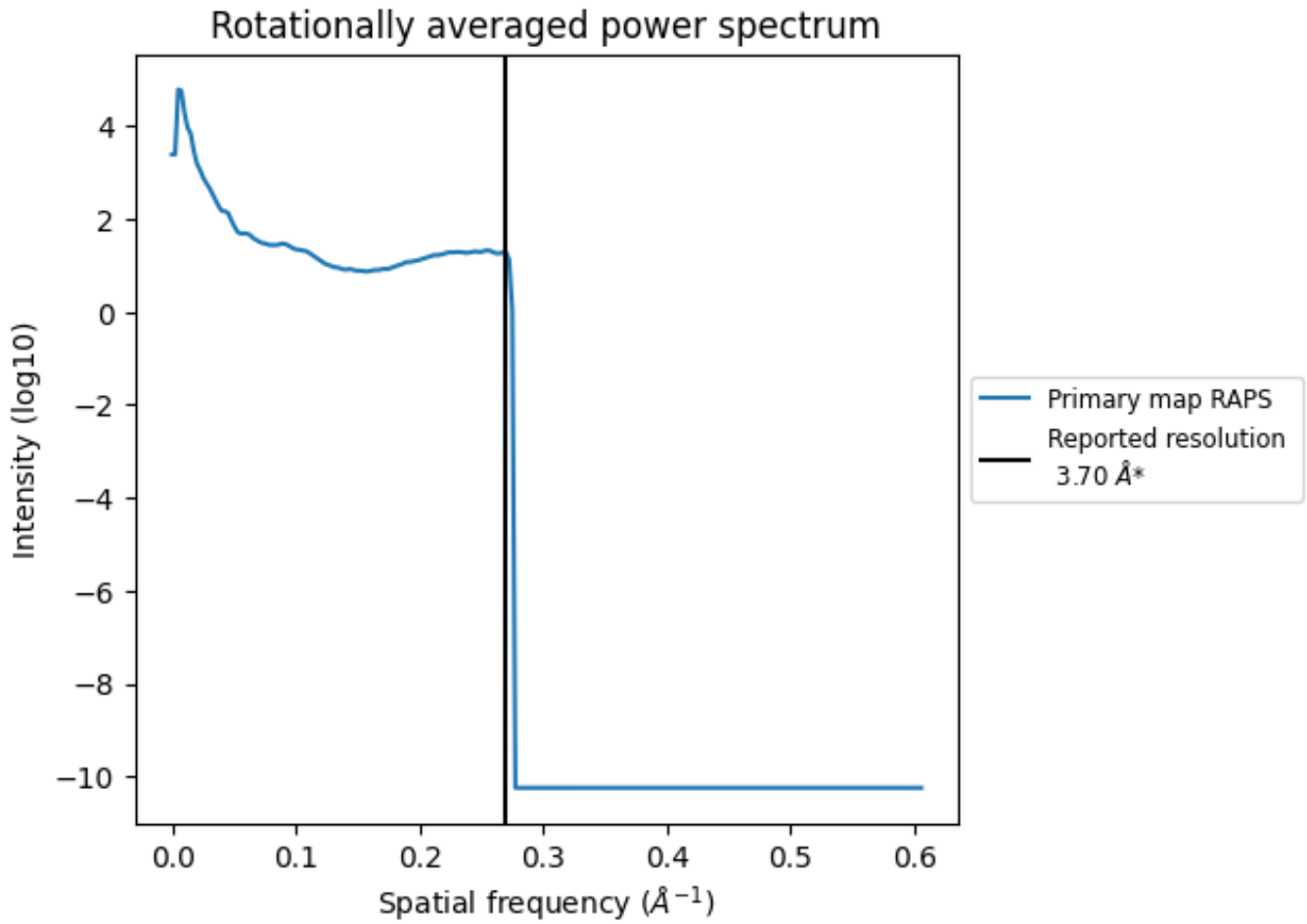
7.2 Volume estimate (i)



The volume at the recommended contour level is 572 nm^3; this corresponds to an approximate mass of 517 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 0.270 Å^{-1}

8 Fourier-Shell correlation (i)

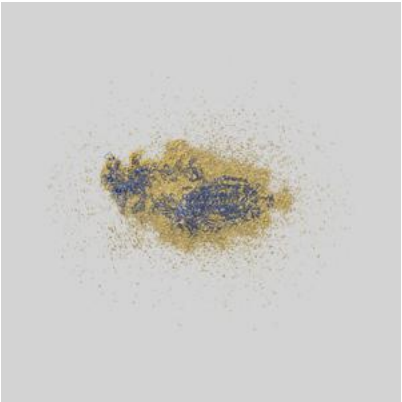
This section was not generated. No FSC curve or half-maps provided.

9 Map-model fit (i)

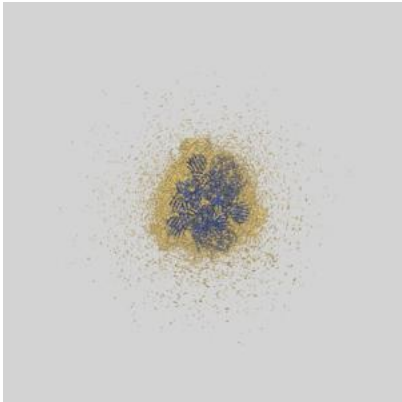
This section contains information regarding the fit between EMDB map EMD-22892 and PDB model 7KJ3. Per-residue inclusion information can be found in section 3 on page 12.

9.1 Map-model overlay (i)

X



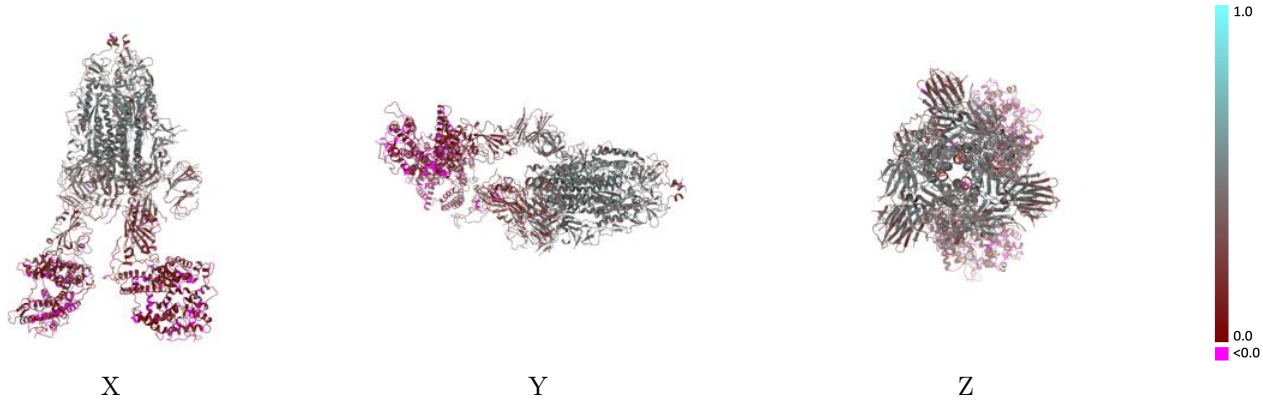
Y



Z

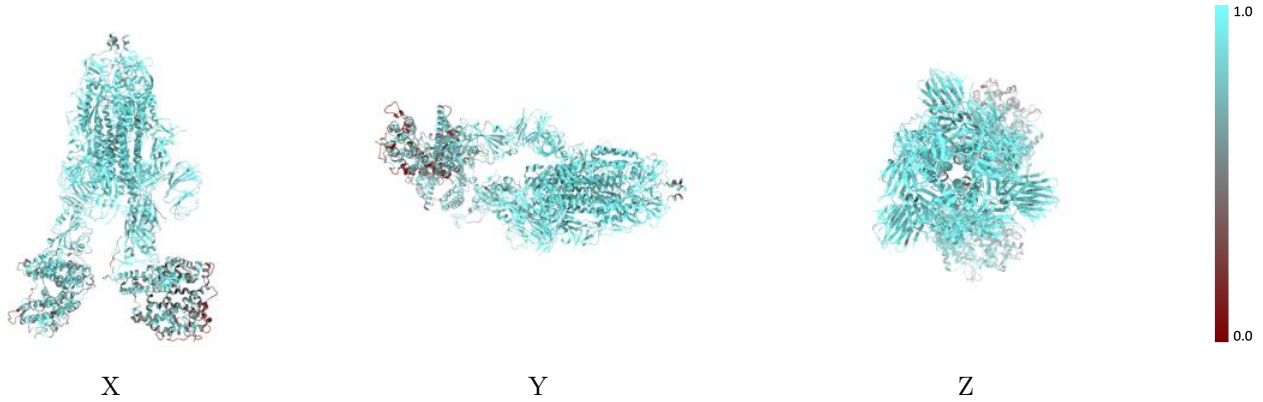
The images above show the 3D surface view of the map at the recommended contour level 0.005 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model (i)



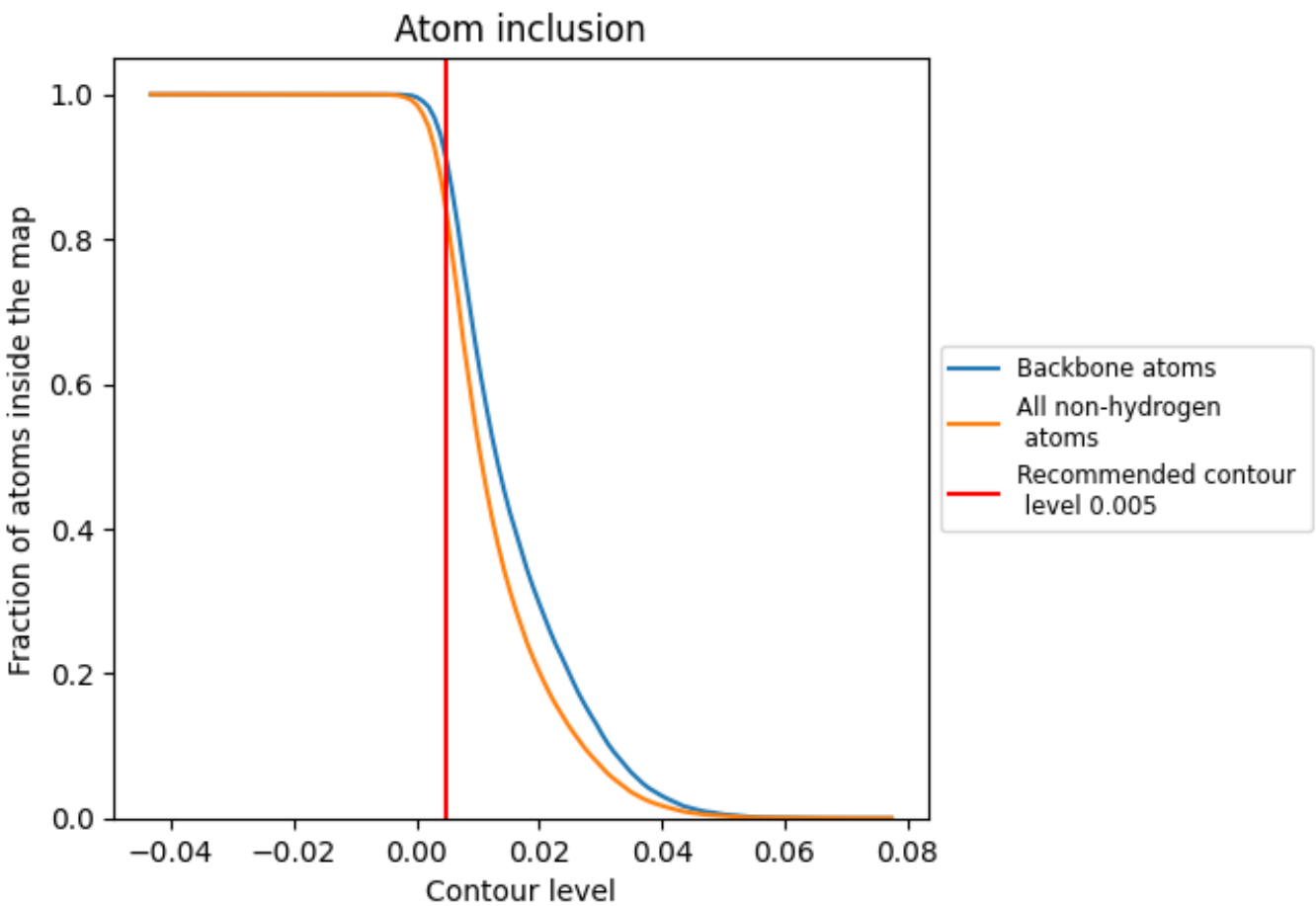
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.005).

9.4 Atom inclusion (i)



At the recommended contour level, 91% of all backbone atoms, 83% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.005) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8322	0.3080
A	0.9057	0.3800
B	0.9107	0.3960
C	0.9108	0.4000
D	0.7367	0.1250
E	0.5911	0.1040
F	0.9286	0.3400
G	0.8929	0.3920
H	0.7857	0.3360
I	0.9286	0.3700
J	0.9286	0.3870
K	0.6429	0.2120
L	0.8571	0.3340
M	0.8571	0.2030
N	0.9286	0.3840
O	0.8214	0.3270
P	0.5000	0.2680
Q	0.2143	-0.1090
R	0.1071	-0.0440
S	0.0714	-0.1940
T	0.3214	0.0010
U	0.3929	0.0690
V	0.1071	-0.2000
W	0.2500	0.1080
X	0.0000	0.0210
Y	0.2500	-0.0360