Full wwPDB EM Validation Report ⓘ

Nov 11, 2024 – 10:24 PM JST

PDB ID	:	7WPR
EMDB ID	:	EMD-32689
Title	:	VWF D'D3 dimer complexed with D1D2 at 4.39 angstron resolution(VWF tube)
Authors	:	Zeng, J.W.; Shu, Z.M.; Zhou, A.W.
Deposited on	:	2022-01-24
Resolution	:	4.39 Å(reported)

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

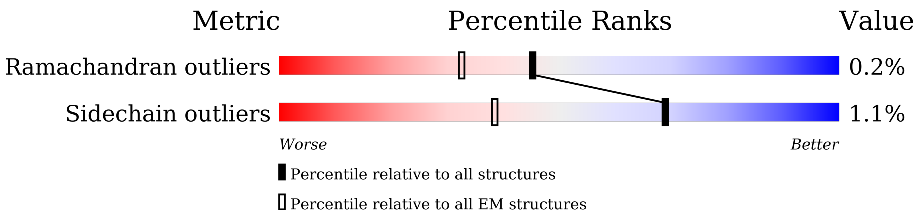
EMDB validation analysis	:	0.0.1.dev113
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

1 Overall quality at a glance ⓘ

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

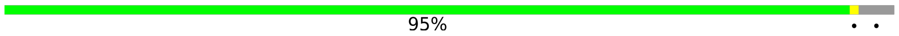
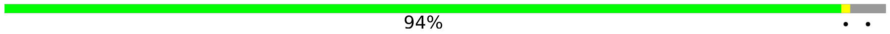
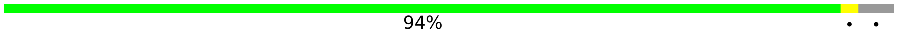
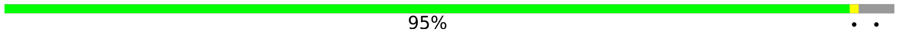
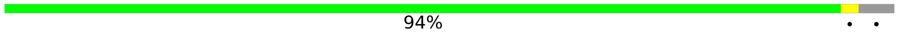
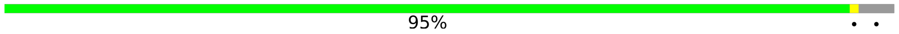
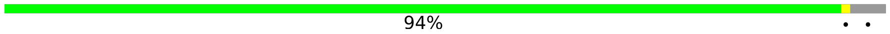
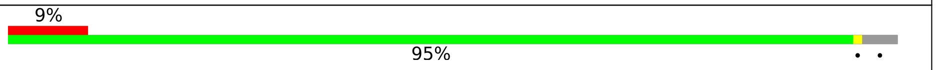
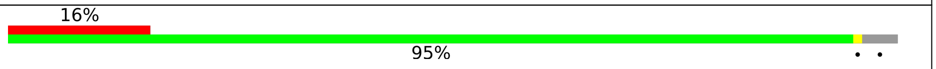
The reported resolution of this entry is 4.39 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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	741	
1	B	741	
1	E	741	
1	F	741	
1	G	741	
1	H	741	
1	I	741	
1	J	741	
1	K	741	

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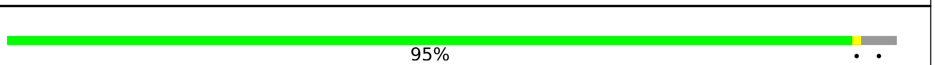
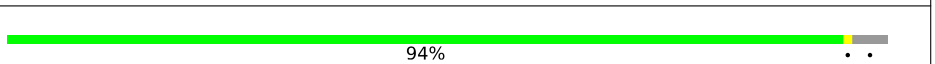
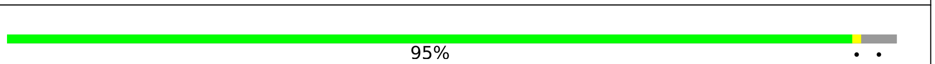
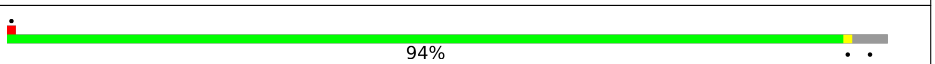
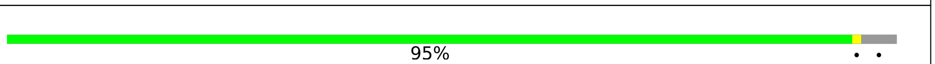
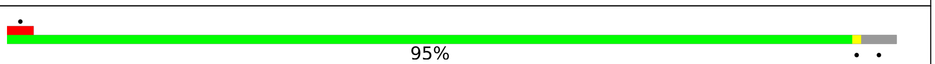
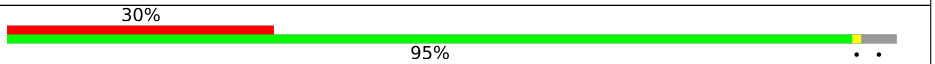
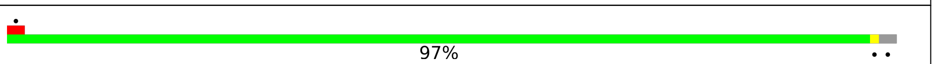
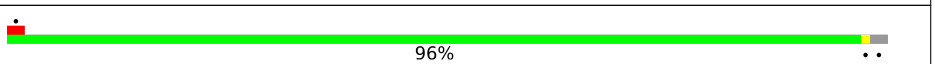
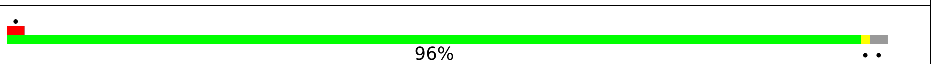
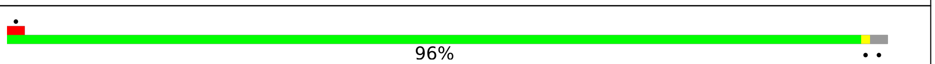
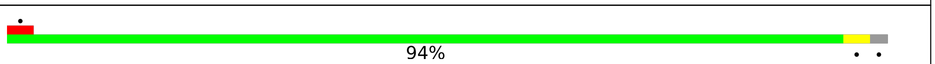
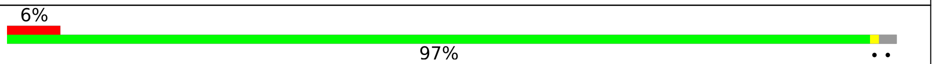
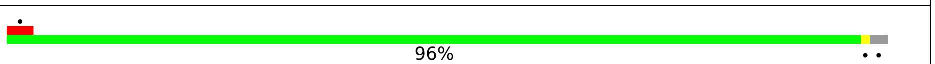
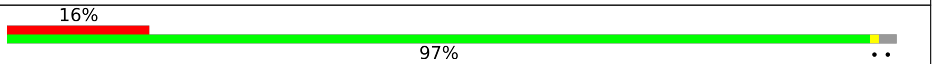
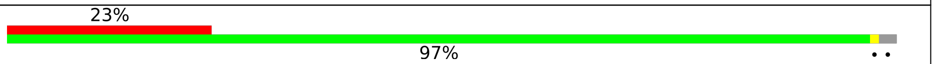
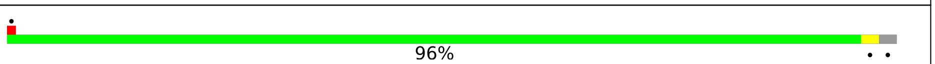
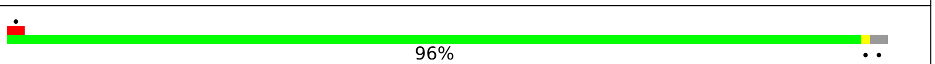
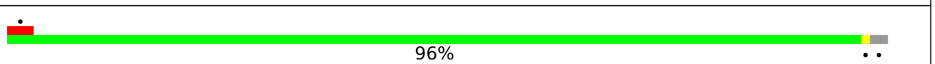
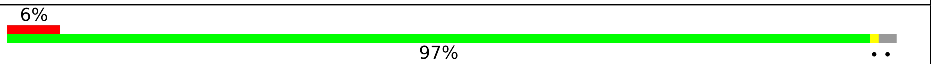
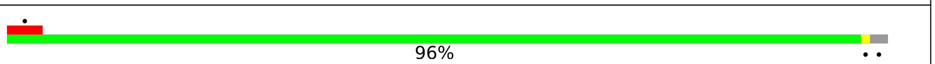
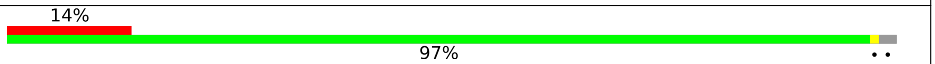
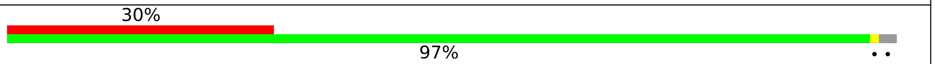
Mol	Chain	Length	Quality of chain
1	L	741	 95%
1	M	741	 94%
1	N	741	 95%
1	O	741	 94%
1	P	741	 95%
1	Q	741	 95%
1	R	741	 30% 95%
2	C	490	 97%
2	D	490	 96%
2	S	490	 96%
2	T	490	 96%
2	U	490	 94%
2	V	490	 6% 97%
2	W	490	 96%
2	X	490	 16% 97%
2	Y	490	 23% 97%
2	Z	490	 96%
2	a	490	 96%
2	b	490	 96%
2	c	490	 6% 97%
2	d	490	 96%
2	e	490	 14% 97%
2	f	490	 30% 97%

2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 145764 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 von Willebrand antigen 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	711	5421	3353	929	1061	78	0	0
1	B	711	5421	3353	929	1061	78	0	0
1	E	711	5421	3353	929	1061	78	0	0
1	F	711	5421	3353	929	1061	78	0	0
1	G	711	5421	3353	929	1061	78	0	0
1	H	711	5421	3353	929	1061	78	0	0
1	I	711	5421	3353	929	1061	78	0	0
1	J	711	5421	3353	929	1061	78	0	0
1	K	711	5421	3353	929	1061	78	0	0
1	L	711	5421	3353	929	1061	78	0	0
1	M	711	5421	3353	929	1061	78	0	0
1	N	711	5421	3353	929	1061	78	0	0
1	O	711	5421	3353	929	1061	78	0	0
1	P	711	5421	3353	929	1061	78	0	0
1	Q	711	5421	3353	929	1061	78	0	0
1	R	711	5421	3353	929	1061	78	0	0

- Molecule 2 is a protein called von Willebrand factor.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	a	478	Total 3649	C 2247	N 631	O 711	S 60	1	0
2	b	478	Total 3649	C 2247	N 631	O 711	S 60	1	0
2	C	478	Total 3649	C 2247	N 631	O 711	S 60	1	0
2	c	478	Total 3649	C 2247	N 631	O 711	S 60	1	0
2	D	478	Total 3649	C 2247	N 631	O 711	S 60	1	0
2	d	478	Total 3649	C 2247	N 631	O 711	S 60	1	0
2	e	478	Total 3649	C 2247	N 631	O 711	S 60	1	0
2	f	478	Total 3649	C 2247	N 631	O 711	S 60	1	0
2	S	478	Total 3649	C 2247	N 631	O 711	S 60	1	0
2	T	478	Total 3649	C 2247	N 631	O 711	S 60	1	0
2	U	478	Total 3649	C 2247	N 631	O 711	S 60	1	0
2	V	478	Total 3649	C 2247	N 631	O 711	S 60	1	0
2	W	478	Total 3649	C 2247	N 631	O 711	S 60	1	0
2	X	478	Total 3649	C 2247	N 631	O 711	S 60	1	0
2	Y	478	Total 3649	C 2247	N 631	O 711	S 60	1	0
2	Z	478	Total 3649	C 2247	N 631	O 711	S 60	1	0

There are 192 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
a	1242	GLY	-	expression tag	UNP P04275
a	1243	LEU	-	expression tag	UNP P04275
a	1244	VAL	-	expression tag	UNP P04275
a	1245	VAL	-	expression tag	UNP P04275
a	1246	PRO	-	expression tag	UNP P04275
a	1247	PRO	-	expression tag	UNP P04275
a	1248	HIS	-	expression tag	UNP P04275
a	1249	HIS	-	expression tag	UNP P04275

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Chain	Residue	Modelled	Actual	Comment	Reference
a	1250	HIS	-	expression tag	UNP P04275
a	1251	HIS	-	expression tag	UNP P04275
a	1252	HIS	-	expression tag	UNP P04275
a	1253	HIS	-	expression tag	UNP P04275
b	1242	GLY	-	expression tag	UNP P04275
b	1243	LEU	-	expression tag	UNP P04275
b	1244	VAL	-	expression tag	UNP P04275
b	1245	VAL	-	expression tag	UNP P04275
b	1246	PRO	-	expression tag	UNP P04275
b	1247	PRO	-	expression tag	UNP P04275
b	1248	HIS	-	expression tag	UNP P04275
b	1249	HIS	-	expression tag	UNP P04275
b	1250	HIS	-	expression tag	UNP P04275
b	1251	HIS	-	expression tag	UNP P04275
b	1252	HIS	-	expression tag	UNP P04275
b	1253	HIS	-	expression tag	UNP P04275
C	1242	GLY	-	expression tag	UNP P04275
C	1243	LEU	-	expression tag	UNP P04275
C	1244	VAL	-	expression tag	UNP P04275
C	1245	VAL	-	expression tag	UNP P04275
C	1246	PRO	-	expression tag	UNP P04275
C	1247	PRO	-	expression tag	UNP P04275
C	1248	HIS	-	expression tag	UNP P04275
C	1249	HIS	-	expression tag	UNP P04275
C	1250	HIS	-	expression tag	UNP P04275
C	1251	HIS	-	expression tag	UNP P04275
C	1252	HIS	-	expression tag	UNP P04275
C	1253	HIS	-	expression tag	UNP P04275
c	1242	GLY	-	expression tag	UNP P04275
c	1243	LEU	-	expression tag	UNP P04275
c	1244	VAL	-	expression tag	UNP P04275
c	1245	VAL	-	expression tag	UNP P04275
c	1246	PRO	-	expression tag	UNP P04275
c	1247	PRO	-	expression tag	UNP P04275
c	1248	HIS	-	expression tag	UNP P04275
c	1249	HIS	-	expression tag	UNP P04275
c	1250	HIS	-	expression tag	UNP P04275
c	1251	HIS	-	expression tag	UNP P04275
c	1252	HIS	-	expression tag	UNP P04275
c	1253	HIS	-	expression tag	UNP P04275
D	1242	GLY	-	expression tag	UNP P04275
D	1243	LEU	-	expression tag	UNP P04275

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Chain	Residue	Modelled	Actual	Comment	Reference
D	1244	VAL	-	expression tag	UNP P04275
D	1245	VAL	-	expression tag	UNP P04275
D	1246	PRO	-	expression tag	UNP P04275
D	1247	PRO	-	expression tag	UNP P04275
D	1248	HIS	-	expression tag	UNP P04275
D	1249	HIS	-	expression tag	UNP P04275
D	1250	HIS	-	expression tag	UNP P04275
D	1251	HIS	-	expression tag	UNP P04275
D	1252	HIS	-	expression tag	UNP P04275
D	1253	HIS	-	expression tag	UNP P04275
d	1242	GLY	-	expression tag	UNP P04275
d	1243	LEU	-	expression tag	UNP P04275
d	1244	VAL	-	expression tag	UNP P04275
d	1245	VAL	-	expression tag	UNP P04275
d	1246	PRO	-	expression tag	UNP P04275
d	1247	PRO	-	expression tag	UNP P04275
d	1248	HIS	-	expression tag	UNP P04275
d	1249	HIS	-	expression tag	UNP P04275
d	1250	HIS	-	expression tag	UNP P04275
d	1251	HIS	-	expression tag	UNP P04275
d	1252	HIS	-	expression tag	UNP P04275
d	1253	HIS	-	expression tag	UNP P04275
e	1242	GLY	-	expression tag	UNP P04275
e	1243	LEU	-	expression tag	UNP P04275
e	1244	VAL	-	expression tag	UNP P04275
e	1245	VAL	-	expression tag	UNP P04275
e	1246	PRO	-	expression tag	UNP P04275
e	1247	PRO	-	expression tag	UNP P04275
e	1248	HIS	-	expression tag	UNP P04275
e	1249	HIS	-	expression tag	UNP P04275
e	1250	HIS	-	expression tag	UNP P04275
e	1251	HIS	-	expression tag	UNP P04275
e	1252	HIS	-	expression tag	UNP P04275
e	1253	HIS	-	expression tag	UNP P04275
f	1242	GLY	-	expression tag	UNP P04275
f	1243	LEU	-	expression tag	UNP P04275
f	1244	VAL	-	expression tag	UNP P04275
f	1245	VAL	-	expression tag	UNP P04275
f	1246	PRO	-	expression tag	UNP P04275
f	1247	PRO	-	expression tag	UNP P04275
f	1248	HIS	-	expression tag	UNP P04275
f	1249	HIS	-	expression tag	UNP P04275

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Chain	Residue	Modelled	Actual	Comment	Reference
f	1250	HIS	-	expression tag	UNP P04275
f	1251	HIS	-	expression tag	UNP P04275
f	1252	HIS	-	expression tag	UNP P04275
f	1253	HIS	-	expression tag	UNP P04275
S	1242	GLY	-	expression tag	UNP P04275
S	1243	LEU	-	expression tag	UNP P04275
S	1244	VAL	-	expression tag	UNP P04275
S	1245	VAL	-	expression tag	UNP P04275
S	1246	PRO	-	expression tag	UNP P04275
S	1247	PRO	-	expression tag	UNP P04275
S	1248	HIS	-	expression tag	UNP P04275
S	1249	HIS	-	expression tag	UNP P04275
S	1250	HIS	-	expression tag	UNP P04275
S	1251	HIS	-	expression tag	UNP P04275
S	1252	HIS	-	expression tag	UNP P04275
S	1253	HIS	-	expression tag	UNP P04275
T	1242	GLY	-	expression tag	UNP P04275
T	1243	LEU	-	expression tag	UNP P04275
T	1244	VAL	-	expression tag	UNP P04275
T	1245	VAL	-	expression tag	UNP P04275
T	1246	PRO	-	expression tag	UNP P04275
T	1247	PRO	-	expression tag	UNP P04275
T	1248	HIS	-	expression tag	UNP P04275
T	1249	HIS	-	expression tag	UNP P04275
T	1250	HIS	-	expression tag	UNP P04275
T	1251	HIS	-	expression tag	UNP P04275
T	1252	HIS	-	expression tag	UNP P04275
T	1253	HIS	-	expression tag	UNP P04275
U	1242	GLY	-	expression tag	UNP P04275
U	1243	LEU	-	expression tag	UNP P04275
U	1244	VAL	-	expression tag	UNP P04275
U	1245	VAL	-	expression tag	UNP P04275
U	1246	PRO	-	expression tag	UNP P04275
U	1247	PRO	-	expression tag	UNP P04275
U	1248	HIS	-	expression tag	UNP P04275
U	1249	HIS	-	expression tag	UNP P04275
U	1250	HIS	-	expression tag	UNP P04275
U	1251	HIS	-	expression tag	UNP P04275
U	1252	HIS	-	expression tag	UNP P04275
U	1253	HIS	-	expression tag	UNP P04275
V	1242	GLY	-	expression tag	UNP P04275
V	1243	LEU	-	expression tag	UNP P04275

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Chain	Residue	Modelled	Actual	Comment	Reference
V	1244	VAL	-	expression tag	UNP P04275
V	1245	VAL	-	expression tag	UNP P04275
V	1246	PRO	-	expression tag	UNP P04275
V	1247	PRO	-	expression tag	UNP P04275
V	1248	HIS	-	expression tag	UNP P04275
V	1249	HIS	-	expression tag	UNP P04275
V	1250	HIS	-	expression tag	UNP P04275
V	1251	HIS	-	expression tag	UNP P04275
V	1252	HIS	-	expression tag	UNP P04275
V	1253	HIS	-	expression tag	UNP P04275
W	1242	GLY	-	expression tag	UNP P04275
W	1243	LEU	-	expression tag	UNP P04275
W	1244	VAL	-	expression tag	UNP P04275
W	1245	VAL	-	expression tag	UNP P04275
W	1246	PRO	-	expression tag	UNP P04275
W	1247	PRO	-	expression tag	UNP P04275
W	1248	HIS	-	expression tag	UNP P04275
W	1249	HIS	-	expression tag	UNP P04275
W	1250	HIS	-	expression tag	UNP P04275
W	1251	HIS	-	expression tag	UNP P04275
W	1252	HIS	-	expression tag	UNP P04275
W	1253	HIS	-	expression tag	UNP P04275
X	1242	GLY	-	expression tag	UNP P04275
X	1243	LEU	-	expression tag	UNP P04275
X	1244	VAL	-	expression tag	UNP P04275
X	1245	VAL	-	expression tag	UNP P04275
X	1246	PRO	-	expression tag	UNP P04275
X	1247	PRO	-	expression tag	UNP P04275
X	1248	HIS	-	expression tag	UNP P04275
X	1249	HIS	-	expression tag	UNP P04275
X	1250	HIS	-	expression tag	UNP P04275
X	1251	HIS	-	expression tag	UNP P04275
X	1252	HIS	-	expression tag	UNP P04275
X	1253	HIS	-	expression tag	UNP P04275
Y	1242	GLY	-	expression tag	UNP P04275
Y	1243	LEU	-	expression tag	UNP P04275
Y	1244	VAL	-	expression tag	UNP P04275
Y	1245	VAL	-	expression tag	UNP P04275
Y	1246	PRO	-	expression tag	UNP P04275
Y	1247	PRO	-	expression tag	UNP P04275
Y	1248	HIS	-	expression tag	UNP P04275
Y	1249	HIS	-	expression tag	UNP P04275

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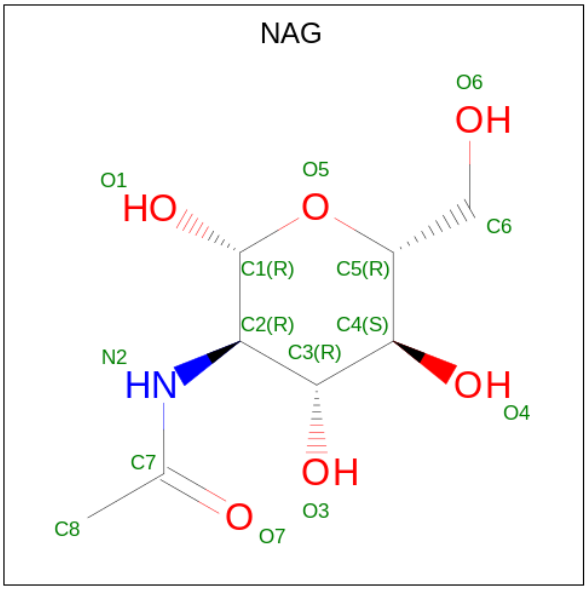
Chain	Residue	Modelled	Actual	Comment	Reference
Y	1250	HIS	-	expression tag	UNP P04275
Y	1251	HIS	-	expression tag	UNP P04275
Y	1252	HIS	-	expression tag	UNP P04275
Y	1253	HIS	-	expression tag	UNP P04275
Z	1242	GLY	-	expression tag	UNP P04275
Z	1243	LEU	-	expression tag	UNP P04275
Z	1244	VAL	-	expression tag	UNP P04275
Z	1245	VAL	-	expression tag	UNP P04275
Z	1246	PRO	-	expression tag	UNP P04275
Z	1247	PRO	-	expression tag	UNP P04275
Z	1248	HIS	-	expression tag	UNP P04275
Z	1249	HIS	-	expression tag	UNP P04275
Z	1250	HIS	-	expression tag	UNP P04275
Z	1251	HIS	-	expression tag	UNP P04275
Z	1252	HIS	-	expression tag	UNP P04275
Z	1253	HIS	-	expression tag	UNP P04275

- Molecule 3 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
3	A	1	Total C N O 14 8 1 5	0
3	A	1	Total C N O 14 8 1 5	0
3	a	1	Total C N O 14 8 1 5	0

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Mol	Chain	Residues	Atoms				AltConf
3	a	1	Total 14	C 8	N 1	O 5	0
3	B	1	Total 14	C 8	N 1	O 5	0
3	B	1	Total 14	C 8	N 1	O 5	0
3	b	1	Total 14	C 8	N 1	O 5	0
3	b	1	Total 14	C 8	N 1	O 5	0
3	C	1	Total 14	C 8	N 1	O 5	0
3	C	1	Total 14	C 8	N 1	O 5	0
3	D	1	Total 14	C 8	N 1	O 5	0
3	D	1	Total 14	C 8	N 1	O 5	0
3	d	1	Total 14	C 8	N 1	O 5	0
3	E	1	Total 14	C 8	N 1	O 5	0
3	E	1	Total 14	C 8	N 1	O 5	0
3	F	1	Total 14	C 8	N 1	O 5	0
3	F	1	Total 14	C 8	N 1	O 5	0
3	G	1	Total 14	C 8	N 1	O 5	0
3	G	1	Total 14	C 8	N 1	O 5	0
3	I	1	Total 14	C 8	N 1	O 5	0
3	I	1	Total 14	C 8	N 1	O 5	0
3	L	1	Total 14	C 8	N 1	O 5	0
3	L	1	Total 14	C 8	N 1	O 5	0
3	M	1	Total 14	C 8	N 1	O 5	0

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Mol	Chain	Residues	Atoms	AltConf
3	M	1	Total C N O 14 8 1 5	0
3	N	1	Total C N O 14 8 1 5	0
3	N	1	Total C N O 14 8 1 5	0
3	O	1	Total C N O 14 8 1 5	0
3	O	1	Total C N O 14 8 1 5	0
3	P	1	Total C N O 14 8 1 5	0
3	P	1	Total C N O 14 8 1 5	0
3	S	1	Total C N O 14 8 1 5	0
3	S	1	Total C N O 14 8 1 5	0
3	T	1	Total C N O 14 8 1 5	0
3	T	1	Total C N O 14 8 1 5	0
3	U	1	Total C N O 14 8 1 5	0
3	U	1	Total C N O 14 8 1 5	0
3	V	1	Total C N O 14 8 1 5	0
3	W	1	Total C N O 14 8 1 5	0
3	W	1	Total C N O 14 8 1 5	0
3	Z	1	Total C N O 14 8 1 5	0
3	Z	1	Total C N O 14 8 1 5	0

- Molecule 4 is CALCIUM ION (three-letter code: CA) (formula: Ca) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms	AltConf
4	A	2	Total Ca 2 2	0

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Mol	Chain	Residues	Atoms	AltConf
4	a	1	Total Ca 1 1	0
4	B	2	Total Ca 2 2	0
4	b	1	Total Ca 1 1	0
4	C	2	Total Ca 2 2	0
4	c	1	Total Ca 1 1	0
4	D	1	Total Ca 1 1	0
4	d	1	Total Ca 1 1	0
4	E	2	Total Ca 2 2	0
4	e	1	Total Ca 1 1	0
4	F	2	Total Ca 2 2	0
4	f	1	Total Ca 1 1	0
4	G	2	Total Ca 2 2	0
4	H	2	Total Ca 2 2	0
4	I	2	Total Ca 2 2	0
4	J	2	Total Ca 2 2	0
4	K	2	Total Ca 2 2	0
4	L	2	Total Ca 2 2	0
4	M	2	Total Ca 2 2	0
4	N	2	Total Ca 2 2	0
4	O	2	Total Ca 2 2	0
4	P	2	Total Ca 2 2	0

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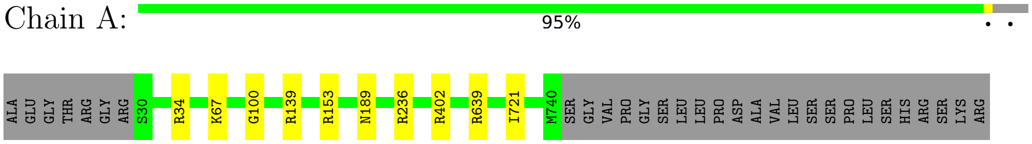
Mol	Chain	Residues	Atoms	AltConf
4	Q	2	Total Ca 2 2	0
4	R	2	Total Ca 2 2	0
4	S	2	Total Ca 2 2	0
4	T	2	Total Ca 2 2	0
4	U	2	Total Ca 2 2	0
4	V	2	Total Ca 2 2	0
4	W	2	Total Ca 2 2	0
4	X	2	Total Ca 2 2	0
4	Y	2	Total Ca 2 2	0
4	Z	1	Total Ca 1 1	0

3 Residue-property plots ⓘ

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

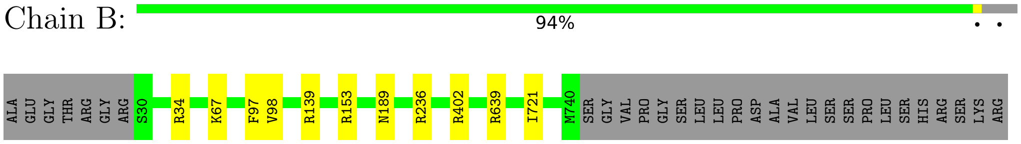
- Molecule 1: von Willebrand antigen 2

Chain A:



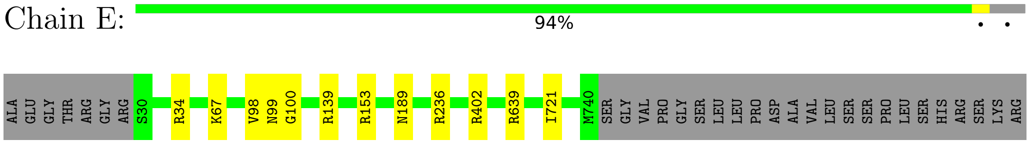
- Molecule 1: von Willebrand antigen 2

Chain B:



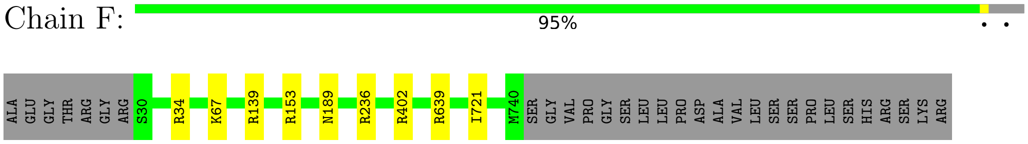
- Molecule 1: von Willebrand antigen 2

Chain E:



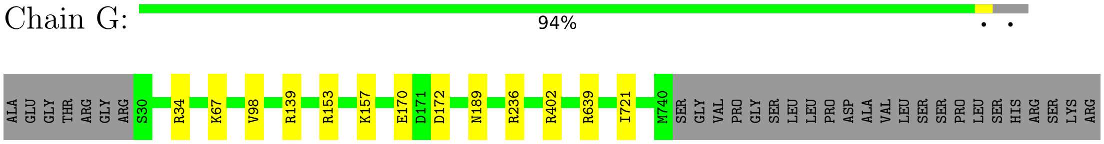
- Molecule 1: von Willebrand antigen 2

Chain F:



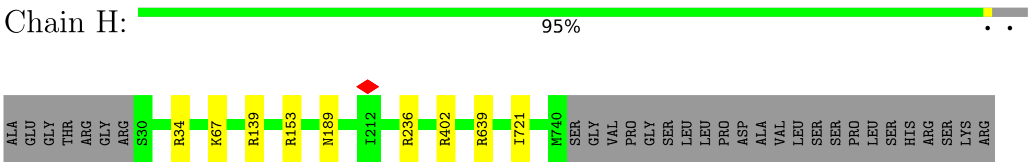
- Molecule 1: von Willebrand antigen 2

Chain G:



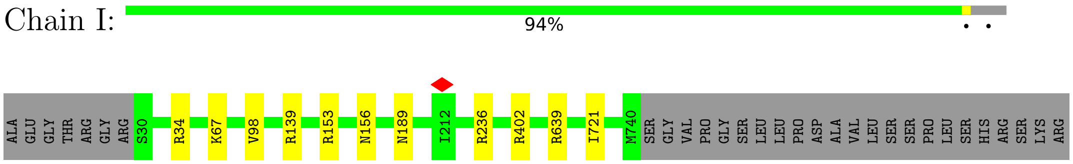
- Molecule 1: von Willebrand antigen 2

Chain H:



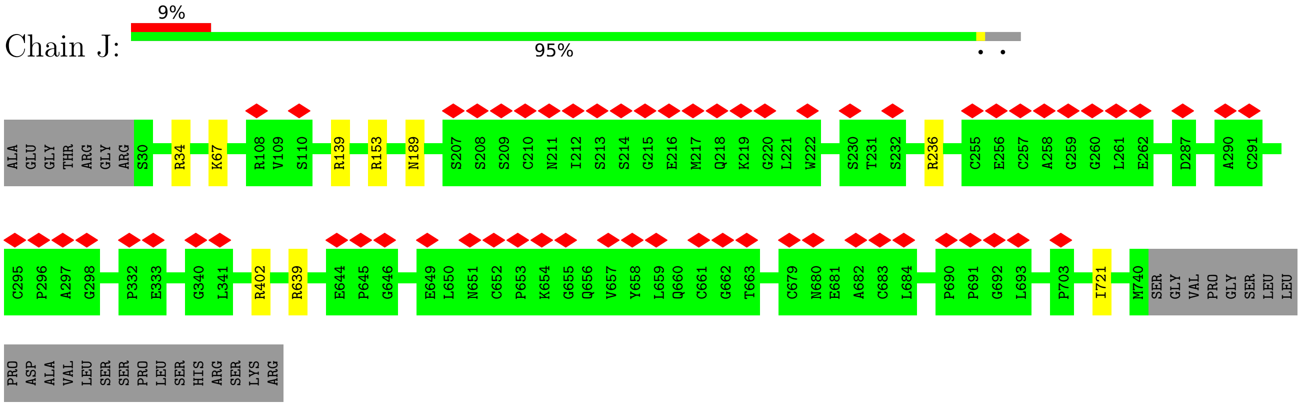
- Molecule 1: von Willebrand antigen 2

Chain I:



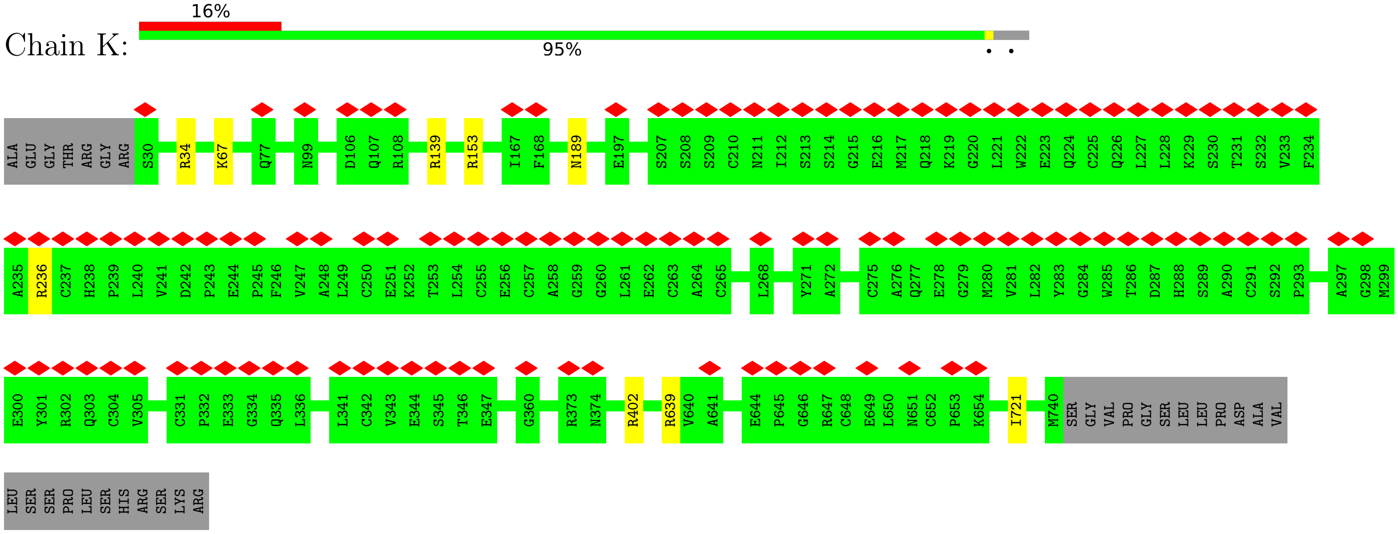
- Molecule 1: von Willebrand antigen 2

Chain J:



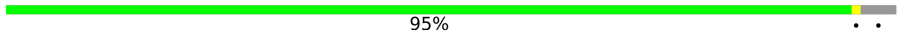
- Molecule 1: von Willebrand antigen 2

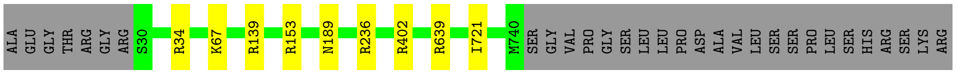
Chain K:



- Molecule 1: von Willebrand antigen 2

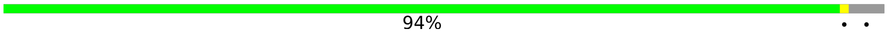
Chain L:

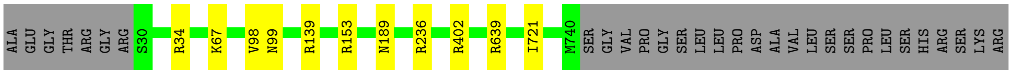




- Molecule 1: von Willebrand antigen 2

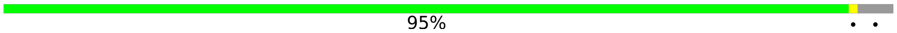
Chain M:

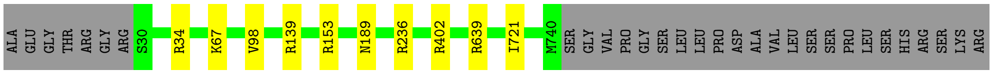




- Molecule 1: von Willebrand antigen 2

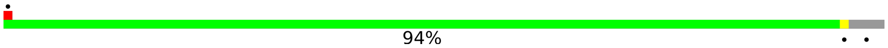
Chain N:

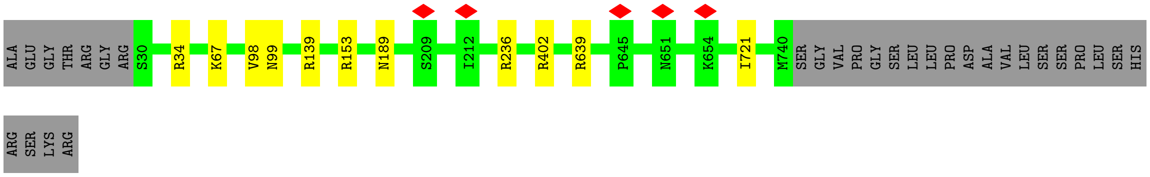




- Molecule 1: von Willebrand antigen 2

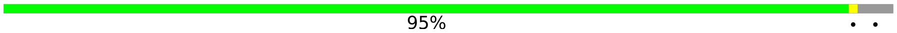
Chain O:

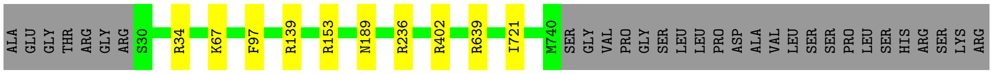




- Molecule 1: von Willebrand antigen 2

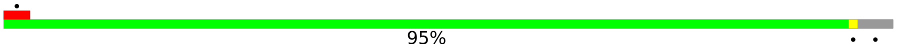
Chain P:

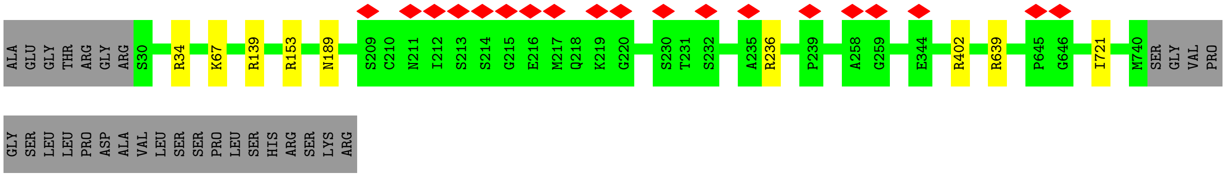




- Molecule 1: von Willebrand antigen 2

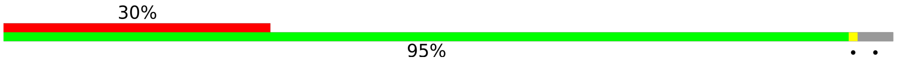
Chain Q:

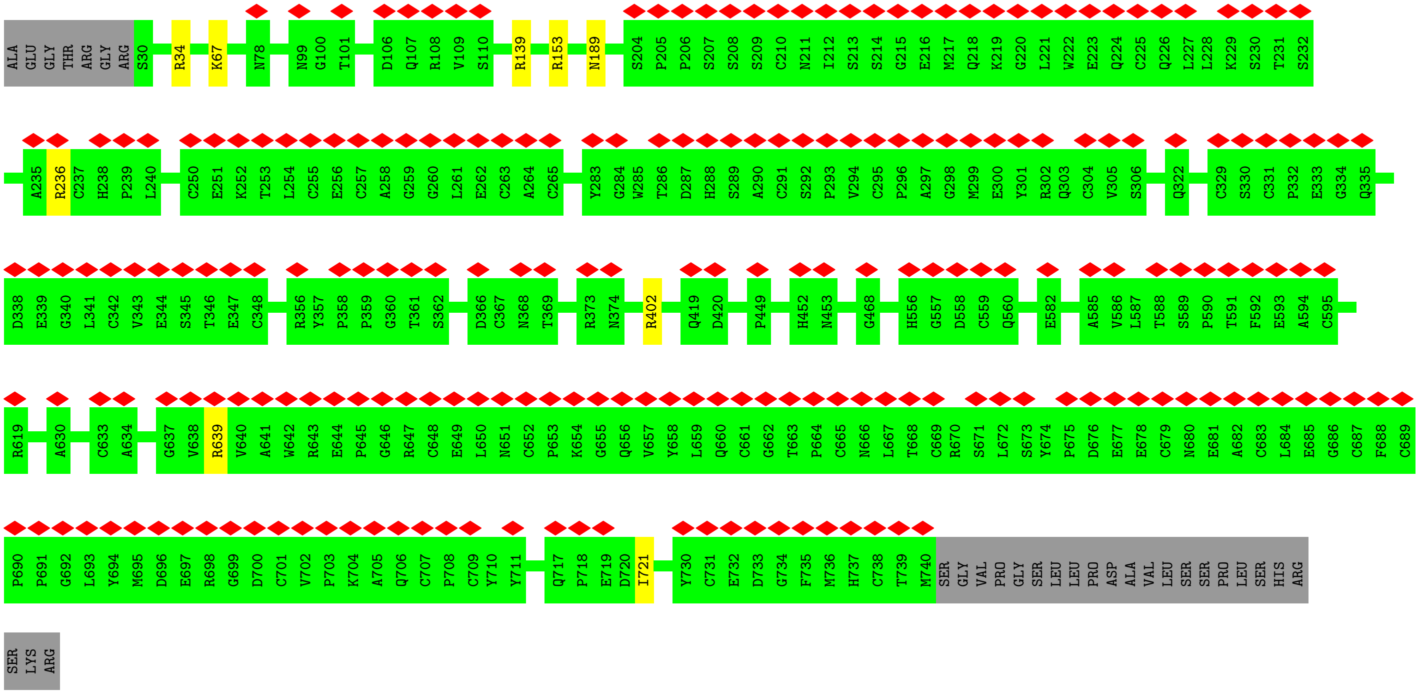




- Molecule 1: von Willebrand antigen 2

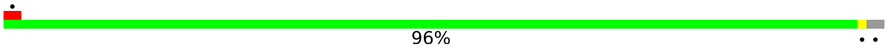
Chain R:

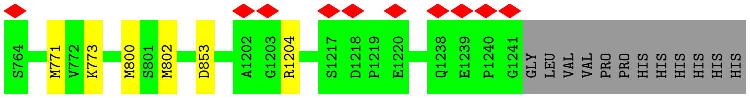




- Molecule 2: von Willebrand factor

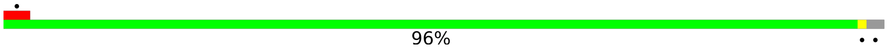
Chain a:

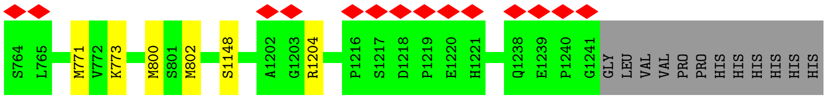




- Molecule 2: von Willebrand factor

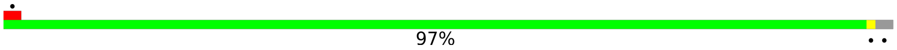
Chain b:

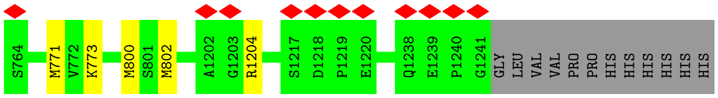




- Molecule 2: von Willebrand factor

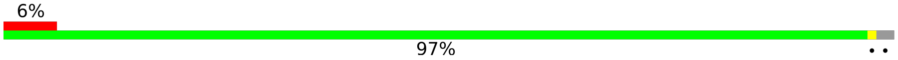
Chain C:

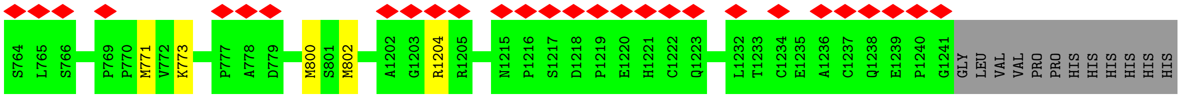




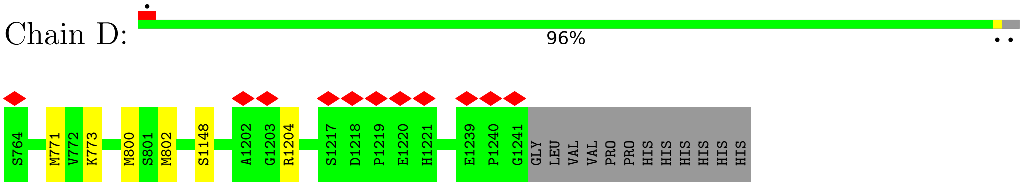
- Molecule 2: von Willebrand factor

Chain c:

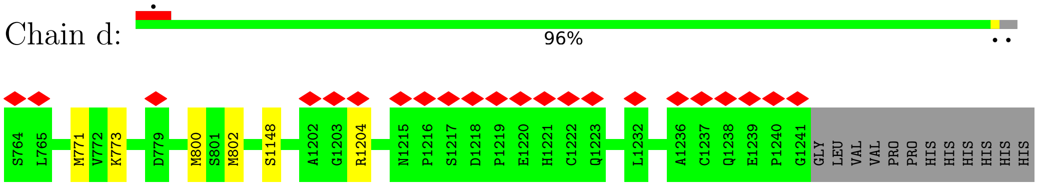




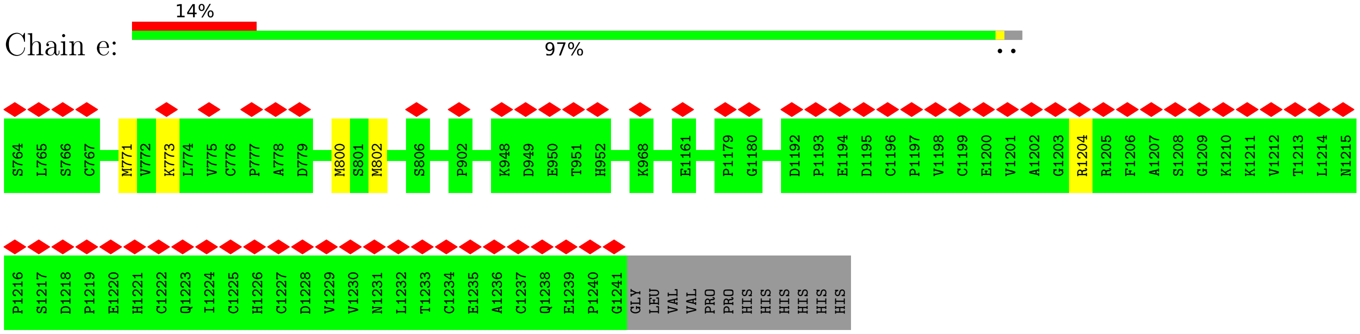
- Molecule 2: von Willebrand factor



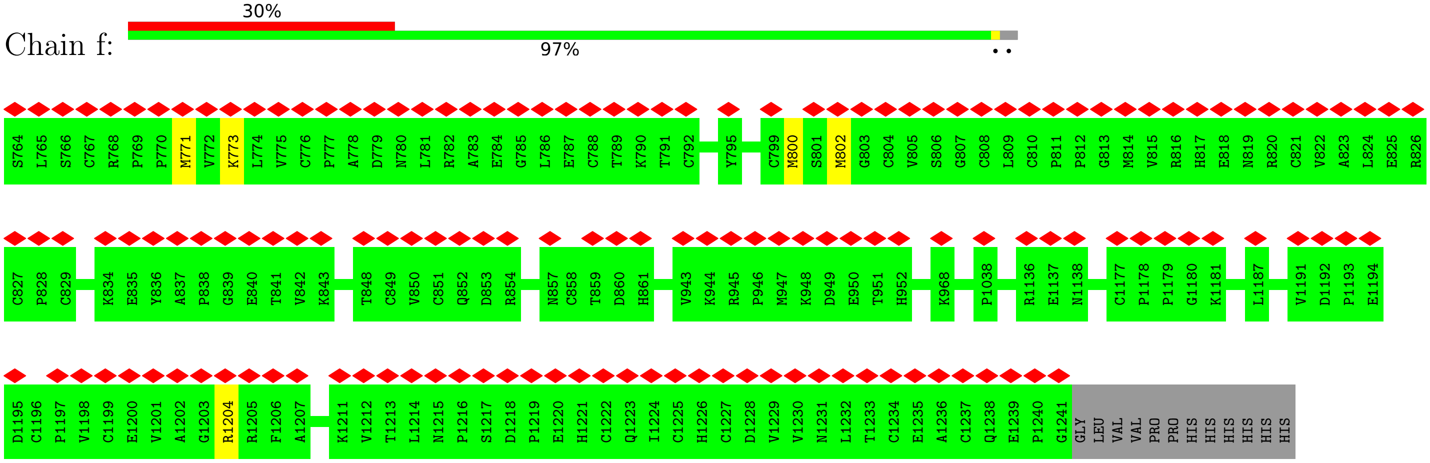
- Molecule 2: von Willebrand factor



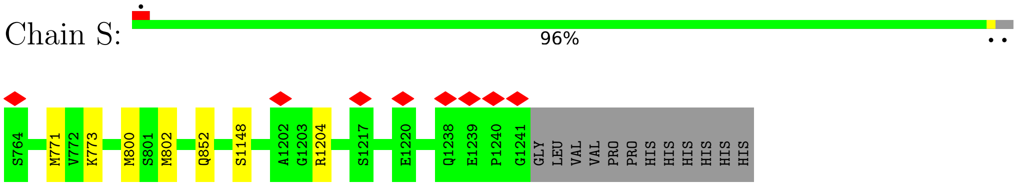
- Molecule 2: von Willebrand factor



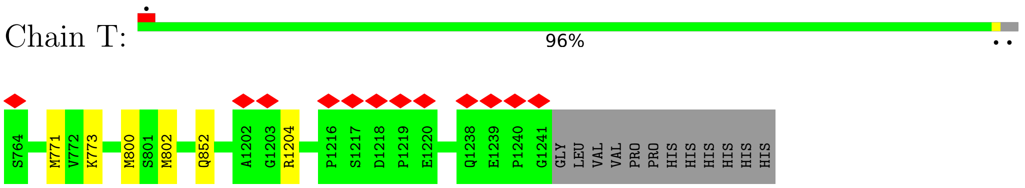
- Molecule 2: von Willebrand factor



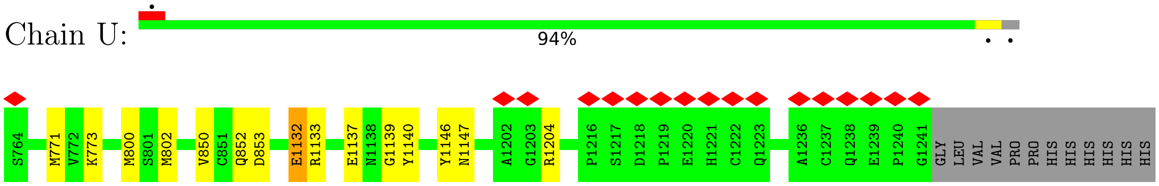
- Molecule 2: von Willebrand factor



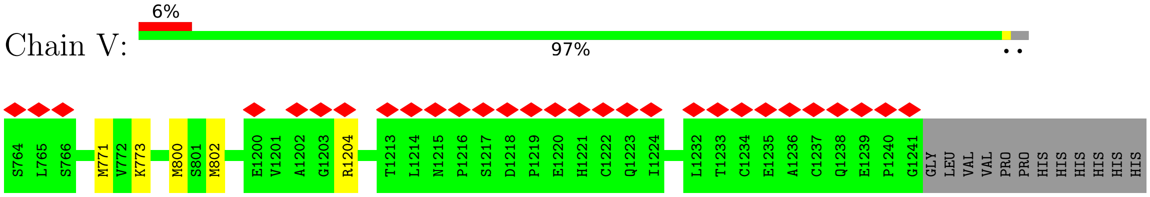
- Molecule 2: von Willebrand factor



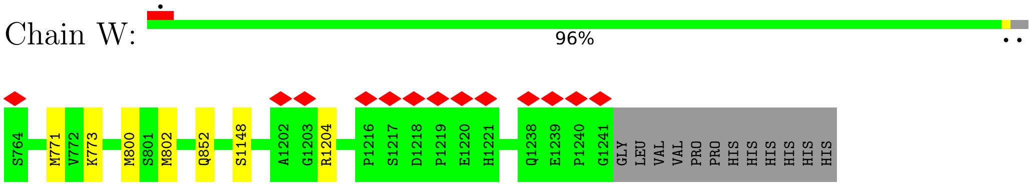
- Molecule 2: von Willebrand factor



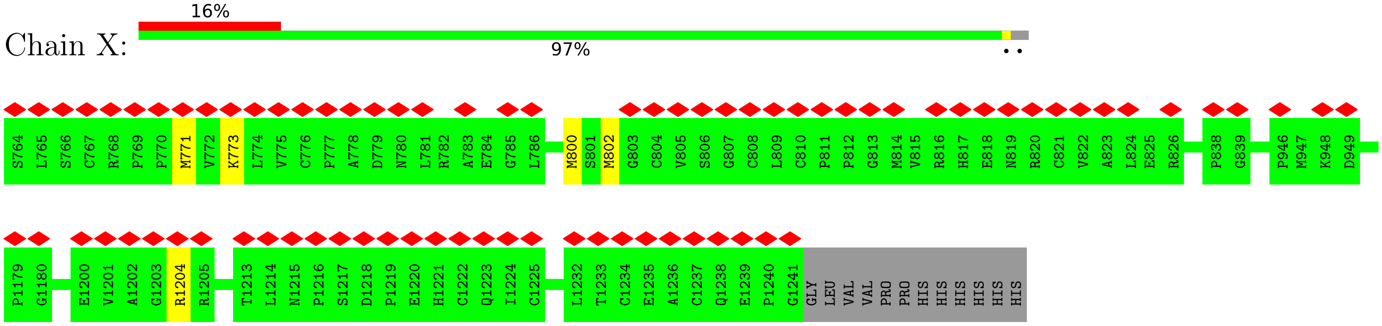
- Molecule 2: von Willebrand factor



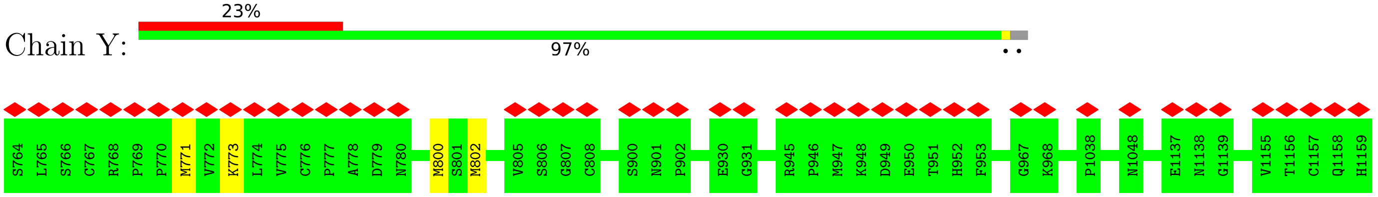
- Molecule 2: von Willebrand factor



- Molecule 2: von Willebrand factor

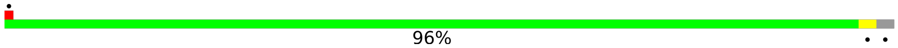


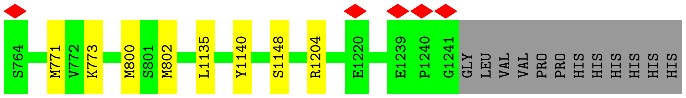
- Molecule 2: von Willebrand factor



- Molecule 2: von Willebrand factor

Chain Z:





4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	323041	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose $(e^-/\text{Å}^2)$	50	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.114	Depositor
Minimum map value	-0.030	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.005	Depositor
Recommended contour level	0.01	Depositor
Map size (Å)	562.1248, 562.1248, 562.1248	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	2.1958, 2.1958, 2.1958	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: CA, 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	0.44	0/5547	0.66	2/7520 (0.0%)
1	B	0.44	0/5547	0.66	2/7520 (0.0%)
1	E	0.44	0/5547	0.66	2/7520 (0.0%)
1	F	0.44	0/5547	0.66	2/7520 (0.0%)
1	G	0.44	0/5547	0.66	2/7520 (0.0%)
1	H	0.44	0/5547	0.66	2/7520 (0.0%)
1	I	0.44	0/5547	0.66	2/7520 (0.0%)
1	J	0.44	0/5547	0.66	2/7520 (0.0%)
1	K	0.44	0/5547	0.66	2/7520 (0.0%)
1	L	0.44	0/5547	0.66	2/7520 (0.0%)
1	M	0.44	0/5547	0.66	2/7520 (0.0%)
1	N	0.44	0/5547	0.66	2/7520 (0.0%)
1	O	0.44	0/5547	0.66	2/7520 (0.0%)
1	P	0.44	0/5547	0.66	2/7520 (0.0%)
1	Q	0.44	0/5547	0.66	2/7520 (0.0%)
1	R	0.44	0/5547	0.66	2/7520 (0.0%)
2	C	0.38	0/3728	0.59	0/5066
2	D	0.39	0/3728	0.59	0/5066
2	S	0.38	0/3728	0.59	0/5066
2	T	0.38	0/3728	0.59	0/5066
2	U	0.39	0/3728	0.59	0/5066
2	V	0.38	0/3728	0.59	0/5066
2	W	0.38	0/3728	0.59	0/5066
2	X	0.38	0/3728	0.59	0/5066
2	Y	0.38	0/3728	0.59	0/5066
2	Z	0.39	0/3728	0.59	0/5066
2	a	0.38	0/3728	0.59	0/5066
2	b	0.38	0/3728	0.59	0/5066
2	c	0.38	0/3728	0.59	0/5066
2	d	0.38	0/3728	0.59	0/5066
2	e	0.38	0/3728	0.59	0/5066
2	f	0.38	0/3728	0.59	0/5066

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
All	All	0.42	0/148400	0.63	32/201376 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	B	0	1
1	E	0	1
1	F	0	1
1	G	0	1
1	H	0	1
1	I	0	1
1	J	0	1
1	K	0	1
1	L	0	1
1	M	0	1
1	N	0	1
1	O	0	1
1	P	0	1
1	Q	0	1
1	R	0	1
All	All	0	16

There are no bond length outliers.

All (32) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	N	153	ARG	NE-CZ-NH1	5.50	123.05	120.30
1	H	153	ARG	NE-CZ-NH1	5.47	123.04	120.30
1	P	153	ARG	NE-CZ-NH1	5.46	123.03	120.30
1	Q	153	ARG	NE-CZ-NH1	5.45	123.03	120.30
1	A	153	ARG	NE-CZ-NH1	5.43	123.02	120.30
1	A	402	ARG	NE-CZ-NH2	-5.41	117.60	120.30
1	Q	402	ARG	NE-CZ-NH2	-5.38	117.61	120.30
1	O	153	ARG	NE-CZ-NH1	5.33	122.96	120.30
1	G	153	ARG	NE-CZ-NH1	5.32	122.96	120.30
1	K	402	ARG	NE-CZ-NH2	-5.32	117.64	120.30
1	I	402	ARG	NE-CZ-NH2	-5.29	117.66	120.30
1	G	402	ARG	NE-CZ-NH2	-5.27	117.67	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	M	402	ARG	NE-CZ-NH2	-5.27	117.67	120.30
1	L	153	ARG	NE-CZ-NH1	5.26	122.93	120.30
1	J	153	ARG	NE-CZ-NH1	5.25	122.92	120.30
1	N	402	ARG	NE-CZ-NH2	-5.25	117.68	120.30
1	J	402	ARG	NE-CZ-NH2	-5.25	117.68	120.30
1	E	153	ARG	NE-CZ-NH1	5.24	122.92	120.30
1	B	153	ARG	NE-CZ-NH1	5.24	122.92	120.30
1	E	402	ARG	NE-CZ-NH2	-5.24	117.68	120.30
1	P	402	ARG	NE-CZ-NH2	-5.23	117.68	120.30
1	K	153	ARG	NE-CZ-NH1	5.22	122.91	120.30
1	F	153	ARG	NE-CZ-NH1	5.21	122.91	120.30
1	M	153	ARG	NE-CZ-NH1	5.21	122.91	120.30
1	B	402	ARG	NE-CZ-NH2	-5.19	117.70	120.30
1	L	402	ARG	NE-CZ-NH2	-5.18	117.71	120.30
1	F	402	ARG	NE-CZ-NH2	-5.16	117.72	120.30
1	I	153	ARG	NE-CZ-NH1	5.16	122.88	120.30
1	R	153	ARG	NE-CZ-NH1	5.16	122.88	120.30
1	R	402	ARG	NE-CZ-NH2	-5.12	117.74	120.30
1	H	402	ARG	NE-CZ-NH2	-5.11	117.75	120.30
1	O	402	ARG	NE-CZ-NH2	-5.02	117.79	120.30

There are no chirality outliers.

All (16) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	721	ILE	Peptide
1	B	721	ILE	Peptide
1	E	721	ILE	Peptide
1	F	721	ILE	Peptide
1	G	721	ILE	Peptide
1	H	721	ILE	Peptide
1	I	721	ILE	Peptide
1	J	721	ILE	Peptide
1	K	721	ILE	Peptide
1	L	721	ILE	Peptide
1	M	721	ILE	Peptide
1	N	721	ILE	Peptide
1	O	721	ILE	Peptide
1	P	721	ILE	Peptide
1	Q	721	ILE	Peptide
1	R	721	ILE	Peptide

5.2 Too-close contacts ⓘ

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

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	709/741 (96%)	646 (91%)	62 (9%)	1 (0%)	48	83
1	B	709/741 (96%)	648 (91%)	60 (8%)	1 (0%)	48	83
1	E	709/741 (96%)	644 (91%)	62 (9%)	3 (0%)	30	67
1	F	709/741 (96%)	646 (91%)	63 (9%)	0	100	100
1	G	709/741 (96%)	638 (90%)	68 (10%)	3 (0%)	30	67
1	H	709/741 (96%)	646 (91%)	63 (9%)	0	100	100
1	I	709/741 (96%)	643 (91%)	64 (9%)	2 (0%)	37	72
1	J	709/741 (96%)	647 (91%)	62 (9%)	0	100	100
1	K	709/741 (96%)	647 (91%)	62 (9%)	0	100	100
1	L	709/741 (96%)	648 (91%)	61 (9%)	0	100	100
1	M	709/741 (96%)	646 (91%)	61 (9%)	2 (0%)	37	72
1	N	709/741 (96%)	643 (91%)	65 (9%)	1 (0%)	48	83
1	O	709/741 (96%)	644 (91%)	63 (9%)	2 (0%)	37	72
1	P	709/741 (96%)	647 (91%)	62 (9%)	0	100	100
1	Q	709/741 (96%)	648 (91%)	61 (9%)	0	100	100
1	R	709/741 (96%)	649 (92%)	60 (8%)	0	100	100
2	C	477/490 (97%)	424 (89%)	53 (11%)	0	100	100
2	D	477/490 (97%)	426 (89%)	50 (10%)	1 (0%)	44	78
2	S	477/490 (97%)	425 (89%)	51 (11%)	1 (0%)	44	78
2	T	477/490 (97%)	425 (89%)	52 (11%)	0	100	100
2	U	477/490 (97%)	415 (87%)	55 (12%)	7 (2%)	8	39

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	V	477/490 (97%)	427 (90%)	50 (10%)	0	100	100
2	W	477/490 (97%)	426 (89%)	50 (10%)	1 (0%)	44	78
2	X	477/490 (97%)	425 (89%)	52 (11%)	0	100	100
2	Y	477/490 (97%)	425 (89%)	52 (11%)	0	100	100
2	Z	477/490 (97%)	420 (88%)	55 (12%)	2 (0%)	30	67
2	a	477/490 (97%)	427 (90%)	49 (10%)	1 (0%)	44	78
2	b	477/490 (97%)	425 (89%)	51 (11%)	1 (0%)	44	78
2	c	477/490 (97%)	425 (89%)	52 (11%)	0	100	100
2	d	477/490 (97%)	424 (89%)	52 (11%)	1 (0%)	44	78
2	e	477/490 (97%)	425 (89%)	52 (11%)	0	100	100
2	f	477/490 (97%)	425 (89%)	52 (11%)	0	100	100
All	All	18976/19696 (96%)	17119 (90%)	1827 (10%)	30 (0%)	45	78

All (30) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	M	98	VAL
1	M	99	ASN
1	O	98	VAL
1	O	99	ASN
2	W	1148	SER
1	B	98	VAL
2	b	1148	SER
2	D	1148	SER
2	d	1148	SER
1	E	98	VAL
1	E	99	ASN
1	E	100	GLY
1	G	98	VAL
1	I	98	VAL
2	U	1132	GLU
2	U	1139	GLY
2	U	1146	TYR
2	Z	1140	TYR
1	G	172	ASP
1	I	156	ASN
1	N	98	VAL
2	S	1148	SER

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Mol	Chain	Res	Type
2	U	1137	GLU
2	Z	1148	SER
2	a	853	ASP
2	U	853	ASP
2	U	1133	ARG
1	G	170	GLU
2	U	852	GLN
1	A	100	GLY

5.3.2 Protein sidechains ⓘ

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	599/628 (95%)	593 (99%)	6 (1%)	73	82
1	B	599/628 (95%)	592 (99%)	7 (1%)	67	79
1	E	599/628 (95%)	593 (99%)	6 (1%)	73	82
1	F	599/628 (95%)	593 (99%)	6 (1%)	73	82
1	G	599/628 (95%)	592 (99%)	7 (1%)	67	79
1	H	599/628 (95%)	593 (99%)	6 (1%)	73	82
1	I	599/628 (95%)	593 (99%)	6 (1%)	73	82
1	J	599/628 (95%)	593 (99%)	6 (1%)	73	82
1	K	599/628 (95%)	593 (99%)	6 (1%)	73	82
1	L	599/628 (95%)	593 (99%)	6 (1%)	73	82
1	M	599/628 (95%)	593 (99%)	6 (1%)	73	82
1	N	599/628 (95%)	593 (99%)	6 (1%)	73	82
1	O	599/628 (95%)	593 (99%)	6 (1%)	73	82
1	P	599/628 (95%)	592 (99%)	7 (1%)	67	79
1	Q	599/628 (95%)	593 (99%)	6 (1%)	73	82
1	R	599/628 (95%)	593 (99%)	6 (1%)	73	82
2	C	423/436 (97%)	418 (99%)	5 (1%)	67	79

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	D	423/436 (97%)	418 (99%)	5 (1%)	67	79
2	S	423/436 (97%)	417 (99%)	6 (1%)	62	76
2	T	423/436 (97%)	417 (99%)	6 (1%)	62	76
2	U	423/436 (97%)	414 (98%)	9 (2%)	48	67
2	V	423/436 (97%)	418 (99%)	5 (1%)	67	79
2	W	423/436 (97%)	417 (99%)	6 (1%)	62	76
2	X	423/436 (97%)	418 (99%)	5 (1%)	67	79
2	Y	423/436 (97%)	418 (99%)	5 (1%)	67	79
2	Z	423/436 (97%)	417 (99%)	6 (1%)	62	76
2	a	423/436 (97%)	418 (99%)	5 (1%)	67	79
2	b	423/436 (97%)	418 (99%)	5 (1%)	67	79
2	c	423/436 (97%)	418 (99%)	5 (1%)	67	79
2	d	423/436 (97%)	418 (99%)	5 (1%)	67	79
2	e	423/436 (97%)	418 (99%)	5 (1%)	67	79
2	f	423/436 (97%)	418 (99%)	5 (1%)	67	79
All	All	16352/17024 (96%)	16165 (99%)	187 (1%)	69	80

All (187) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	34	ARG
1	A	67	LYS
1	A	139	ARG
1	A	189	ASN
1	A	236	ARG
1	A	639	ARG
2	a	771	MET
2	a	773	LYS
2	a	800	MET
2	a	802	MET
2	a	1204	ARG
1	B	34	ARG
1	B	67	LYS
1	B	97	PHE
1	B	139	ARG
1	B	189	ASN
1	B	236	ARG

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Mol	Chain	Res	Type
1	B	639	ARG
2	b	771	MET
2	b	773	LYS
2	b	800	MET
2	b	802	MET
2	b	1204	ARG
2	C	771	MET
2	C	773	LYS
2	C	800	MET
2	C	802	MET
2	C	1204	ARG
2	c	771	MET
2	c	773	LYS
2	c	800	MET
2	c	802	MET
2	c	1204	ARG
2	D	771	MET
2	D	773	LYS
2	D	800	MET
2	D	802	MET
2	D	1204	ARG
2	d	771	MET
2	d	773	LYS
2	d	800	MET
2	d	802	MET
2	d	1204	ARG
1	E	34	ARG
1	E	67	LYS
1	E	139	ARG
1	E	189	ASN
1	E	236	ARG
1	E	639	ARG
2	e	771	MET
2	e	773	LYS
2	e	800	MET
2	e	802	MET
2	e	1204	ARG
1	F	34	ARG
1	F	67	LYS
1	F	139	ARG
1	F	189	ASN
1	F	236	ARG

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Mol	Chain	Res	Type
1	F	639	ARG
2	f	771	MET
2	f	773	LYS
2	f	800	MET
2	f	802	MET
2	f	1204	ARG
1	G	34	ARG
1	G	67	LYS
1	G	139	ARG
1	G	157	LYS
1	G	189	ASN
1	G	236	ARG
1	G	639	ARG
1	H	34	ARG
1	H	67	LYS
1	H	139	ARG
1	H	189	ASN
1	H	236	ARG
1	H	639	ARG
1	I	34	ARG
1	I	67	LYS
1	I	139	ARG
1	I	189	ASN
1	I	236	ARG
1	I	639	ARG
1	J	34	ARG
1	J	67	LYS
1	J	139	ARG
1	J	189	ASN
1	J	236	ARG
1	J	639	ARG
1	K	34	ARG
1	K	67	LYS
1	K	139	ARG
1	K	189	ASN
1	K	236	ARG
1	K	639	ARG
1	L	34	ARG
1	L	67	LYS
1	L	139	ARG
1	L	189	ASN
1	L	236	ARG

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Mol	Chain	Res	Type
1	L	639	ARG
1	M	34	ARG
1	M	67	LYS
1	M	139	ARG
1	M	189	ASN
1	M	236	ARG
1	M	639	ARG
1	N	34	ARG
1	N	67	LYS
1	N	139	ARG
1	N	189	ASN
1	N	236	ARG
1	N	639	ARG
1	O	34	ARG
1	O	67	LYS
1	O	139	ARG
1	O	189	ASN
1	O	236	ARG
1	O	639	ARG
1	P	34	ARG
1	P	67	LYS
1	P	97	PHE
1	P	139	ARG
1	P	189	ASN
1	P	236	ARG
1	P	639	ARG
1	Q	34	ARG
1	Q	67	LYS
1	Q	139	ARG
1	Q	189	ASN
1	Q	236	ARG
1	Q	639	ARG
1	R	34	ARG
1	R	67	LYS
1	R	139	ARG
1	R	189	ASN
1	R	236	ARG
1	R	639	ARG
2	S	771	MET
2	S	773	LYS
2	S	800	MET
2	S	802	MET

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Mol	Chain	Res	Type
2	S	852	GLN
2	S	1204	ARG
2	T	771	MET
2	T	773	LYS
2	T	800	MET
2	T	802	MET
2	T	852	GLN
2	T	1204	ARG
2	U	771	MET
2	U	773	LYS
2	U	800	MET
2	U	802	MET
2	U	850	VAL
2	U	1132	GLU
2	U	1140	TYR
2	U	1147	ASN
2	U	1204	ARG
2	V	771	MET
2	V	773	LYS
2	V	800	MET
2	V	802	MET
2	V	1204	ARG
2	W	771	MET
2	W	773	LYS
2	W	800	MET
2	W	802	MET
2	W	852	GLN
2	W	1204	ARG
2	X	771	MET
2	X	773	LYS
2	X	800	MET
2	X	802	MET
2	X	1204	ARG
2	Y	771	MET
2	Y	773	LYS
2	Y	800	MET
2	Y	802	MET
2	Y	1204	ARG
2	Z	771	MET
2	Z	773	LYS
2	Z	800	MET
2	Z	802	MET

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Mol	Chain	Res	Type
2	Z	1135	LEU
2	Z	1204	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (52) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	368	ASN
2	a	852	GLN
1	B	368	ASN
1	B	563	GLN
2	C	1013	GLN
2	c	857	ASN
2	D	852	GLN
2	D	1174	HIS
2	d	857	ASN
1	E	166	ASN
1	E	368	ASN
1	E	563	GLN
2	e	857	ASN
1	F	368	ASN
1	F	563	GLN
2	f	857	ASN
1	G	368	ASN
1	H	368	ASN
1	H	469	GLN
1	H	563	GLN
1	I	368	ASN
1	J	368	ASN
1	J	563	GLN
1	K	368	ASN
1	K	469	GLN
1	K	563	GLN
1	L	368	ASN
1	M	368	ASN
1	N	368	ASN
1	O	368	ASN
1	O	469	GLN
1	O	472	GLN
1	O	563	GLN
1	P	368	ASN
1	Q	368	ASN
1	Q	469	GLN

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Mol	Chain	Res	Type
2	S	1013	GLN
2	T	852	GLN
2	T	1013	GLN
2	U	1013	GLN
2	U	1138	ASN
2	V	1013	GLN
2	W	852	GLN
2	W	1013	GLN
2	W	1176	HIS
2	X	857	ASN
2	X	1013	GLN
2	Y	857	ASN
2	Y	1013	GLN
2	Z	1138	ASN
2	Z	1174	HIS
2	Z	1188	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 98 ligands modelled in this entry, 56 are monoatomic - leaving 42 for Mogul analysis.

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	S	1301	2	14,14,15	0.40	0	17,19,21	0.82	0
3	NAG	S	1302	2	14,14,15	0.39	0	17,19,21	0.82	0
3	NAG	B	802	1	14,14,15	0.29	0	17,19,21	0.67	0
3	NAG	W	1302	2	14,14,15	0.40	0	17,19,21	0.81	0
3	NAG	I	802	1	14,14,15	0.39	0	17,19,21	0.81	0
3	NAG	N	804	1	14,14,15	0.40	0	17,19,21	0.81	0
3	NAG	F	801	1	14,14,15	0.39	0	17,19,21	0.82	0
3	NAG	E	801	1	14,14,15	0.30	0	17,19,21	0.66	0
3	NAG	b	1302	2	14,14,15	0.40	0	17,19,21	0.81	0
3	NAG	P	801	1	14,14,15	0.39	0	17,19,21	0.81	0
3	NAG	Z	1302	2	14,14,15	0.40	0	17,19,21	0.81	0
3	NAG	L	801	1	14,14,15	0.42	0	17,19,21	0.81	0
3	NAG	Z	1301	2	14,14,15	0.28	0	17,19,21	0.65	0
3	NAG	L	802	1	14,14,15	0.42	0	17,19,21	0.82	0
3	NAG	C	1302	2	14,14,15	0.39	0	17,19,21	0.82	0
3	NAG	d	1301	2	14,14,15	0.40	0	17,19,21	0.82	0
3	NAG	D	1302	2	14,14,15	0.39	0	17,19,21	0.82	0
3	NAG	V	1301	2	14,14,15	0.42	0	17,19,21	0.82	0
3	NAG	A	802	1	14,14,15	0.28	0	17,19,21	0.66	0
3	NAG	G	802	1	14,14,15	0.40	0	17,19,21	0.81	0
3	NAG	M	801	1	14,14,15	0.40	0	17,19,21	0.82	0
3	NAG	a	1301	2	14,14,15	0.27	0	17,19,21	0.71	0
3	NAG	W	1301	2	14,14,15	0.41	0	17,19,21	0.81	0
3	NAG	F	802	1	14,14,15	0.38	0	17,19,21	0.81	0
3	NAG	B	801	1	14,14,15	0.40	0	17,19,21	0.81	0
3	NAG	I	801	1	14,14,15	0.37	0	17,19,21	0.81	0
3	NAG	A	801	1	14,14,15	0.40	0	17,19,21	0.81	0
3	NAG	M	802	1	14,14,15	0.40	0	17,19,21	0.82	0
3	NAG	N	801	1	14,14,15	0.39	0	17,19,21	0.80	0
3	NAG	T	1301	2	14,14,15	0.29	0	17,19,21	0.59	0
3	NAG	b	1301	2	14,14,15	0.39	0	17,19,21	0.81	0
3	NAG	T	1302	2	14,14,15	0.40	0	17,19,21	0.81	0
3	NAG	P	802	1	14,14,15	0.39	0	17,19,21	0.81	0
3	NAG	E	802	1	14,14,15	0.39	0	17,19,21	0.81	0
3	NAG	O	802	1	14,14,15	0.41	0	17,19,21	0.82	0
3	NAG	U	1303	2	14,14,15	0.42	0	17,19,21	0.81	0
3	NAG	C	1301	2	14,14,15	0.40	0	17,19,21	0.81	0
3	NAG	U	1302	2	14,14,15	0.40	0	17,19,21	0.82	0
3	NAG	a	1302	2	14,14,15	0.41	0	17,19,21	0.81	0
3	NAG	D	1301	2	14,14,15	0.40	0	17,19,21	0.82	0
3	NAG	G	801	1	14,14,15	0.41	0	17,19,21	0.81	0
3	NAG	O	801	1	14,14,15	0.39	0	17,19,21	0.82	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	S	1301	2	-	0/6/23/26	0/1/1/1
3	NAG	S	1302	2	-	0/6/23/26	0/1/1/1
3	NAG	B	802	1	-	2/6/23/26	0/1/1/1
3	NAG	W	1302	2	-	0/6/23/26	0/1/1/1
3	NAG	I	802	1	-	0/6/23/26	0/1/1/1
3	NAG	N	804	1	-	0/6/23/26	0/1/1/1
3	NAG	F	801	1	-	0/6/23/26	0/1/1/1
3	NAG	E	801	1	-	2/6/23/26	0/1/1/1
3	NAG	b	1302	2	-	0/6/23/26	0/1/1/1
3	NAG	P	801	1	-	0/6/23/26	0/1/1/1
3	NAG	Z	1302	2	-	0/6/23/26	0/1/1/1
3	NAG	L	801	1	-	0/6/23/26	0/1/1/1
3	NAG	Z	1301	2	-	0/6/23/26	0/1/1/1
3	NAG	L	802	1	-	0/6/23/26	0/1/1/1
3	NAG	C	1302	2	-	0/6/23/26	0/1/1/1
3	NAG	d	1301	2	-	0/6/23/26	0/1/1/1
3	NAG	D	1302	2	-	0/6/23/26	0/1/1/1
3	NAG	V	1301	2	-	0/6/23/26	0/1/1/1
3	NAG	A	802	1	-	2/6/23/26	0/1/1/1
3	NAG	G	802	1	-	0/6/23/26	0/1/1/1
3	NAG	M	801	1	-	0/6/23/26	0/1/1/1
3	NAG	a	1301	2	-	4/6/23/26	0/1/1/1
3	NAG	W	1301	2	-	0/6/23/26	0/1/1/1
3	NAG	F	802	1	-	0/6/23/26	0/1/1/1
3	NAG	B	801	1	-	0/6/23/26	0/1/1/1
3	NAG	I	801	1	-	0/6/23/26	0/1/1/1
3	NAG	A	801	1	-	0/6/23/26	0/1/1/1
3	NAG	M	802	1	-	0/6/23/26	0/1/1/1
3	NAG	N	801	1	-	0/6/23/26	0/1/1/1
3	NAG	T	1301	2	-	1/6/23/26	0/1/1/1
3	NAG	b	1301	2	-	0/6/23/26	0/1/1/1
3	NAG	T	1302	2	-	0/6/23/26	0/1/1/1
3	NAG	P	802	1	-	0/6/23/26	0/1/1/1
3	NAG	E	802	1	-	0/6/23/26	0/1/1/1
3	NAG	O	802	1	-	0/6/23/26	0/1/1/1
3	NAG	U	1303	2	-	0/6/23/26	0/1/1/1
3	NAG	C	1301	2	-	0/6/23/26	0/1/1/1
3	NAG	U	1302	2	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	a	1302	2	-	0/6/23/26	0/1/1/1
3	NAG	D	1301	2	-	0/6/23/26	0/1/1/1
3	NAG	G	801	1	-	0/6/23/26	0/1/1/1
3	NAG	O	801	1	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (11) torsion outliers are listed below:

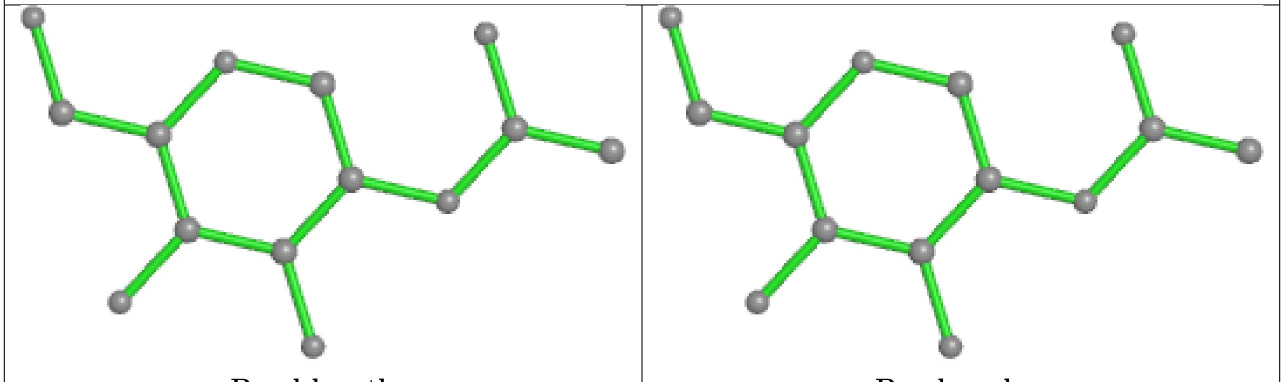
Mol	Chain	Res	Type	Atoms
3	a	1301	NAG	C3-C2-N2-C7
3	a	1301	NAG	C8-C7-N2-C2
3	a	1301	NAG	O7-C7-N2-C2
3	E	801	NAG	C8-C7-N2-C2
3	E	801	NAG	O7-C7-N2-C2
3	T	1301	NAG	O5-C5-C6-O6
3	A	802	NAG	C8-C7-N2-C2
3	a	1301	NAG	C1-C2-N2-C7
3	A	802	NAG	O7-C7-N2-C2
3	B	802	NAG	C8-C7-N2-C2
3	B	802	NAG	O7-C7-N2-C2

There are no ring outliers.

No monomer is involved in short contacts.

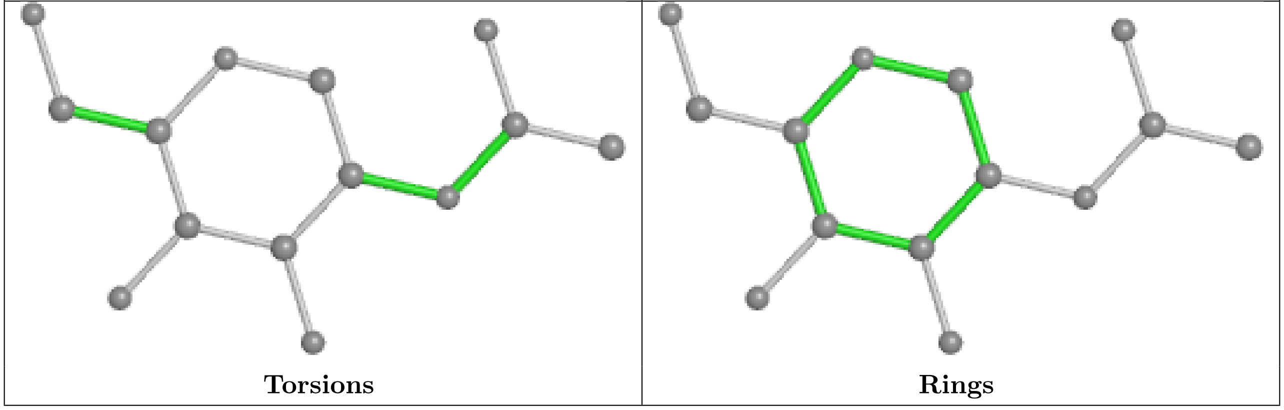
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less 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 S 1301



Bond lengths

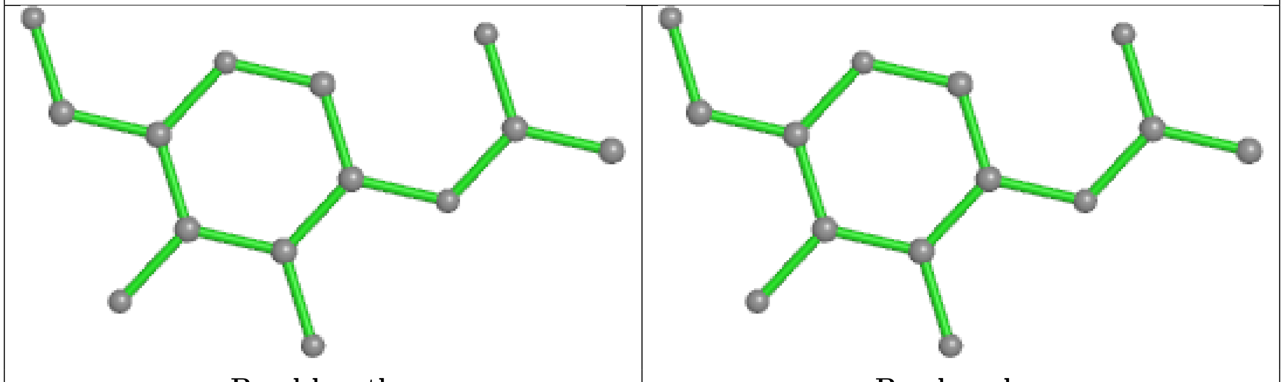
Bond angles



Torsions

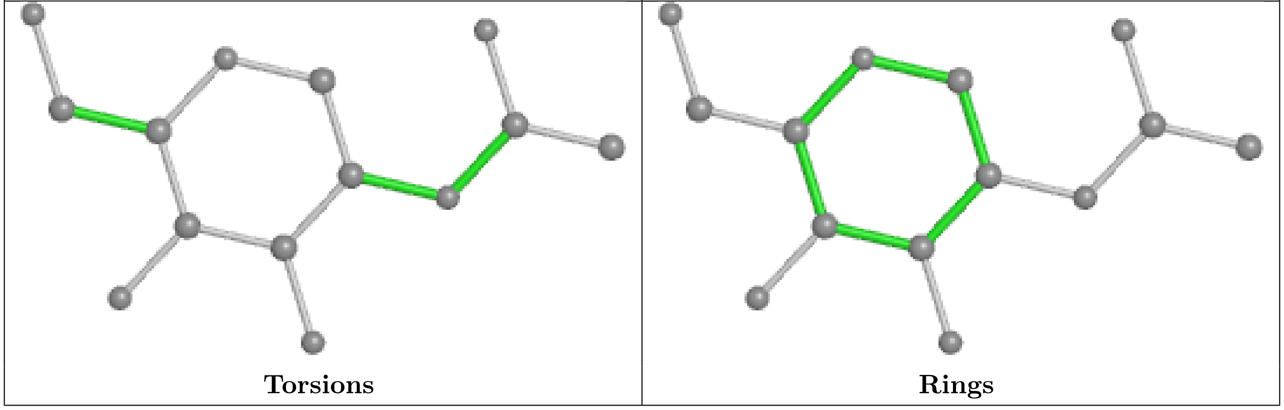
Rings

Ligand NAG S 1302



Bond lengths

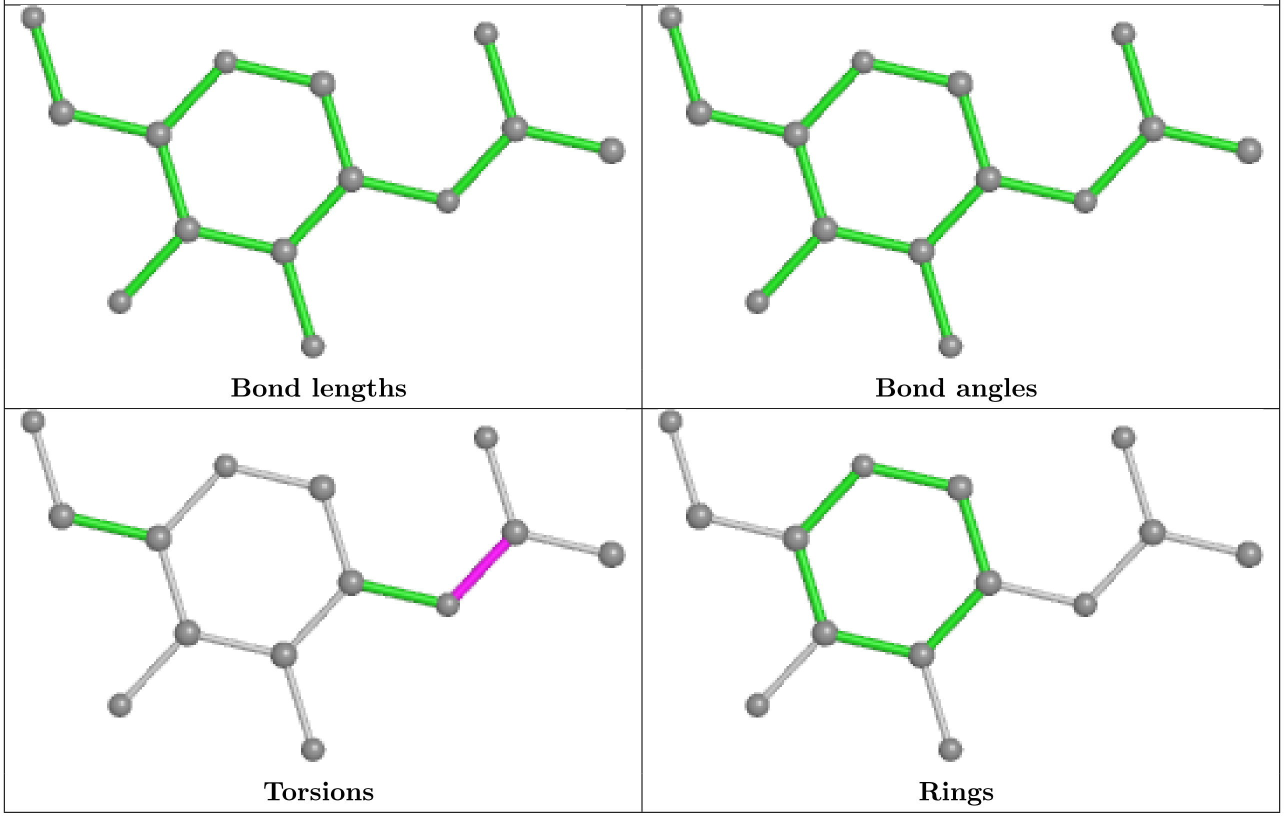
Bond angles



Torsions

Rings

Ligand NAG B 802



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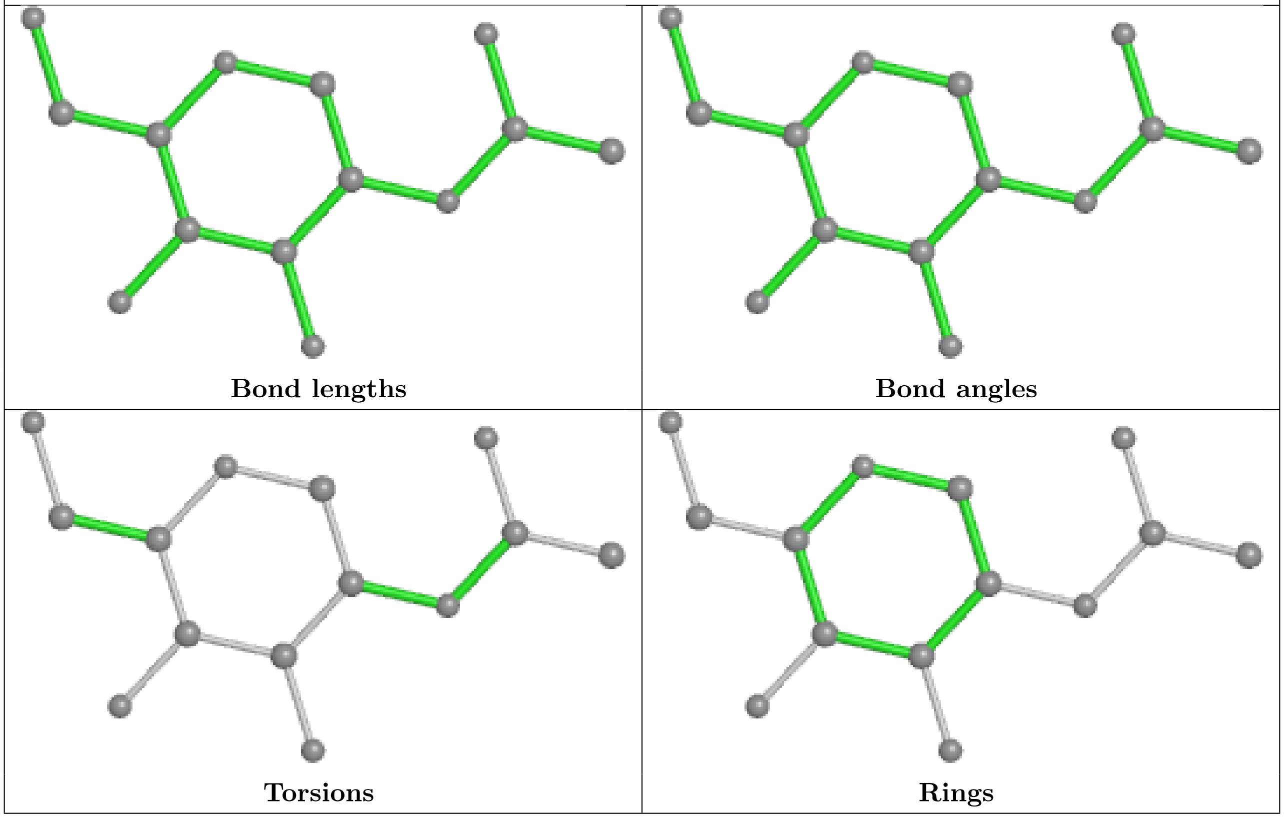

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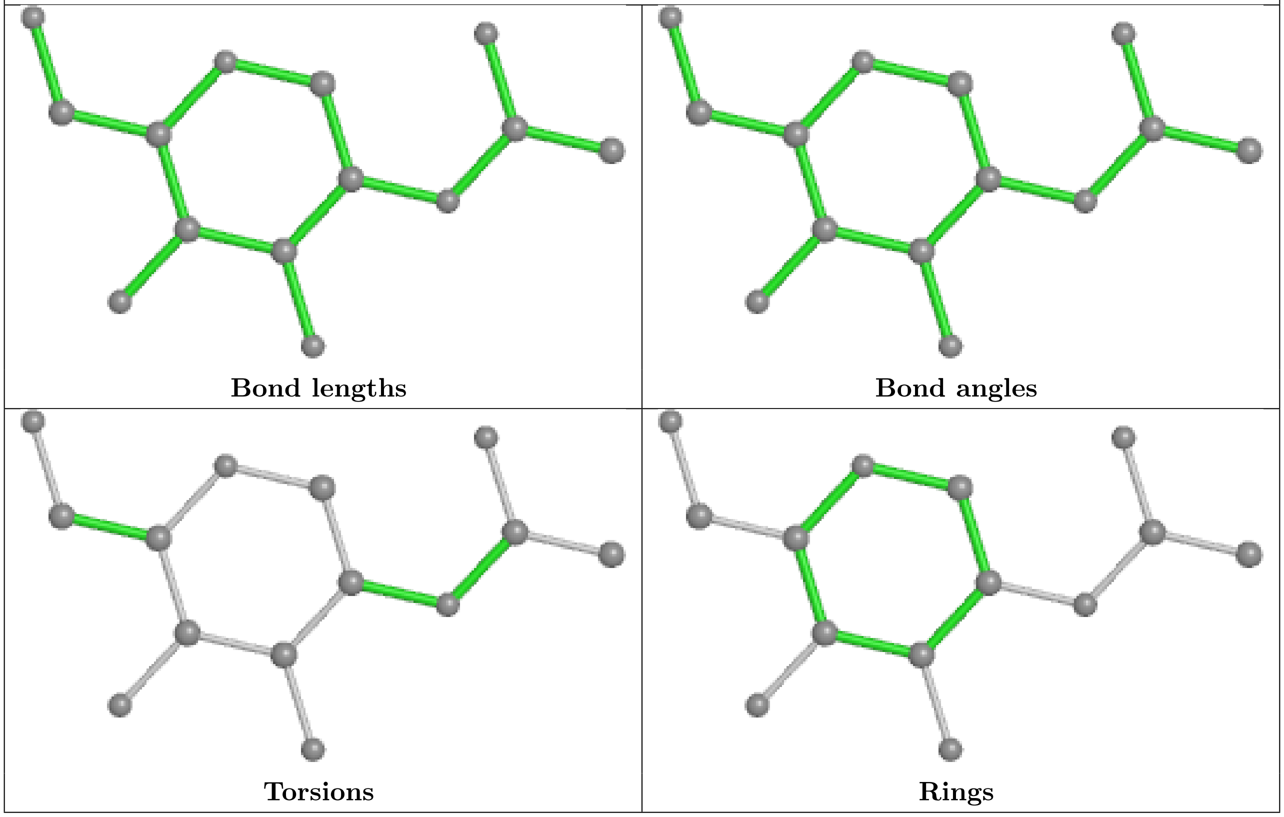


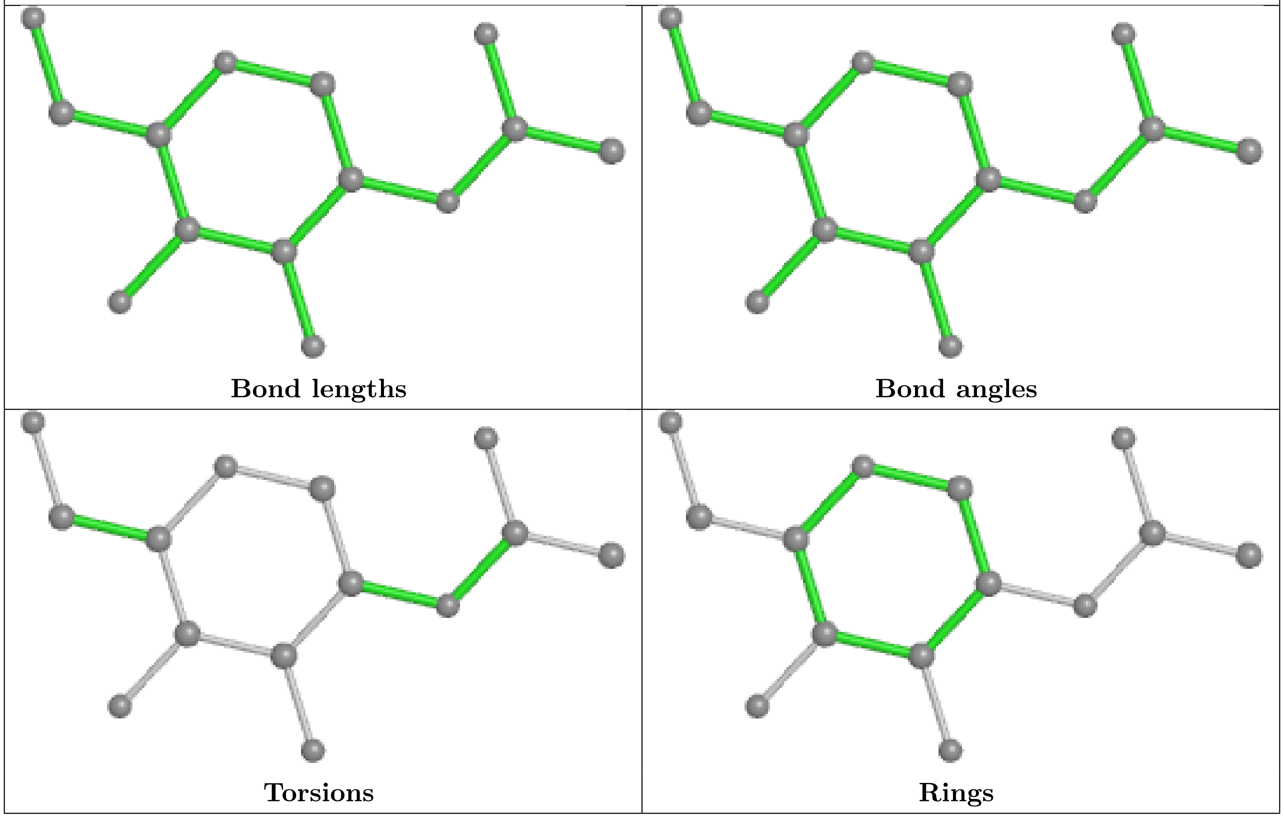
Bond lengths

Bond angles

Torsions

Rings

Ligand NAG N 804



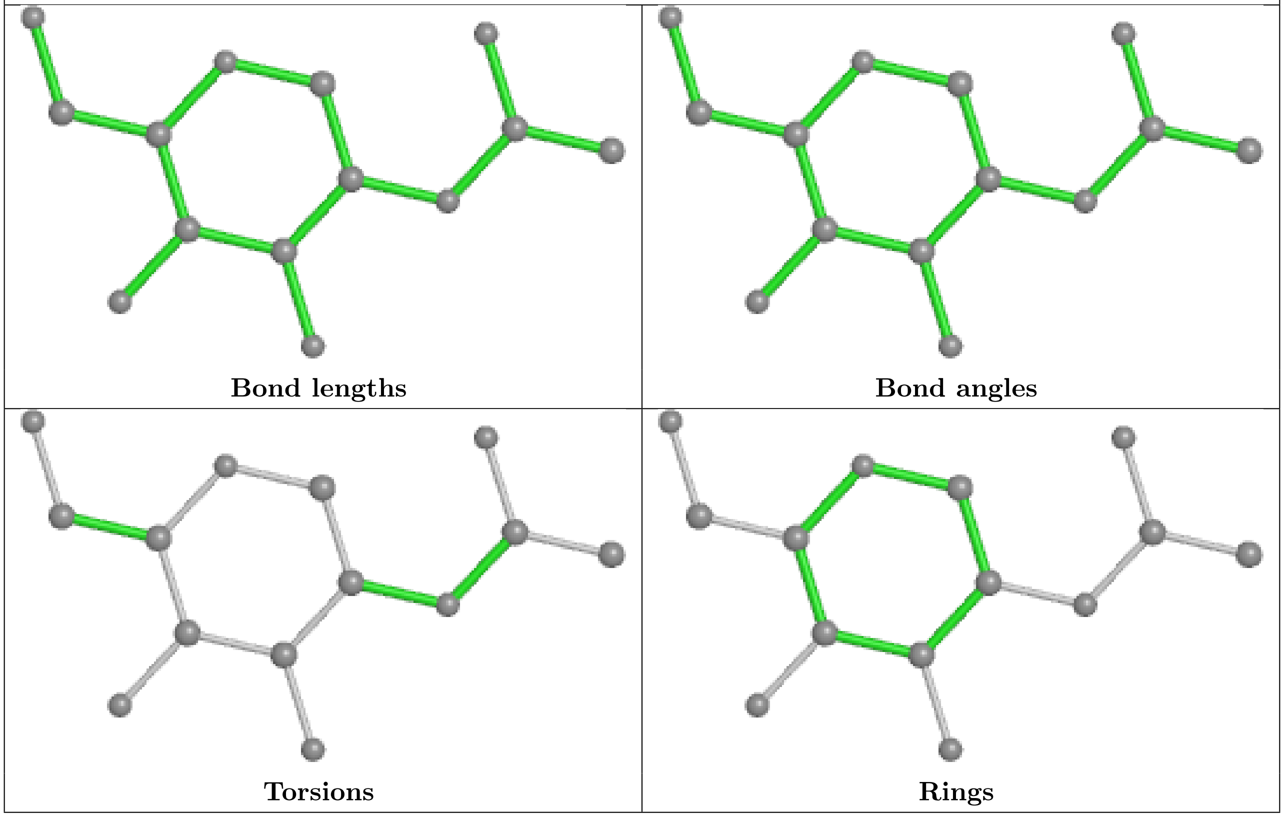
Bond lengths

Bond angles

Torsions

Rings

Ligand NAG F 801



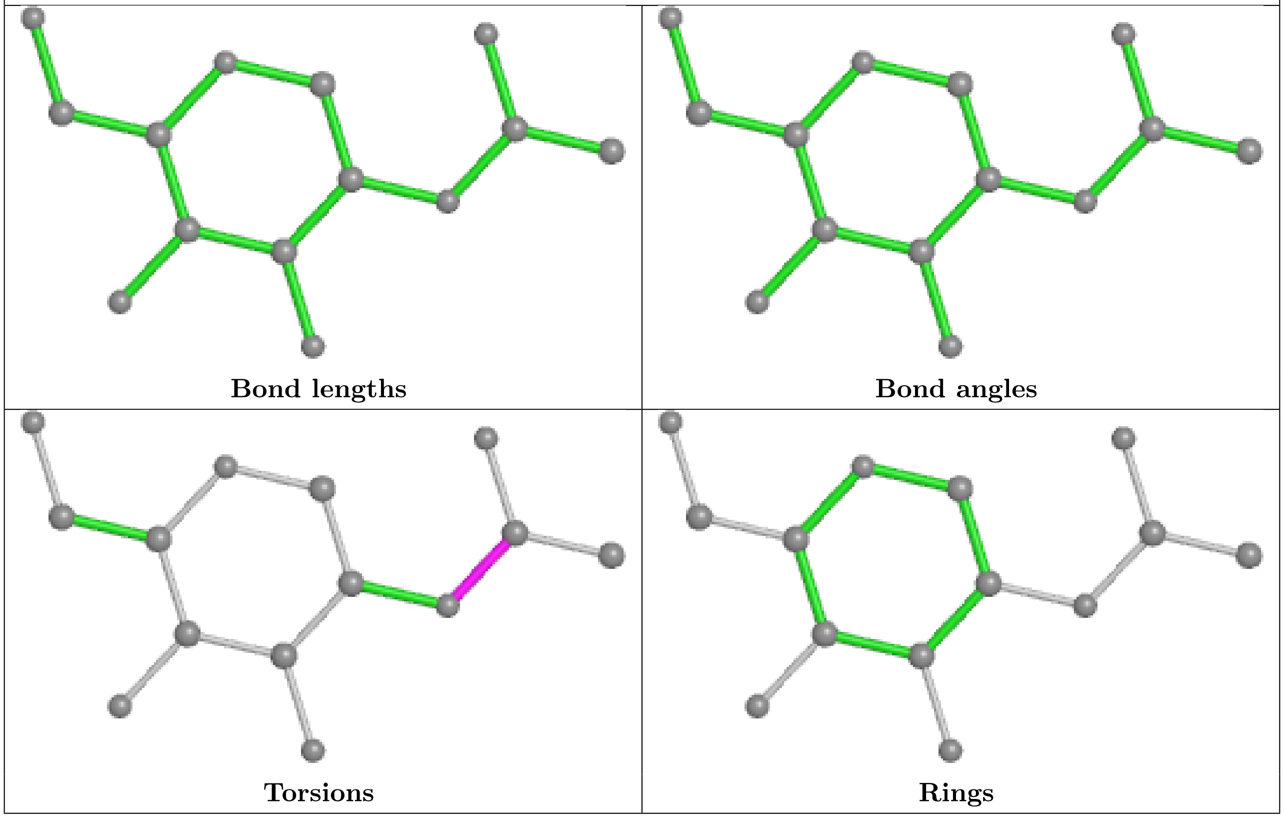
Bond lengths

Bond angles

Torsions

Rings

Ligand NAG E 801



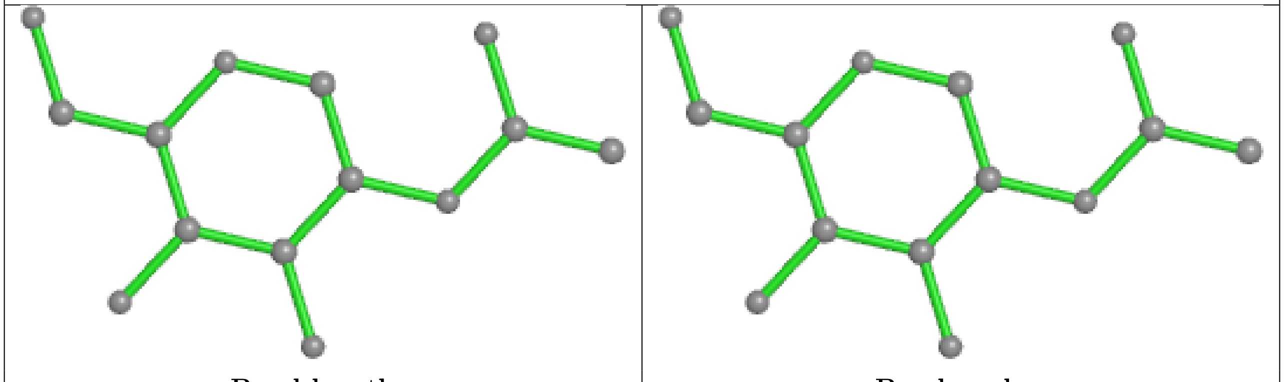
Bond lengths

Bond angles

Torsions

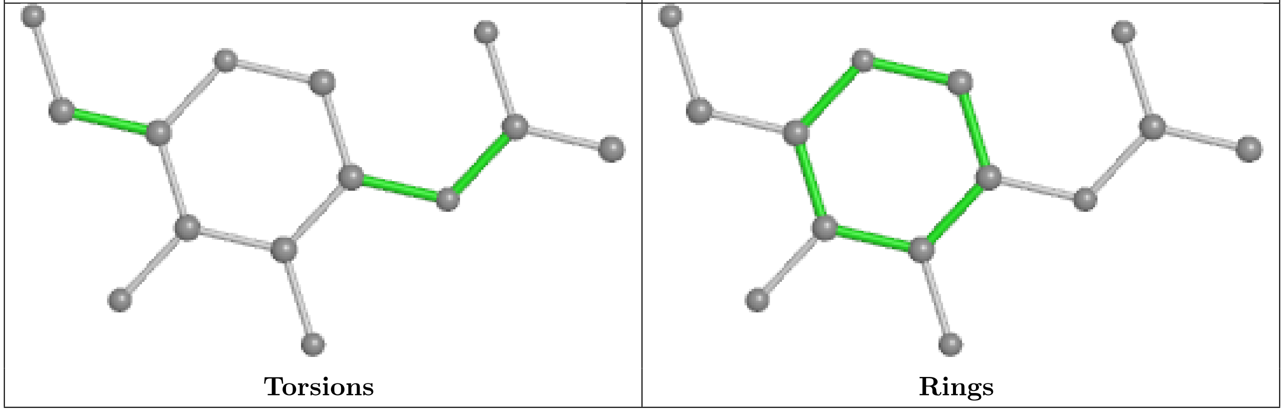
Rings

Ligand NAG b 1302



Bond lengths

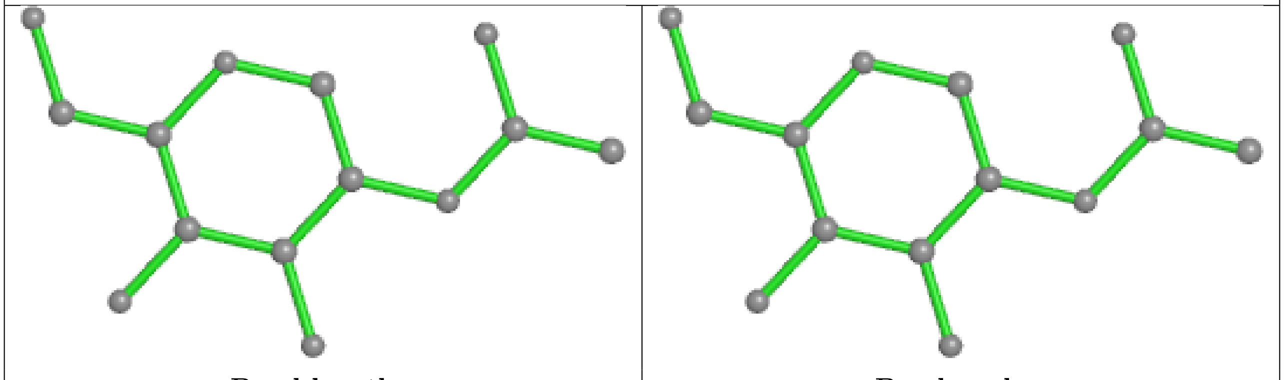
Bond angles



Torsions

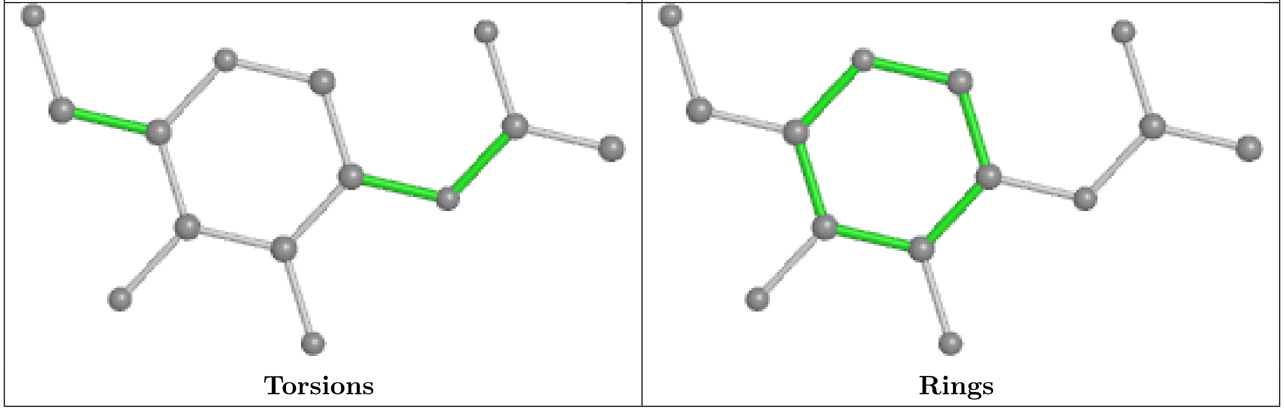
Rings

Ligand NAG P 801



Bond lengths

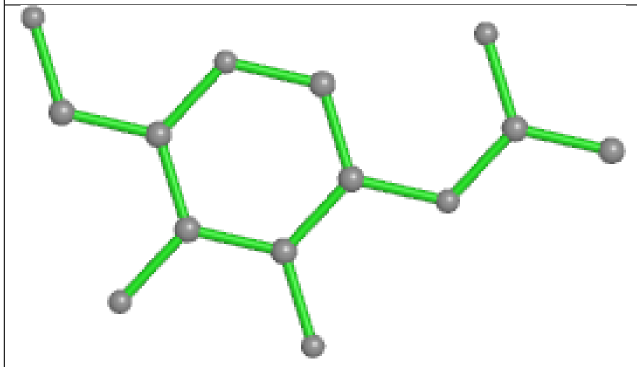
Bond angles

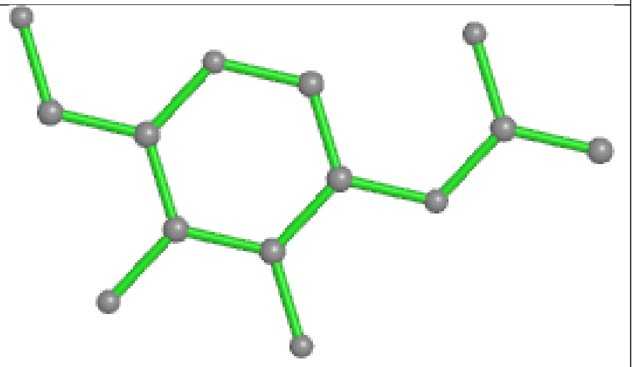


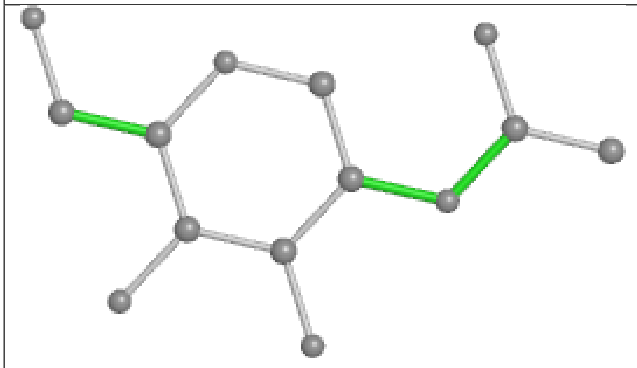
Torsions

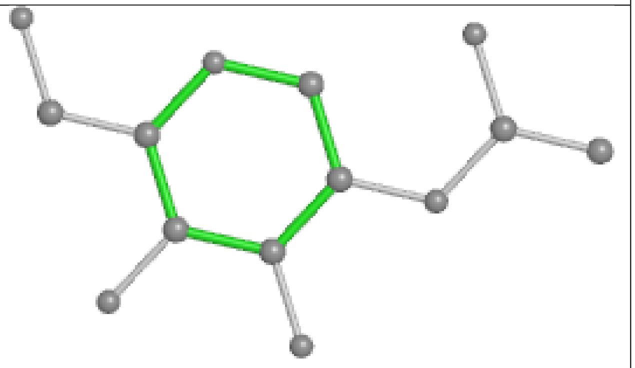
Rings

Ligand NAG Z 1302

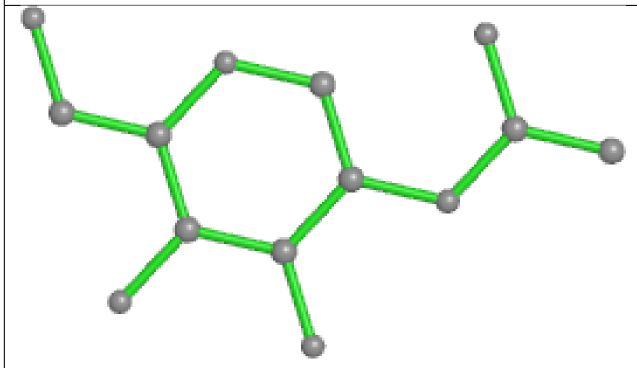

Bond lengths

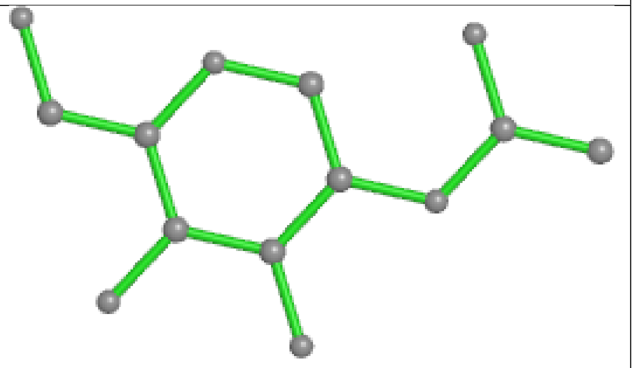

Bond angles

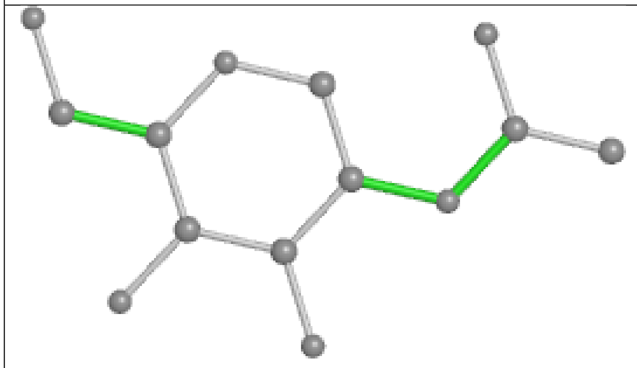

Torsions

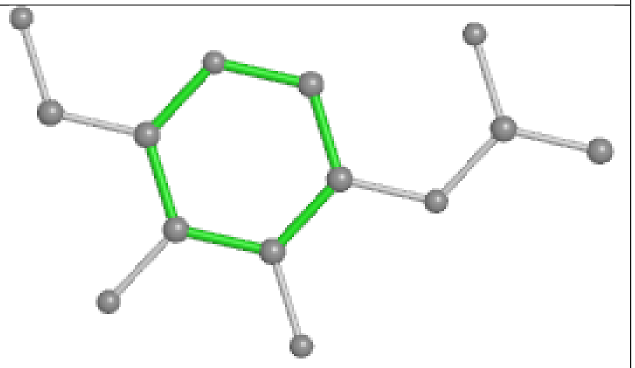

Rings

Ligand NAG L 801

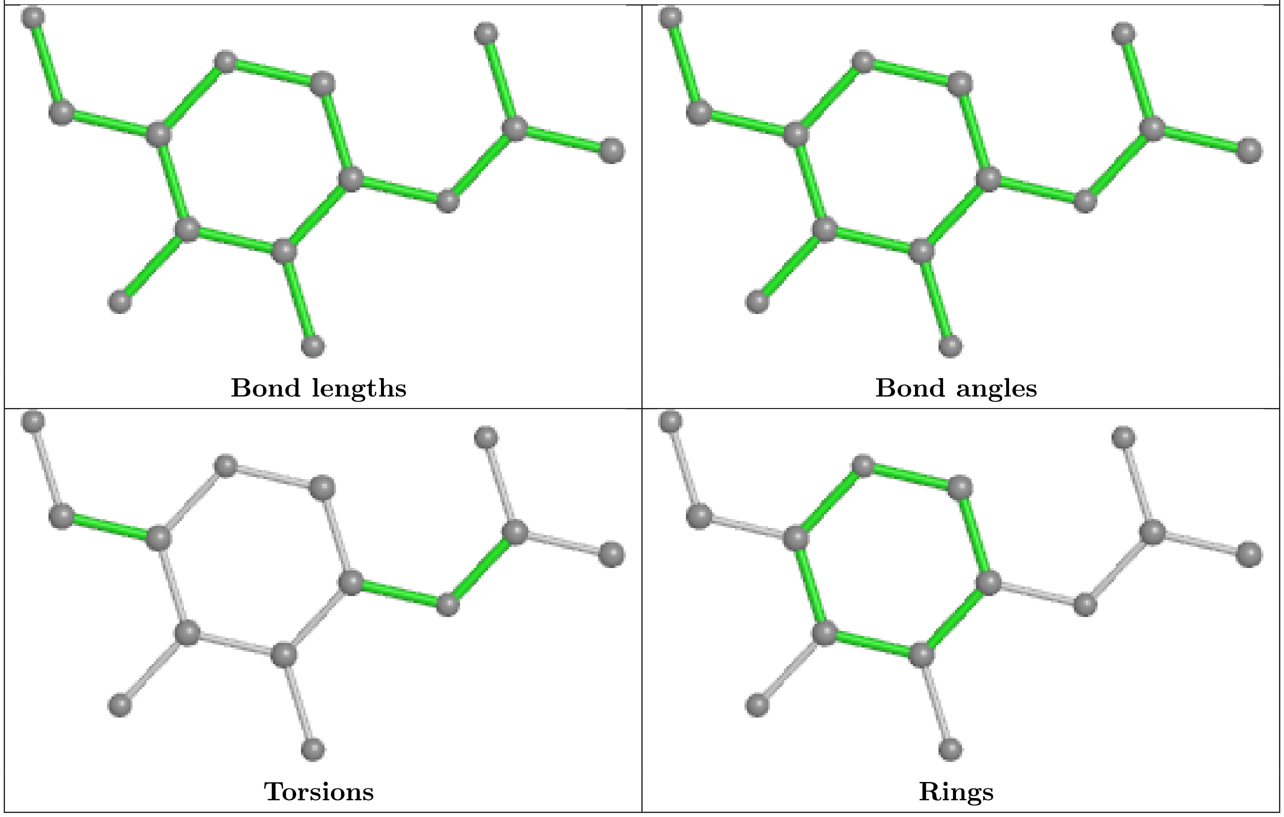

Bond lengths


Bond angles


Torsions


Rings

Ligand NAG Z 1301



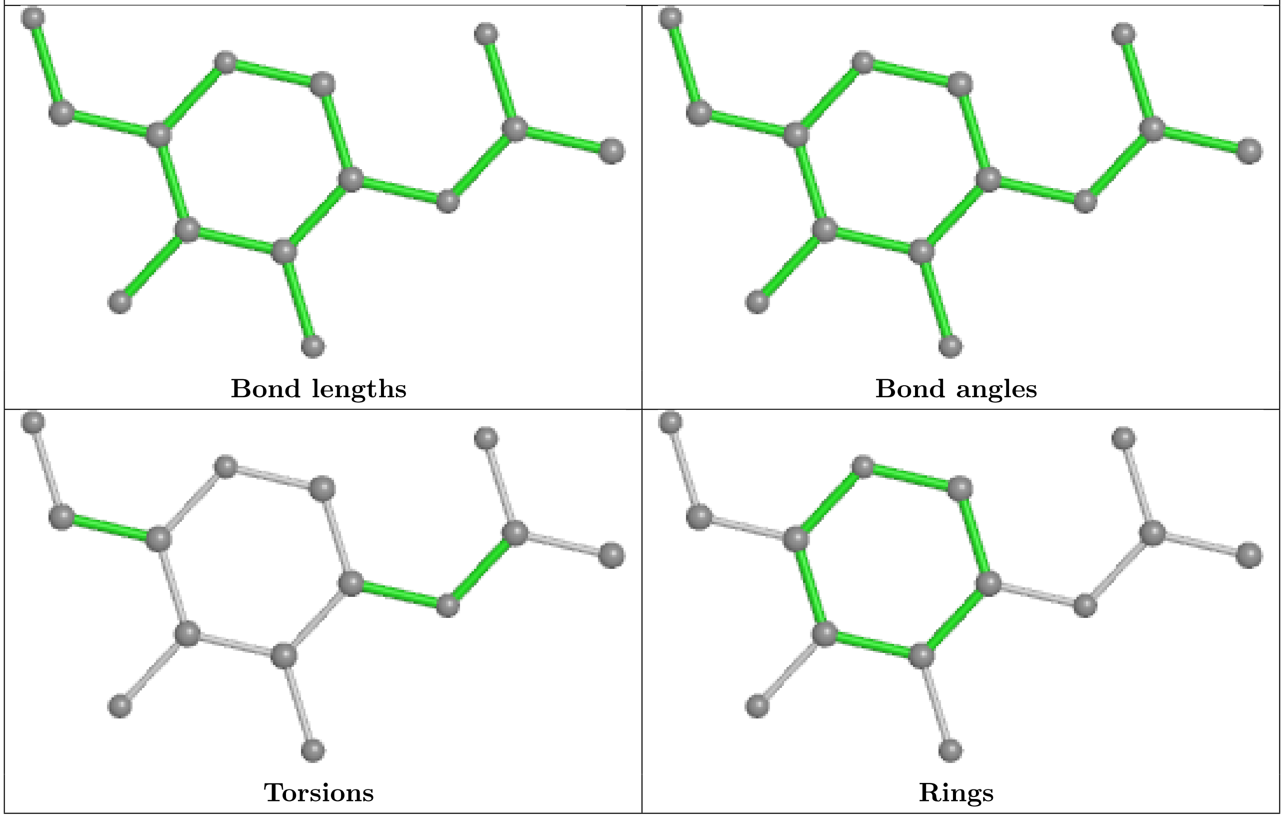
Bond lengths

Bond angles

Torsions

Rings

Ligand NAG L 802



Bond lengths

Bond angles

Torsions

Rings

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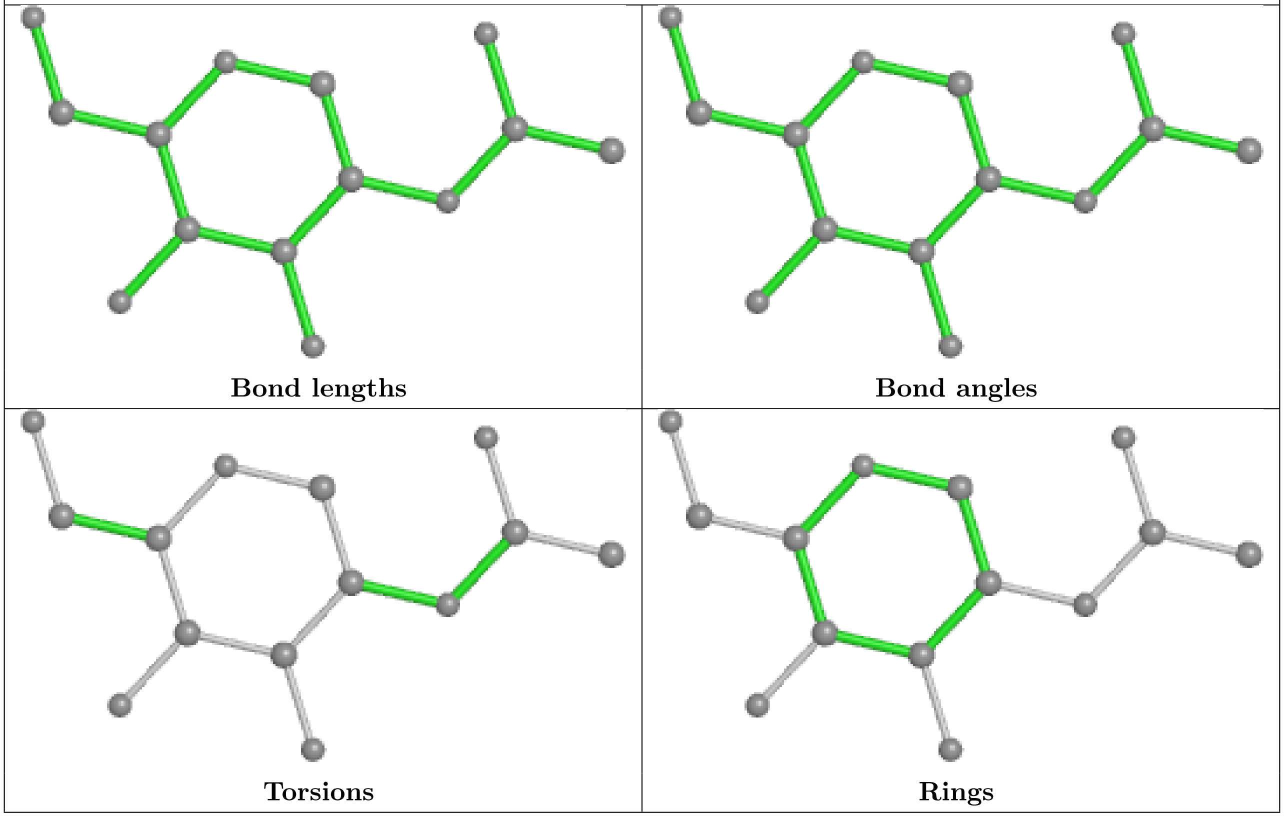


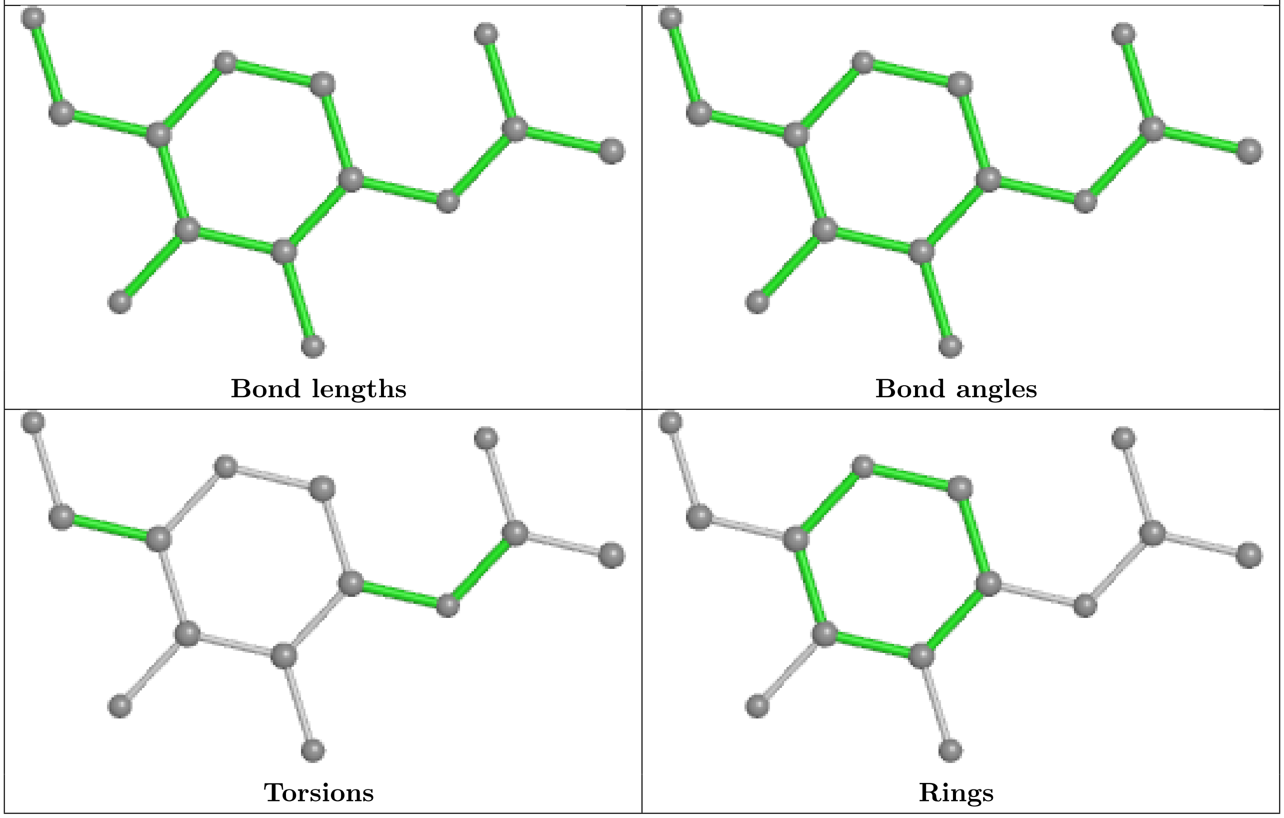
Bond lengths

Bond angles

Torsions

Rings

Ligand NAG d 1301



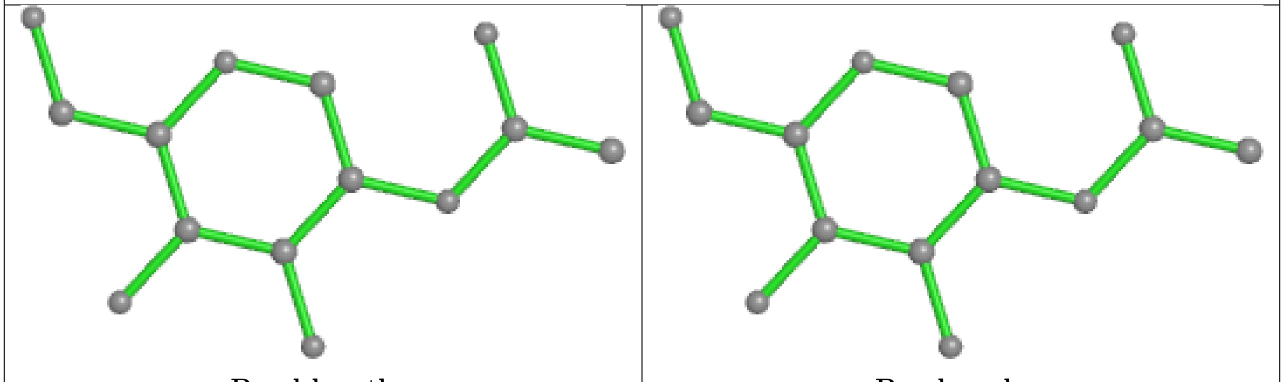
Bond lengths

Bond angles

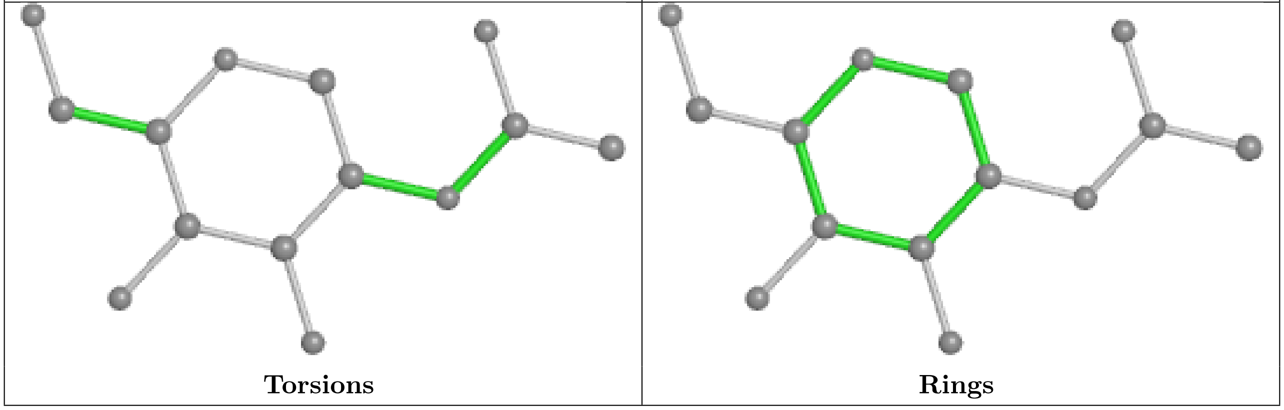
Torsions

Rings

Ligand NAG D 1302

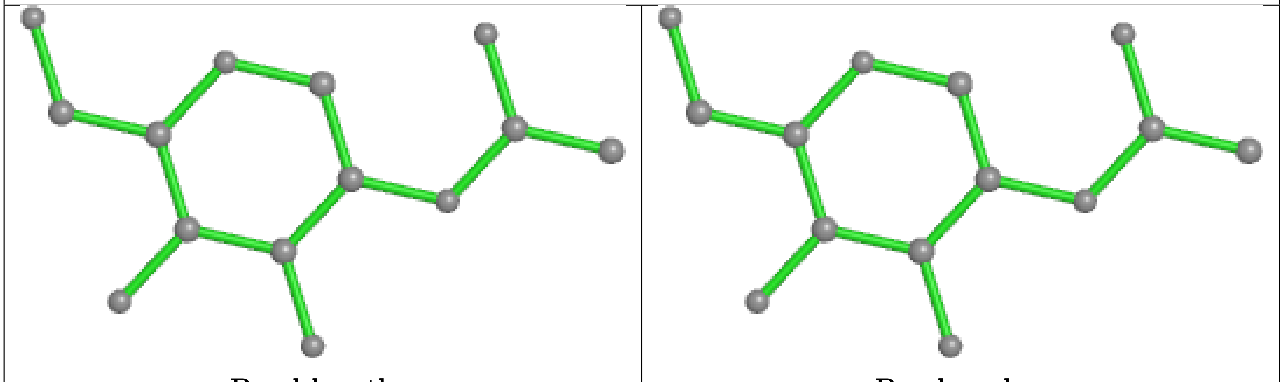


Bond lengths Bond angles

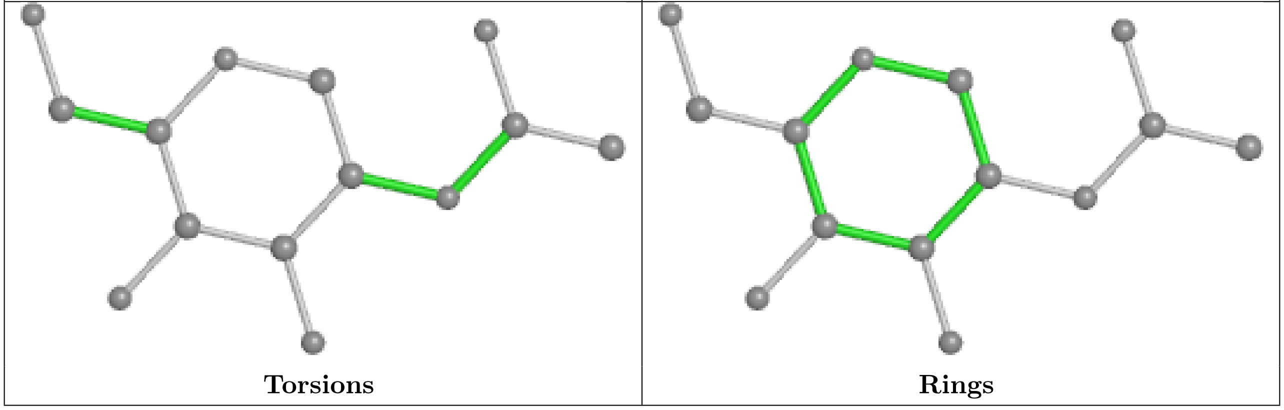


Torsions Rings

Ligand NAG V 1301

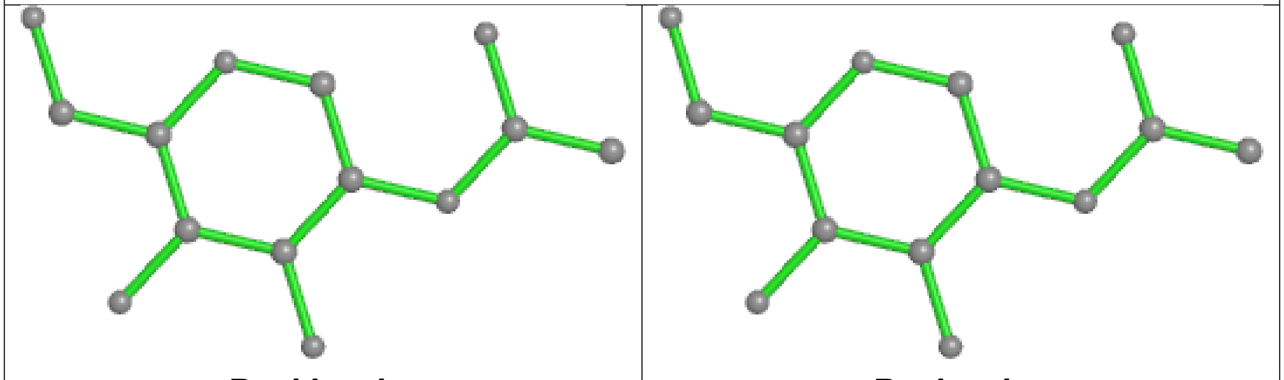


Bond lengths Bond angles



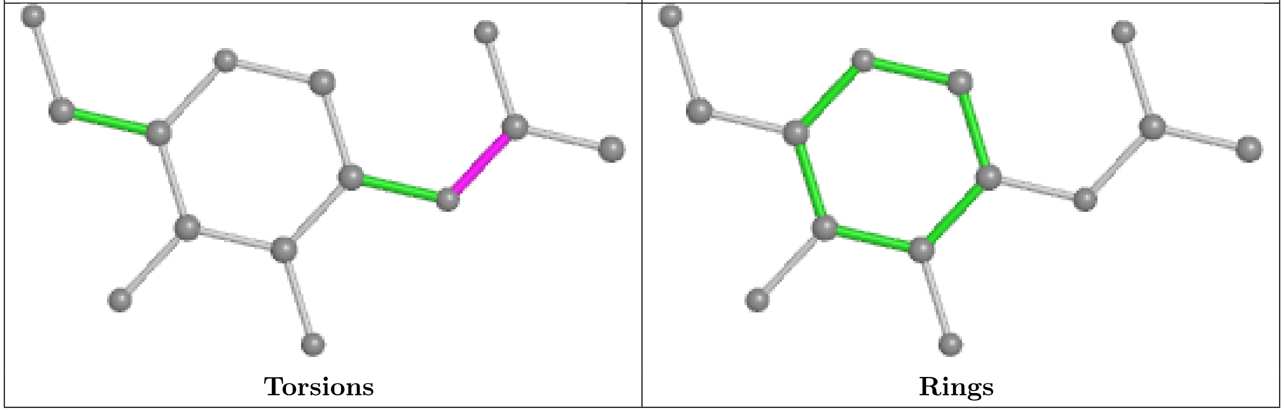
Torsions Rings

Ligand NAG A 802



Bond lengths

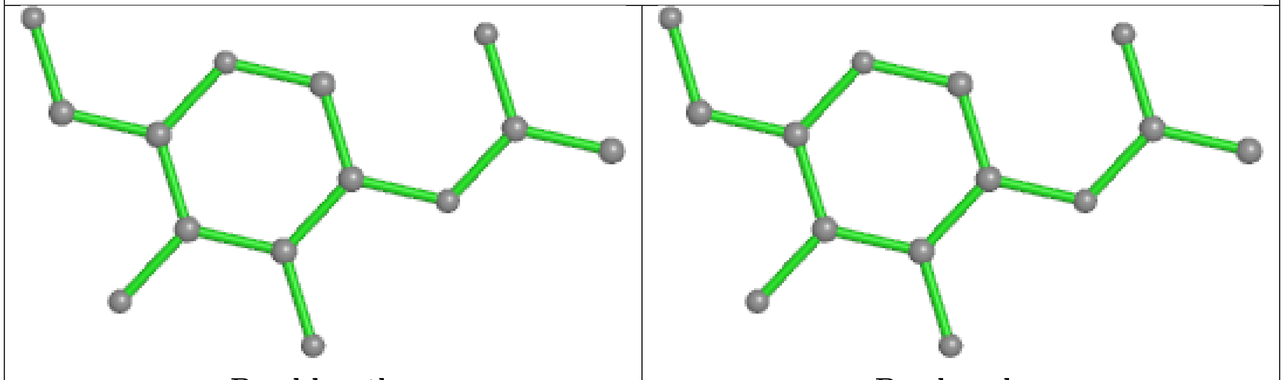
Bond angles



Torsions

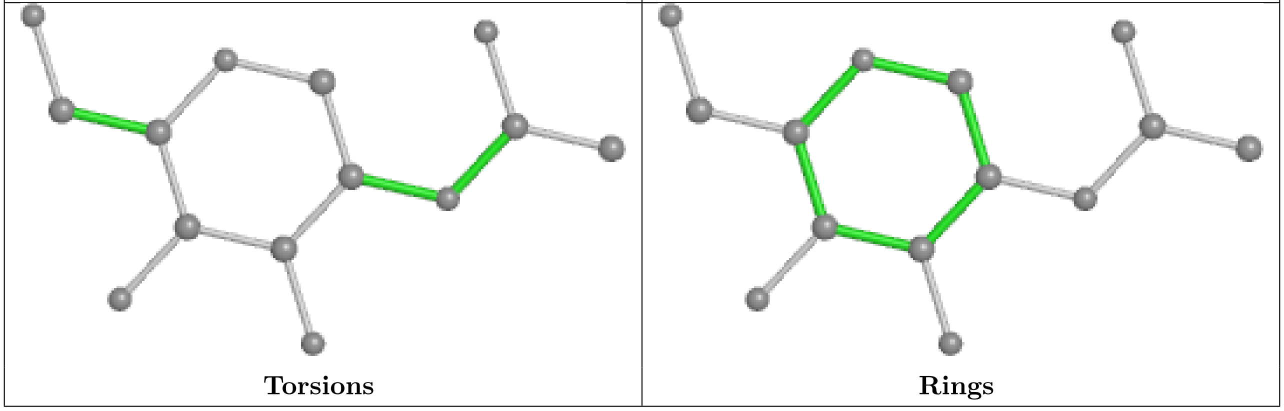
Rings

Ligand NAG G 802



Bond lengths

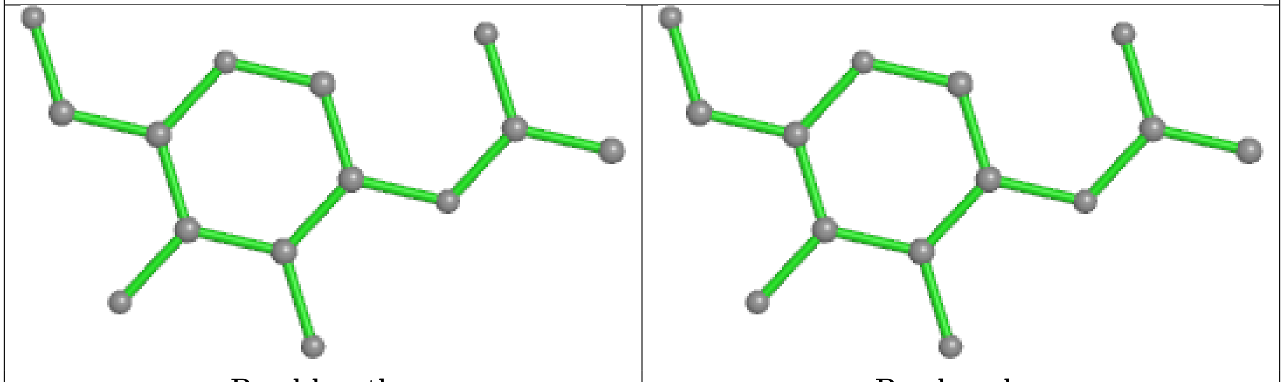
Bond angles



Torsions

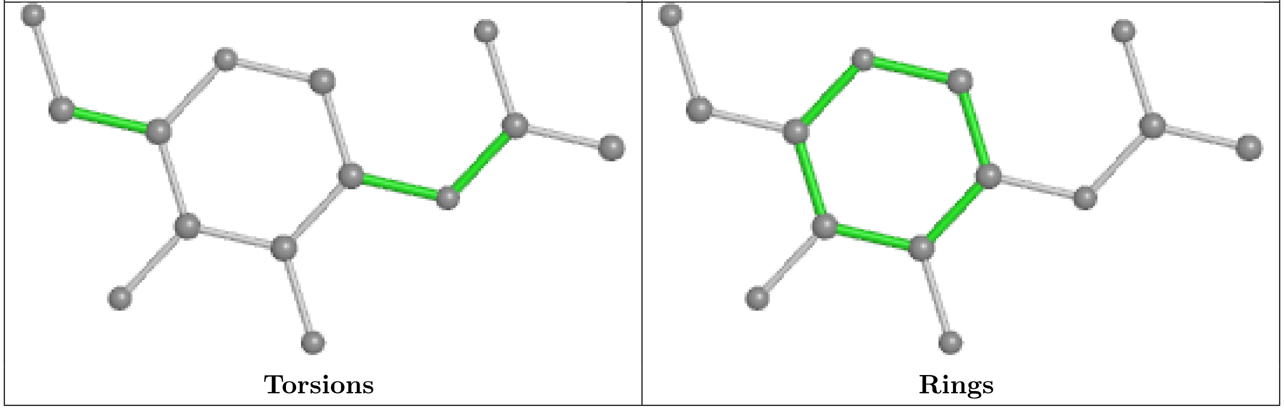
Rings

Ligand NAG M 801



Bond lengths

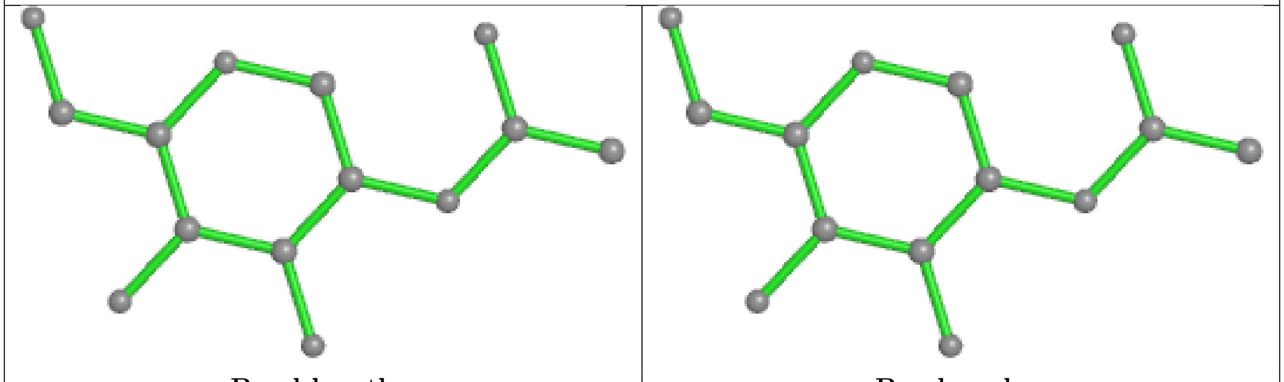
Bond angles



Torsions

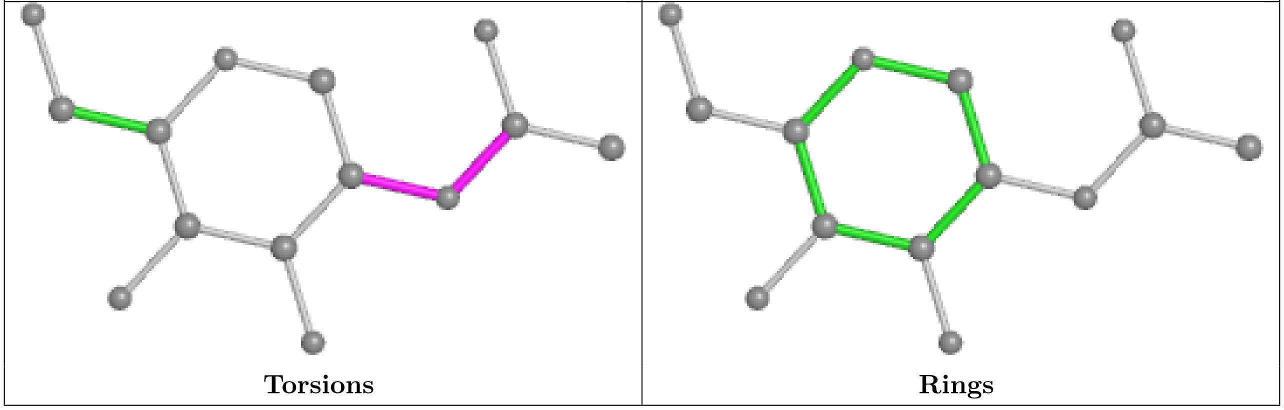
Rings

Ligand NAG a 1301



Bond lengths

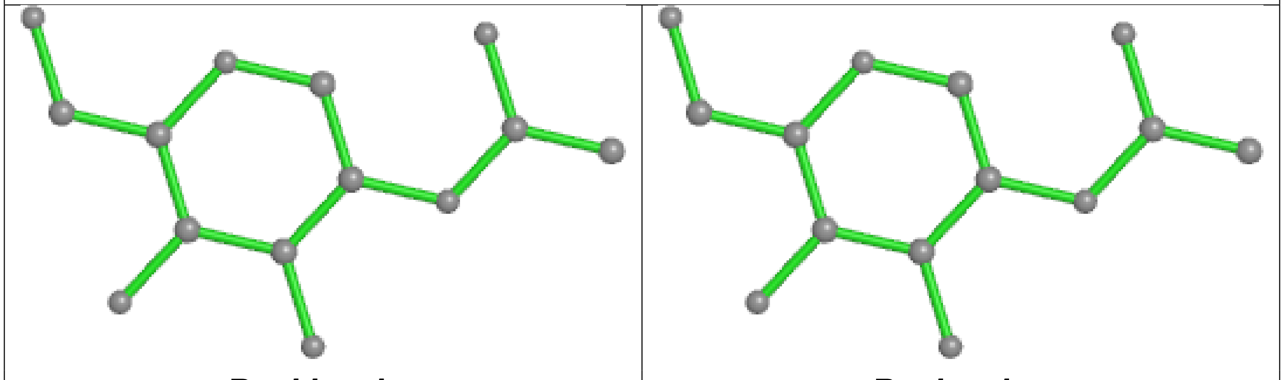
Bond angles



Torsions

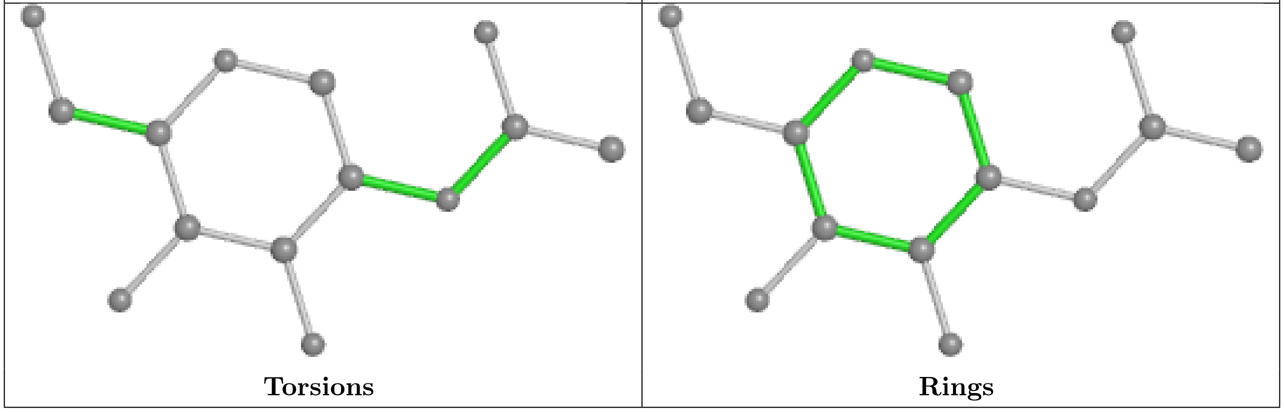
Rings

Ligand NAG W 1301



Bond lengths

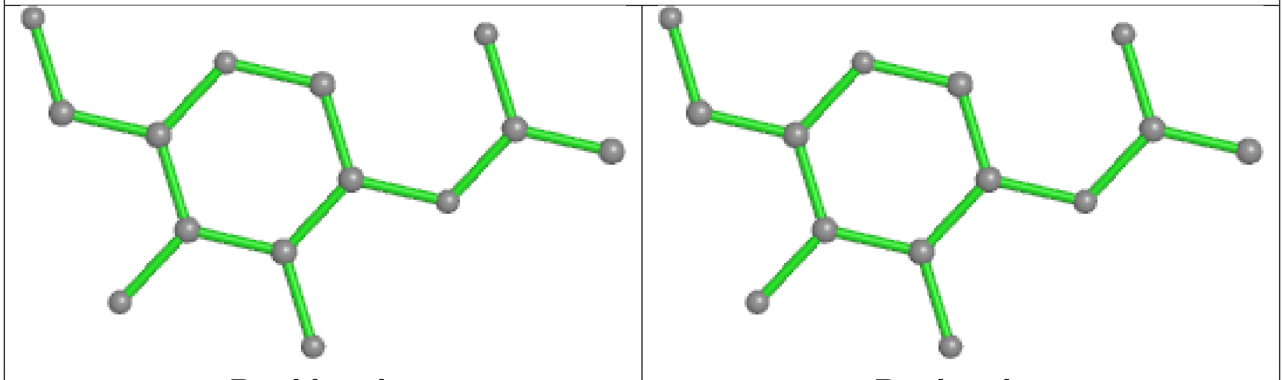
Bond angles



Torsions

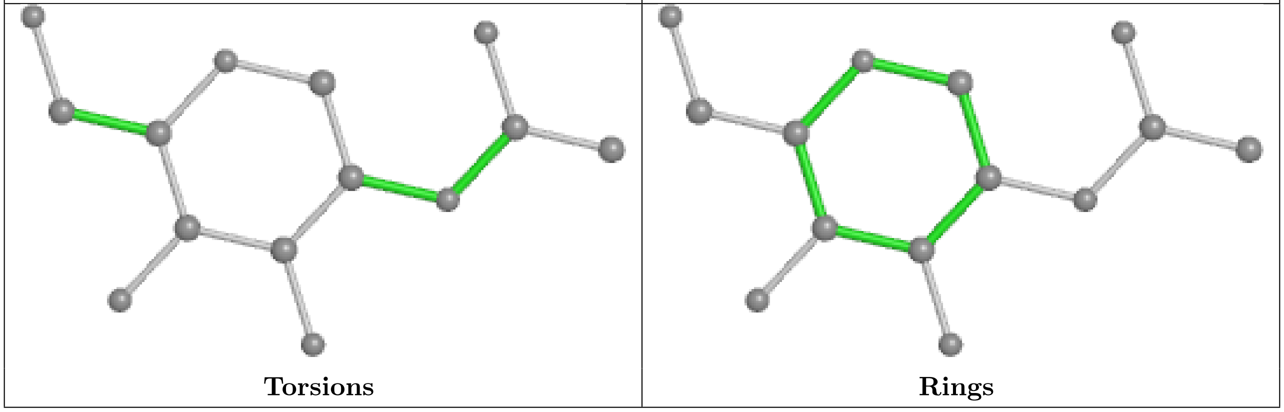
Rings

Ligand NAG F 802



Bond lengths

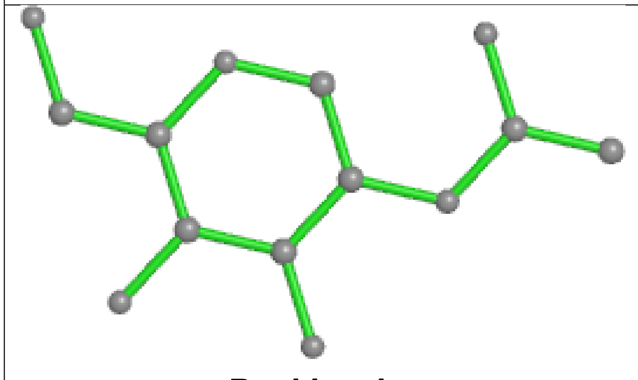
Bond angles



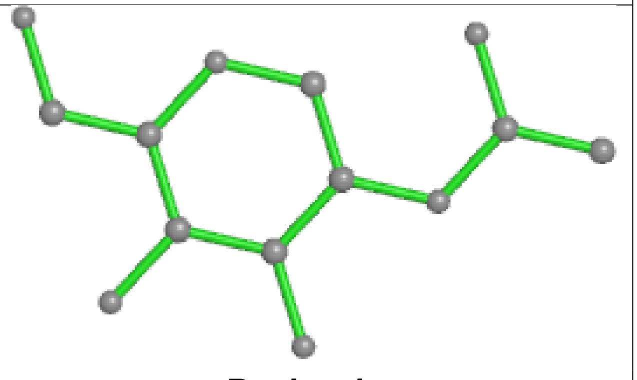
Torsions

Rings

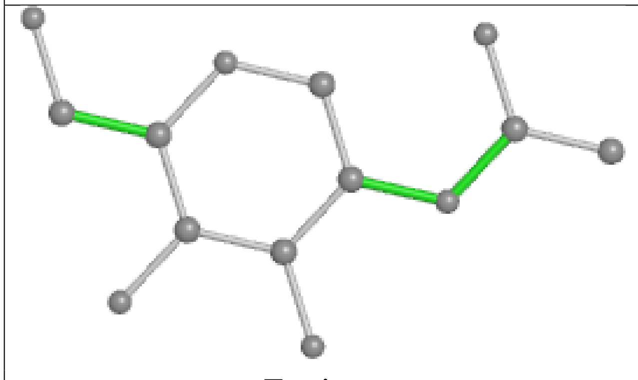
Ligand NAG B 801



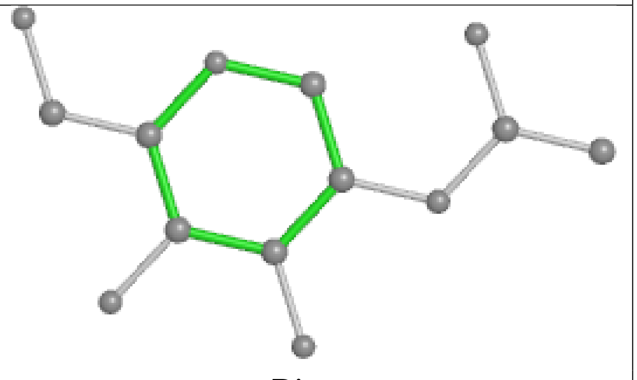
Bond lengths



Bond angles

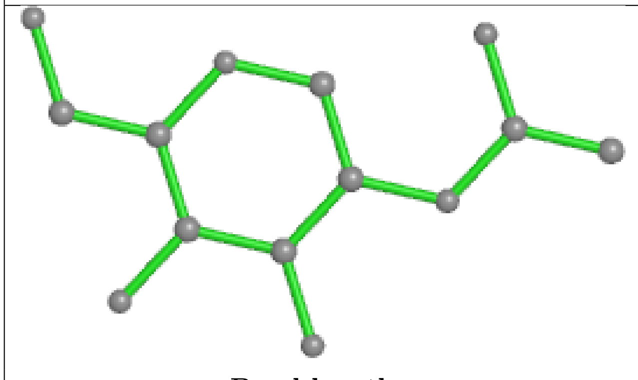


Torsions

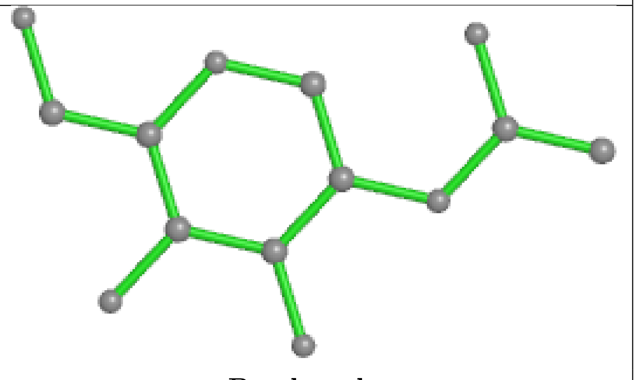


Rings

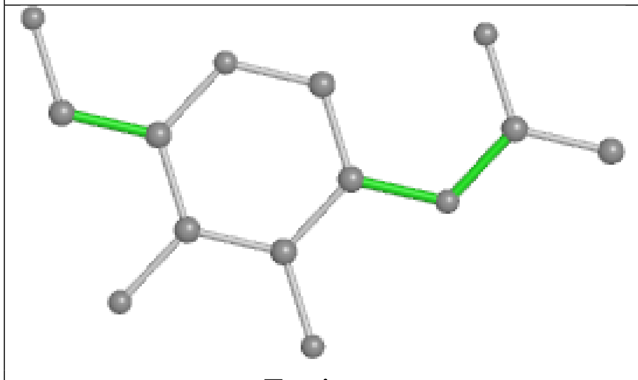
Ligand NAG I 801



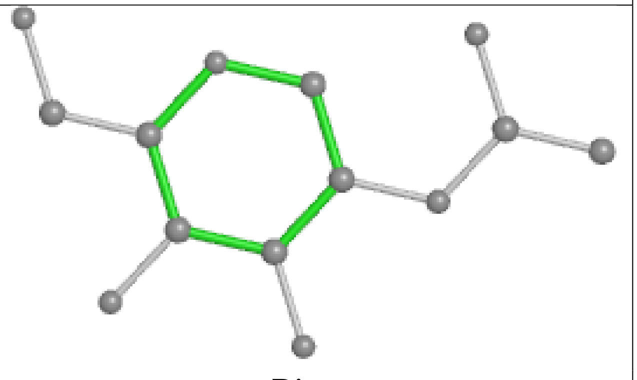
Bond lengths



Bond angles

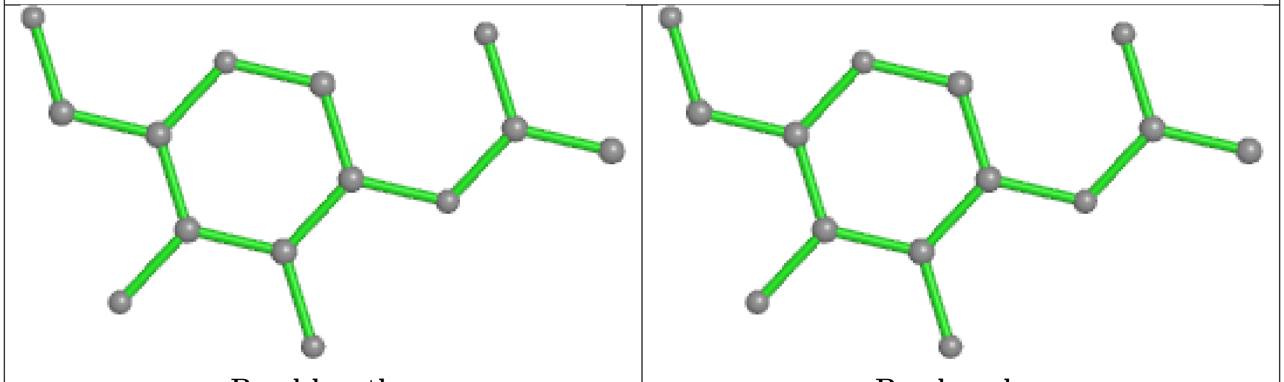


Torsions



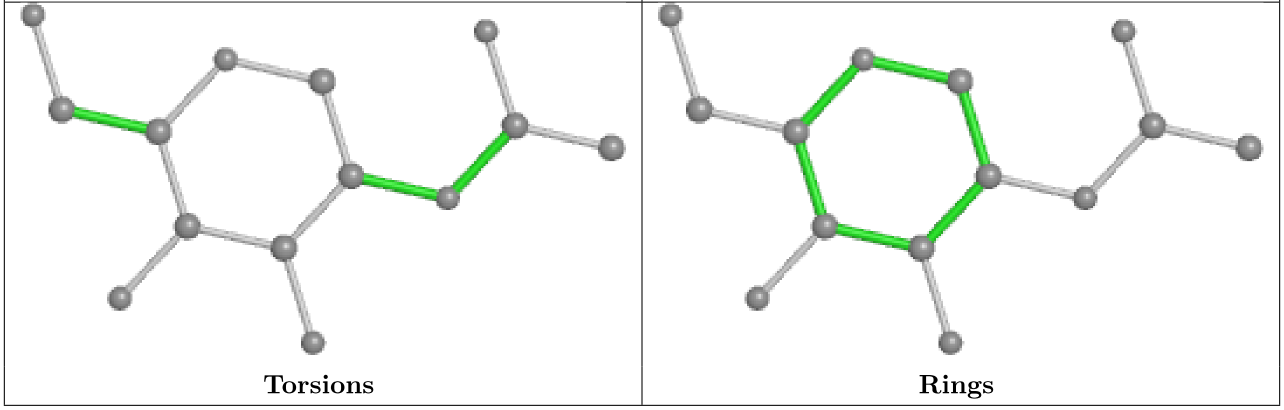
Rings

Ligand NAG A 801



Bond lengths

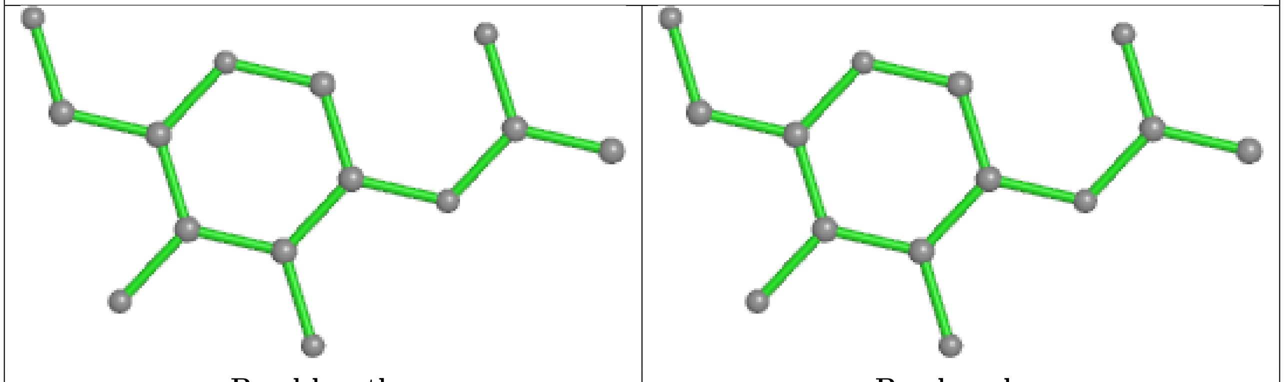
Bond angles



Torsions

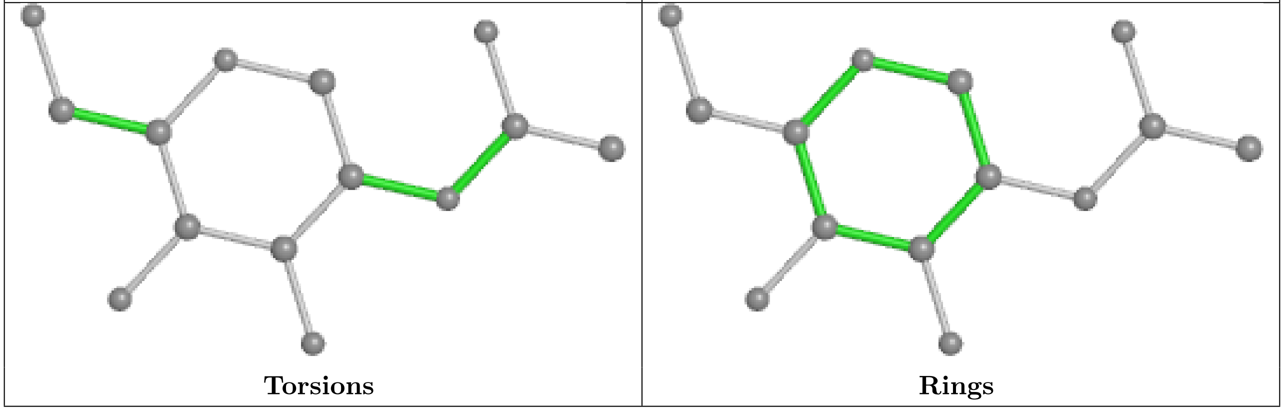
Rings

Ligand NAG M 802



Bond lengths

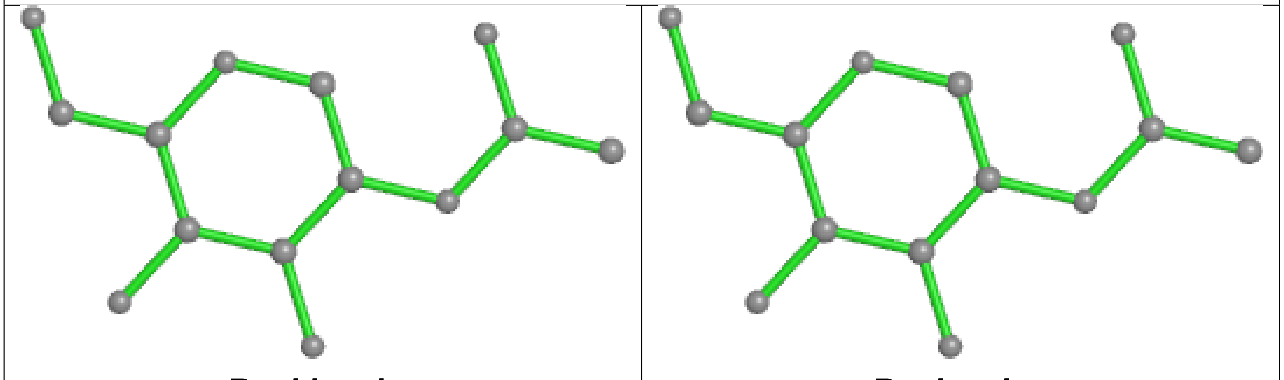
Bond angles



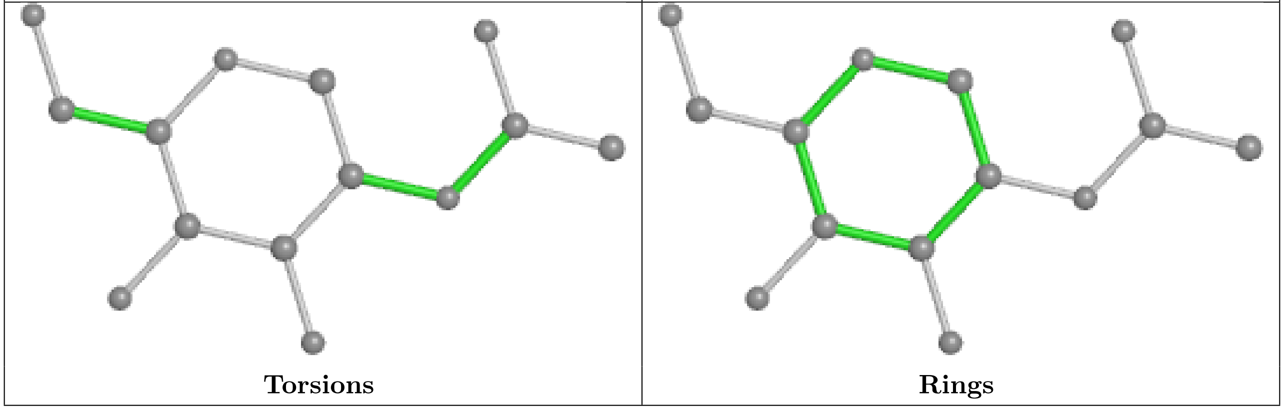
Torsions

Rings

Ligand NAG N 801

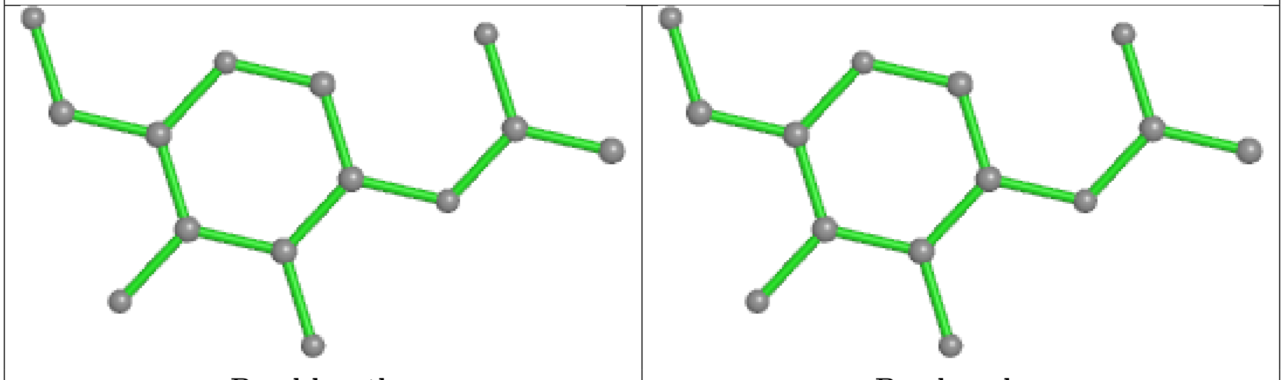


Bond lengths Bond angles

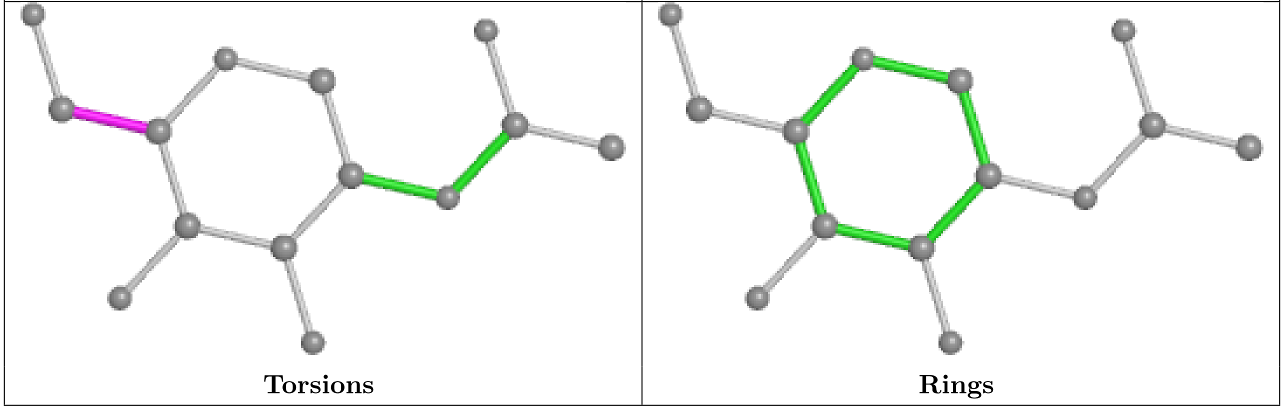


Torsions Rings

Ligand NAG T 1301

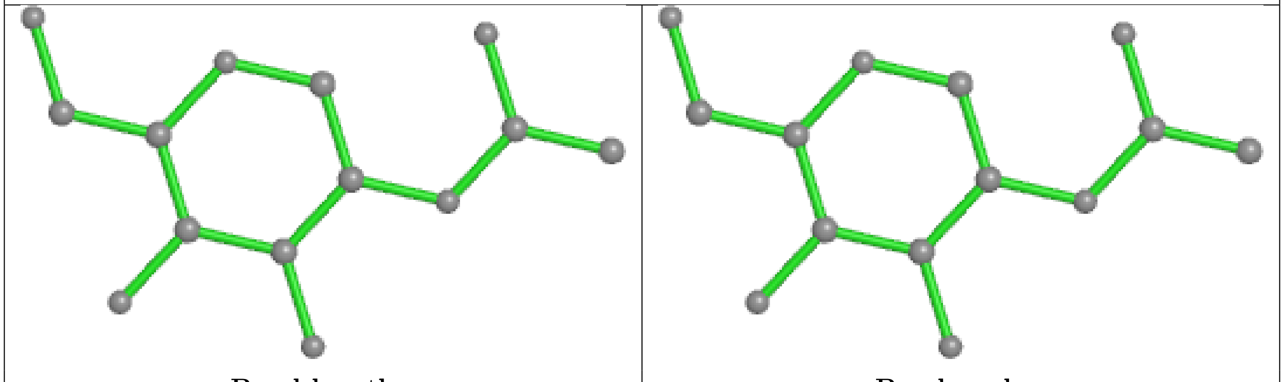


Bond lengths Bond angles

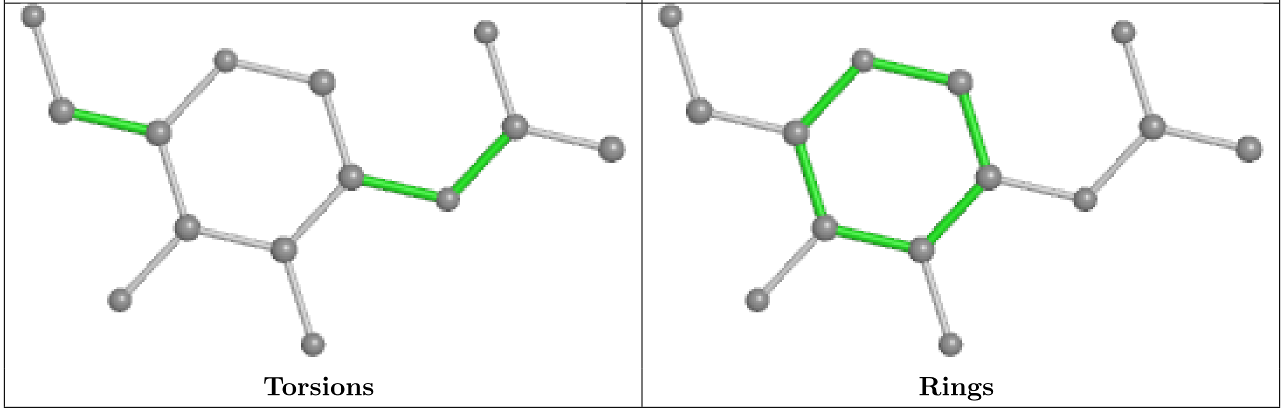


Torsions Rings

Ligand NAG b 1301

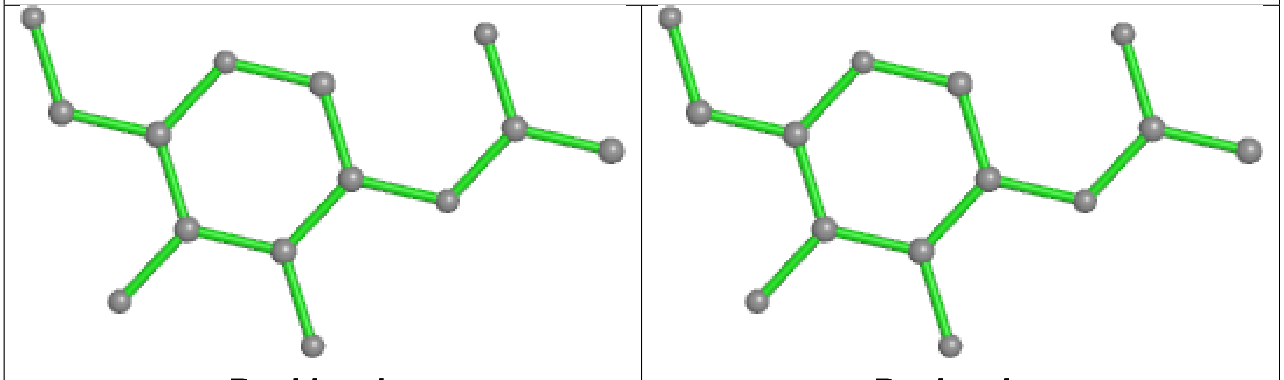


Bond lengths Bond angles

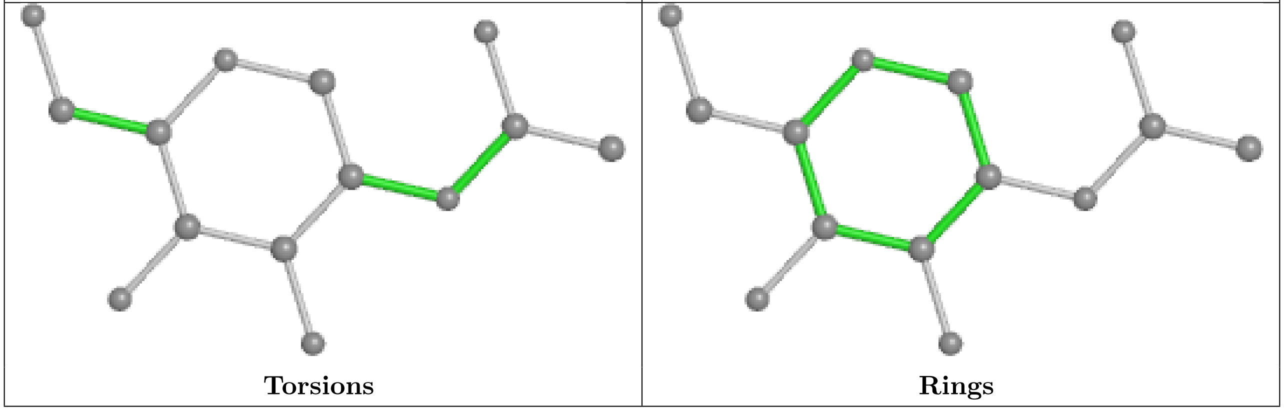


Torsions Rings

Ligand NAG T 1302

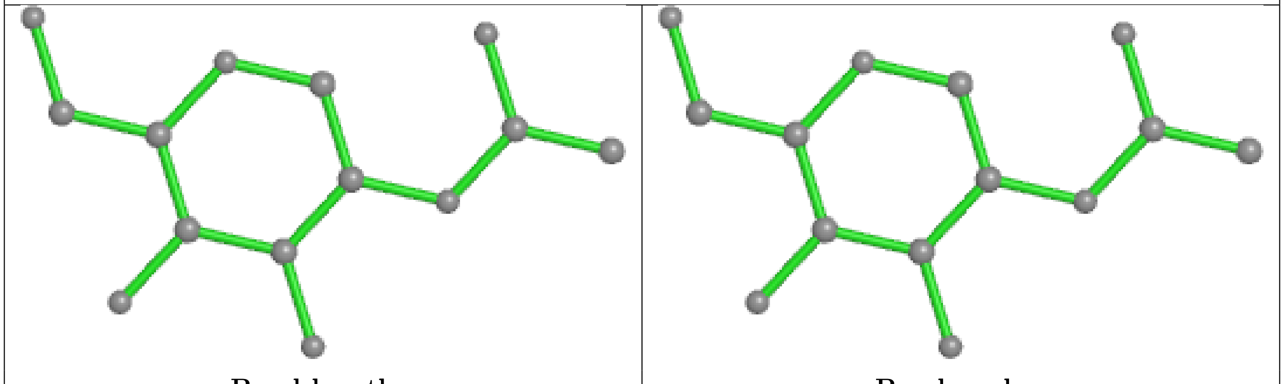


Bond lengths Bond angles

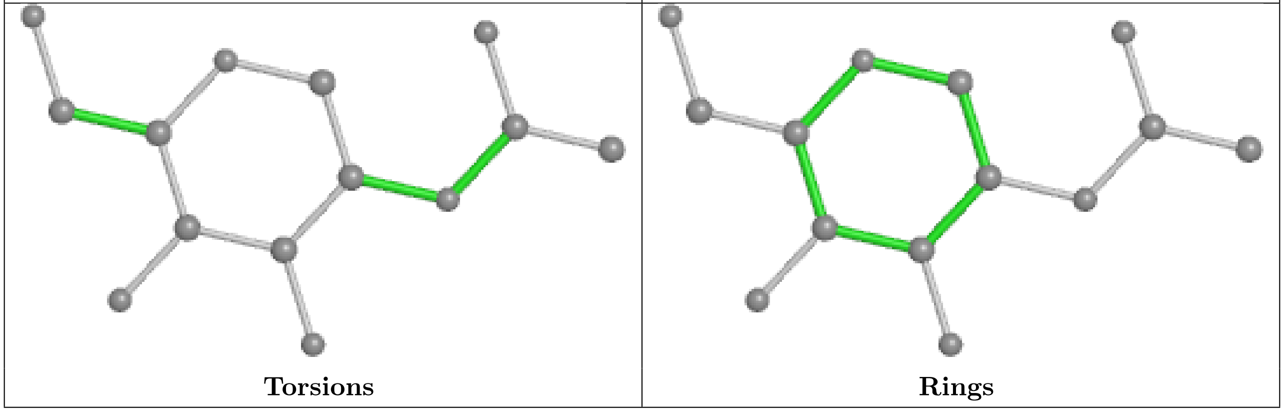


Torsions Rings

Ligand NAG P 802

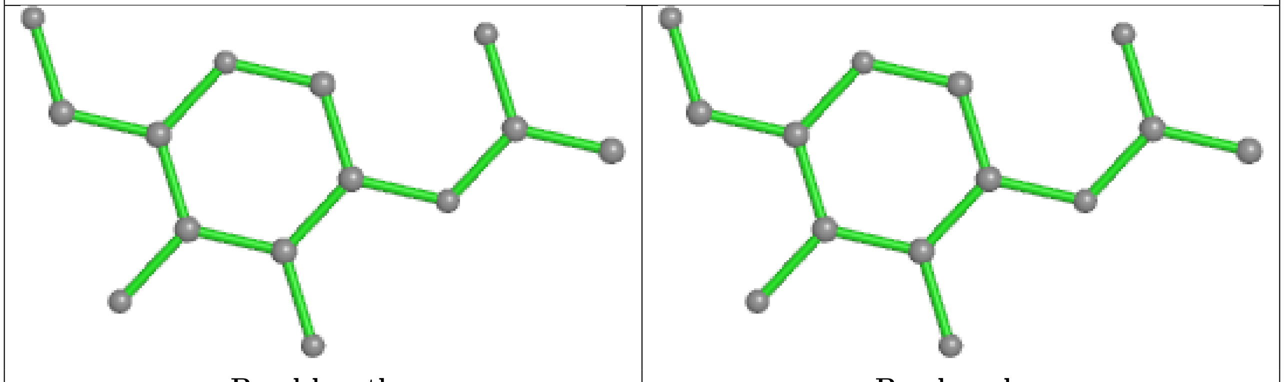


Bond lengths Bond angles

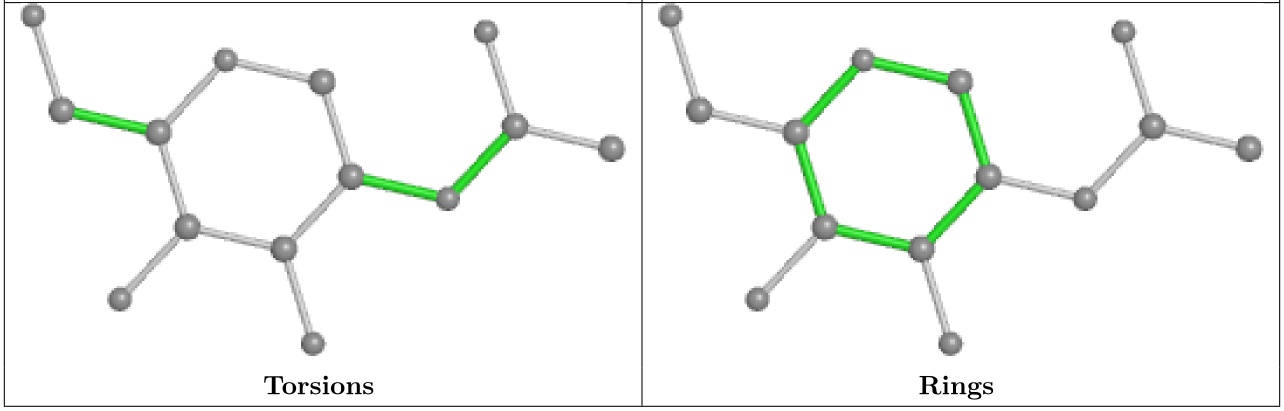


Torsions Rings

Ligand NAG E 802

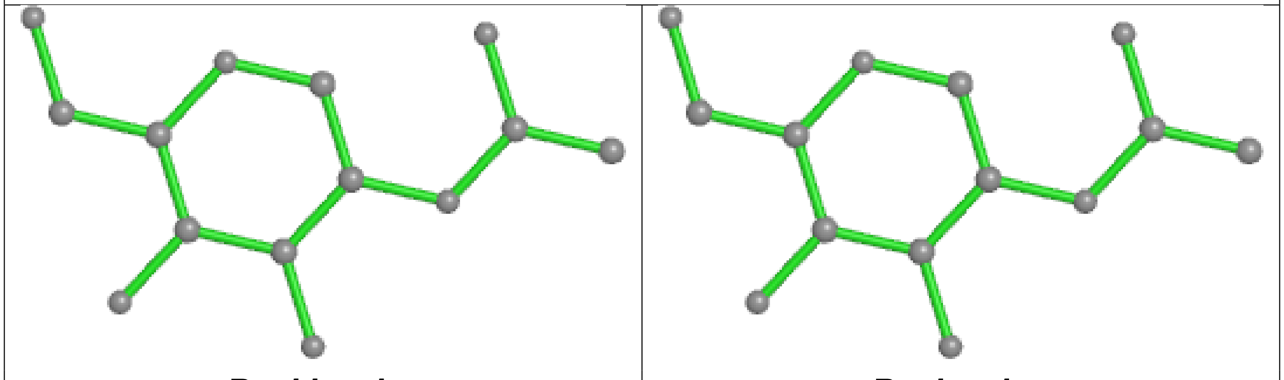


Bond lengths Bond angles

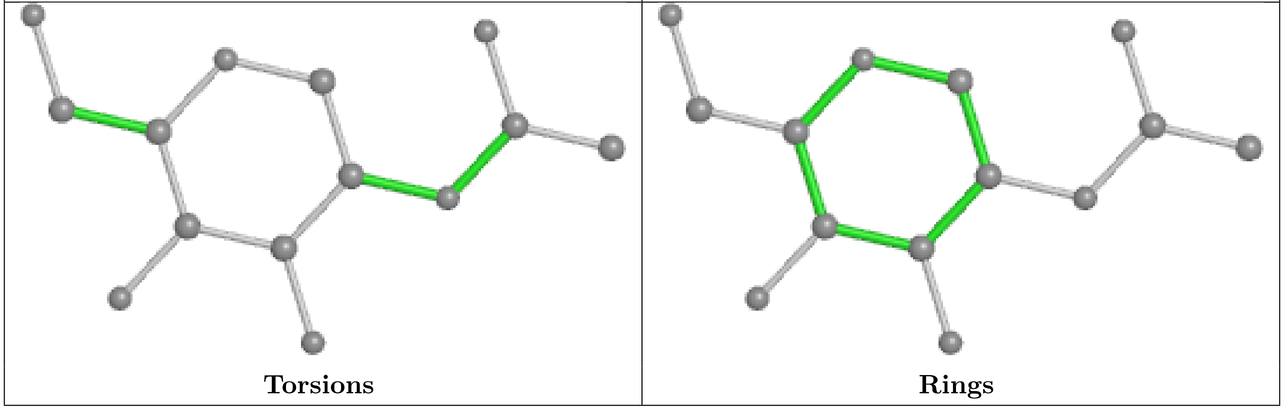


Torsions Rings

Ligand NAG O 802

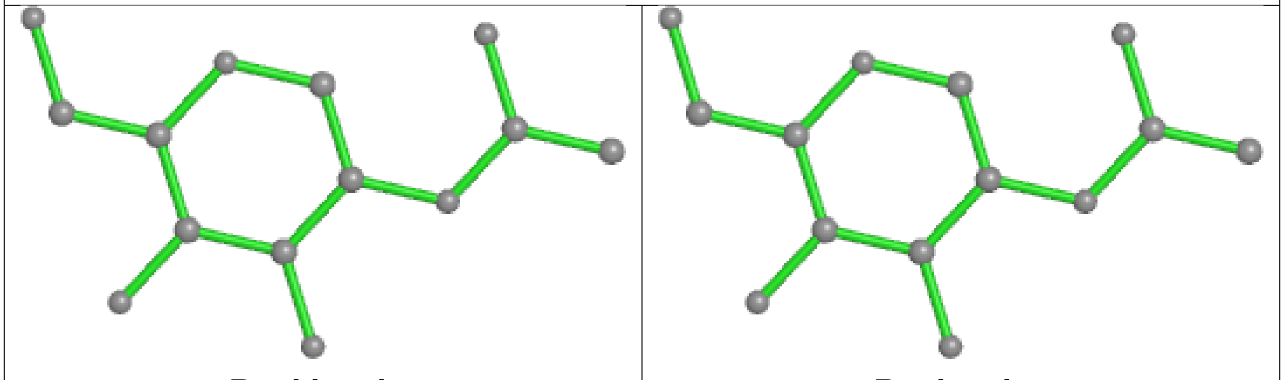


Bond lengths Bond angles

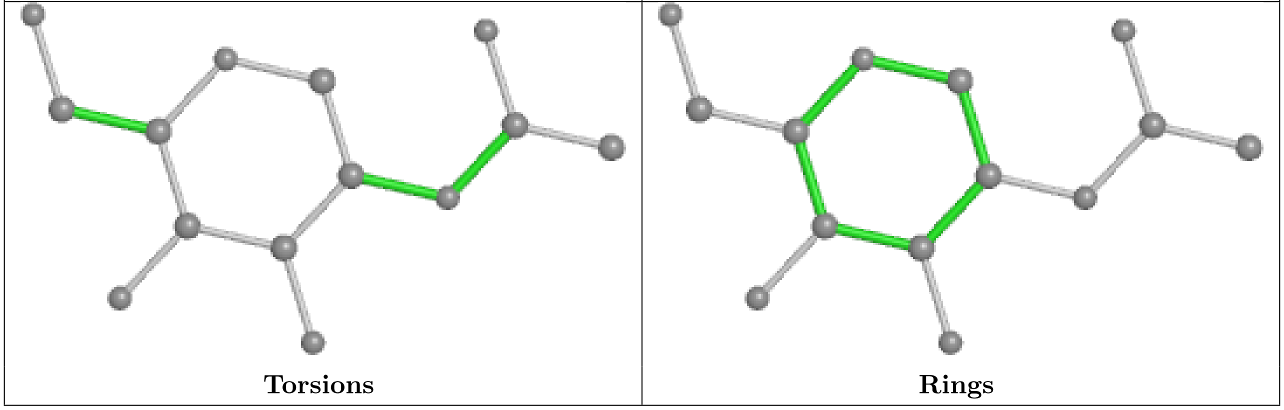


Torsions Rings

Ligand NAG U 1303

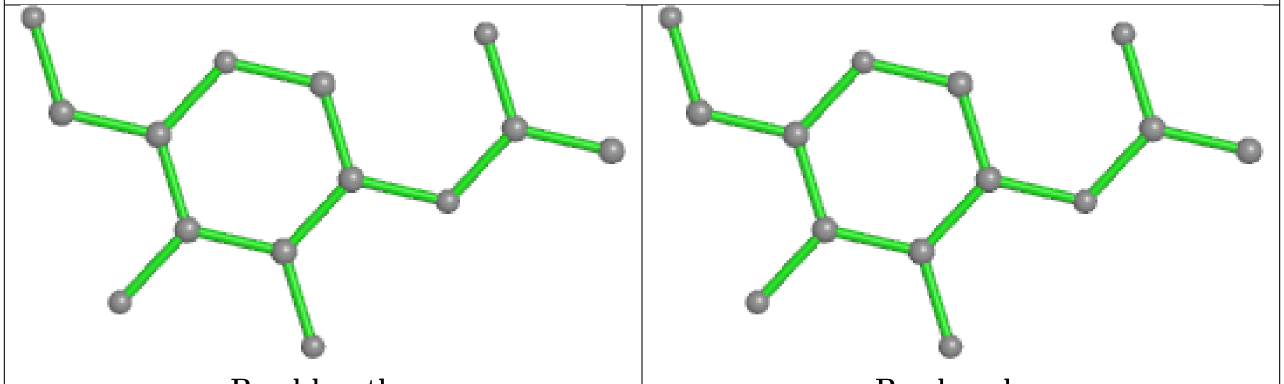


Bond lengths Bond angles



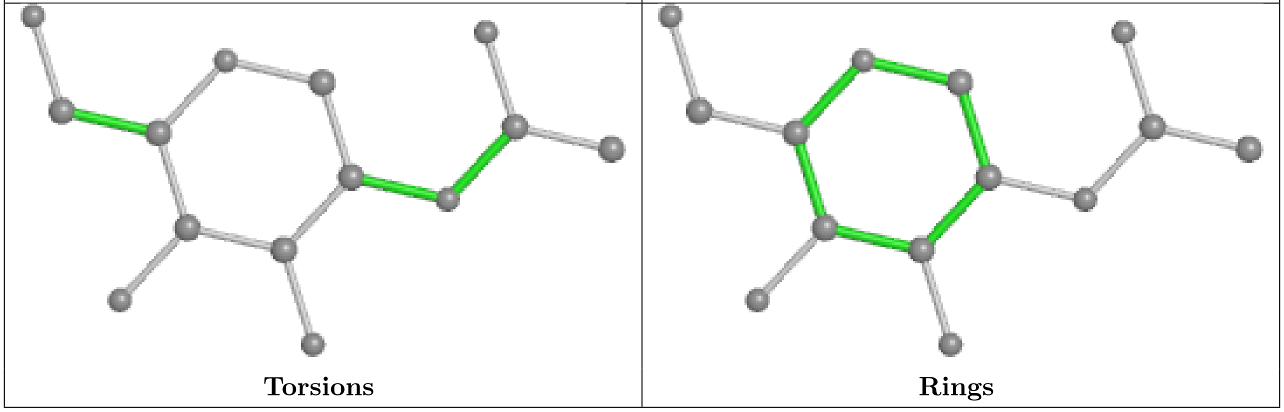
Torsions Rings

Ligand NAG C 1301



Bond lengths

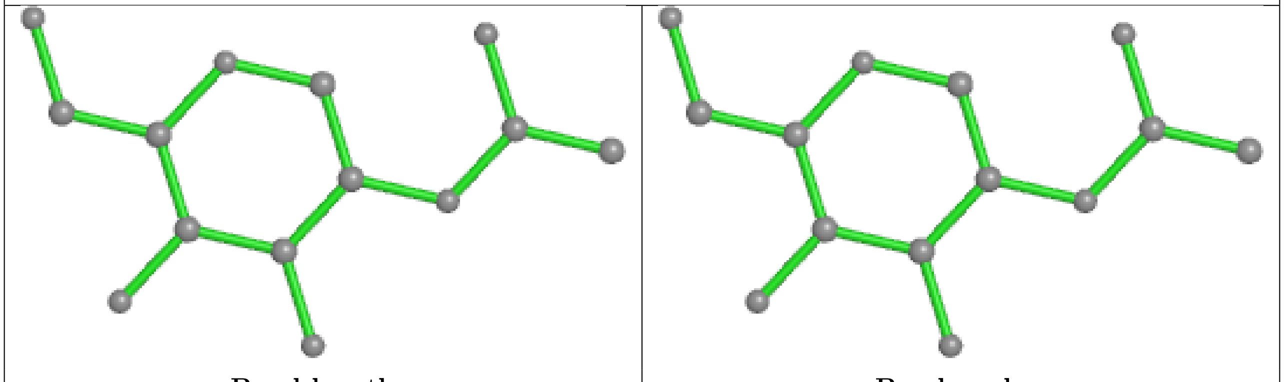
Bond angles



Torsions

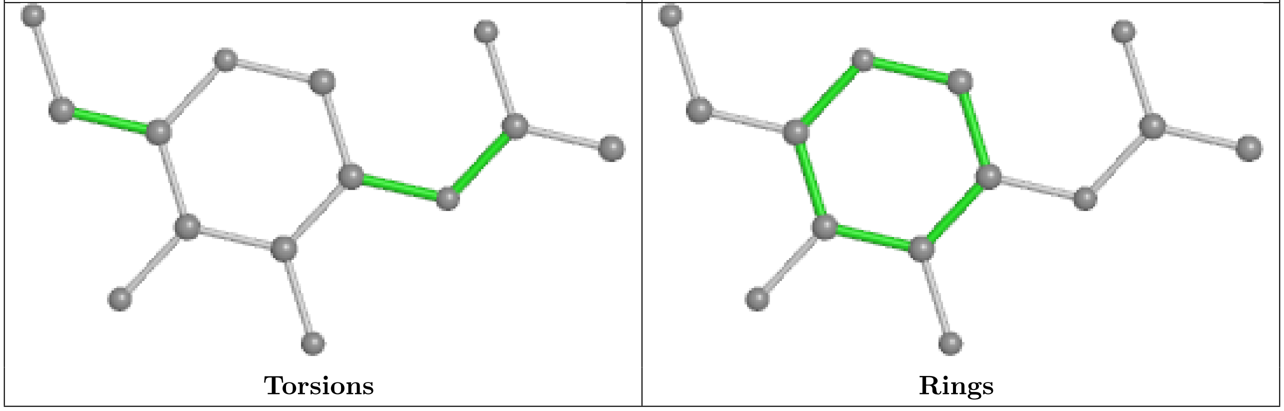
Rings

Ligand NAG U 1302



Bond lengths

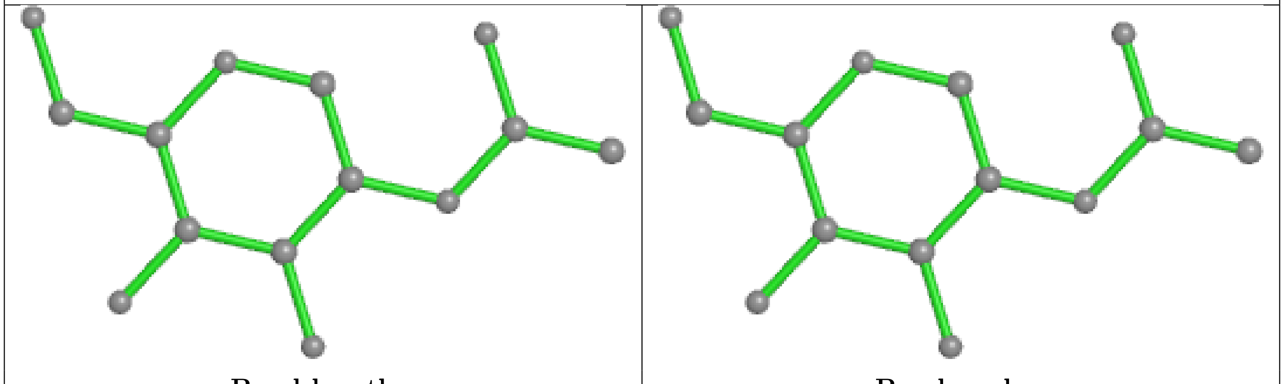
Bond angles

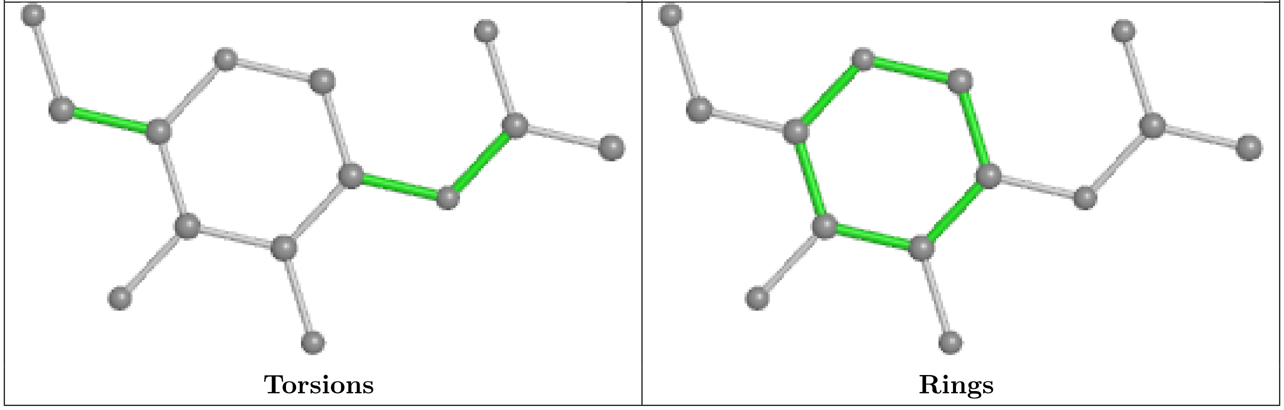


Torsions

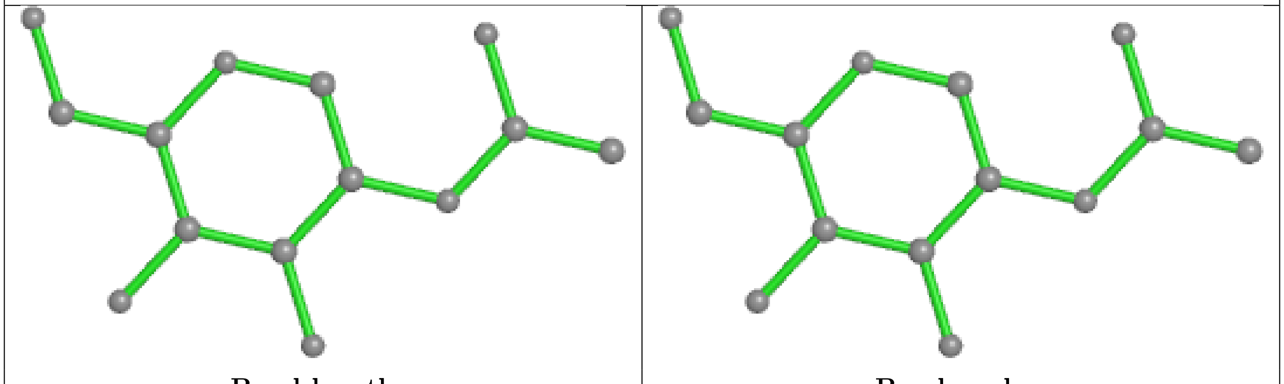
Rings

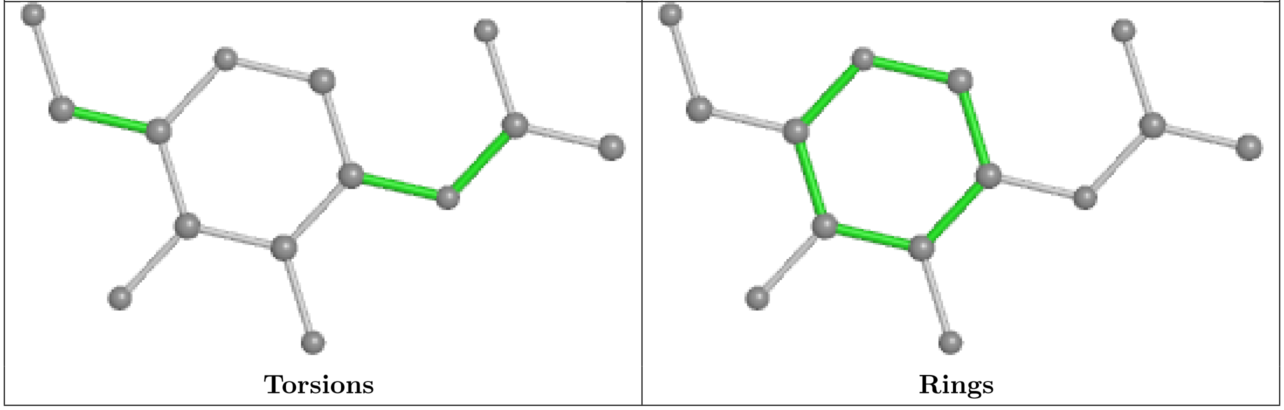
Ligand NAG a 1302


Bond lengths Bond angles

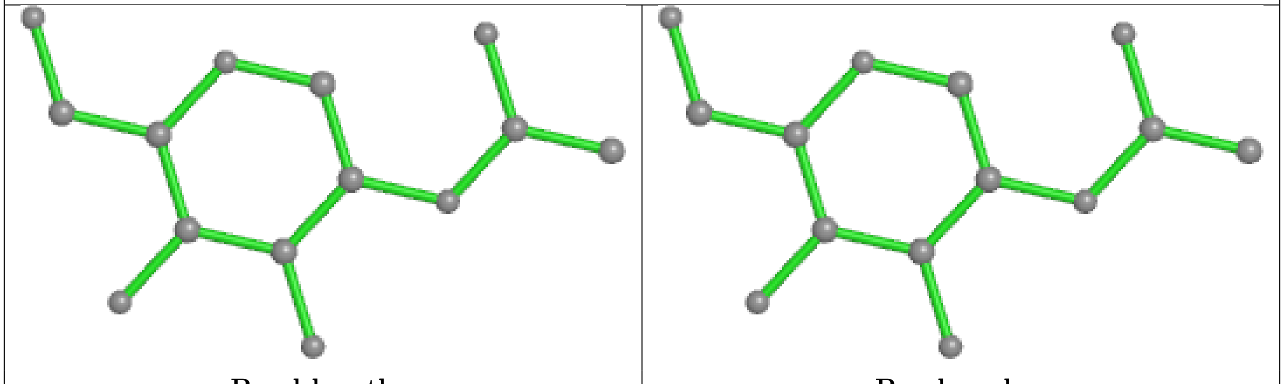

Torsions Rings

Ligand NAG D 1301


Bond lengths Bond angles

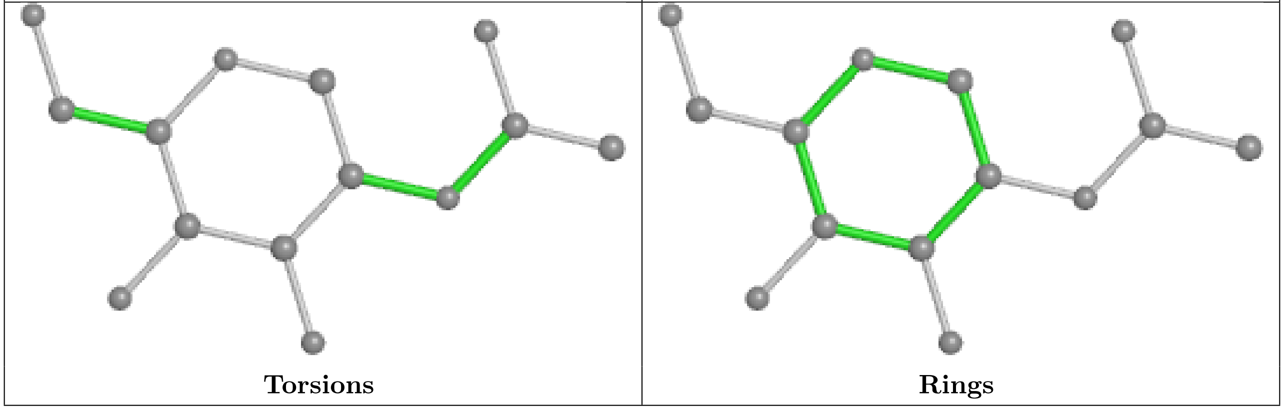

Torsions Rings

Ligand NAG G 801



Bond lengths

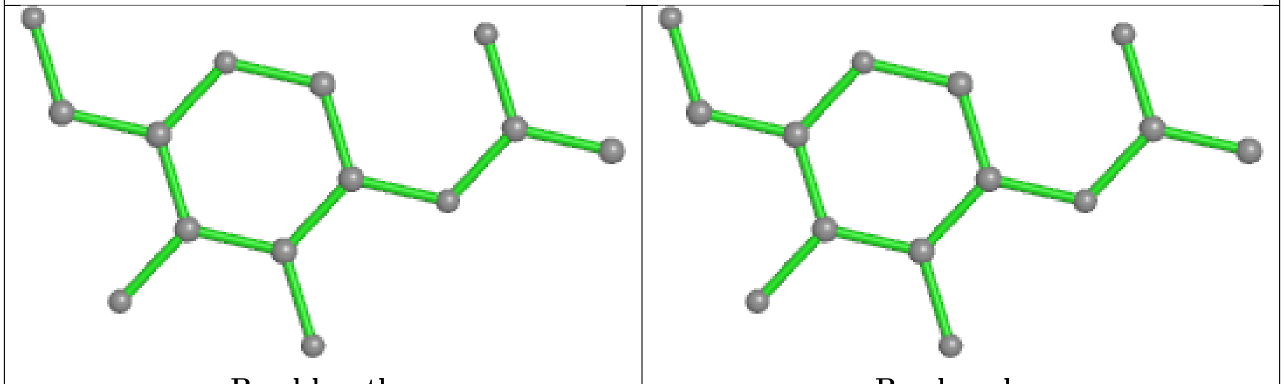
Bond angles



Torsions

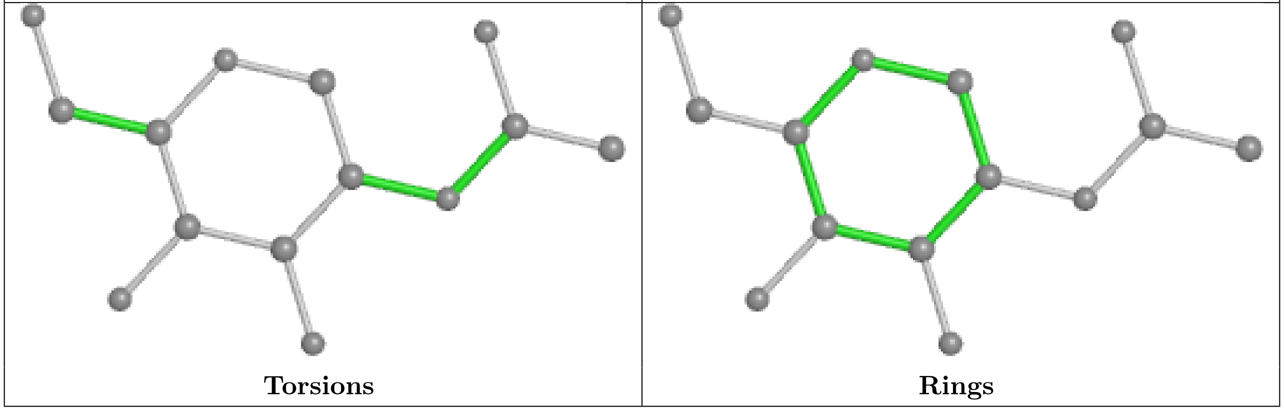
Rings

Ligand NAG O 801



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.

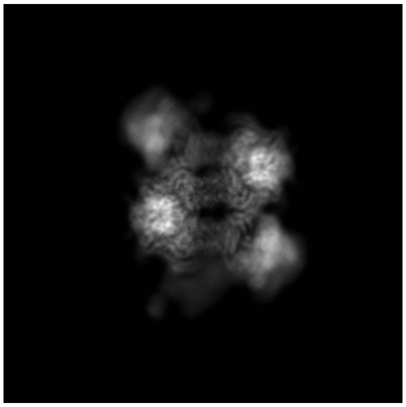
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-32689. These allow visual inspection of the internal detail of the map and identification of artifacts.

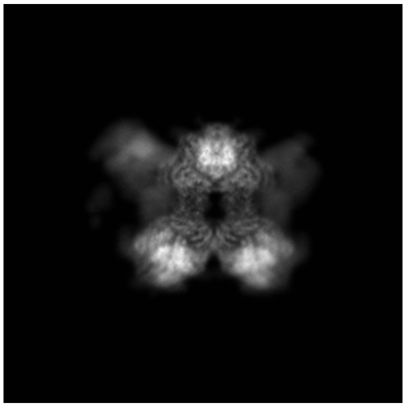
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

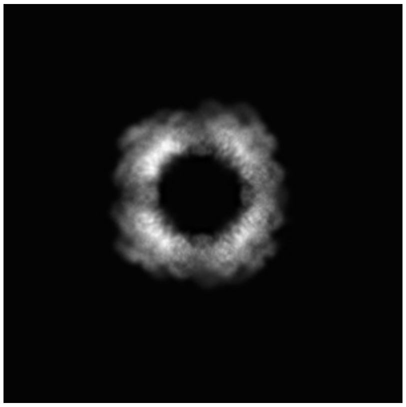
6.1.1 Primary map



X



Y

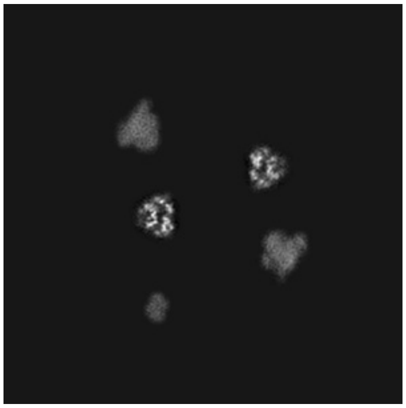


Z

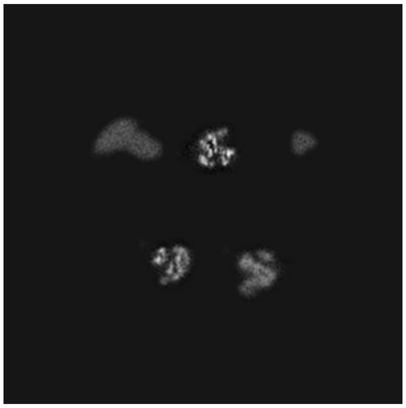
The images above show the map projected in three orthogonal directions.

6.2 Central slices

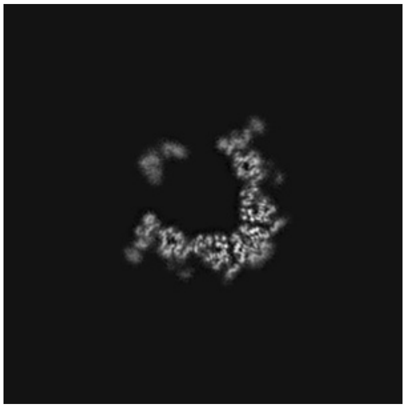
6.2.1 Primary map



X Index: 128



Y Index: 128

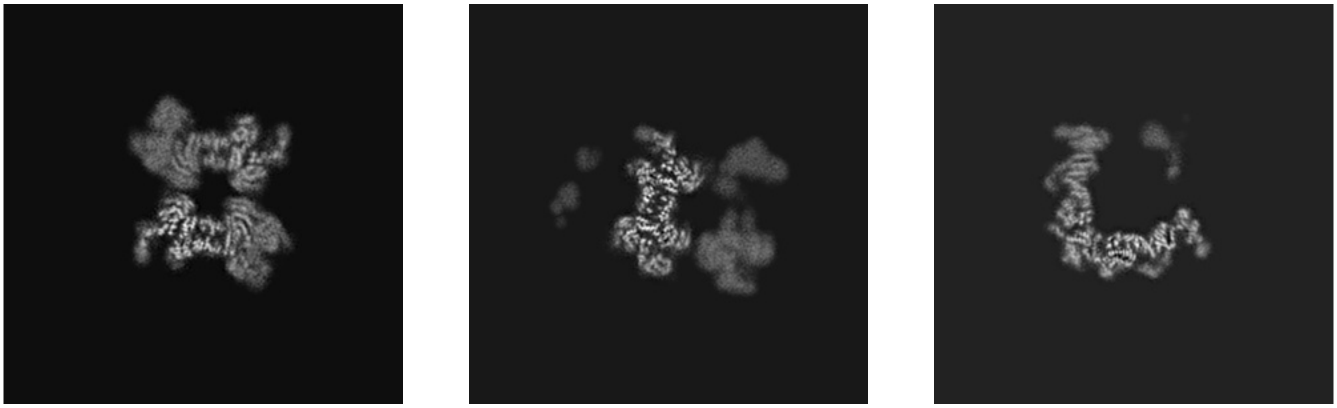


Z Index: 128

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

6.3 Largest variance slices ⓘ

6.3.1 Primary map

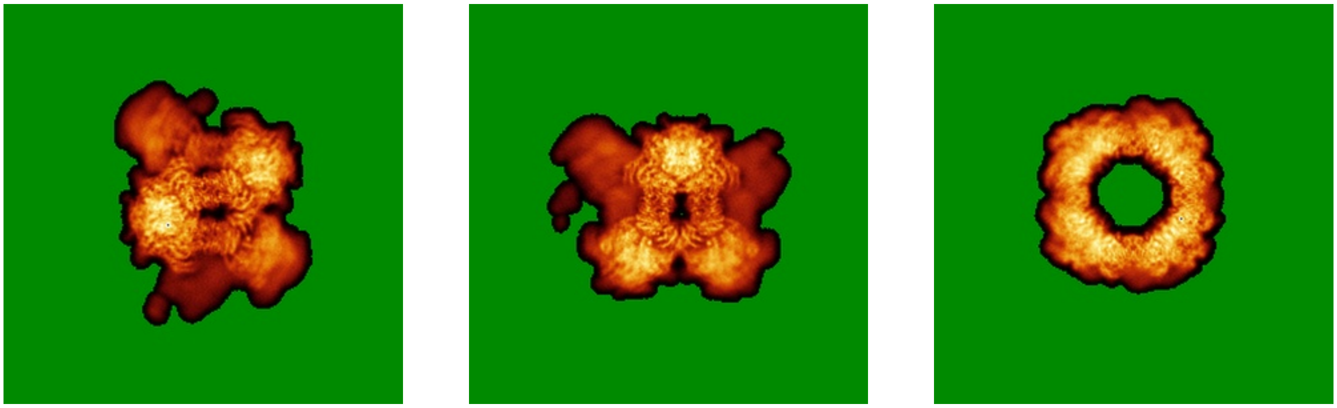


X Index: 94 Y Index: 101 Z Index: 114

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

6.4 Orthogonal standard-deviation projections (False-color) ⓘ

6.4.1 Primary map



X Y Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views

6.5.1 Primary map

X

Y

Z

The images above show the 3D surface view of the map at the recommended contour level 0.01. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

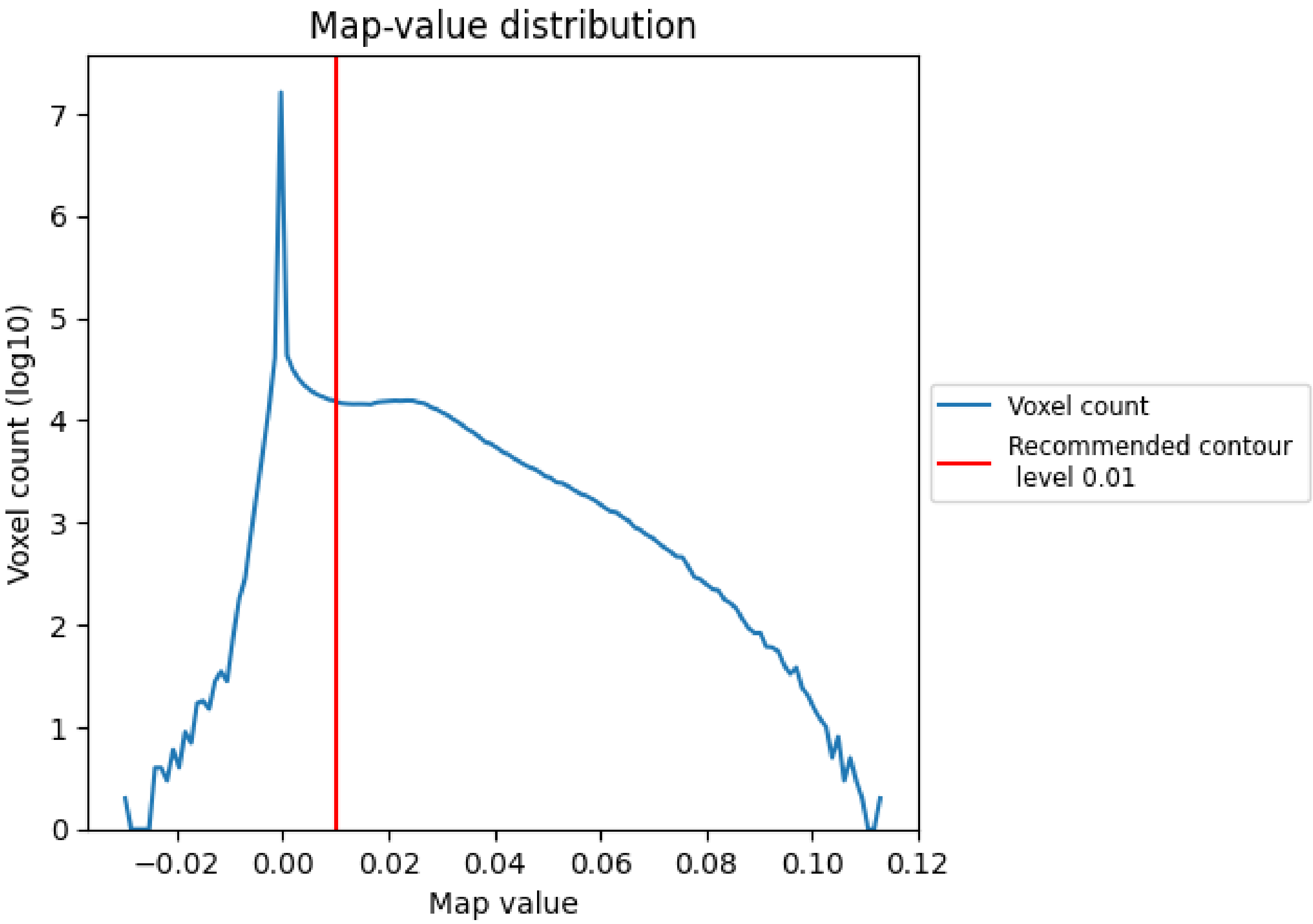
6.6 Mask visualisation

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

7 Map analysis ⓘ

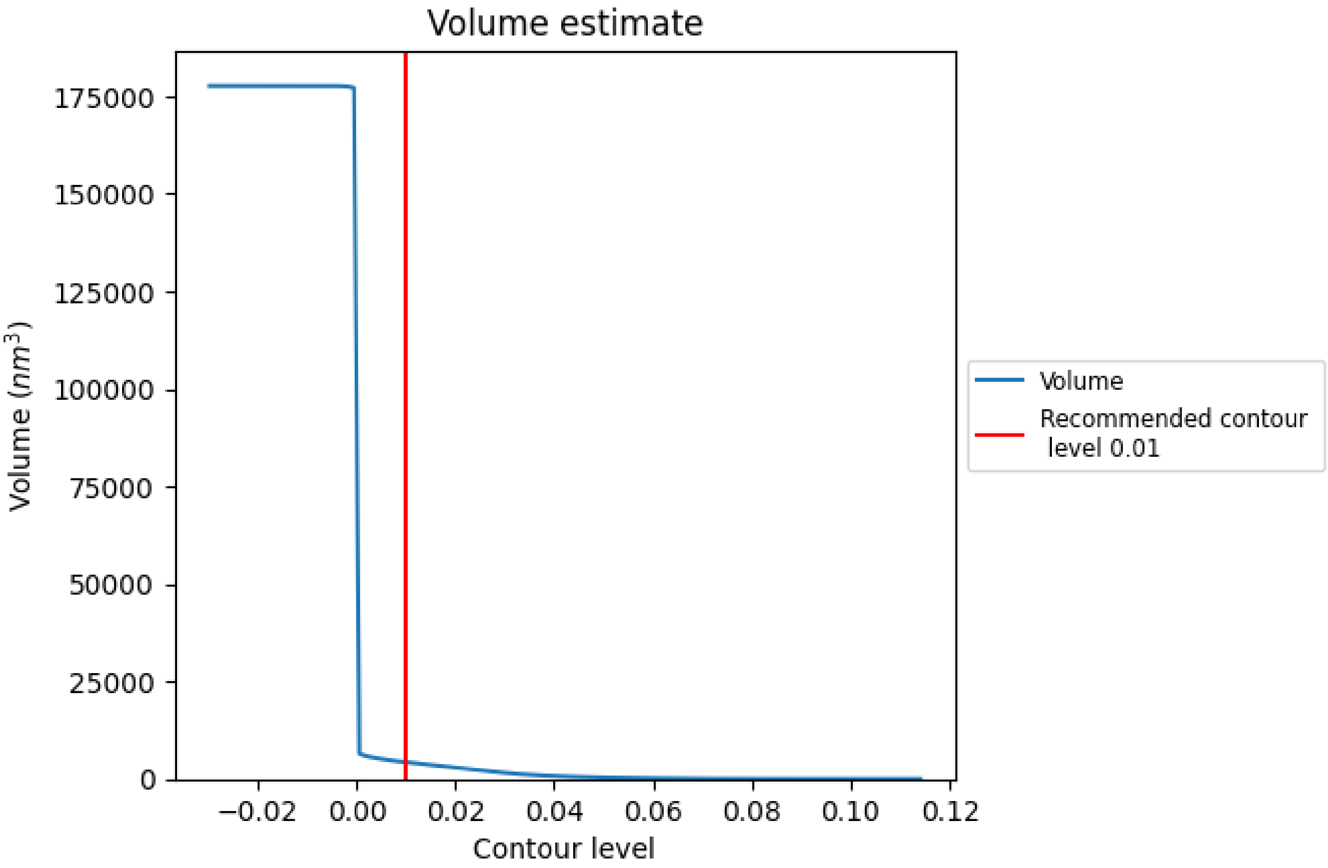
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution ⓘ



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.

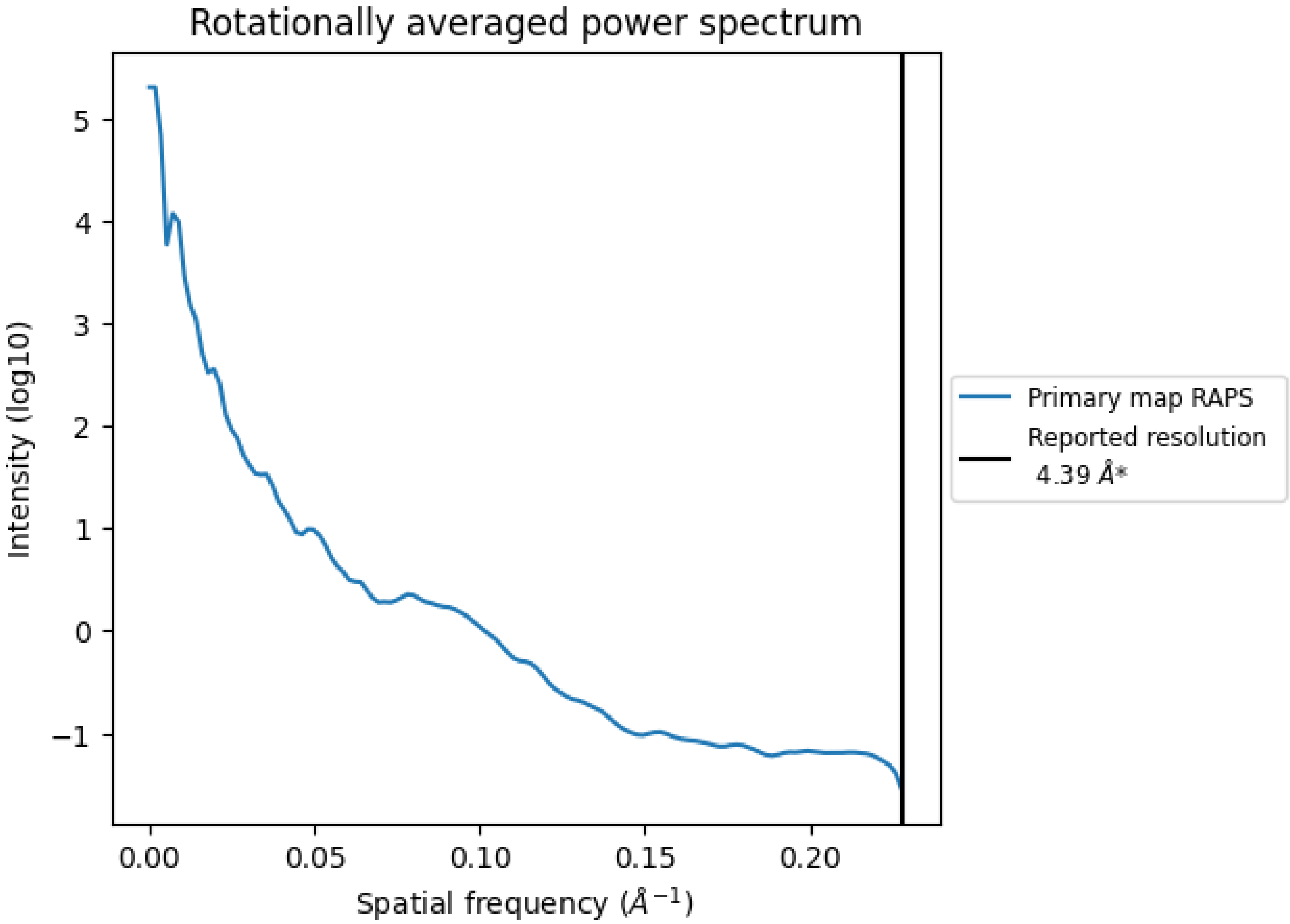
7.2 Volume estimate ⓘ



The volume at the recommended contour level is 4345 nm^3; this corresponds to an approximate mass of 3925 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 0.228 Å^{-1}

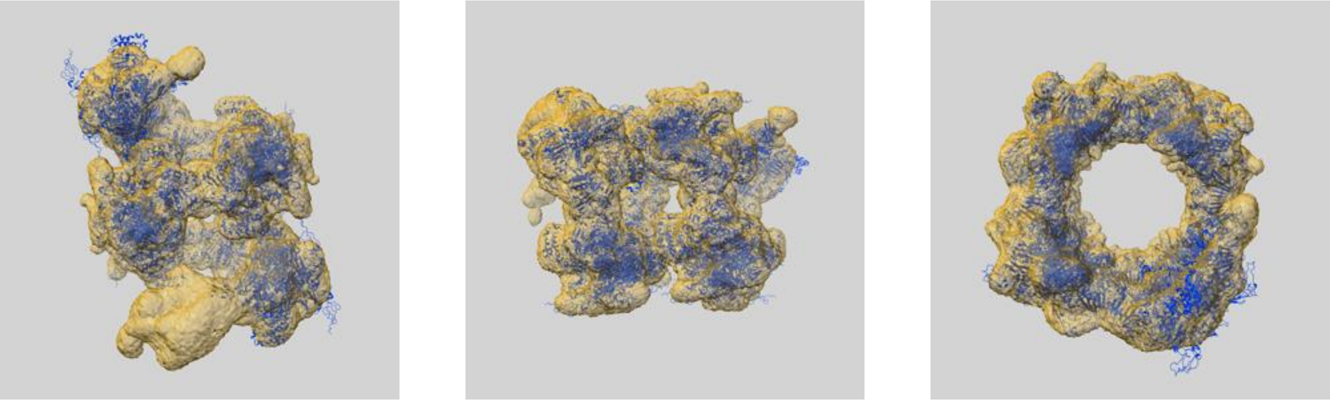
8 Fourier-Shell correlation (i)

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

9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-32689 and PDB model 7WPR. Per-residue inclusion information can be found in section 3 on page 15.

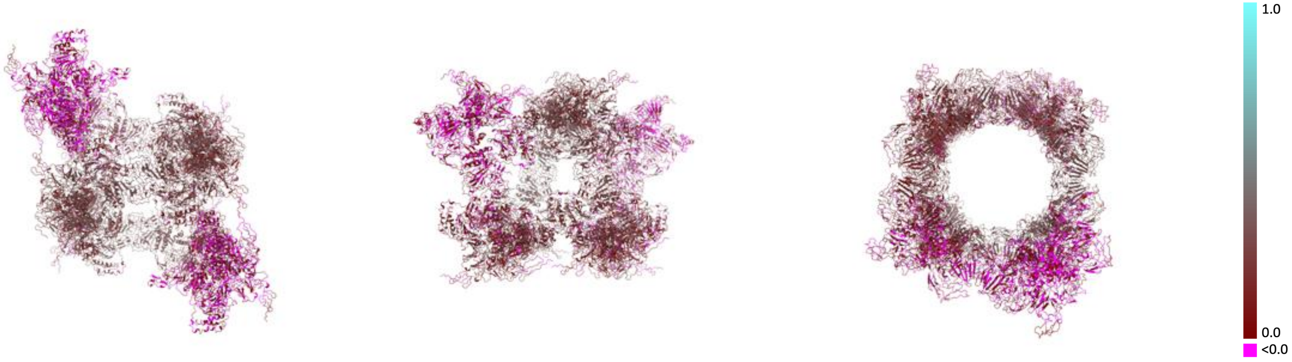
9.1 Map-model overlay



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.01 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.

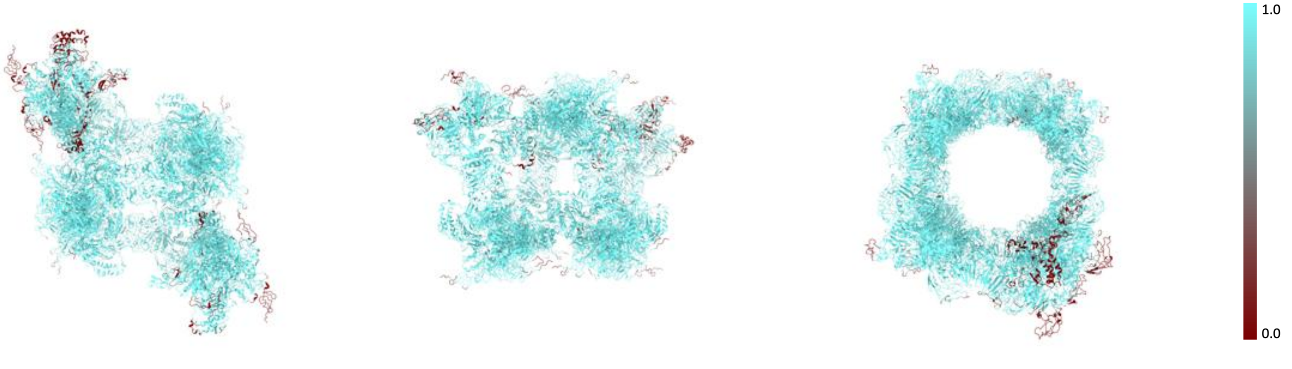
9.2 Q-score mapped to coordinate model ⓘ



X Y Z

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.

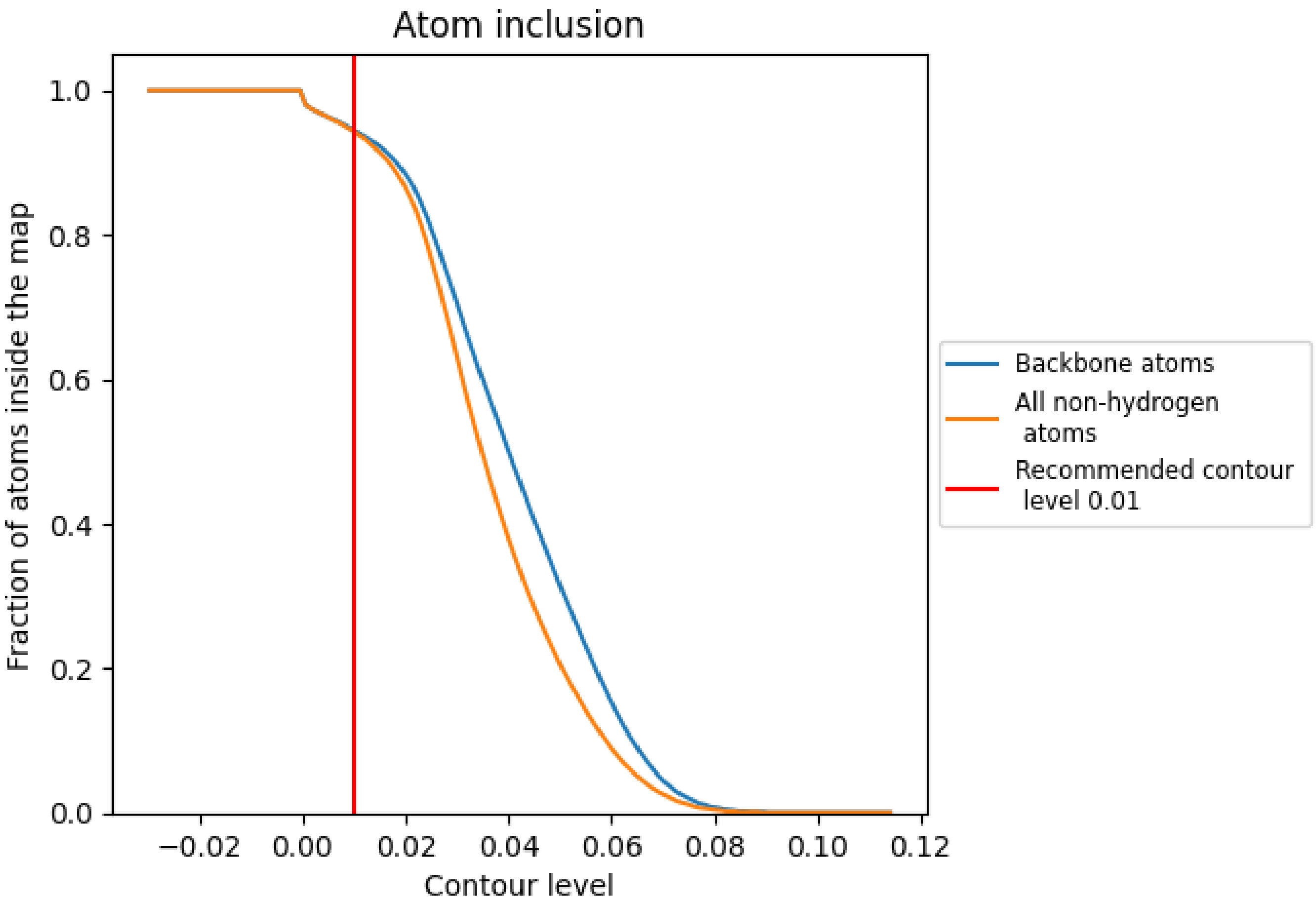
9.3 Atom inclusion mapped to coordinate model ⓘ



X Y Z

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 (0.01).

9.4 Atom inclusion ⓘ



At the recommended contour level, 94% of all backbone atoms, 94% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.01) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	🟦 0.9430	🟥 0.1640
A	🟦 0.9990	🟥 0.2860
B	🟦 0.9980	🟥 0.2670
C	🟦 0.9760	🟥 0.2420
D	🟦 0.9760	🟥 0.2300
E	🟦 0.9990	🟥 0.2830
F	🟦 0.9990	🟥 0.2840
G	🟦 0.9990	🟥 0.2460
H	🟦 0.9960	🟥 0.1280
I	🟦 0.9980	🟥 0.2040
J	🟦 0.9000	🟥 0.0440
K	🟦 0.8160	🟥 0.0210
L	🟦 0.9970	🟥 0.2850
M	🟦 0.9990	🟥 0.2630
N	🟦 0.9990	🟥 0.2030
O	🟦 0.9860	🟥 0.0830
P	🟦 0.9970	🟥 0.1410
Q	🟦 0.9640	🟥 0.0600
R	🟦 0.6860	🟥 0.0020
S	🟦 0.9790	🟥 0.2520
T	🟦 0.9720	🟥 0.2380
U	🟦 0.9660	🟥 0.2110
V	🟦 0.9350	🟥 0.1040
W	🟦 0.9670	🟥 0.1760
X	🟦 0.8320	🟥 0.0200
Y	🟦 0.7500	🟥 0.0140
Z	🟦 0.9850	🟥 0.2560
a	🟦 0.9780	🟥 0.2270
b	🟦 0.9660	🟥 0.1720
c	🟦 0.9350	🟥 0.0740
d	🟦 0.9530	🟥 0.1240
e	🟦 0.8500	🟥 0.0270
f	🟦 0.6820	🟪 -0.0060