



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 2, 2023 – 02:33 PM EDT

PDB ID : 6NLI  
Title : 1.90 Å resolution structure of WT BfrB from *Pseudomonas aeruginosa* in complex with a protein-protein interaction inhibitor (analog 11)  
Authors : Lovell, S.; Punchi-Hewage, A.; Battaile, K.P.; Yao, H.; Nammalwar, B.; Gnanasekaran, K.K.; Bunce, R.A.; Reitz, A.B.; Rivera, M.  
Deposited on : 2019-01-08  
Resolution : 1.90 Å (reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

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

## 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.90 Å.

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

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

## 2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 17392 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Ferroxidase.

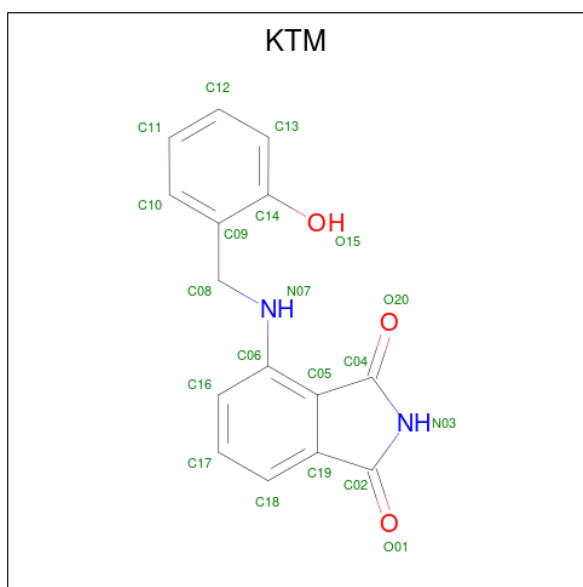
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	156	1267	804	213	243	7	0	2	0
1	B	156	1273	807	217	242	7	0	3	0
1	C	156	1274	806	217	244	7	0	2	0
1	D	156	1277	808	218	244	7	0	2	0
1	E	156	1269	804	217	241	7	0	1	0
1	F	156	1272	806	214	245	7	0	2	0
1	G	156	1274	808	218	241	7	0	3	0
1	H	156	1278	808	217	246	7	0	2	0
1	I	156	1270	805	214	244	7	0	2	0
1	J	156	1280	810	219	244	7	0	2	0
1	K	156	1286	816	219	244	7	0	3	0
1	L	156	1281	811	219	244	7	0	2	0

- Molecule 2 is FE (II) ION (three-letter code: FE2) (formula: Fe).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Fe	0	0
			1	1		
2	B	1	Total	Fe	0	0
			1	1		

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
4	A	1	Total 40	C 30	N 4	O 6	0	1
4	B	1	Total 40	C 30	N 4	O 6	0	1
4	C	1	Total 20	C 15	N 2	O 3	0	0
4	D	1	Total 20	C 15	N 2	O 3	0	0
4	E	1	Total 40	C 30	N 4	O 6	0	1
4	G	1	Total 40	C 30	N 4	O 6	0	1
4	H	1	Total 40	C 30	N 4	O 6	0	1
4	I	1	Total 40	C 30	N 4	O 6	0	1
4	J	1	Total 20	C 15	N 2	O 3	0	0

- Molecule 5 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula: C<sub>8</sub>H<sub>18</sub>O<sub>5</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 10 6 4	0	0
5	B	1	Total C O 11 7 4	0	0
5	C	1	Total C O 11 7 4	0	0
5	D	1	Total C O 10 6 4	0	0
5	D	1	Total C O 9 6 3	0	0
5	E	1	Total C O 13 8 5	0	0
5	F	1	Total C O 11 7 4	0	0
5	F	1	Total C O 11 7 4	0	0
5	G	1	Total C O 13 8 5	0	0
5	H	1	Total C O 11 7 4	0	0
5	J	1	Total C O 11 7 4	0	0
5	K	1	Total C O 11 7 4	0	0
5	L	1	Total C O 13 8 5	0	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	112	Total O 112 112	0	0
6	B	98	Total O 98 98	0	0
6	C	103	Total O 103 103	0	0
6	D	110	Total O 110 110	0	0
6	E	116	Total O 116 116	0	0
6	F	105	Total O 105 105	0	0
6	G	110	Total O 110 110	0	0
6	H	113	Total O 113 113	0	0
6	I	118	Total O 118 118	0	0
6	J	143	Total O 143 143	0	0
6	K	90	Total O 90 90	0	0
6	L	81	Total O 81 81	0	0

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

### 3 Data and refinement statistics

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

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	129.55Å 194.23Å 202.76Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.22 – 1.90	Depositor
% Data completeness (in resolution range)	100.0 (47.22-1.90)	Depositor
$R_{merge}$	0.11	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.08 (at 1.90Å)	Xtrriage
Refinement program	PHENIX	Depositor
R, $R_{free}$	0.166 , 0.205	Depositor
Wilson B-factor (Å <sup>2</sup> )	25.3	Xtrriage
Anisotropy	0.586	Xtrriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	17392	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	29.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.76% of the height of the origin peak. No significant pseudotranslation is detected.*

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

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



## 4 Model quality [i](#)

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

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

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

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

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

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

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

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

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

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

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

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

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

### 4.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

### 4.6 Ligand geometry [i](#)

Of 39 ligands modelled in this entry, 3 are monoatomic - leaving 36 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	HEM	D	202	1	41,50,50	1.40	4 (9%)	45,82,82	1.64	9 (20%)
5	PG4	C	203	-	10,10,12	0.48	0	9,9,11	0.34	0
4	KTM	E	202[B]	-	22,22,22	1.97	6 (27%)	31,31,31	1.33	3 (9%)
3	HEM	F	201	1	41,50,50	1.35	5 (12%)	45,82,82	1.60	10 (22%)
5	PG4	J	203	-	10,10,12	0.55	0	9,9,11	0.46	0
3	HEM	A	202[A]	1	41,50,50	1.42	4 (9%)	45,82,82	1.69	11 (24%)
5	PG4	D	205	-	8,8,12	0.53	0	7,7,11	0.26	0
4	KTM	I	201[A]	-	22,22,22	1.82	5 (22%)	31,31,31	0.99	3 (9%)
3	HEM	L	201	1	41,50,50	1.50	6 (14%)	45,82,82	1.52	8 (17%)
3	HEM	J	201	1	41,50,50	1.36	4 (9%)	45,82,82	1.85	12 (26%)
4	KTM	E	202[A]	-	22,22,22	1.95	6 (27%)	31,31,31	1.36	4 (12%)
4	KTM	H	201[B]	-	22,22,22	1.75	6 (27%)	31,31,31	1.08	3 (9%)
5	PG4	F	203	-	10,10,12	0.50	0	9,9,11	0.35	0
3	HEM	E	201	1	41,50,50	1.45	7 (17%)	45,82,82	2.03	15 (33%)
5	PG4	E	203	-	12,12,12	0.47	0	11,11,11	0.52	0
4	KTM	J	202	-	22,22,22	1.98	6 (27%)	31,31,31	1.22	4 (12%)
4	KTM	H	201[A]	-	22,22,22	1.74	6 (27%)	31,31,31	1.12	3 (9%)
4	KTM	A	203[B]	-	22,22,22	1.93	6 (27%)	31,31,31	1.17	3 (9%)
4	KTM	G	201[B]	-	22,22,22	1.80	6 (27%)	31,31,31	1.24	4 (12%)
5	PG4	G	202	-	12,12,12	0.46	0	11,11,11	0.52	0
5	PG4	L	202	-	12,12,12	0.50	0	11,11,11	0.44	0
5	PG4	F	202	-	10,10,12	0.51	0	9,9,11	0.27	0
4	KTM	D	203	-	22,22,22	1.84	7 (31%)	31,31,31	1.25	5 (16%)
5	PG4	A	204	-	9,9,12	0.47	0	8,8,11	0.46	0
4	KTM	B	202[B]	-	22,22,22	1.88	6 (27%)	31,31,31	1.10	3 (9%)
3	HEM	C	201	1	41,50,50	1.51	5 (12%)	45,82,82	1.84	12 (26%)
4	KTM	A	203[A]	-	22,22,22	1.94	6 (27%)	31,31,31	1.35	4 (12%)
4	KTM	G	201[A]	-	22,22,22	1.78	6 (27%)	31,31,31	0.99	3 (9%)
5	PG4	B	203	-	10,10,12	0.48	0	9,9,11	0.25	0
5	PG4	H	202	-	10,10,12	0.51	0	9,9,11	0.28	0
5	PG4	D	204	-	9,9,12	0.50	0	8,8,11	0.33	0
4	KTM	C	202	-	22,22,22	1.88	5 (22%)	31,31,31	1.37	4 (12%)
3	HEM	A	202[B]	1	41,50,50	1.46	5 (12%)	45,82,82	1.66	9 (20%)
4	KTM	B	202[A]	-	22,22,22	1.89	6 (27%)	31,31,31	1.08	3 (9%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	KTM	I	201[B]	-	22,22,22	1.91	6 (27%)	31,31,31	1.09	3 (9%)
5	PG4	K	201	-	10,10,12	0.52	0	9,9,11	0.33	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	HEM	D	202	1	-	4/12/54/54	-
5	PG4	C	203	-	-	3/8/8/10	-
4	KTM	E	202[B]	-	-	2/5/17/17	0/3/3/3
3	HEM	F	201	1	-	4/12/54/54	-
5	PG4	J	203	-	-	0/8/8/10	-
3	HEM	A	202[A]	1	-	2/12/54/54	-
5	PG4	D	205	-	-	2/6/6/10	-
4	KTM	I	201[A]	-	-	0/5/17/17	0/3/3/3
3	HEM	L	201	1	-	4/12/54/54	-
3	HEM	J	201	1	-	4/12/54/54	-
4	KTM	E	202[A]	-	-	0/5/17/17	0/3/3/3
4	KTM	H	201[B]	-	-	0/5/17/17	0/3/3/3
5	PG4	F	203	-	-	2/8/8/10	-
3	HEM	E	201	1	-	4/12/54/54	-
5	PG4	E	203	-	-	1/10/10/10	-
4	KTM	J	202	-	-	1/5/17/17	0/3/3/3
4	KTM	H	201[A]	-	-	0/5/17/17	0/3/3/3
4	KTM	A	203[B]	-	-	2/5/17/17	0/3/3/3
4	KTM	G	201[B]	-	-	2/5/17/17	0/3/3/3
5	PG4	G	202	-	-	5/10/10/10	-
5	PG4	L	202	-	-	2/10/10/10	-
5	PG4	F	202	-	-	0/8/8/10	-
4	KTM	D	203	-	-	1/5/17/17	0/3/3/3
5	PG4	A	204	-	-	1/7/7/10	-
4	KTM	B	202[B]	-	-	2/5/17/17	0/3/3/3
3	HEM	C	201	1	-	4/12/54/54	-
4	KTM	A	203[A]	-	-	1/5/17/17	0/3/3/3
4	KTM	G	201[A]	-	-	0/5/17/17	0/3/3/3
5	PG4	B	203	-	-	0/8/8/10	-
5	PG4	H	202	-	-	0/8/8/10	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	PG4	D	204	-	-	0/7/7/10	-
4	KTM	C	202	-	-	1/5/17/17	0/3/3/3
3	HEM	A	202[B]	1	-	2/12/54/54	-
4	KTM	B	202[A]	-	-	0/5/17/17	0/3/3/3
4	KTM	I	201[B]	-	-	2/5/17/17	0/3/3/3
5	PG4	K	201	-	-	1/8/8/10	-

All (129) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	J	202	KTM	C04-N03	4.78	1.45	1.38
4	I	201[B]	KTM	C19-C02	4.64	1.55	1.48
4	E	202[B]	KTM	C04-N03	4.50	1.45	1.38
4	A	203[A]	KTM	C04-N03	4.48	1.45	1.38
4	E	202[A]	KTM	C04-N03	4.45	1.45	1.38
4	C	202	KTM	C19-C02	4.44	1.55	1.48
4	C	202	KTM	C02-N03	4.43	1.45	1.38
4	I	201[A]	KTM	C19-C02	4.40	1.55	1.48
4	E	202[B]	KTM	C02-N03	4.38	1.45	1.38
4	E	202[A]	KTM	C02-N03	4.35	1.45	1.38
4	A	203[B]	KTM	C19-C02	4.31	1.55	1.48
4	B	202[B]	KTM	C04-N03	4.22	1.44	1.38
4	B	202[A]	KTM	C04-N03	4.20	1.44	1.38
4	J	202	KTM	C02-N03	4.19	1.44	1.38
4	A	203[B]	KTM	C04-N03	4.18	1.44	1.38
4	D	203	KTM	C19-C02	4.15	1.54	1.48
4	A	203[A]	KTM	C02-N03	4.14	1.44	1.38
3	J	201	HEM	C3C-C2C	-4.13	1.34	1.40
4	J	202	KTM	C19-C02	4.10	1.54	1.48
4	A	203[A]	KTM	C19-C02	4.09	1.54	1.48
4	B	202[A]	KTM	C19-C02	4.08	1.54	1.48
4	B	202[B]	KTM	C19-C02	4.06	1.54	1.48
4	A	203[B]	KTM	C02-N03	4.01	1.44	1.38
4	E	202[B]	KTM	C19-C02	3.98	1.54	1.48
3	A	202[B]	HEM	C3C-C2C	-3.96	1.34	1.40
4	E	202[A]	KTM	C19-C02	3.94	1.54	1.48
4	H	201[B]	KTM	C19-C02	3.92	1.54	1.48
4	I	201[B]	KTM	C02-N03	3.84	1.44	1.38
3	E	201	HEM	C3C-C2C	-3.80	1.35	1.40
3	C	201	HEM	C3C-C2C	-3.78	1.35	1.40
4	D	203	KTM	C04-N03	3.78	1.44	1.38
4	G	201[B]	KTM	C19-C02	3.78	1.54	1.48

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	D	203	KTM	C02-N03	3.77	1.44	1.38
4	I	201[B]	KTM	C04-N03	3.76	1.44	1.38
3	L	201	HEM	C3C-C2C	-3.75	1.35	1.40
4	B	202[B]	KTM	C02-N03	3.73	1.44	1.38
4	H	201[A]	KTM	C19-C02	3.72	1.54	1.48
4	B	202[A]	KTM	C02-N03	3.69	1.44	1.38
4	G	201[A]	KTM	C19-C02	3.68	1.54	1.48
3	L	201	HEM	C3C-CAC	3.66	1.55	1.47
4	I	201[A]	KTM	C02-N03	3.64	1.44	1.38
4	G	201[B]	KTM	C02-N03	3.63	1.44	1.38
3	D	202	HEM	C3C-CAC	3.60	1.55	1.47
4	G	201[A]	KTM	C04-N03	3.60	1.43	1.38
3	A	202[B]	HEM	C3C-CAC	3.60	1.55	1.47
4	G	201[A]	KTM	C02-N03	3.59	1.43	1.38
3	A	202[A]	HEM	C3C-C2C	-3.56	1.35	1.40
4	I	201[A]	KTM	C04-N03	3.53	1.43	1.38
4	G	201[B]	KTM	C04-N03	3.50	1.43	1.38
3	A	202[A]	HEM	C3C-CAC	3.45	1.54	1.47
3	C	201	HEM	C3C-CAC	3.44	1.54	1.47
4	H	201[B]	KTM	C02-N03	3.41	1.43	1.38
4	H	201[A]	KTM	C04-N03	3.36	1.43	1.38
4	B	202[B]	KTM	C06-N07	3.35	1.46	1.37
4	B	202[A]	KTM	C06-N07	3.33	1.46	1.37
4	H	201[A]	KTM	C02-N03	3.31	1.43	1.38
4	C	202	KTM	C04-N03	3.30	1.43	1.38
4	G	201[A]	KTM	C06-N07	3.25	1.46	1.37
4	A	203[B]	KTM	C06-N07	3.23	1.46	1.37
4	J	202	KTM	C06-N07	3.21	1.46	1.37
4	H	201[A]	KTM	C06-N07	3.20	1.46	1.37
4	H	201[B]	KTM	C06-N07	3.20	1.46	1.37
4	H	201[B]	KTM	C04-N03	3.20	1.43	1.38
4	E	202[B]	KTM	C06-N07	3.18	1.46	1.37
4	I	201[B]	KTM	C06-N07	3.17	1.46	1.37
3	D	202	HEM	C3C-C2C	-3.16	1.36	1.40
4	I	201[A]	KTM	C06-N07	3.11	1.46	1.37
3	C	201	HEM	CAB-C3B	3.10	1.55	1.47
4	E	202[A]	KTM	C06-N07	3.06	1.45	1.37
4	A	203[A]	KTM	C06-N07	3.06	1.45	1.37
3	F	201	HEM	C3C-C2C	-3.06	1.36	1.40
3	F	201	HEM	C3C-CAC	3.04	1.54	1.47
4	D	203	KTM	C06-N07	3.00	1.45	1.37
4	C	202	KTM	C06-N07	2.98	1.45	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	G	201[B]	KTM	C06-N07	2.97	1.45	1.37
3	L	201	HEM	FE-ND	2.93	2.11	1.96
3	D	202	HEM	CAB-C3B	2.79	1.55	1.47
3	L	201	HEM	CAB-C3B	2.79	1.55	1.47
3	A	202[B]	HEM	CAB-C3B	2.74	1.54	1.47
4	G	201[B]	KTM	O01-C02	-2.64	1.17	1.23
3	A	202[A]	HEM	CAB-C3B	2.63	1.54	1.47
3	E	201	HEM	CAB-C3B	2.62	1.54	1.47
3	J	201	HEM	C3C-CAC	2.56	1.53	1.47
3	F	201	HEM	CAB-C3B	2.53	1.54	1.47
4	B	202[A]	KTM	O15-C14	2.48	1.41	1.36
3	E	201	HEM	C3C-CAC	2.48	1.52	1.47
4	H	201[A]	KTM	O01-C02	-2.46	1.18	1.23
4	D	203	KTM	O15-C14	2.40	1.41	1.36
4	H	201[B]	KTM	O01-C02	-2.40	1.18	1.23
4	E	202[B]	KTM	O01-C02	-2.39	1.18	1.23
4	E	202[A]	KTM	O01-C02	-2.38	1.18	1.23
3	A	202[A]	HEM	FE-ND	2.35	2.08	1.96
4	E	202[A]	KTM	O15-C14	2.35	1.41	1.36
3	C	201	HEM	C1B-NB	-2.34	1.36	1.40
4	J	202	KTM	O15-C14	2.33	1.41	1.36
4	I	201[B]	KTM	O15-C14	2.32	1.41	1.36
4	A	203[A]	KTM	O01-C02	-2.31	1.18	1.23
4	G	201[A]	KTM	O01-C02	-2.29	1.18	1.23
4	B	202[B]	KTM	O15-C14	2.26	1.41	1.36
3	J	201	HEM	CAB-C3B	2.26	1.53	1.47
3	E	201	HEM	CMB-C2B	2.25	1.55	1.50
4	B	202[B]	KTM	O01-C02	-2.24	1.18	1.23
3	L	201	HEM	CMD-C2D	2.24	1.55	1.50
3	E	201	HEM	FE-NB	2.23	2.07	1.96
4	D	203	KTM	O01-C02	-2.23	1.18	1.23
4	B	202[A]	KTM	O01-C02	-2.23	1.18	1.23
4	H	201[A]	KTM	O15-C14	2.22	1.40	1.36
3	J	201	HEM	CMB-C2B	2.22	1.55	1.50
3	D	202	HEM	FE-ND	2.20	2.07	1.96
3	E	201	HEM	FE-ND	2.20	2.07	1.96
3	A	202[B]	HEM	FE-ND	2.19	2.07	1.96
3	E	201	HEM	CAA-C2A	2.18	1.55	1.52
4	A	203[B]	KTM	O15-C14	2.18	1.40	1.36
4	A	203[A]	KTM	O15-C14	2.17	1.40	1.36
4	I	201[B]	KTM	O20-C04	-2.17	1.18	1.23
4	H	201[B]	KTM	O15-C14	2.17	1.40	1.36

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	E	202[B]	KTM	O15-C14	2.16	1.40	1.36
4	A	203[B]	KTM	O01-C02	-2.14	1.19	1.23
3	F	201	HEM	CMB-C2B	2.13	1.55	1.50
4	J	202	KTM	O01-C02	-2.12	1.19	1.23
4	G	201[B]	KTM	O15-C14	2.11	1.40	1.36
3	A	202[B]	HEM	CAA-C2A	2.10	1.55	1.52
3	L	201	HEM	CAA-C2A	2.10	1.55	1.52
4	G	201[A]	KTM	O15-C14	2.07	1.40	1.36
4	D	203	KTM	C05-C04	2.03	1.55	1.49
3	C	201	HEM	CMB-C2B	2.03	1.55	1.50
3	F	201	HEM	C3B-C2B	-2.02	1.33	1.37
4	C	202	KTM	O15-C14	2.01	1.40	1.36
4	I	201[A]	KTM	O15-C14	2.00	1.40	1.36

All (138) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	202	KTM	C05-C06-N07	-4.88	115.54	121.32
4	E	202[B]	KTM	C04-N03-C02	-4.76	108.46	112.52
4	E	202[A]	KTM	C04-N03-C02	-4.69	108.52	112.52
3	C	201	HEM	C4B-CHC-C1C	4.63	128.67	122.56
3	E	201	HEM	C4B-CHC-C1C	4.43	128.41	122.56
4	A	203[A]	KTM	C04-N03-C02	-4.42	108.75	112.52
3	J	201	HEM	CMC-C2C-C3C	4.38	132.87	124.68
3	J	201	HEM	C4D-ND-C1D	4.35	109.56	105.07
3	E	201	HEM	C4D-ND-C1D	4.32	109.53	105.07
3	F	201	HEM	C4B-CHC-C1C	4.25	128.17	122.56
3	C	201	HEM	C1B-NB-C4B	4.20	109.41	105.07
3	D	202	HEM	CMC-C2C-C3C	3.98	132.12	124.68
3	A	202[A]	HEM	C4D-ND-C1D	3.89	109.09	105.07
4	A	203[B]	KTM	C04-N03-C02	-3.78	109.30	112.52
3	F	201	HEM	CMC-C2C-C3C	3.68	131.57	124.68
3	E	201	HEM	C1B-NB-C4B	3.64	108.83	105.07
3	A	202[A]	HEM	CMC-C2C-C3C	3.59	131.40	124.68
3	E	201	HEM	CMA-C3A-C4A	-3.59	122.95	128.46
4	D	203	KTM	C19-C05-C06	-3.59	119.44	121.91
3	A	202[B]	HEM	CMC-C2C-C3C	3.59	131.39	124.68
3	C	201	HEM	C4D-ND-C1D	3.58	108.77	105.07
4	J	202	KTM	C04-N03-C02	-3.58	109.47	112.52
4	A	203[A]	KTM	C05-C06-N07	-3.56	117.11	121.32
4	I	201[B]	KTM	C04-N03-C02	-3.53	109.51	112.52
3	A	202[B]	HEM	C4C-CHD-C1D	3.52	127.20	122.56

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	202[B]	HEM	C4D-ND-C1D	3.45	108.64	105.07
3	D	202	HEM	C4D-ND-C1D	3.44	108.63	105.07
3	E	201	HEM	CMB-C2B-C1B	-3.39	119.88	125.04
3	L	201	HEM	CMC-C2C-C3C	3.35	130.95	124.68
3	J	201	HEM	C1B-NB-C4B	3.31	108.49	105.07
4	B	202[B]	KTM	C05-C06-N07	-3.19	117.54	121.32
3	F	201	HEM	CMA-C3A-C4A	-3.18	123.58	128.46
4	G	201[B]	KTM	C19-C05-C06	-3.15	119.74	121.91
3	F	201	HEM	CHC-C4B-NB	3.13	127.83	124.43
3	C	201	HEM	CMC-C2C-C3C	3.11	130.50	124.68
3	E	201	HEM	C2C-C3C-C4C	3.06	109.03	106.90
3	L	201	HEM	C4D-ND-C1D	3.01	108.18	105.07
4	E	202[B]	KTM	C19-C05-C06	-3.01	119.84	121.91
3	L	201	HEM	C4B-CHC-C1C	2.96	126.46	122.56
4	H	201[A]	KTM	C19-C05-C06	-2.95	119.88	121.91
3	A	202[B]	HEM	C1B-NB-C4B	2.94	108.11	105.07
3	D	202	HEM	C1B-NB-C4B	2.93	108.10	105.07
3	C	201	HEM	CMA-C3A-C4A	-2.92	123.97	128.46
4	G	201[B]	KTM	C04-N03-C02	-2.92	110.03	112.52
3	A	202[A]	HEM	CBA-CAA-C2A	-2.89	107.68	112.62
4	H	201[B]	KTM	C05-C06-N07	-2.89	117.89	121.32
4	B	202[A]	KTM	C04-N03-C02	-2.89	110.06	112.52
3	J	201	HEM	C4B-CHC-C1C	2.88	126.36	122.56
3	C	201	HEM	CHC-C4B-NB	2.88	127.56	124.43
3	J	201	HEM	C3D-C4D-ND	-2.87	106.97	110.17
4	A	203[B]	KTM	C05-C06-N07	-2.87	117.92	121.32
4	I	201[B]	KTM	C05-C06-N07	-2.85	117.95	121.32
3	D	202	HEM	C4B-CHC-C1C	2.84	126.31	122.56
4	H	201[A]	KTM	C05-C06-N07	-2.84	117.96	121.32
3	L	201	HEM	CBA-CAA-C2A	-2.82	107.80	112.62
4	E	202[A]	KTM	C19-C05-C06	-2.82	119.97	121.91
4	B	202[B]	KTM	C04-N03-C02	-2.81	110.12	112.52
4	I	201[A]	KTM	C05-C06-N07	-2.81	117.98	121.32
3	L	201	HEM	CAD-CBD-CGD	-2.80	107.57	113.60
3	A	202[A]	HEM	C4C-CHD-C1D	2.80	126.25	122.56
3	C	201	HEM	CBA-CAA-C2A	-2.78	107.88	112.62
3	J	201	HEM	C2C-C3C-C4C	2.77	108.83	106.90
3	E	201	HEM	C3D-C4D-ND	-2.75	107.10	110.17
3	E	201	HEM	C4A-C3A-C2A	2.75	108.91	107.00
4	D	203	KTM	C05-C06-N07	-2.75	118.07	121.32
3	C	201	HEM	CAD-CBD-CGD	-2.74	107.70	113.60
3	D	202	HEM	C4C-CHD-C1D	2.72	126.14	122.56

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	202[A]	KTM	C05-C06-N07	-2.72	118.10	121.32
3	J	201	HEM	CAD-CBD-CGD	-2.70	107.79	113.60
3	L	201	HEM	C1B-NB-C4B	2.69	107.85	105.07
3	A	202[A]	HEM	C4B-CHC-C1C	2.67	126.08	122.56
3	J	201	HEM	CBA-CAA-C2A	-2.66	108.08	112.62
3	E	201	HEM	CMC-C2C-C3C	2.64	129.62	124.68
4	J	202	KTM	C05-C06-N07	-2.63	118.21	121.32
3	F	201	HEM	CBA-CAA-C2A	-2.62	108.16	112.62
3	E	201	HEM	C2D-C1D-ND	-2.62	106.75	109.88
4	G	201[B]	KTM	C05-C06-N07	-2.62	118.22	121.32
3	F	201	HEM	C4D-ND-C1D	2.61	107.77	105.07
3	A	202[A]	HEM	C1B-NB-C4B	2.60	107.76	105.07
4	B	202[A]	KTM	C19-C05-C06	-2.59	120.12	121.91
4	G	201[A]	KTM	C04-N03-C02	-2.58	110.32	112.52
3	E	201	HEM	CHC-C4B-NB	2.57	127.22	124.43
3	A	202[A]	HEM	C3D-C4D-ND	-2.57	107.31	110.17
3	A	202[A]	HEM	CMB-C2B-C1B	-2.56	121.13	125.04
4	H	201[B]	KTM	C19-C05-C06	-2.56	120.15	121.91
4	E	202[A]	KTM	C05-C06-N07	-2.54	118.31	121.32
3	A	202[B]	HEM	C4B-CHC-C1C	2.53	125.89	122.56
3	A	202[B]	HEM	CMA-C3A-C4A	-2.51	124.60	128.46
3	C	201	HEM	C3D-C4D-ND	-2.51	107.37	110.17
3	J	201	HEM	C2D-C1D-ND	-2.50	106.88	109.88
4	D	203	KTM	C04-N03-C02	-2.48	110.41	112.52
4	C	202	KTM	C19-C05-C06	-2.48	120.20	121.91
3	A	202[B]	HEM	C3B-C2B-C1B	2.46	108.31	106.49
4	I	201[A]	KTM	C04-N03-C02	-2.45	110.44	112.52
4	G	201[A]	KTM	C05-C06-N07	-2.43	118.44	121.32
3	L	201	HEM	C3D-C4D-ND	-2.43	107.46	110.17
3	D	202	HEM	C3B-C2B-C1B	2.39	108.26	106.49
3	E	201	HEM	CBA-CAA-C2A	-2.38	108.56	112.62
4	H	201[B]	KTM	C04-N03-C02	-2.38	110.50	112.52
4	J	202	KTM	C10-C09-C14	2.38	120.69	118.16
3	F	201	HEM	C3D-C4D-ND	-2.36	107.54	110.17
4	B	202[B]	KTM	C19-C05-C06	-2.35	120.29	121.91
3	A	202[A]	HEM	CHB-C1B-NB	2.34	127.27	124.38
3	E	201	HEM	CBD-CAD-C3D	-2.32	106.17	112.63
4	E	202[A]	KTM	C19-C02-N03	2.30	108.00	105.89
3	C	201	HEM	CAA-CBA-CGA	-2.29	107.33	113.76
4	E	202[B]	KTM	C19-C02-N03	2.29	107.99	105.89
4	G	201[A]	KTM	C19-C05-C06	-2.29	120.33	121.91
3	J	201	HEM	C4C-CHD-C1D	2.29	125.58	122.56

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	J	201	HEM	CHD-C1D-ND	2.29	126.92	124.43
3	D	202	HEM	C3D-C4D-ND	-2.27	107.64	110.17
4	C	202	KTM	C09-C08-N07	-2.26	105.99	113.38
4	H	201[A]	KTM	C04-N03-C02	-2.26	110.60	112.52
3	E	201	HEM	CHA-C4D-ND	2.25	127.16	124.38
3	D	202	HEM	CMB-C2B-C1B	-2.23	121.64	125.04
3	A	202[B]	HEM	C2D-C1D-ND	-2.22	107.22	109.88
4	J	202	KTM	C09-C08-N07	-2.20	106.20	113.38
3	F	201	HEM	C4B-C3B-C2B	2.20	108.86	107.11
3	J	201	HEM	CAA-CBA-CGA	-2.18	107.66	113.76
3	A	202[A]	HEM	C3B-C2B-C1B	2.15	108.08	106.49
3	E	201	HEM	C3C-C4C-NC	-2.13	106.91	110.94
3	L	201	HEM	C4C-CHD-C1D	2.13	125.37	122.56
4	A	203[B]	KTM	C19-C05-C06	-2.13	120.44	121.91
3	A	202[B]	HEM	CHD-C1D-C2D	2.12	128.30	124.98
4	C	202	KTM	C04-N03-C02	-2.12	110.72	112.52
3	D	202	HEM	C2D-C1D-ND	-2.11	107.35	109.88
3	F	201	HEM	CMA-C3A-C2A	2.10	128.89	124.94
3	C	201	HEM	C4C-CHD-C1D	2.09	125.31	122.56
4	D	203	KTM	C10-C09-C14	2.09	120.39	118.16
4	A	203[A]	KTM	C19-C05-C06	-2.08	120.47	121.91
4	G	201[B]	KTM	C09-C08-N07	-2.07	106.64	113.38
3	A	202[A]	HEM	C2D-C1D-ND	-2.06	107.41	109.88
4	A	203[A]	KTM	C19-C02-N03	2.05	107.77	105.89
4	I	201[B]	KTM	C18-C19-C02	2.03	133.44	129.37
3	F	201	HEM	CBD-CAD-C3D	-2.03	107.00	112.63
4	I	201[A]	KTM	C19-C05-C06	-2.03	120.52	121.91
3	C	201	HEM	C2B-C1B-NB	-2.02	107.44	109.84
4	D	203	KTM	C06-C05-C04	2.02	132.06	129.21

There are no chirality outliers.

All (59) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	G	202	PG4	O1-C1-C2-O2
4	B	202[B]	KTM	C05-C06-N07-C08
4	E	202[B]	KTM	C05-C06-N07-C08
4	I	201[B]	KTM	C05-C06-N07-C08
4	I	201[B]	KTM	C16-C06-N07-C08
4	E	202[B]	KTM	C16-C06-N07-C08
4	B	202[B]	KTM	C16-C06-N07-C08
4	G	201[B]	KTM	C16-C06-N07-C08

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Mol	Chain	Res	Type	Atoms
5	C	203	PG4	O3-C5-C6-O4
4	G	201[B]	KTM	C05-C06-N07-C08
5	E	203	PG4	O4-C7-C8-O5
4	D	203	KTM	C09-C08-N07-C06
5	L	202	PG4	C1-C2-O2-C3
5	G	202	PG4	C3-C4-O3-C5
5	L	202	PG4	O1-C1-C2-O2
5	D	205	PG4	O3-C5-C6-O4
5	D	205	PG4	C6-C5-O3-C4
5	G	202	PG4	C4-C3-O2-C2
5	G	202	PG4	O2-C3-C4-O3
5	F	203	PG4	O3-C5-C6-O4
5	G	202	PG4	C1-C2-O2-C3
4	J	202	KTM	C09-C08-N07-C06
5	A	204	PG4	O4-C7-C8-O5
5	F	203	PG4	C3-C4-O3-C5
3	F	201	HEM	CAD-CBD-CGD-O2D
4	A	203[B]	KTM	C05-C06-N07-C08
3	L	201	HEM	CAD-CBD-CGD-O2D
3	C	201	HEM	CAA-CBA-CGA-O1A
3	D	202	HEM	CAA-CBA-CGA-O1A
3	D	202	HEM	CAA-CBA-CGA-O2A
3	E	201	HEM	CAD-CBD-CGD-O1D
3	L	201	HEM	CAD-CBD-CGD-O1D
3	A	202[B]	HEM	CAD-CBD-CGD-O1D
3	F	201	HEM	CAD-CBD-CGD-O1D
3	J	201	HEM	CAD-CBD-CGD-O1D
3	A	202[A]	HEM	CAD-CBD-CGD-O1D
3	C	201	HEM	CAA-CBA-CGA-O2A
3	J	201	HEM	CAD-CBD-CGD-O2D
3	F	201	HEM	CAA-CBA-CGA-O1A
3	A	202[A]	HEM	CAD-CBD-CGD-O2D
3	E	201	HEM	CAD-CBD-CGD-O2D
3	A	202[B]	HEM	CAD-CBD-CGD-O2D
4	A	203[B]	KTM	C16-C06-N07-C08
3	F	201	HEM	CAA-CBA-CGA-O2A
5	C	203	PG4	C8-C7-O4-C6
3	C	201	HEM	CAD-CBD-CGD-O2D
3	C	201	HEM	CAD-CBD-CGD-O1D
4	A	203[A]	KTM	C09-C08-N07-C06
3	E	201	HEM	CAA-CBA-CGA-O2A
5	K	201	PG4	O4-C7-C8-O5

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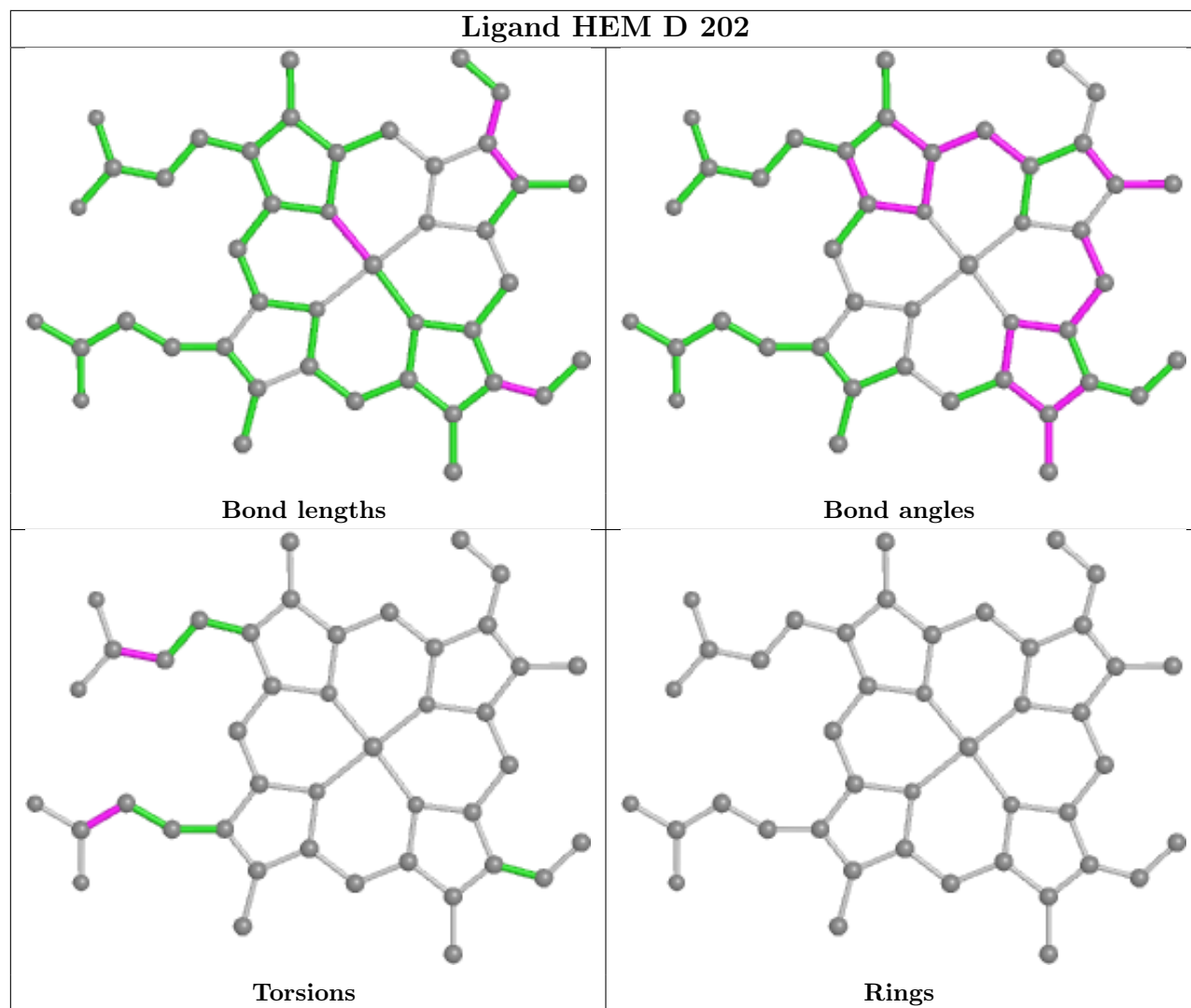
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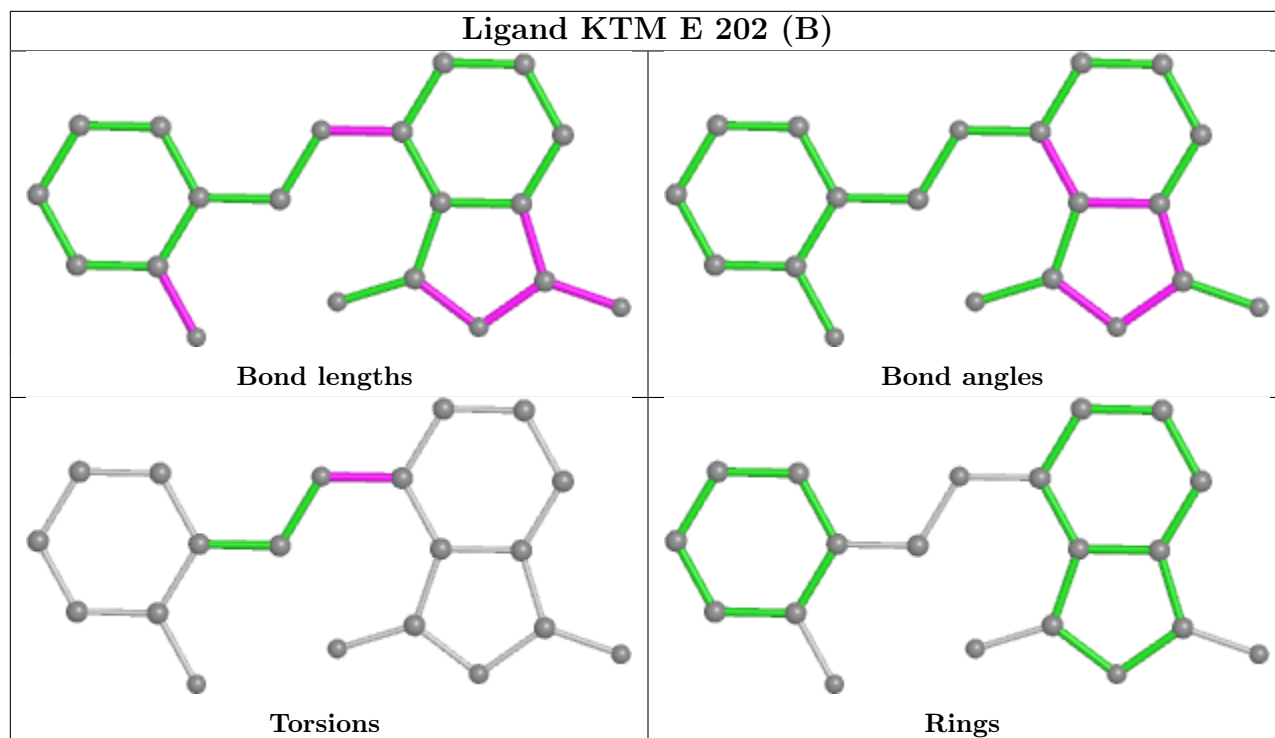
Mol	Chain	Res	Type	Atoms
3	L	201	HEM	CAA-CBA-CGA-O2A
3	E	201	HEM	CAA-CBA-CGA-O1A
3	J	201	HEM	CAA-CBA-CGA-O1A
3	J	201	HEM	CAA-CBA-CGA-O2A
3	L	201	HEM	CAA-CBA-CGA-O1A
3	D	202	HEM	CAD-CBD-CGD-O2D
4	C	202	KTM	C09-C08-N07-C06
3	D	202	HEM	CAD-CBD-CGD-O1D
5	C	203	PG4	C3-C4-O3-C5

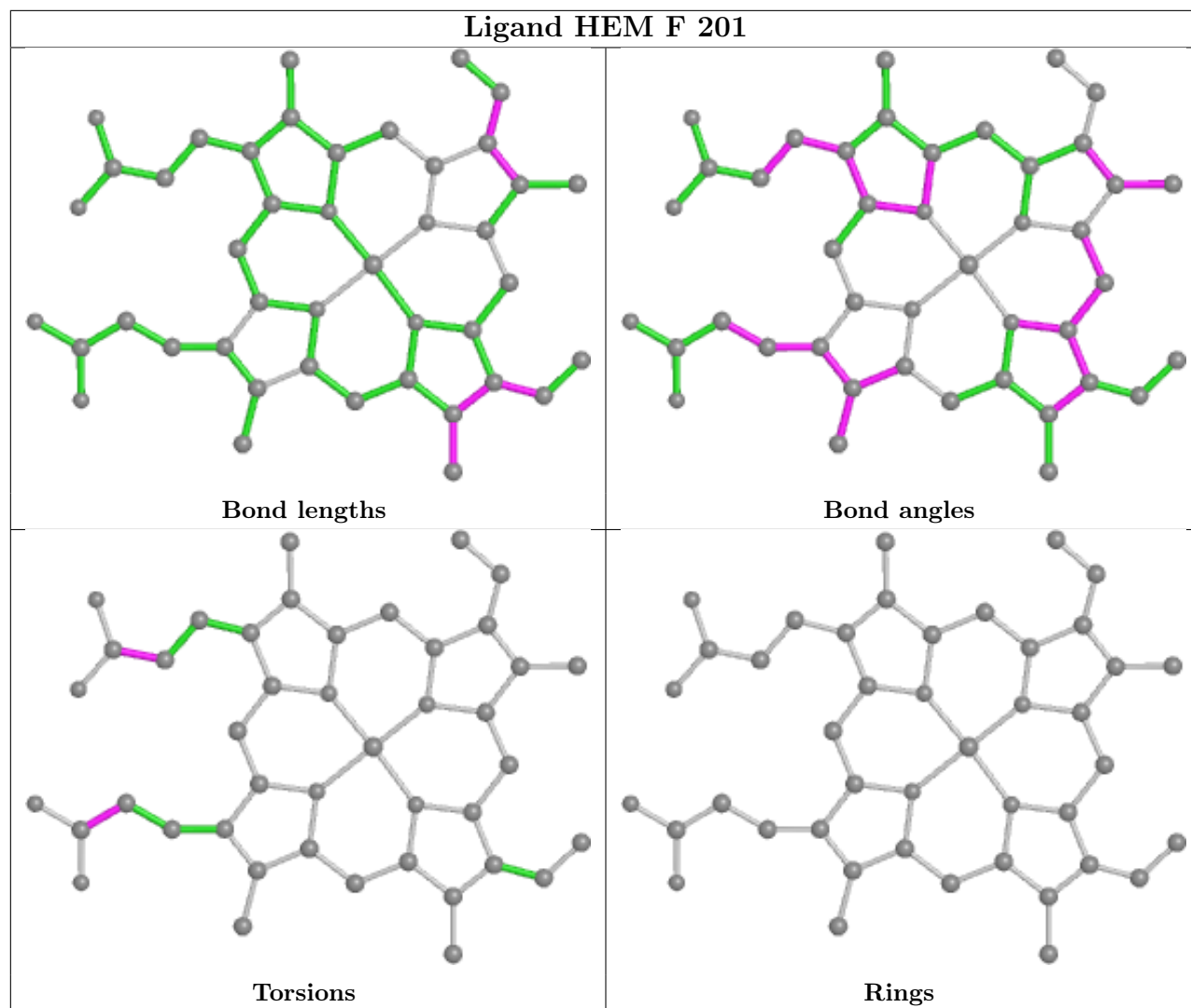
There are no ring outliers.

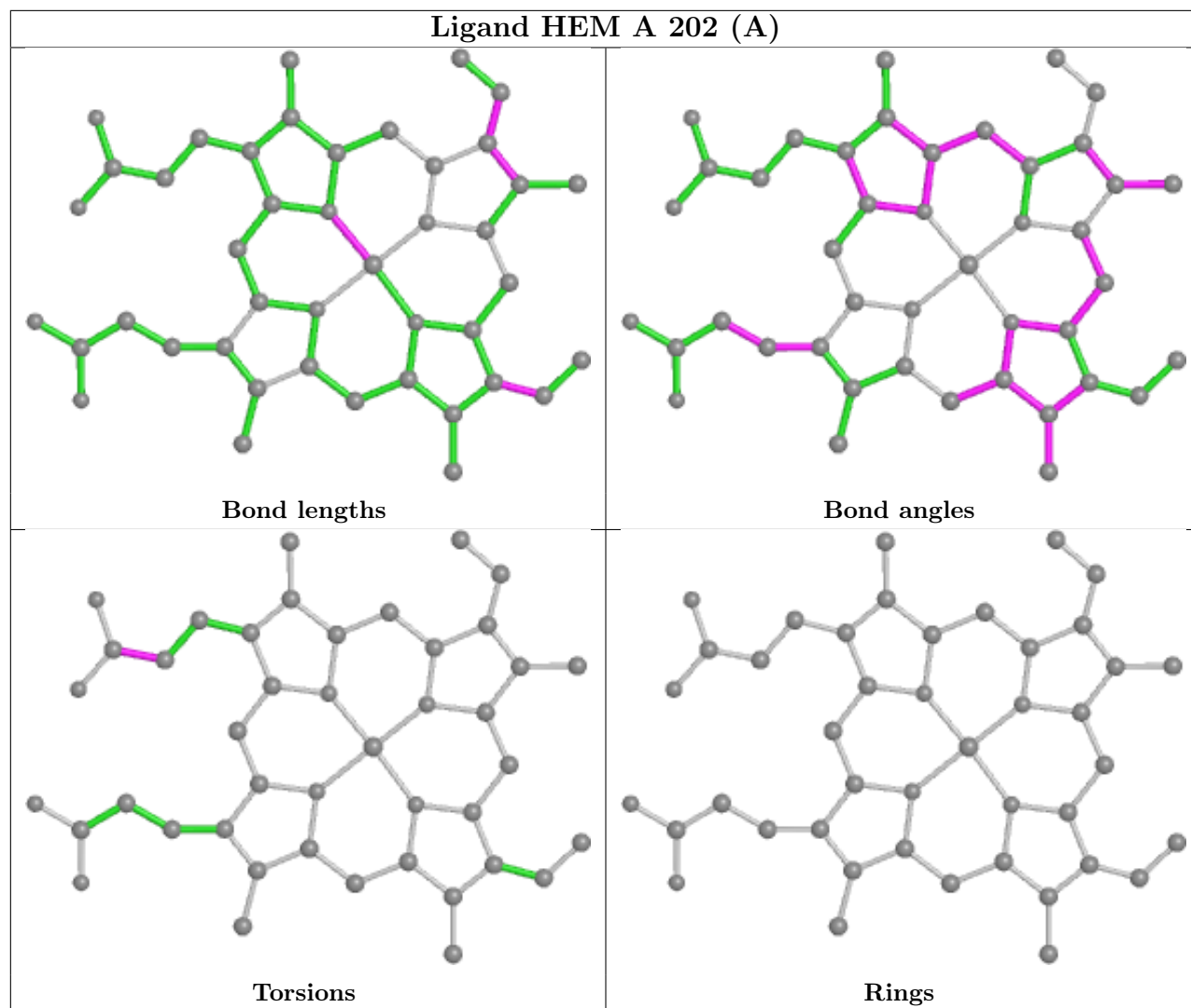
No monomer is involved in short contacts.

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

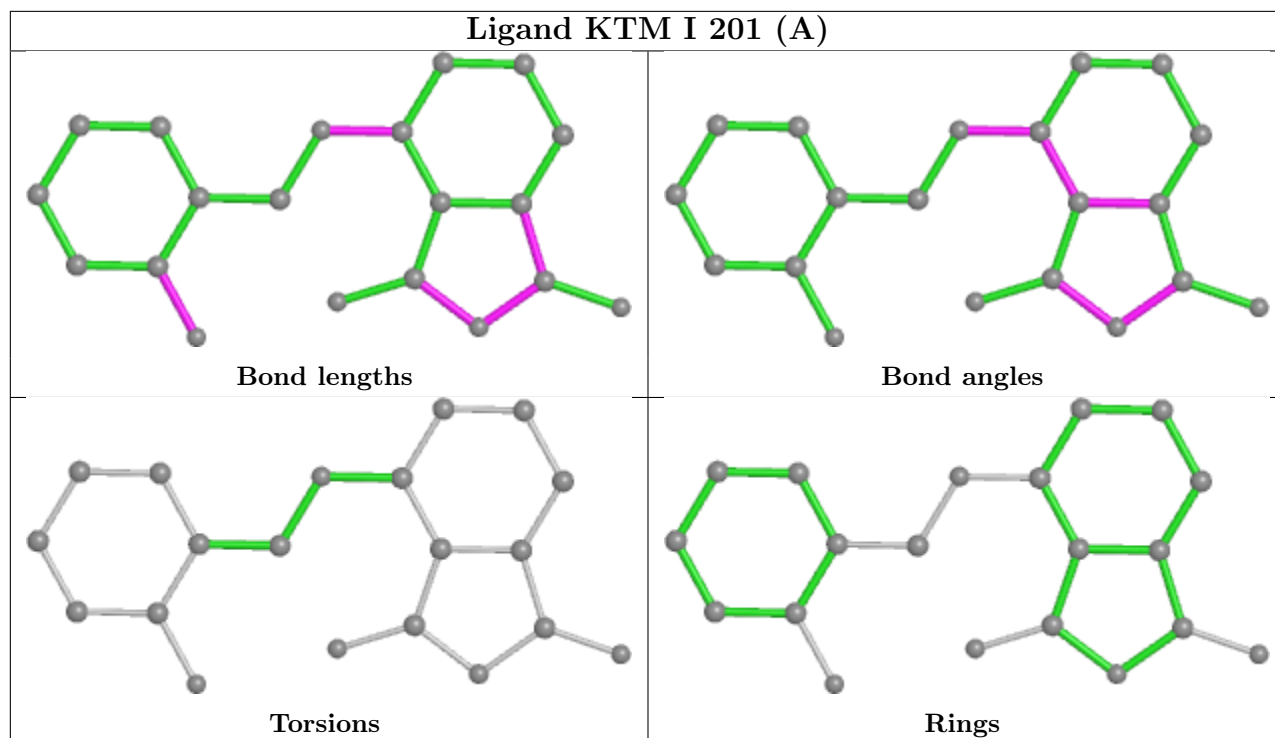


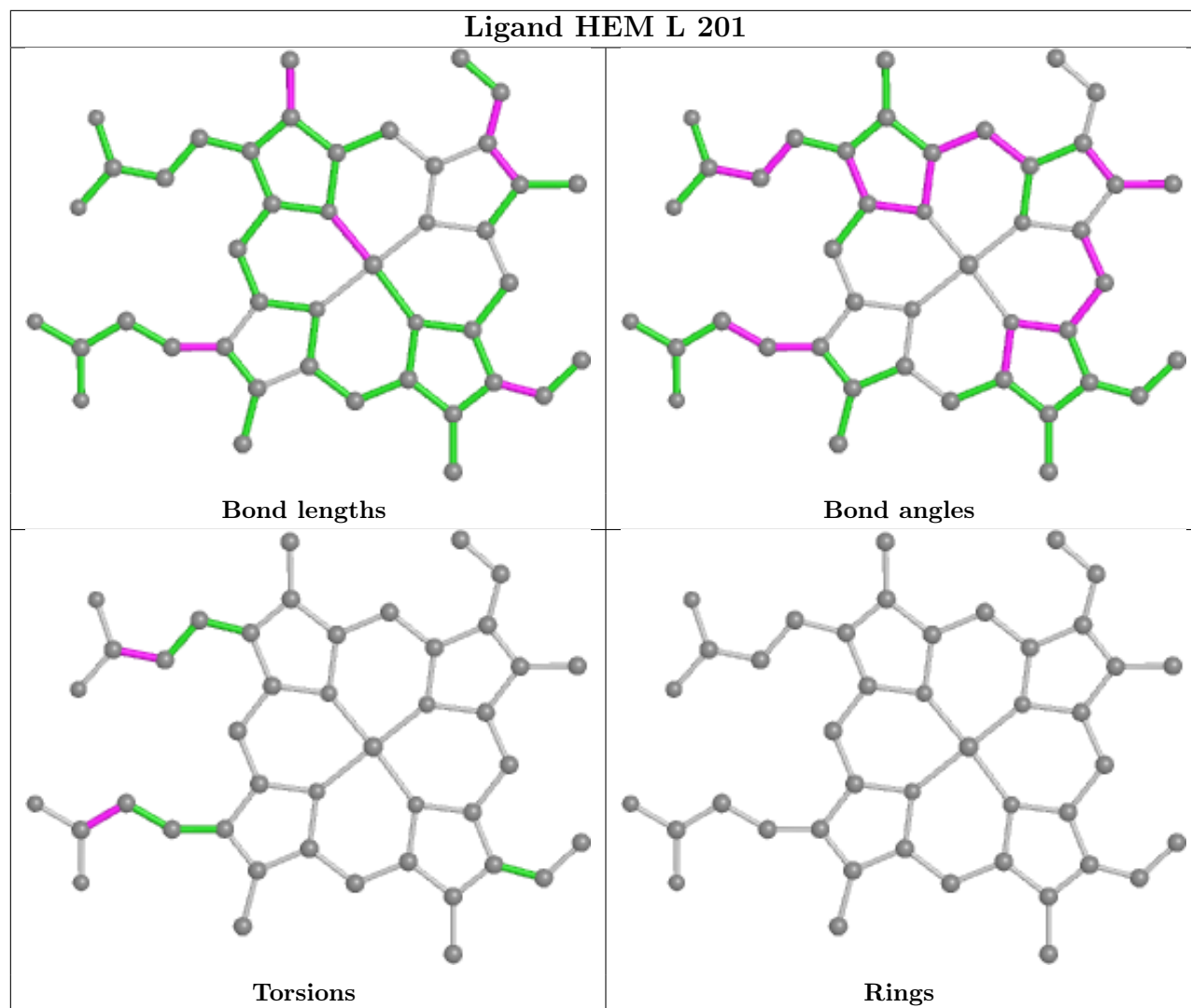


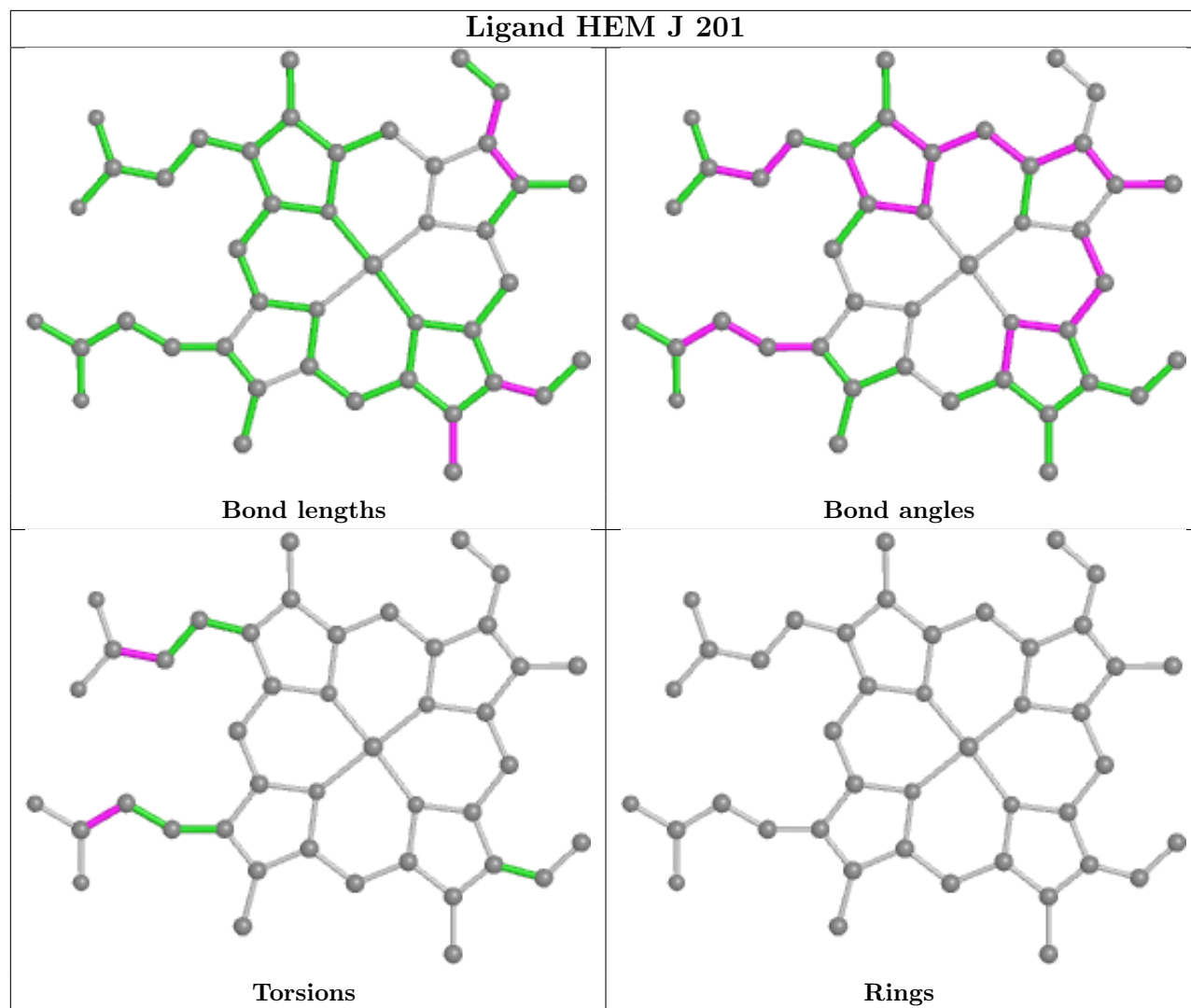


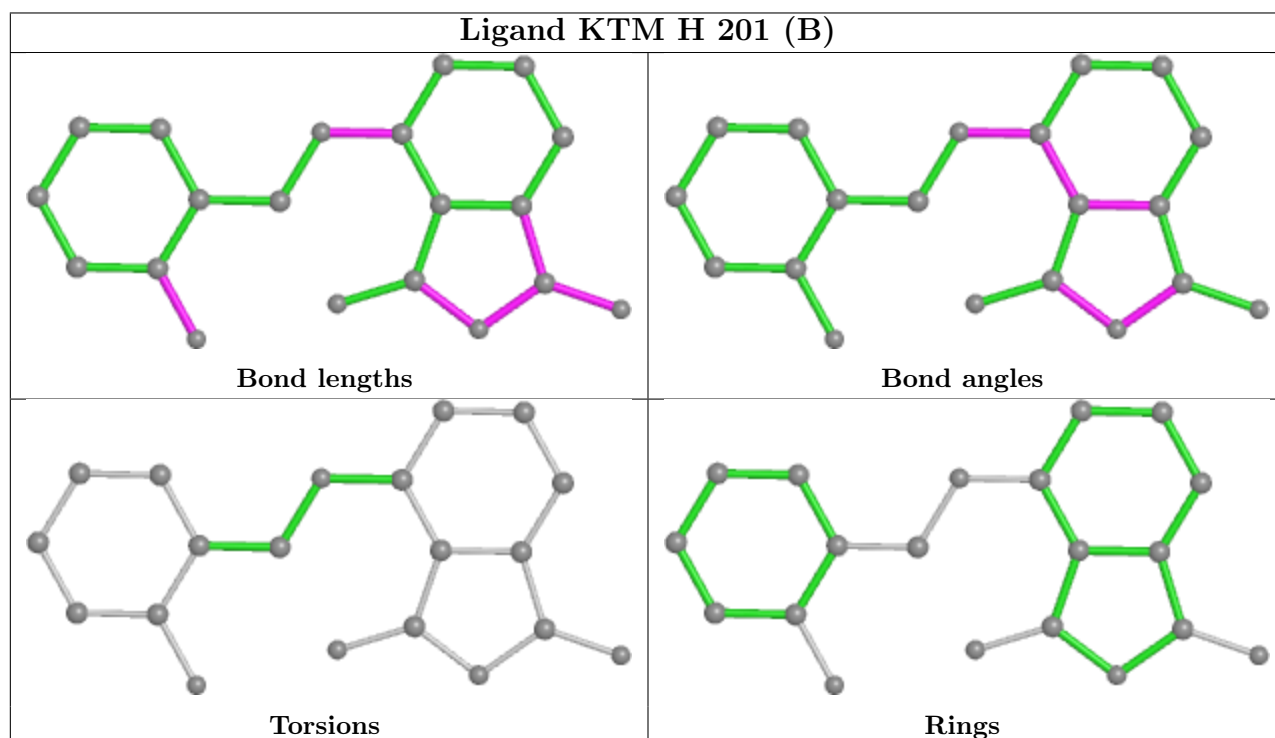
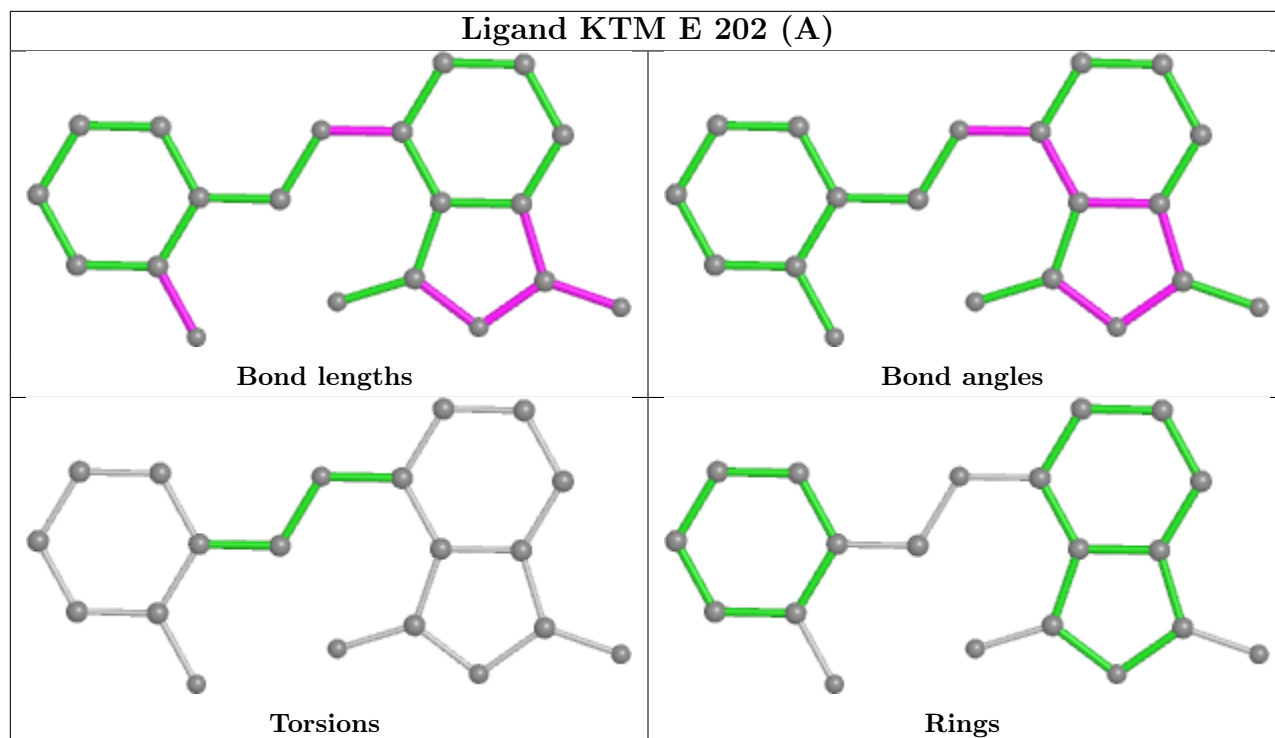


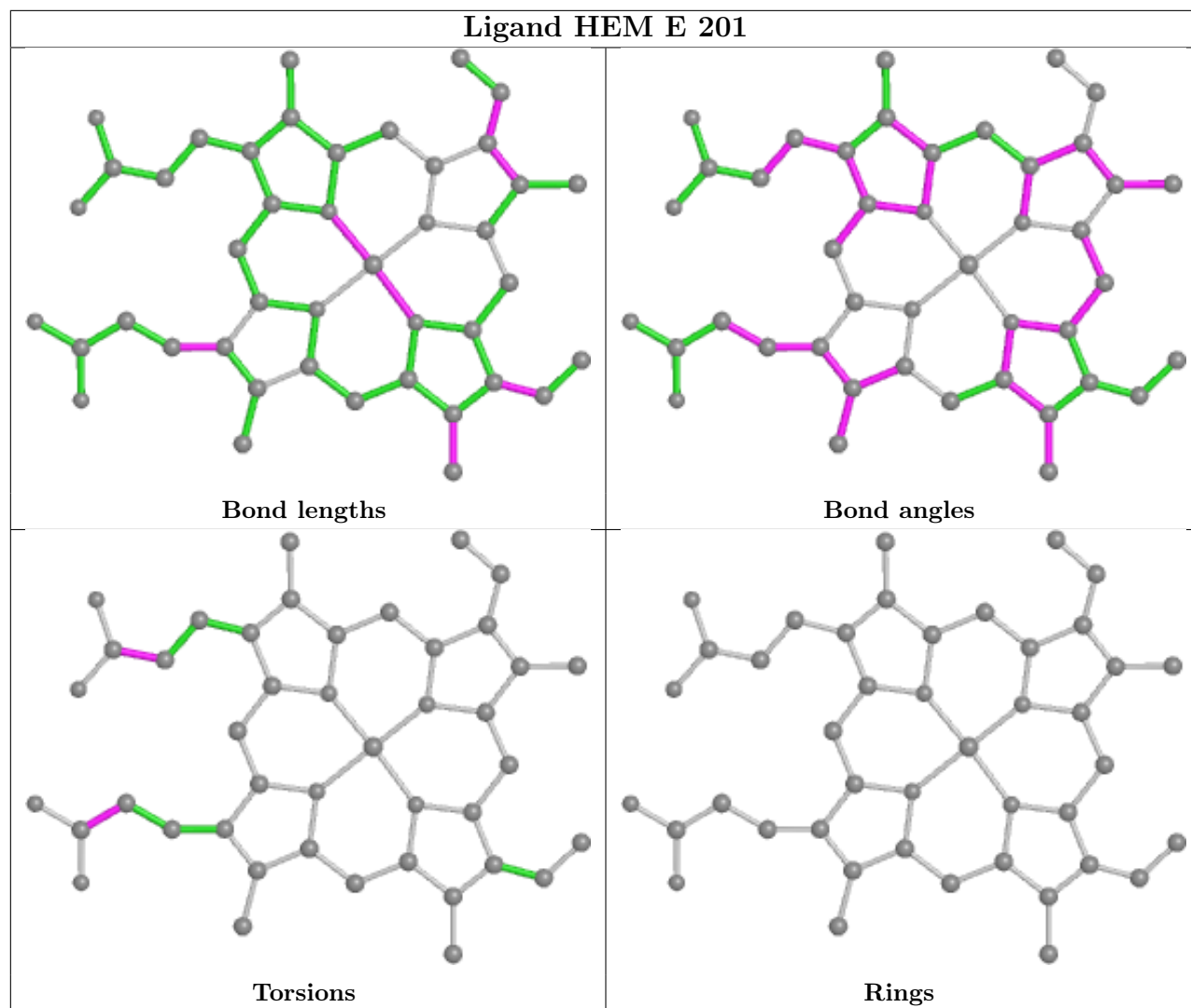


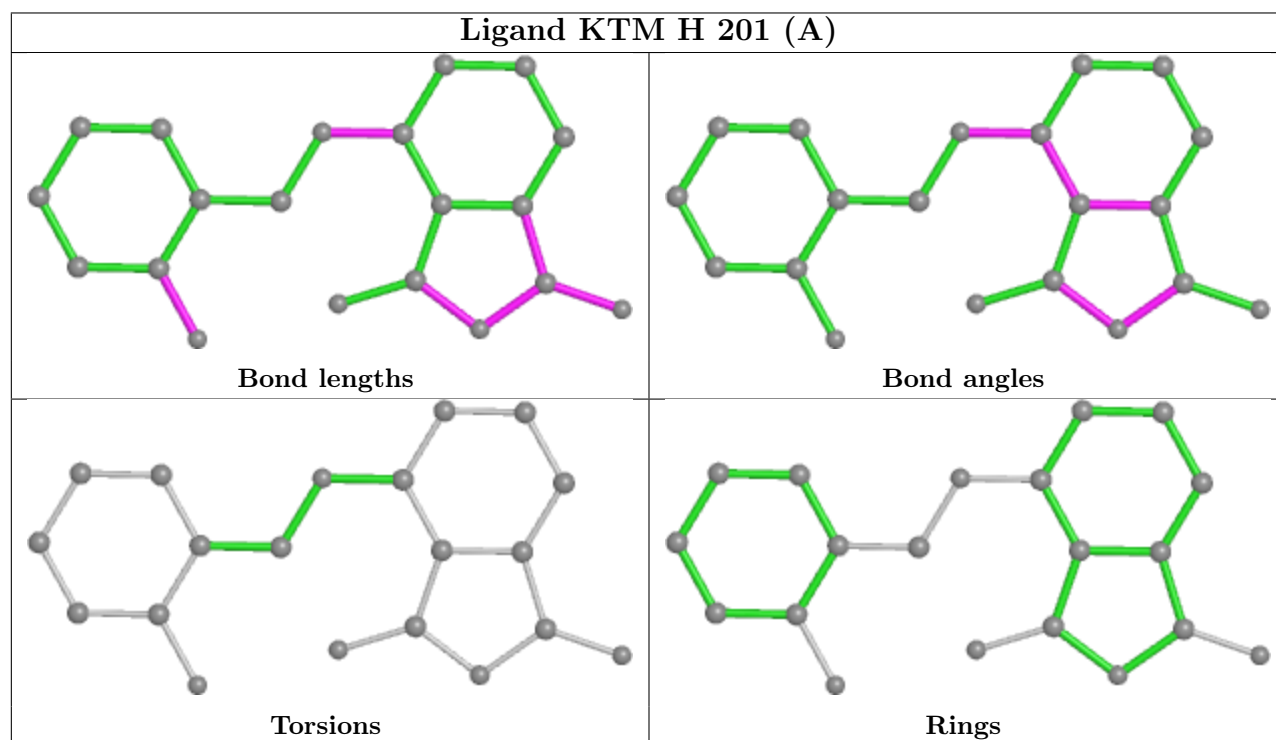
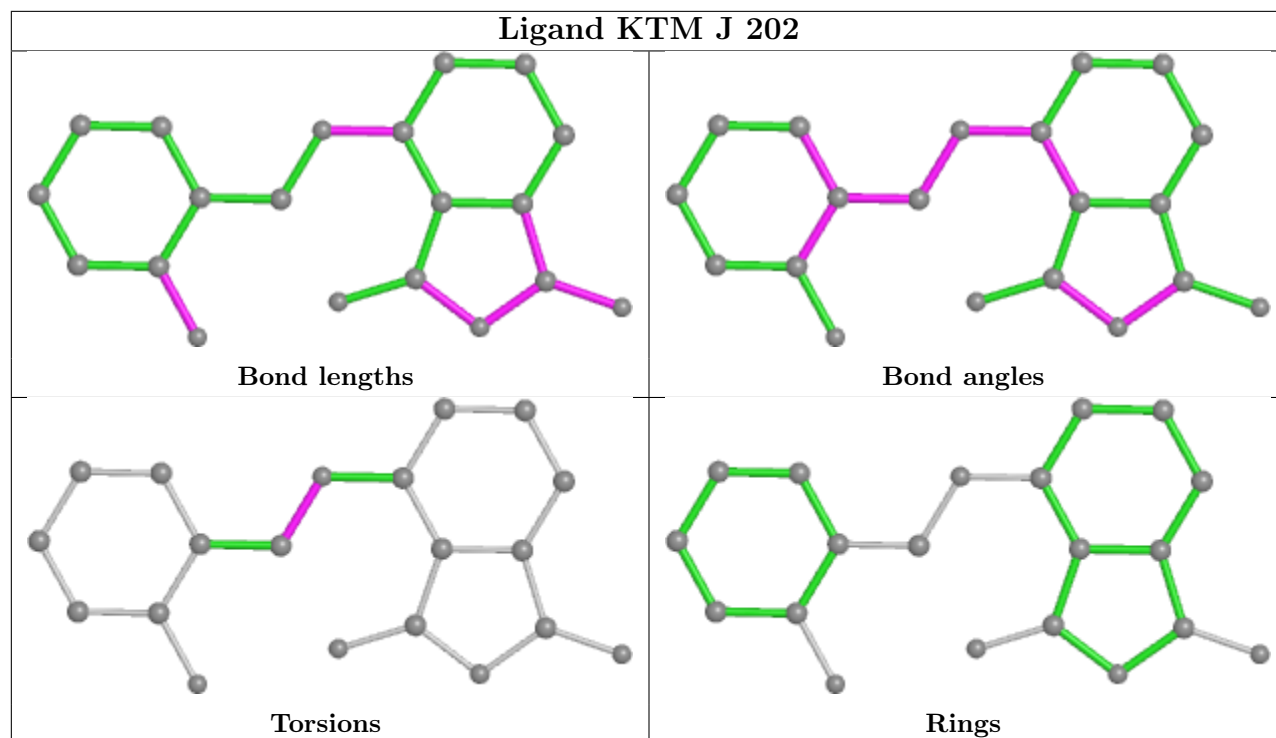


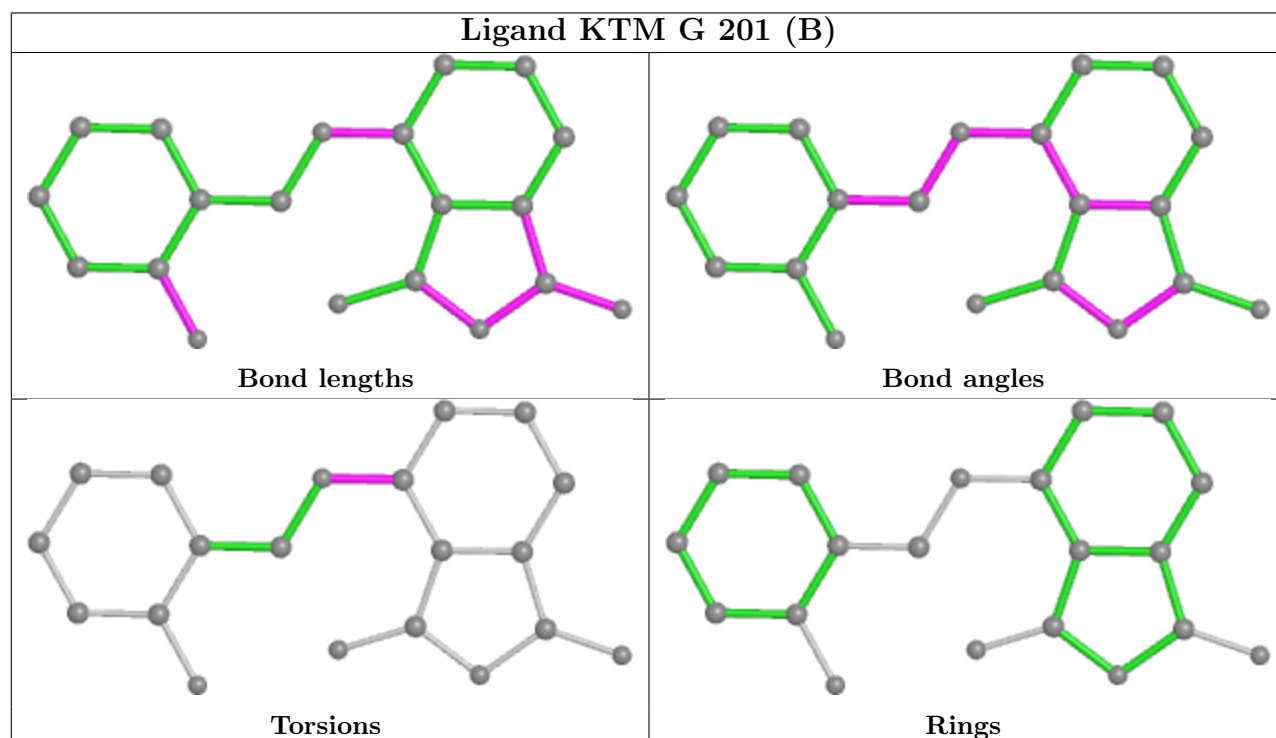
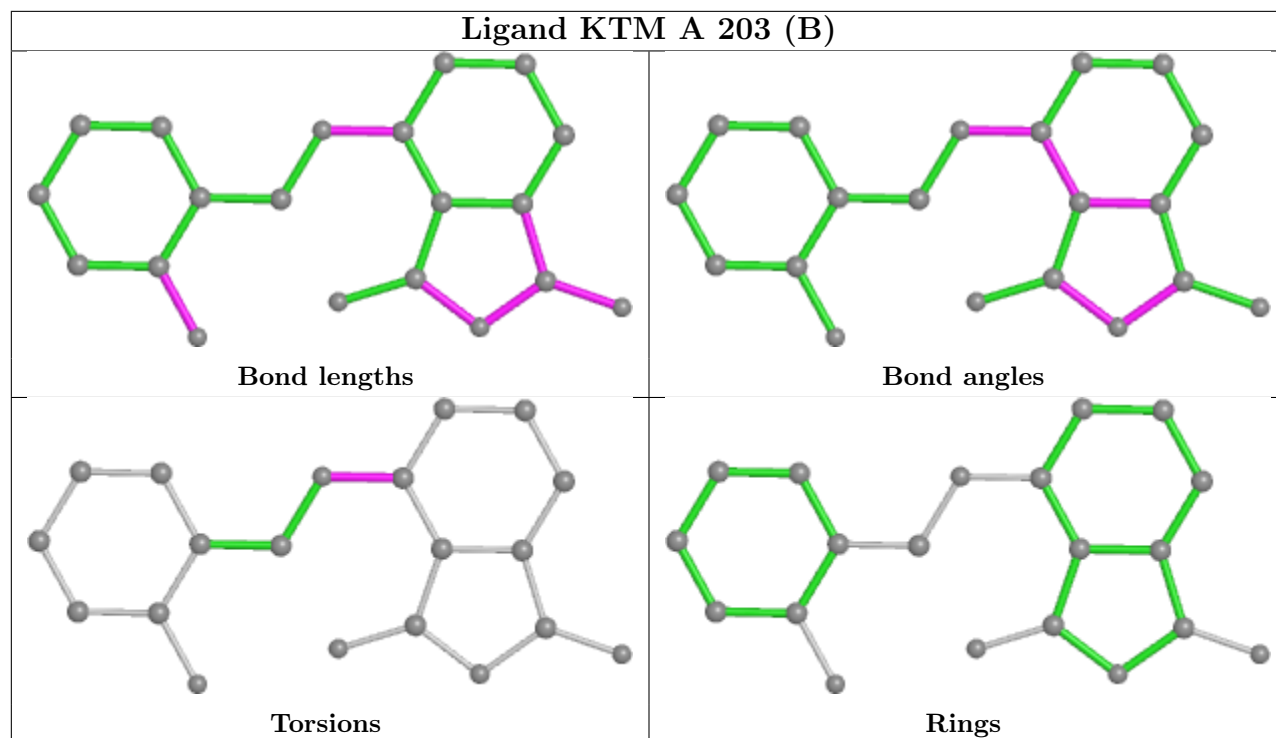


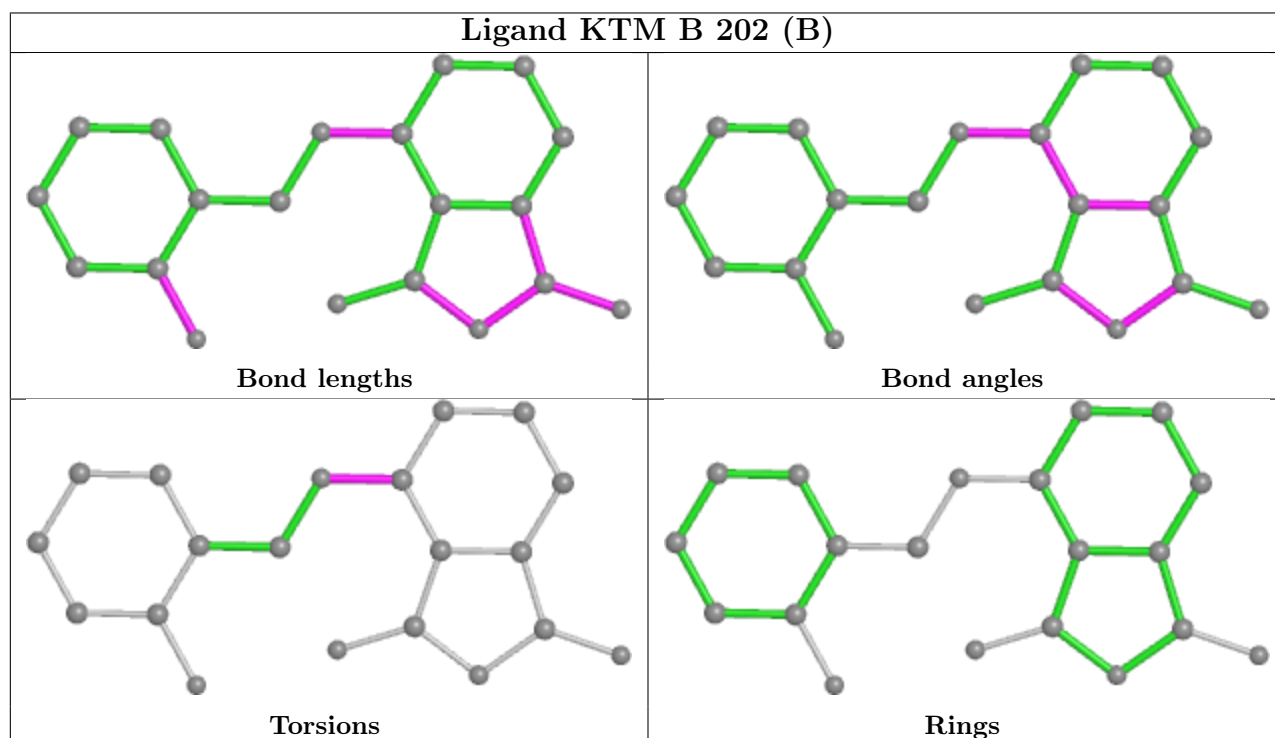
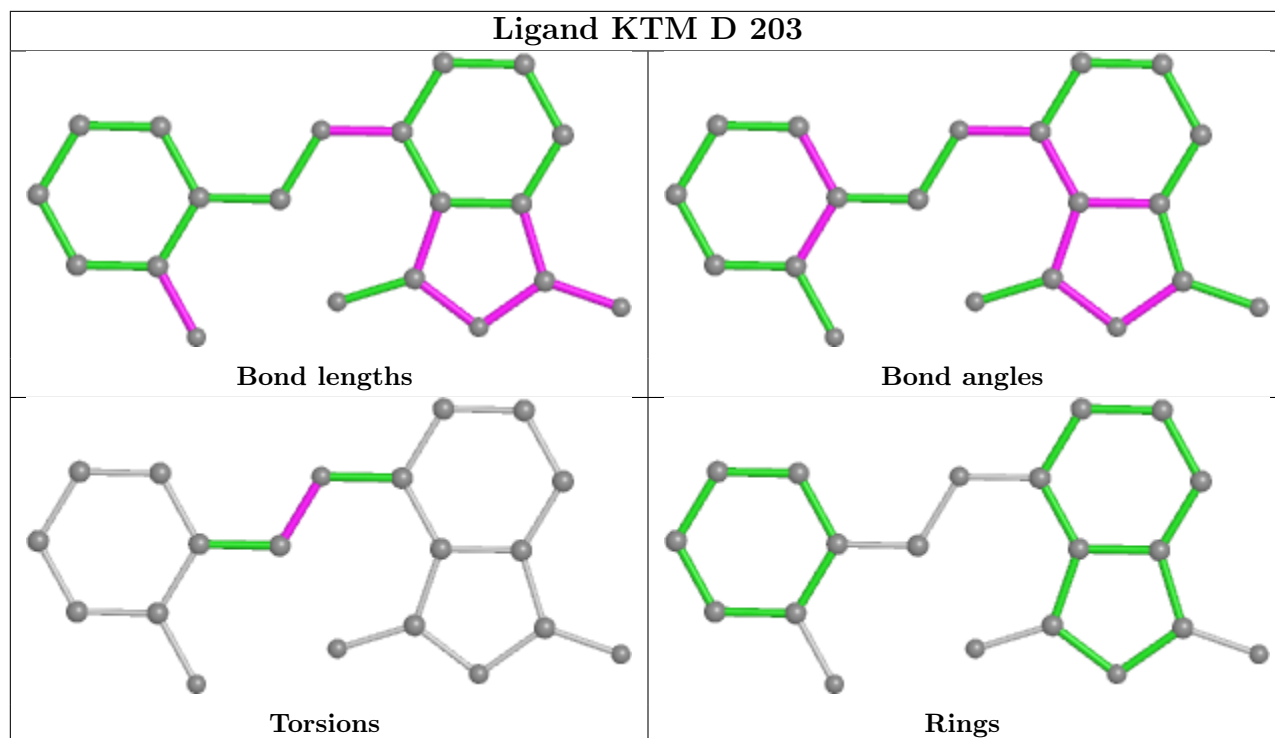




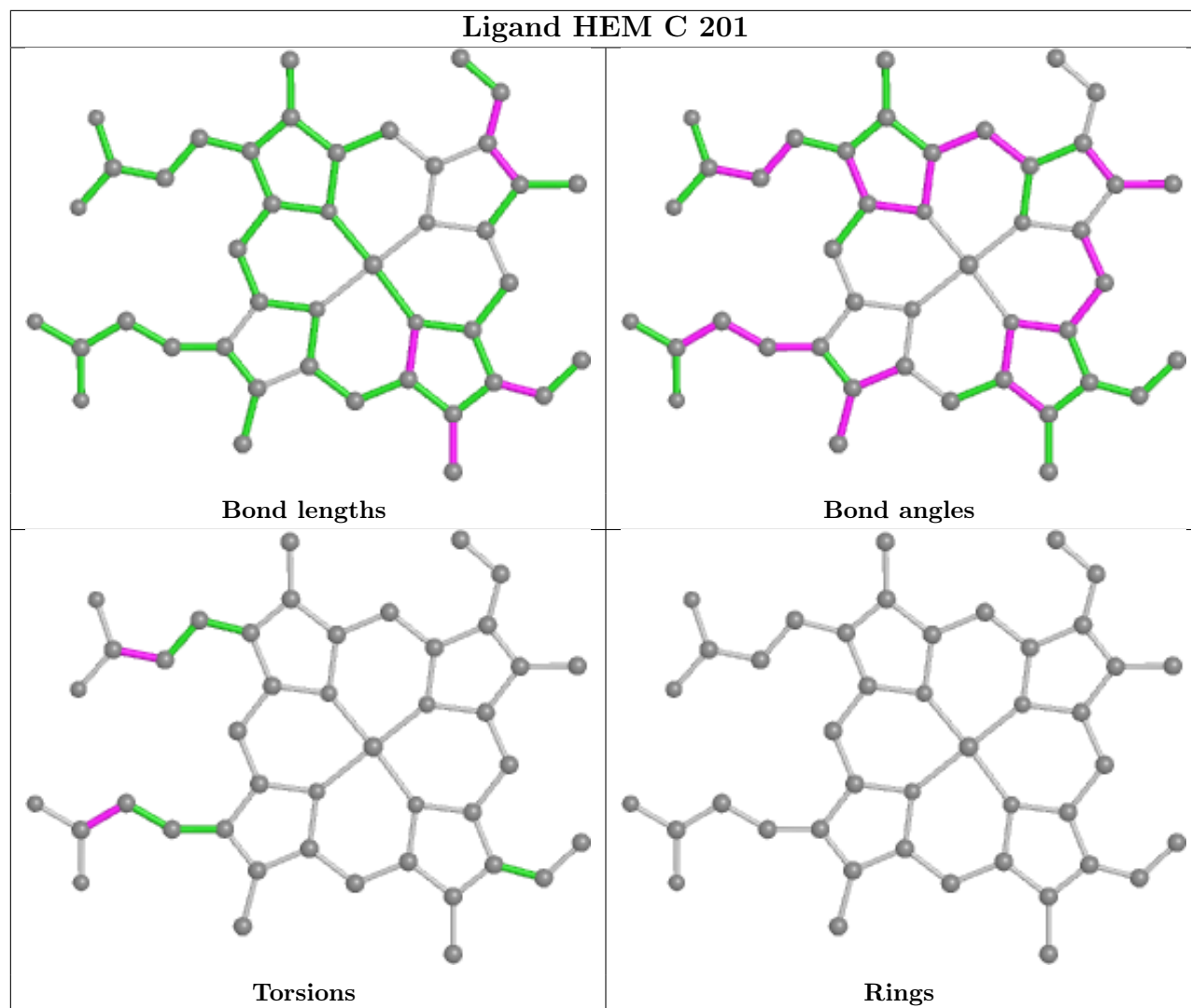


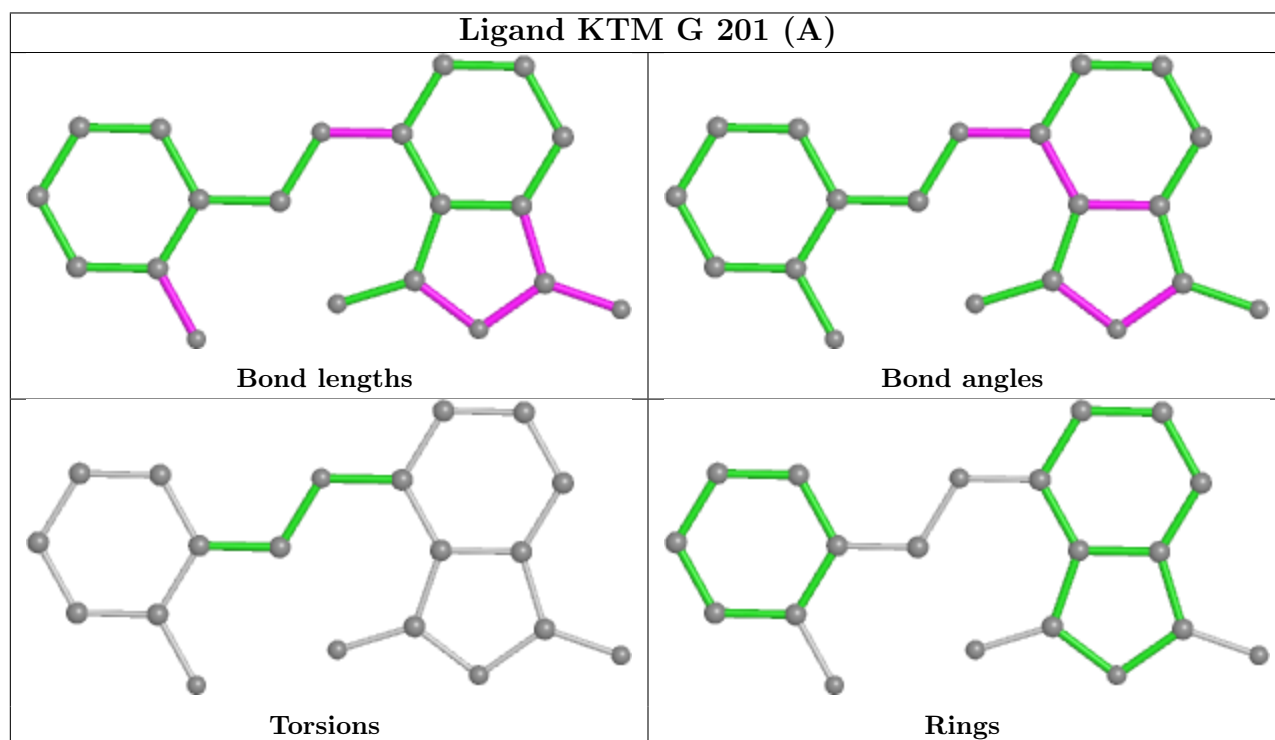
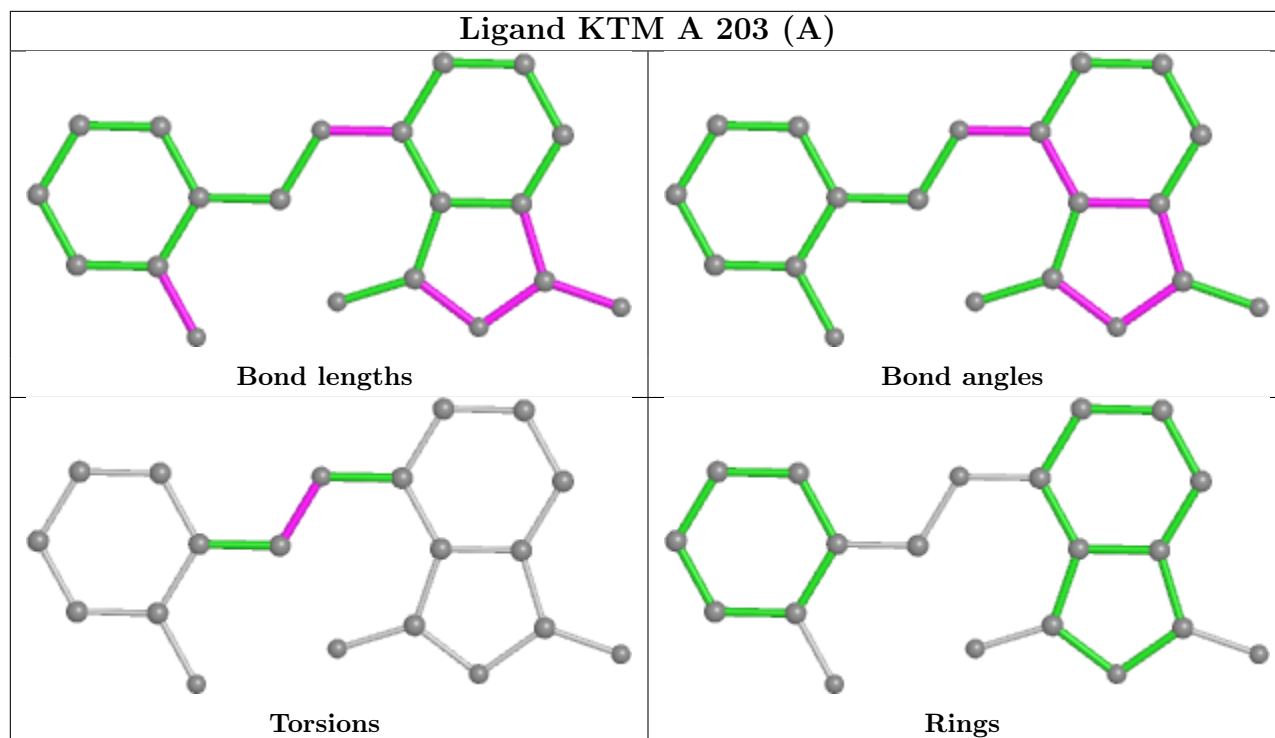


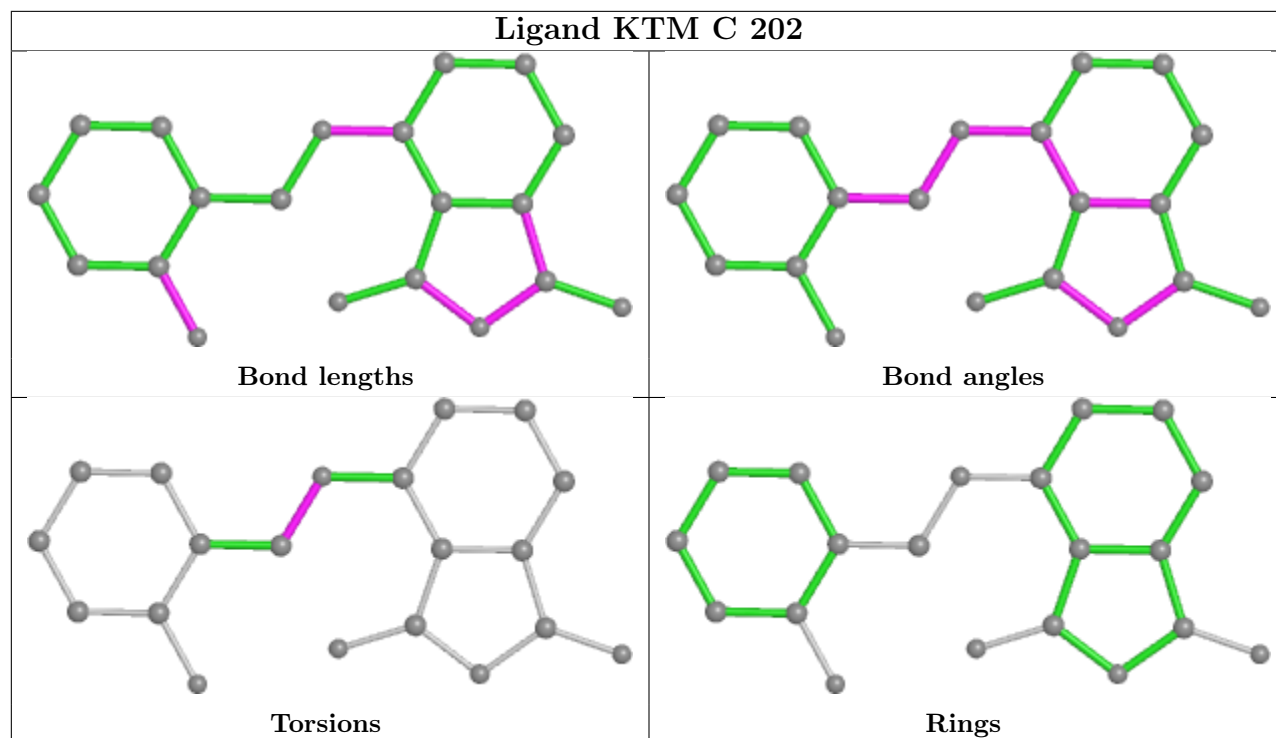


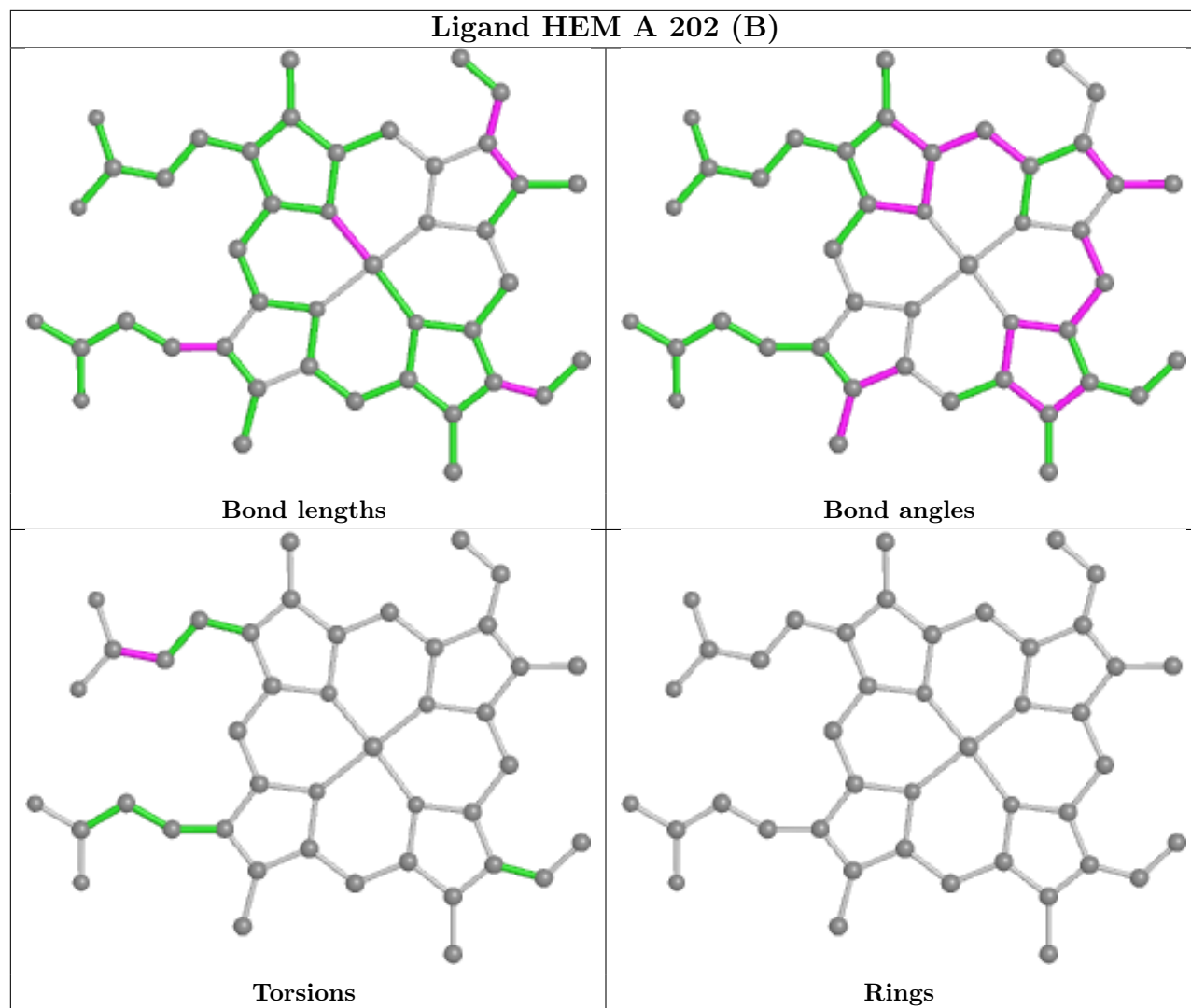


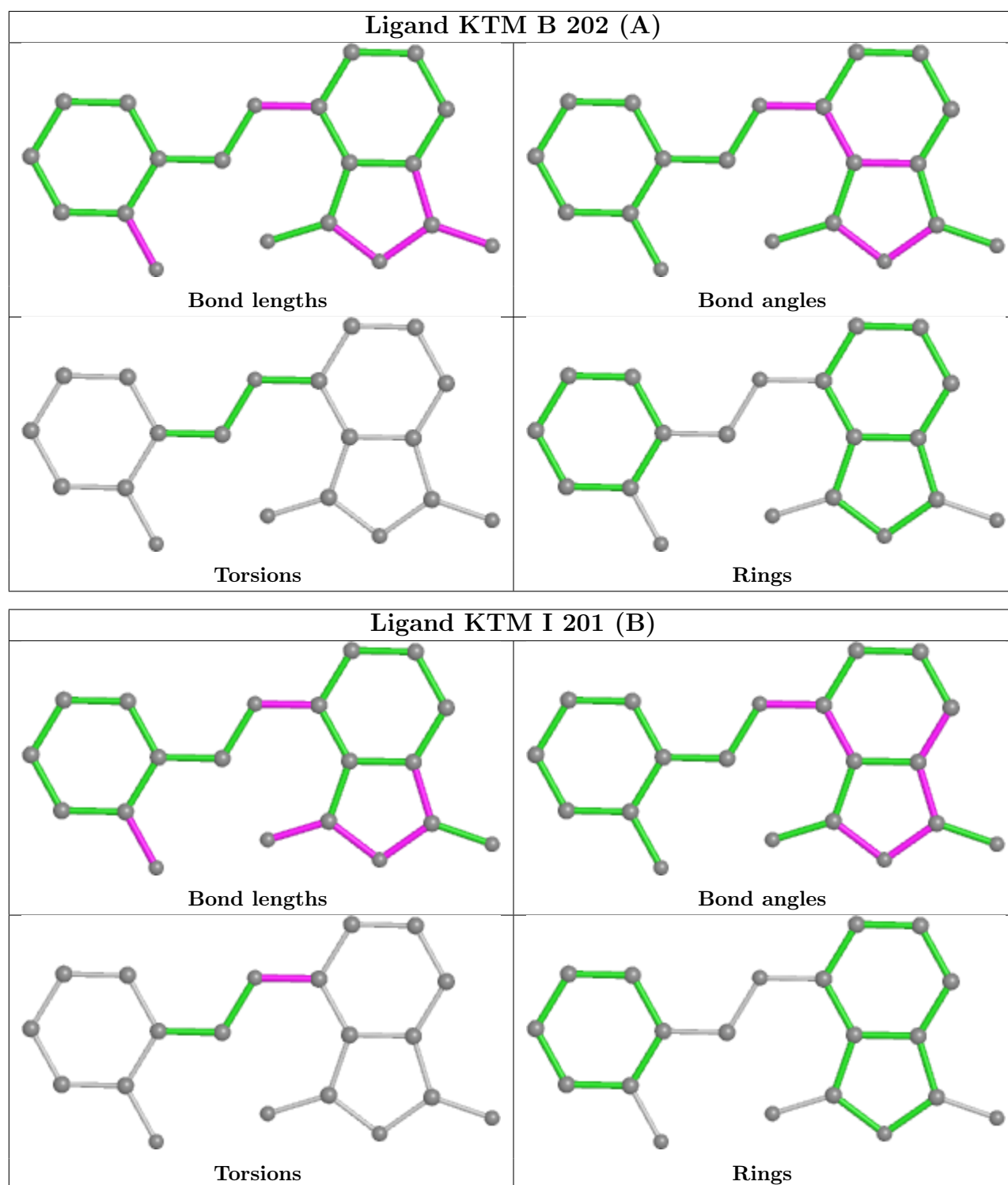












#### 4.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

## 4.8 Polymer linkage issues

There are no chain breaks in this entry.

## 5 Fit of model and data [i](#)

### 5.1 Protein, DNA and RNA chains [i](#)

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

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

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

### 5.3 Carbohydrates [i](#)

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

### 5.4 Ligands [i](#)

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

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

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