



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 3, 2023 – 06:44 AM EDT

PDB ID : 6PP2
Title : Structure of human endothelial nitric oxide synthase heme domain in complex with 4-((4-(2-Amino-4-methylquinolin-7-yl)-2-(aminomethyl)phenoxy)methyl)benzotrile
Authors : Chreifi, G.; Li, H.; Poulos, T.L.
Deposited on : 2019-07-05
Resolution : 2.02 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

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>.

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 2.02 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

There are 10 unique types of molecules in this entry. The entry contains 14200 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 Nitric oxide synthase, endothelial.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	404	3237	2062	570	589	16	0	2	0
1	B	403	3232	2057	570	588	17	0	3	0
1	C	401	3209	2044	563	586	16	0	2	0
1	D	402	3221	2051	566	587	17	0	3	0

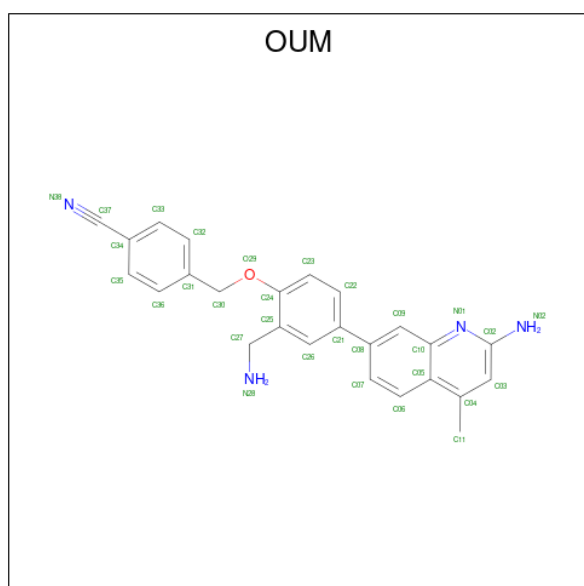
There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	298	GLU	ASP	variant	UNP P29474
B	298	GLU	ASP	variant	UNP P29474
C	298	GLU	ASP	variant	UNP P29474
D	298	GLU	ASP	variant	UNP P29474

- Molecule 2 is PROTOPORPHYRIN IX CONTAINING FE (three-letter code: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			17	9	5	3		
3	B	1	Total	C	N	O	0	0
			17	9	5	3		
3	C	1	Total	C	N	O	0	0
			17	9	5	3		
3	D	1	Total	C	N	O	0	0
			17	9	5	3		

- Molecule 4 is 4-{{2-(aminomethyl)-4-(2-amino-4-methylquinolin-7-yl)phenoxy}methyl}benzotrile (three-letter code: OUM) (formula: C₂₅H₂₂N₄O) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			30	25	4	1		
4	B	1	Total	C	N	O	0	0
			30	25	4	1		
4	C	1	Total	C	N	O	0	0
			30	25	4	1		
4	D	1	Total	C	N	O	0	0
			30	25	4	1		

- Molecule 5 is 2-[BIS-(2-HYDROXY-ETHYL)-AMINO]-2-HYDROXYMETHYL-PROPAN E-1,3-DIOL (three-letter code: BTB) (formula: C₈H₁₉NO₅).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
5	A	1	14	8	1	5	0	0
5	A	1	14	8	1	5	0	0
5	B	1	14	8	1	5	0	0
5	B	1	14	8	1	5	0	0
5	B	1	14	8	1	5	0	0
5	C	1	14	8	1	5	0	0
5	C	1	14	8	1	5	0	0
5	C	1	14	8	1	5	0	0
5	D	1	14	8	1	5	0	0
5	D	1	14	8	1	5	0	0
5	D	1	14	8	1	5	0	0

- Molecule 6 is ZINC ION (three-letter code: ZN) (formula: Zn).

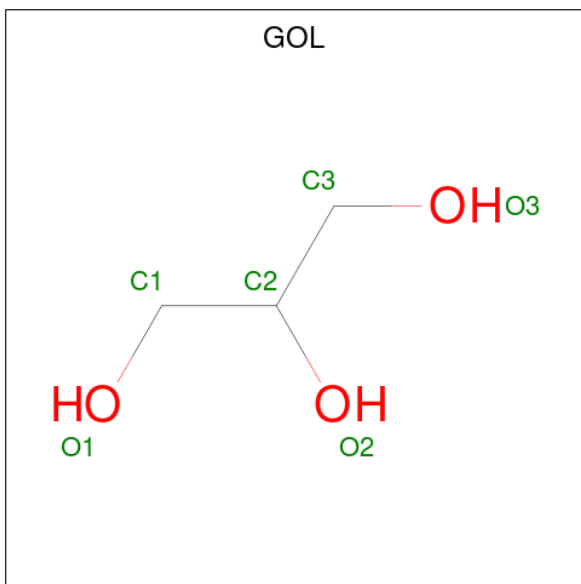
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Zn		
6	A	1	1	1	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	C	1	Total	Zn	0	0
			1	1		

- Molecule 7 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total	C	O	0	0
			6	3	3		
7	C	1	Total	C	O	0	0
			6	3	3		

- Molecule 8 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	1	Total	Cl	0	0
			1	1		
8	B	1	Total	Cl	0	0
			1	1		
8	C	1	Total	Cl	0	0
			1	1		
8	D	1	Total	Cl	0	0
			1	1		

- Molecule 9 is GADOLINIUM ATOM (three-letter code: GD) (formula: Gd).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	B	1	Total Gd 1 1	0	0
9	D	1	Total Gd 1 1	0	0

- Molecule 10 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	A	143	Total O 143 143	0	0
10	B	239	Total O 239 239	0	0
10	C	148	Total O 148 148	0	0
10	D	237	Total O 237 237	0	0

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

3 Data and refinement statistics i

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

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	60.54Å 154.89Å 109.18Å 90.00° 90.80° 90.00°	Depositor
Resolution (Å)	89.23 – 2.02	Depositor
% Data completeness (in resolution range)	94.5 (89.23-2.02)	Depositor
R_{merge}	0.11	Depositor
R_{sym}	0.11	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.26 (at 2.02Å)	Xtrriage
Refinement program	PHENIX (1.11.1_2575: ???)	Depositor
R, R_{free}	0.199 , 0.246	Depositor
Wilson B-factor (Å ²)	27.9	Xtrriage
Anisotropy	0.649	Xtrriage
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.105 for h,-k,-l	Xtrriage
Total number of atoms	14200	wwPDB-VP
Average B, all atoms (Å ²)	45.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.81% of the height of the origin peak. No significant pseudotranslation is detected.*

¹ Intensities estimated from amplitudes.

² 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](#)

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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 33 ligands modelled in this entry, 8 are monoatomic - leaving 25 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
5	BTB	C	504	-	13,13,13	2.91	1 (7%)	7,16,16	1.37	2 (28%)
5	BTB	B	506	-	13,13,13	0.64	0	7,16,16	1.21	1 (14%)
3	H4B	A	502	-	16,18,18	0.99	0	11,26,26	2.44	5 (45%)
7	GOL	A	507	-	5,5,5	0.35	0	5,5,5	0.26	0
3	H4B	B	502	-	16,18,18	0.98	0	11,26,26	2.63	6 (54%)
4	OUM	A	503	-	33,33,33	1.72	4 (12%)	45,46,46	2.17	12 (26%)
5	BTB	A	504	-	13,13,13	4.57	3 (23%)	7,16,16	2.23	2 (28%)
5	BTB	B	504	9	13,13,13	0.53	0	7,16,16	0.90	0
2	HEM	A	501	1	41,50,50	1.48	6 (14%)	45,82,82	1.82	9 (20%)
2	HEM	B	501	1	41,50,50	1.59	6 (14%)	45,82,82	1.79	9 (20%)
5	BTB	D	506	-	13,13,13	0.41	0	7,16,16	0.46	0
2	HEM	D	501	1	41,50,50	1.44	6 (14%)	45,82,82	1.96	12 (26%)
5	BTB	D	505	-	13,13,13	0.84	0	7,16,16	1.56	3 (42%)
5	BTB	B	505	-	13,13,13	0.57	0	7,16,16	0.65	0
3	H4B	D	502	-	16,18,18	0.91	0	11,26,26	2.54	5 (45%)
5	BTB	A	505	-	13,13,13	0.53	0	7,16,16	0.74	0
4	OUM	B	503	-	33,33,33	1.72	4 (12%)	45,46,46	1.88	14 (31%)
4	OUM	D	503	-	33,33,33	1.72	5 (15%)	45,46,46	2.04	12 (26%)
7	GOL	C	508	-	5,5,5	0.51	0	5,5,5	0.76	0
5	BTB	C	506	-	13,13,13	0.35	0	7,16,16	0.49	0
4	OUM	C	503	-	33,33,33	1.63	3 (9%)	45,46,46	1.89	9 (20%)
2	HEM	C	501	1	41,50,50	1.55	8 (19%)	45,82,82	1.84	9 (20%)
3	H4B	C	502	-	16,18,18	0.99	0	11,26,26	2.58	4 (36%)
5	BTB	C	505	-	13,13,13	1.02	2 (15%)	7,16,16	1.23	1 (14%)
5	BTB	D	504	9	13,13,13	0.37	0	7,16,16	0.95	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
5	BTB	C	504	-	-	7/21/21/21	-
5	BTB	B	506	-	-	9/21/21/21	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	H4B	A	502	-	-	0/8/17/17	0/2/2/2
7	GOL	A	507	-	-	4/4/4/4	-
3	H4B	B	502	-	-	0/8/17/17	0/2/2/2
4	OUM	A	503	-	-	1/13/13/13	0/4/4/4
5	BTB	A	504	-	-	14/21/21/21	-
5	BTB	B	504	9	-	2/21/21/21	-
2	HEM	A	501	1	-	3/12/54/54	-
2	HEM	B	501	1	-	2/12/54/54	-
5	BTB	D	506	-	-	14/21/21/21	-
2	HEM	D	501	1	-	3/12/54/54	-
5	BTB	D	505	-	-	13/21/21/21	-
5	BTB	B	505	-	-	5/21/21/21	-
3	H4B	D	502	-	-	3/8/17/17	0/2/2/2
5	BTB	A	505	-	-	4/21/21/21	-
4	OUM	B	503	-	-	2/13/13/13	0/4/4/4
4	OUM	D	503	-	-	2/13/13/13	0/4/4/4
7	GOL	C	508	-	-	2/4/4/4	-
5	BTB	C	506	-	-	3/21/21/21	-
4	OUM	C	503	-	-	5/13/13/13	0/4/4/4
2	HEM	C	501	1	-	5/12/54/54	-
3	H4B	C	502	-	-	0/8/17/17	0/2/2/2
5	BTB	C	505	-	-	5/21/21/21	-
5	BTB	D	504	9	-	1/21/21/21	-

All (48) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	504	BTB	C1-C2	-15.92	1.32	1.53
5	C	504	BTB	C5-N	-10.23	1.33	1.48
4	B	503	OUM	C34-C37	-7.70	1.27	1.44
4	A	503	OUM	C34-C37	-7.40	1.28	1.44
4	D	503	OUM	C34-C37	-7.35	1.28	1.44
4	C	503	OUM	C34-C37	-7.27	1.28	1.44
2	B	501	HEM	C3C-CAC	3.93	1.55	1.47
2	C	501	HEM	C3C-C2C	-3.82	1.35	1.40
2	A	501	HEM	C3C-CAC	3.81	1.55	1.47
2	B	501	HEM	FE-NB	3.78	2.15	1.96
2	C	501	HEM	C3C-CAC	3.67	1.55	1.47

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	501	HEM	C3C-C2C	-3.35	1.35	1.40
2	C	501	HEM	FE-NB	3.34	2.13	1.96
2	B	501	HEM	CMB-C2B	3.29	1.57	1.50
2	A	501	HEM	C3C-C2C	-3.28	1.35	1.40
2	D	501	HEM	C3C-CAC	3.16	1.54	1.47
2	B	501	HEM	CAB-C3B	3.02	1.55	1.47
2	A	501	HEM	CAB-C3B	3.01	1.55	1.47
2	C	501	HEM	CAB-C3B	3.00	1.55	1.47
2	B	501	HEM	C3C-C2C	-2.82	1.36	1.40
2	D	501	HEM	CAB-C3B	2.81	1.55	1.47
4	B	503	OUM	C05-C10	-2.69	1.38	1.42
5	A	504	BTB	C3-C2	-2.69	1.49	1.53
2	D	501	HEM	FE-ND	2.56	2.09	1.96
2	A	501	HEM	CAA-C2A	2.53	1.55	1.52
4	D	503	OUM	C05-C10	-2.49	1.38	1.42
4	D	503	OUM	C09-C10	-2.49	1.38	1.41
4	A	503	OUM	C26-C25	-2.47	1.35	1.39
5	C	505	BTB	C4-C2	-2.44	1.50	1.53
4	D	503	OUM	C26-C21	-2.40	1.35	1.39
5	A	504	BTB	C4-C2	-2.39	1.50	1.53
4	C	503	OUM	C02-N01	2.34	1.36	1.33
2	A	501	HEM	CMD-C2D	2.32	1.55	1.50
2	C	501	HEM	CAA-C2A	2.27	1.55	1.52
2	D	501	HEM	CMD-C2D	2.27	1.55	1.50
2	A	501	HEM	FE-NB	2.25	2.08	1.96
2	B	501	HEM	CMA-C3A	2.24	1.56	1.51
4	C	503	OUM	C26-C21	-2.22	1.35	1.39
5	C	505	BTB	C1-C2	-2.19	1.50	1.53
4	A	503	OUM	C05-C10	-2.19	1.38	1.42
4	B	503	OUM	C04-C05	-2.15	1.38	1.42
4	B	503	OUM	C02-N01	2.13	1.36	1.33
2	D	501	HEM	FE-NB	2.12	2.07	1.96
4	A	503	OUM	C26-C21	-2.10	1.36	1.39
2	C	501	HEM	CMA-C3A	2.10	1.56	1.51
2	C	501	HEM	CMB-C2B	2.05	1.55	1.50
2	C	501	HEM	C2C-C1C	2.02	1.47	1.42
4	D	503	OUM	C04-C05	-2.00	1.38	1.42

All (115) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	503	OUM	C26-C21-C08	-7.78	108.00	120.86

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	503	OUM	O29-C24-C25	7.37	125.41	115.78
4	A	503	OUM	C22-C21-C08	6.70	132.96	121.36
2	B	501	HEM	CBA-CAA-C2A	-6.32	101.84	112.62
3	C	502	H4B	C8A-C4A-C4	6.03	119.93	114.57
2	D	501	HEM	CBA-CAA-C2A	-5.72	102.85	112.62
3	B	502	H4B	C8A-C4A-C4	5.57	119.51	114.57
4	A	503	OUM	C30-O29-C24	5.49	128.57	117.76
4	D	503	OUM	C26-C21-C08	-5.38	111.97	120.86
2	C	501	HEM	CBA-CAA-C2A	-5.32	103.55	112.62
5	A	504	BTB	O1-C1-C2	-5.22	97.14	111.44
3	D	502	H4B	C8A-C4A-C4	5.15	119.15	114.57
4	D	503	OUM	O29-C24-C25	5.10	122.45	115.78
4	B	503	OUM	C26-C21-C08	-4.94	112.70	120.86
2	C	501	HEM	C4B-CHC-C1C	4.92	129.05	122.56
2	A	501	HEM	CBD-CAD-C3D	-4.87	99.09	112.63
3	A	502	H4B	C8A-C4A-C4	4.82	118.85	114.57
4	B	503	OUM	O29-C24-C25	4.45	121.60	115.78
4	D	503	OUM	C22-C21-C08	4.40	128.99	121.36
2	B	501	HEM	CAD-CBD-CGD	-4.37	104.21	113.60
2	A	501	HEM	C4B-CHC-C1C	4.30	128.23	122.56
2	D	501	HEM	CMC-C2C-C3C	4.16	132.47	124.68
2	C	501	HEM	C1B-NB-C4B	3.92	109.12	105.07
4	C	503	OUM	C27-C25-C26	-3.85	113.53	120.38
4	D	503	OUM	C27-C25-C26	-3.79	113.63	120.38
2	D	501	HEM	C4C-CHD-C1D	3.78	127.54	122.56
4	B	503	OUM	C22-C21-C08	3.74	127.83	121.36
2	D	501	HEM	CBD-CAD-C3D	-3.63	102.55	112.63
2	A	501	HEM	C4D-ND-C1D	3.58	108.77	105.07
4	C	503	OUM	O29-C24-C23	-3.52	116.36	123.97
3	A	502	H4B	N1-C2-N3	-3.46	120.00	125.42
3	B	502	H4B	N1-C2-N3	-3.40	120.08	125.42
2	A	501	HEM	CMA-C3A-C4A	-3.37	123.29	128.46
2	A	501	HEM	C1B-NB-C4B	3.35	108.53	105.07
4	B	503	OUM	C27-C25-C26	-3.25	114.59	120.38
4	D	503	OUM	C27-C25-C24	3.24	126.44	120.12
4	B	503	OUM	C35-C34-C37	-3.19	114.67	119.99
4	C	503	OUM	C27-C25-C24	3.18	126.33	120.12
3	D	502	H4B	N1-C2-N3	-3.15	120.47	125.42
2	D	501	HEM	C3D-C4D-ND	-3.15	106.66	110.17
4	A	503	OUM	C09-C08-C21	-3.14	113.88	121.05
4	D	503	OUM	O29-C30-C31	-3.12	99.80	109.16
3	C	502	H4B	N1-C2-N3	-3.03	120.66	125.42

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	501	HEM	C4D-ND-C1D	3.03	108.20	105.07
2	C	501	HEM	C4D-ND-C1D	3.02	108.20	105.07
2	A	501	HEM	C3D-C4D-ND	-3.02	106.80	110.17
4	A	503	OUM	C07-C08-C21	3.02	126.59	121.36
4	D	503	OUM	C09-C08-C21	-3.01	114.17	121.05
3	B	502	H4B	C2-N1-C8A	3.01	121.28	114.54
2	C	501	HEM	CMA-C3A-C4A	-2.99	123.86	128.46
4	D	503	OUM	C07-C08-C21	2.98	126.52	121.36
4	A	503	OUM	C27-C25-C26	-2.96	115.11	120.38
3	B	502	H4B	C2-N3-C4	2.95	120.62	115.93
3	D	502	H4B	C2-N3-C4	2.95	120.61	115.93
4	A	503	OUM	C03-C04-C05	2.90	120.64	117.78
3	A	502	H4B	C2-N3-C4	2.87	120.50	115.93
2	B	501	HEM	C4C-CHD-C1D	2.83	126.30	122.56
3	A	502	H4B	C2-N1-C8A	2.82	120.86	114.54
5	C	504	BTB	C8-C7-N	2.80	122.50	111.59
3	C	502	H4B	C2-N3-C4	2.79	120.36	115.93
4	B	503	OUM	C03-C04-C05	2.79	120.53	117.78
2	B	501	HEM	CMC-C2C-C3C	2.77	129.86	124.68
2	C	501	HEM	CAD-CBD-CGD	-2.76	107.67	113.60
3	C	502	H4B	C2-N1-C8A	2.75	120.70	114.54
4	B	503	OUM	C27-C25-C24	2.75	125.49	120.12
2	B	501	HEM	C4B-CHC-C1C	2.75	126.18	122.56
4	C	503	OUM	C05-C10-N01	-2.70	119.95	122.81
3	D	502	H4B	C2-N1-C8A	2.67	120.53	114.54
2	D	501	HEM	C1B-NB-C4B	2.66	107.82	105.07
2	D	501	HEM	CHC-C4B-C3B	2.61	128.56	124.57
5	D	505	BTB	O3-C3-C2	-2.59	104.34	111.44
4	C	503	OUM	C04-C05-C10	2.58	119.41	118.01
2	A	501	HEM	CHA-C4D-ND	2.56	127.54	124.38
2	C	501	HEM	C3B-C2B-C1B	2.53	108.36	106.49
4	D	503	OUM	O29-C24-C23	-2.53	118.49	123.97
3	B	502	H4B	C4-C4A-N5	2.51	121.23	119.12
5	C	505	BTB	O1-C1-C2	-2.49	104.61	111.44
4	A	503	OUM	C25-C27-N28	-2.48	102.89	115.58
4	D	503	OUM	C30-O29-C24	2.47	122.62	117.76
2	B	501	HEM	C4D-ND-C1D	2.45	107.60	105.07
4	C	503	OUM	C30-O29-C24	2.42	122.53	117.76
4	C	503	OUM	C03-C04-C05	2.40	120.14	117.78
3	A	502	H4B	C4-C4A-N5	2.38	121.12	119.12
2	C	501	HEM	C3D-C4D-ND	-2.37	107.53	110.17
3	D	502	H4B	C4-C4A-N5	2.37	121.11	119.12

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	503	OUM	C26-C25-C24	2.35	120.73	118.26
4	B	503	OUM	O29-C30-C31	-2.35	102.11	109.16
2	A	501	HEM	C3B-C2B-C1B	2.34	108.22	106.49
4	D	503	OUM	C33-C34-C37	-2.33	116.10	119.99
2	B	501	HEM	CBD-CAD-C3D	-2.32	106.17	112.63
5	B	506	BTB	C8-C7-N	2.30	120.58	111.59
4	B	503	OUM	O29-C24-C23	-2.22	119.17	123.97
4	B	503	OUM	C33-C34-C37	2.21	123.67	119.99
5	D	505	BTB	O4-C4-C2	-2.20	105.41	111.44
4	A	503	OUM	N02-C02-N01	2.20	120.08	118.26
4	D	503	OUM	C03-C04-C05	2.19	119.94	117.78
4	B	503	OUM	C30-C31-C36	-2.17	115.56	120.66
4	B	503	OUM	C09-C08-C21	-2.17	116.09	121.05
2	D	501	HEM	C4B-CHC-C1C	2.16	125.40	122.56
2	D	501	HEM	C3B-C2B-C1B	2.15	108.08	106.49
5	D	505	BTB	O1-C1-C2	-2.13	105.61	111.44
4	B	503	OUM	C30-O29-C24	2.12	121.93	117.76
5	C	504	BTB	O3-C3-C2	2.11	117.23	111.44
2	B	501	HEM	CHC-C4B-C3B	2.11	127.80	124.57
2	C	501	HEM	C2B-C1B-NB	-2.11	107.34	109.84
5	A	504	BTB	C8-C7-N	2.11	119.82	111.59
2	B	501	HEM	C3D-C4D-ND	-2.10	107.82	110.17
2	A	501	HEM	CMA-C3A-C2A	2.06	128.83	124.94
4	A	503	OUM	C27-C25-C24	2.06	124.14	120.12
2	D	501	HEM	O1A-CGA-CBA	-2.06	116.47	123.08
2	D	501	HEM	CHB-C1B-NB	2.05	126.92	124.38
4	B	503	OUM	C25-C27-N28	-2.05	105.09	115.58
3	B	502	H4B	N2-C2-N1	2.03	120.42	117.25
4	C	503	OUM	C08-C09-C10	-2.03	119.66	121.44
4	A	503	OUM	O29-C30-C31	-2.01	103.13	109.16

There are no chirality outliers.

All (109) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	HEM	C2A-CAA-CBA-CGA
2	C	501	HEM	C2D-C3D-CAD-CBD
2	C	501	HEM	C4D-C3D-CAD-CBD
4	B	503	OUM	C24-C25-C27-N28
5	A	504	BTB	O1-C1-C2-C4
5	A	504	BTB	C1-C2-N-C5
5	A	504	BTB	C1-C2-N-C7

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Mol	Chain	Res	Type	Atoms
5	A	504	BTB	C3-C2-N-C7
5	A	504	BTB	C4-C2-N-C7
5	A	504	BTB	C6-C5-N-C7
5	A	504	BTB	C8-C7-N-C2
5	A	505	BTB	C1-C2-C3-O3
5	A	505	BTB	C4-C2-C3-O3
5	A	505	BTB	N-C2-C3-O3
5	B	504	BTB	C3-C2-C4-O4
5	B	505	BTB	C1-C2-C3-O3
5	B	505	BTB	C4-C2-C3-O3
5	B	505	BTB	N-C2-C3-O3
5	B	506	BTB	O1-C1-C2-C3
5	B	506	BTB	O1-C1-C2-C4
5	B	506	BTB	O1-C1-C2-N
5	B	506	BTB	C8-C7-N-C2
5	B	506	BTB	N-C5-C6-O6
5	C	504	BTB	O1-C1-C2-C3
5	C	504	BTB	O1-C1-C2-C4
5	C	504	BTB	O1-C1-C2-N
5	C	504	BTB	C6-C5-N-C7
5	C	504	BTB	C8-C7-N-C2
5	C	505	BTB	C1-C2-C3-O3
5	C	505	BTB	C4-C2-C3-O3
5	C	505	BTB	N-C2-C3-O3
5	C	505	BTB	C8-C7-N-C5
5	C	506	BTB	C1-C2-C3-O3
5	C	506	BTB	C4-C2-C3-O3
5	C	506	BTB	N-C2-C3-O3
5	D	505	BTB	C1-C2-N-C5
5	D	505	BTB	C1-C2-N-C7
5	D	505	BTB	C3-C2-N-C5
5	D	505	BTB	C3-C2-N-C7
5	D	505	BTB	C4-C2-N-C5
5	D	505	BTB	C4-C2-N-C7
5	D	505	BTB	C8-C7-N-C5
5	D	506	BTB	O1-C1-C2-C3
5	D	506	BTB	C1-C2-C3-O3
5	D	506	BTB	C4-C2-C3-O3
5	D	506	BTB	N-C2-C3-O3
5	D	506	BTB	C1-C2-N-C5
5	D	506	BTB	C1-C2-N-C7
5	D	506	BTB	C3-C2-N-C5

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Mol	Chain	Res	Type	Atoms
5	D	506	BTB	C3-C2-N-C7
5	D	506	BTB	C4-C2-N-C5
5	D	506	BTB	C4-C2-N-C7
7	A	507	GOL	O1-C1-C2-O2
7	A	507	GOL	O1-C1-C2-C3
7	C	508	GOL	O1-C1-C2-C3
5	C	504	BTB	N-C5-C6-O6
4	C	503	OUM	C24-C25-C27-N28
5	A	504	BTB	N-C7-C8-O8
5	D	504	BTB	N-C5-C6-O6
5	D	505	BTB	N-C7-C8-O8
5	A	505	BTB	N-C5-C6-O6
4	C	503	OUM	C25-C24-O29-C30
5	D	506	BTB	N-C7-C8-O8
4	C	503	OUM	C31-C30-O29-C24
7	A	507	GOL	C1-C2-C3-O3
5	D	505	BTB	N-C5-C6-O6
7	A	507	GOL	O2-C2-C3-O3
7	C	508	GOL	O1-C1-C2-O2
5	D	506	BTB	N-C5-C6-O6
4	A	503	OUM	C24-C25-C27-N28
4	D	503	OUM	C24-C25-C27-N28
5	A	504	BTB	N-C5-C6-O6
5	B	505	BTB	N-C7-C8-O8
4	C	503	OUM	C23-C24-O29-C30
5	D	505	BTB	O1-C1-C2-C3
2	A	501	HEM	C1A-C2A-CAA-CBA
5	A	504	BTB	N-C2-C3-O3
5	A	504	BTB	C3-C2-N-C5
5	A	504	BTB	C4-C2-N-C5
5	B	506	BTB	N-C2-C3-O3
5	B	506	BTB	C1-C2-N-C7
5	C	505	BTB	O1-C1-C2-N
5	D	505	BTB	O1-C1-C2-N
5	D	505	BTB	N-C2-C3-O3
5	D	506	BTB	O1-C1-C2-N
5	C	504	BTB	N-C7-C8-O8
3	D	502	H4B	C7-C6-C9-C10
3	D	502	H4B	C7-C6-C9-O9
2	C	501	HEM	CAD-CBD-CGD-O1D
5	B	505	BTB	N-C5-C6-O6
2	B	501	HEM	CAA-CBA-CGA-O1A

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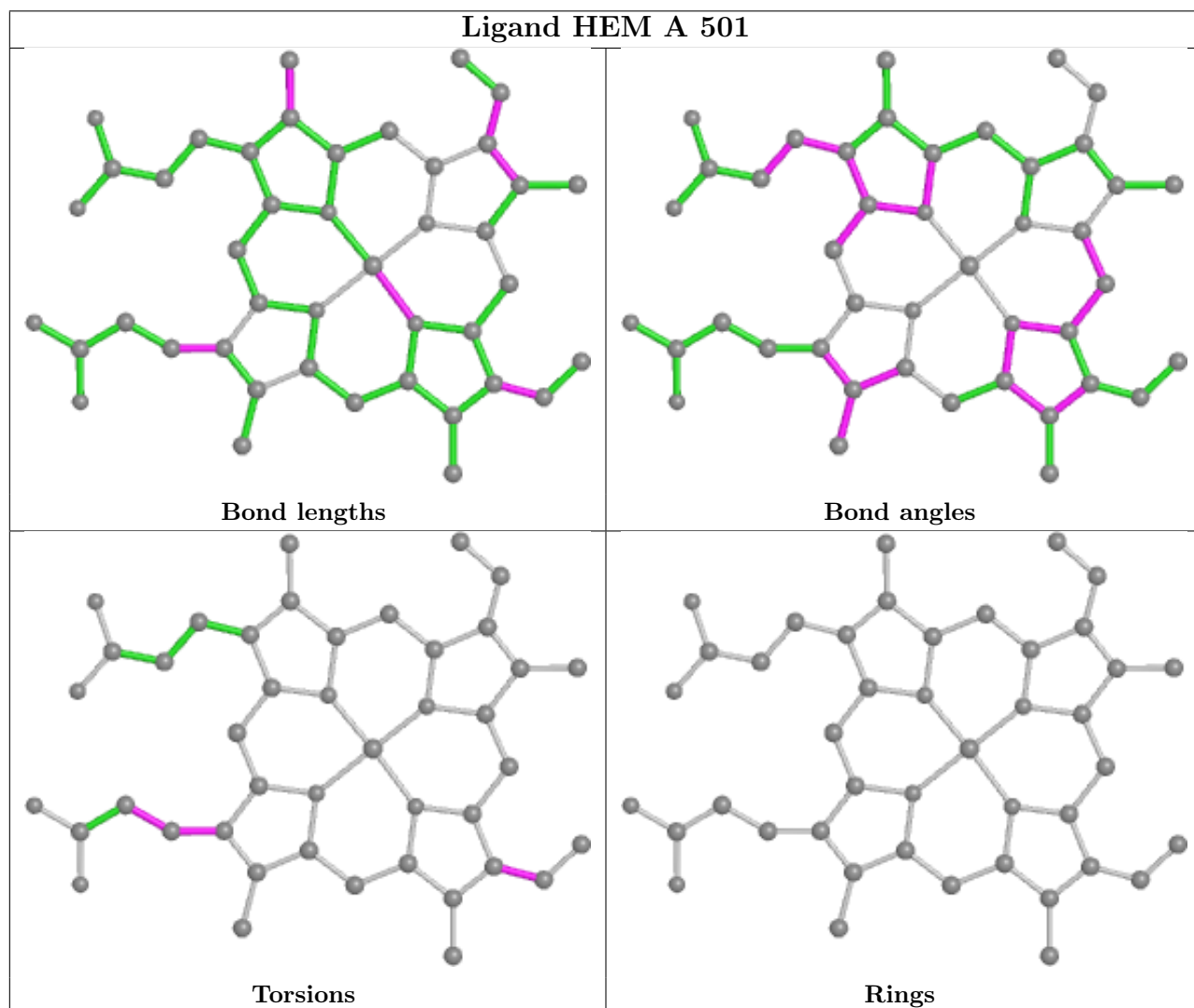
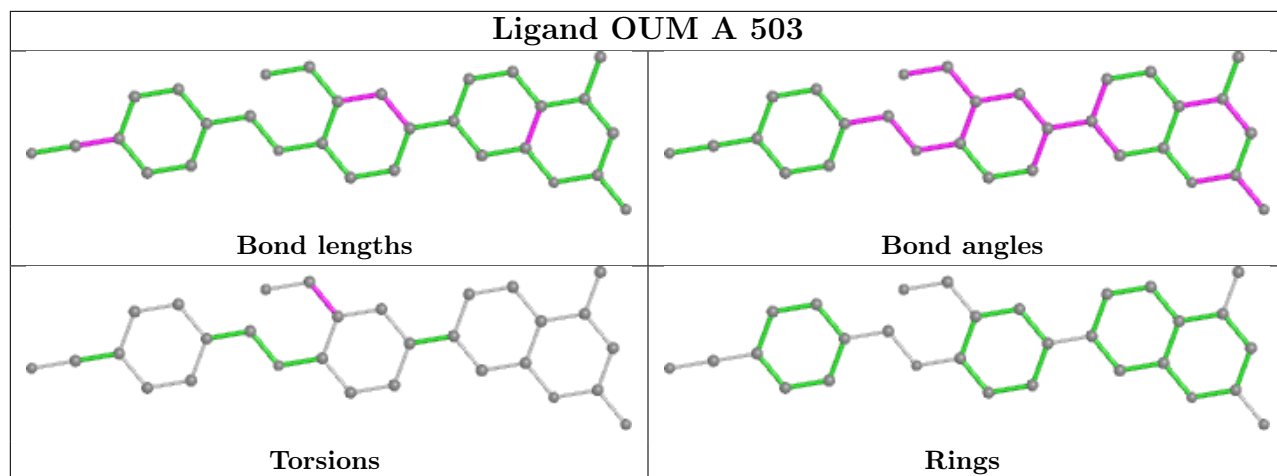
Mol	Chain	Res	Type	Atoms
2	D	501	HEM	CAA-CBA-CGA-O2A
2	D	501	HEM	CAA-CBA-CGA-O1A
2	B	501	HEM	CAA-CBA-CGA-O2A
2	C	501	HEM	CAD-CBD-CGD-O2D
4	B	503	OUM	C35-C34-C37-N38
4	C	503	OUM	C35-C34-C37-N38
2	A	501	HEM	C4B-C3B-CAB-CBB
2	C	501	HEM	C2A-CAA-CBA-CGA
3	D	502	H4B	N5-C6-C9-O9
4	D	503	OUM	C35-C34-C37-N38
5	A	504	BTB	O1-C1-C2-C3
5	A	504	BTB	C1-C2-C3-O3
5	B	504	BTB	C1-C2-C4-O4
5	B	506	BTB	C1-C2-C3-O3
5	B	506	BTB	C4-C2-C3-O3
5	D	505	BTB	C4-C2-C3-O3
5	D	506	BTB	O1-C1-C2-C4
2	D	501	HEM	C3D-CAD-CBD-CGD

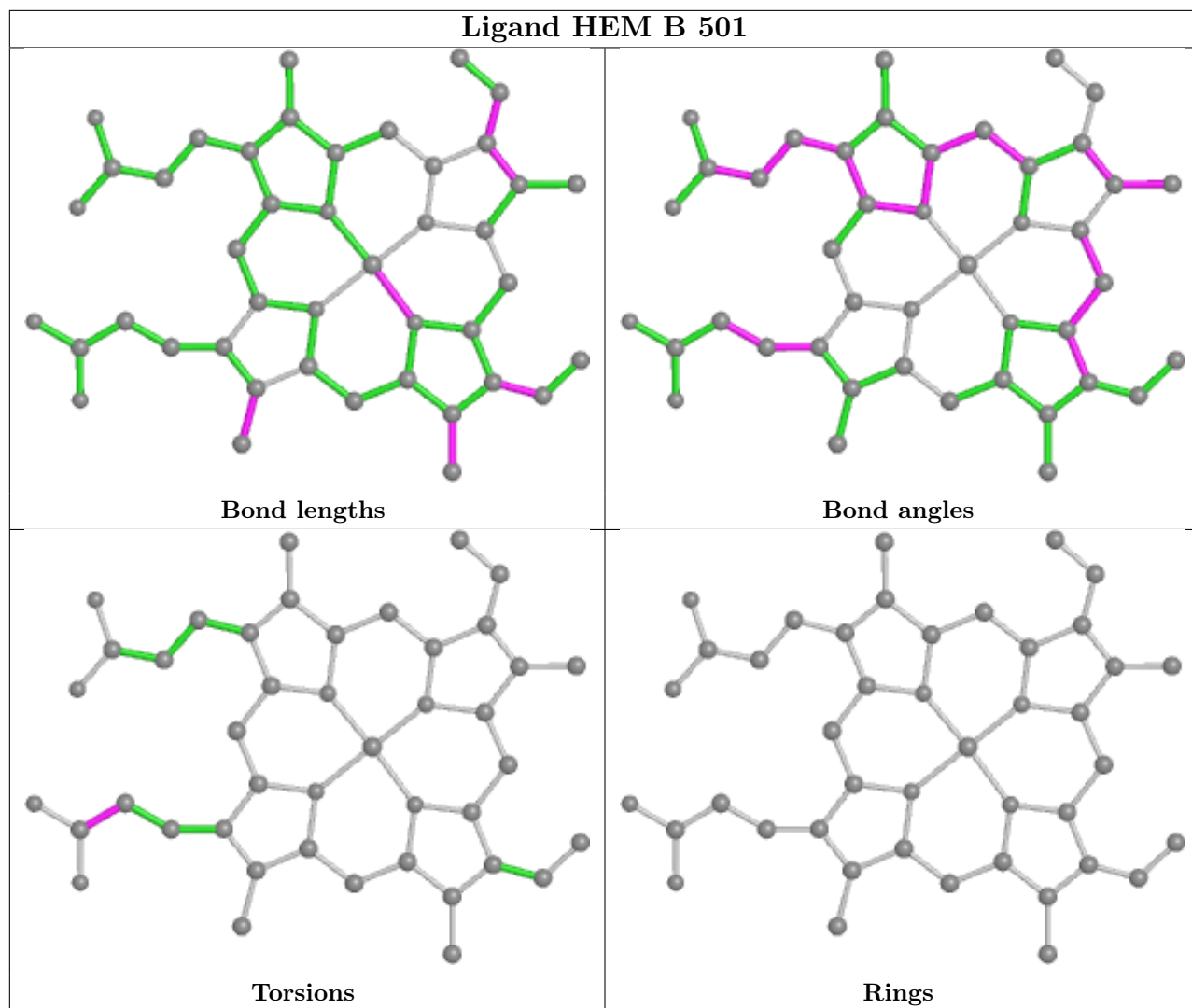
There are no ring outliers.

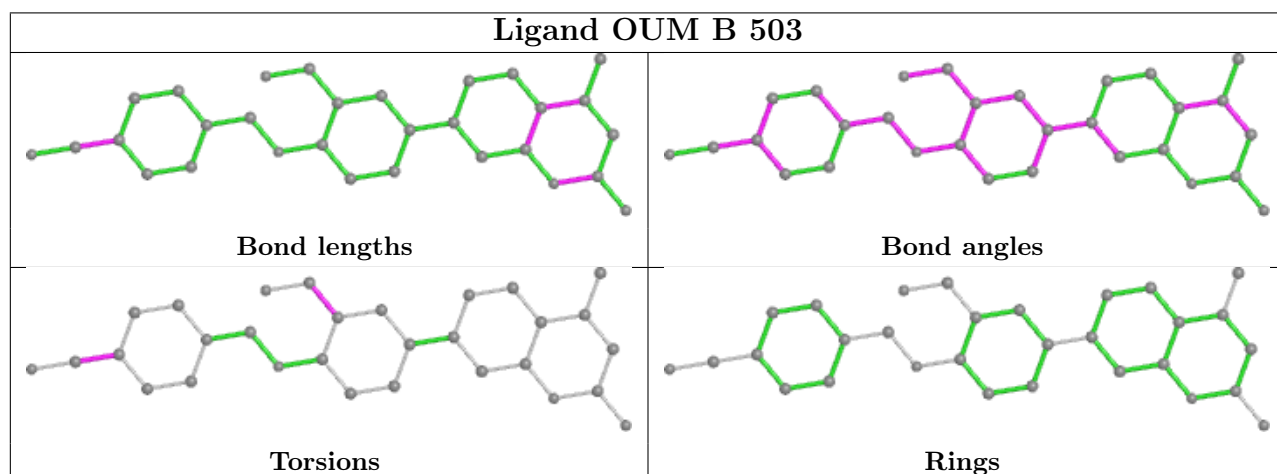
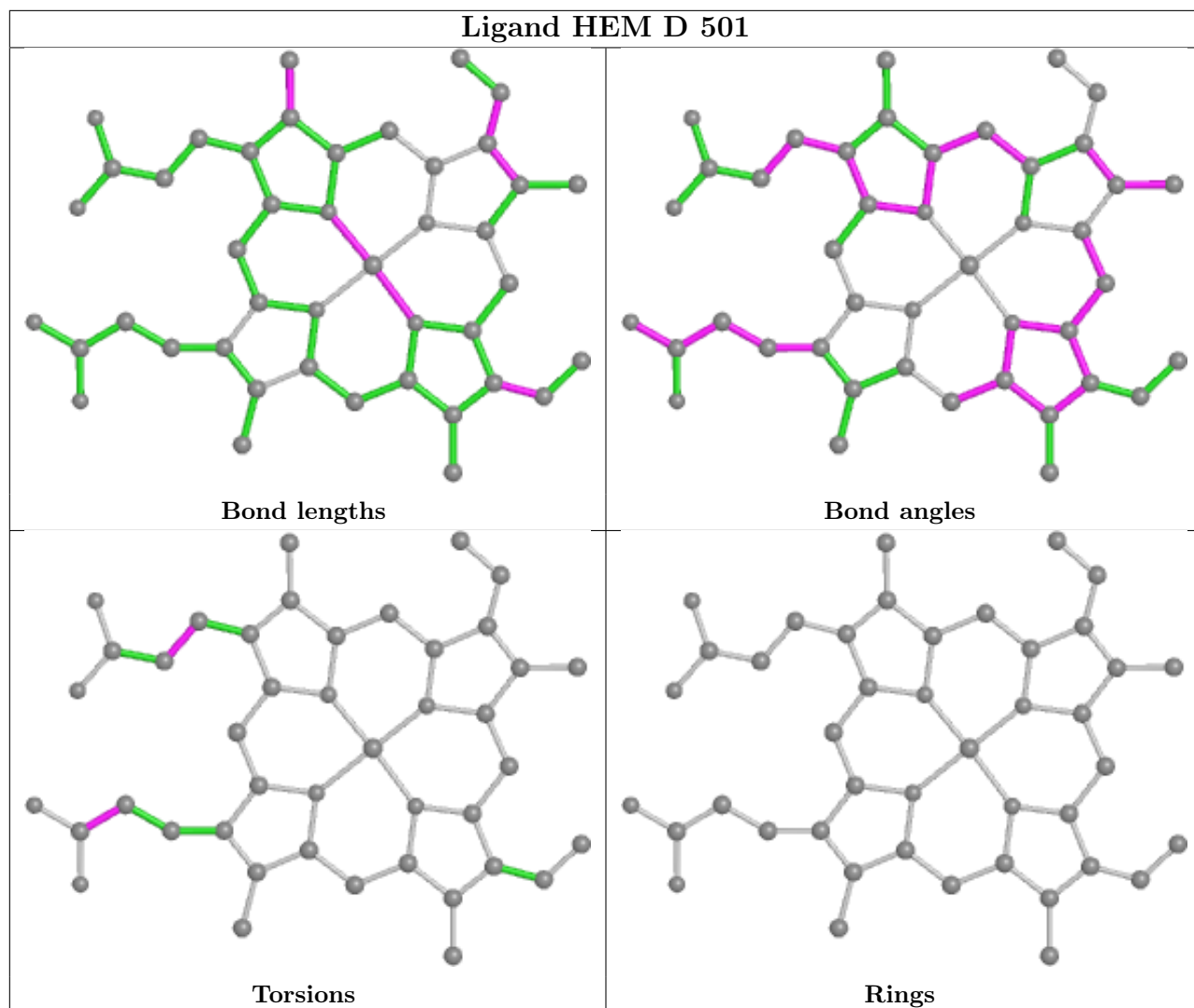
1 monomer is involved in 1 short contact:

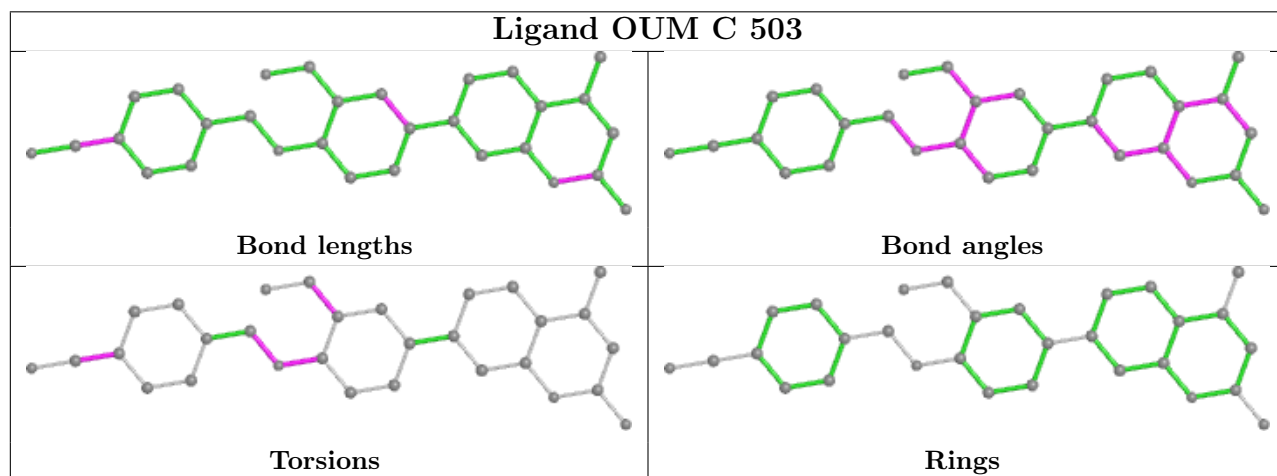
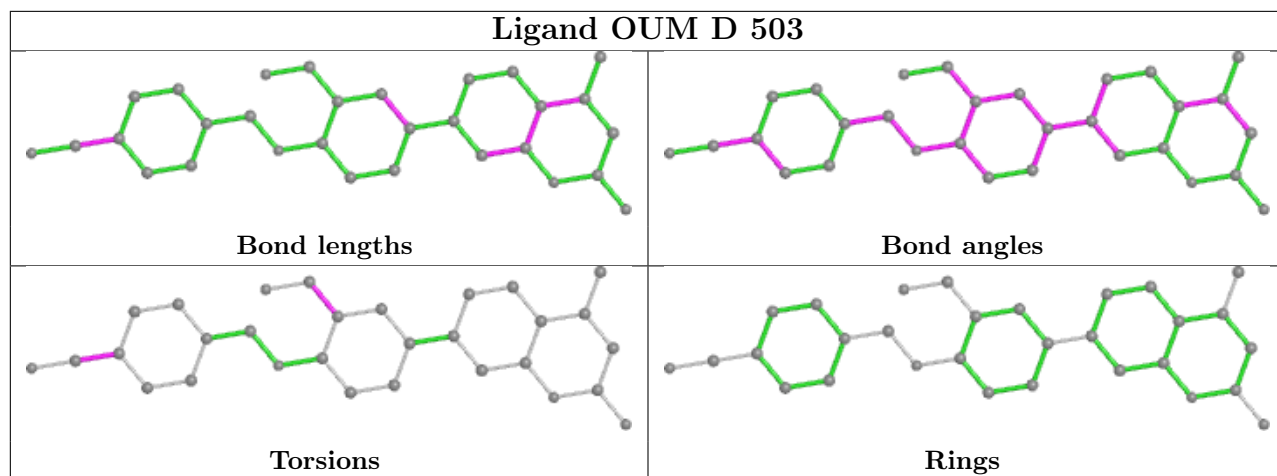
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	D	505	BTB	0	1

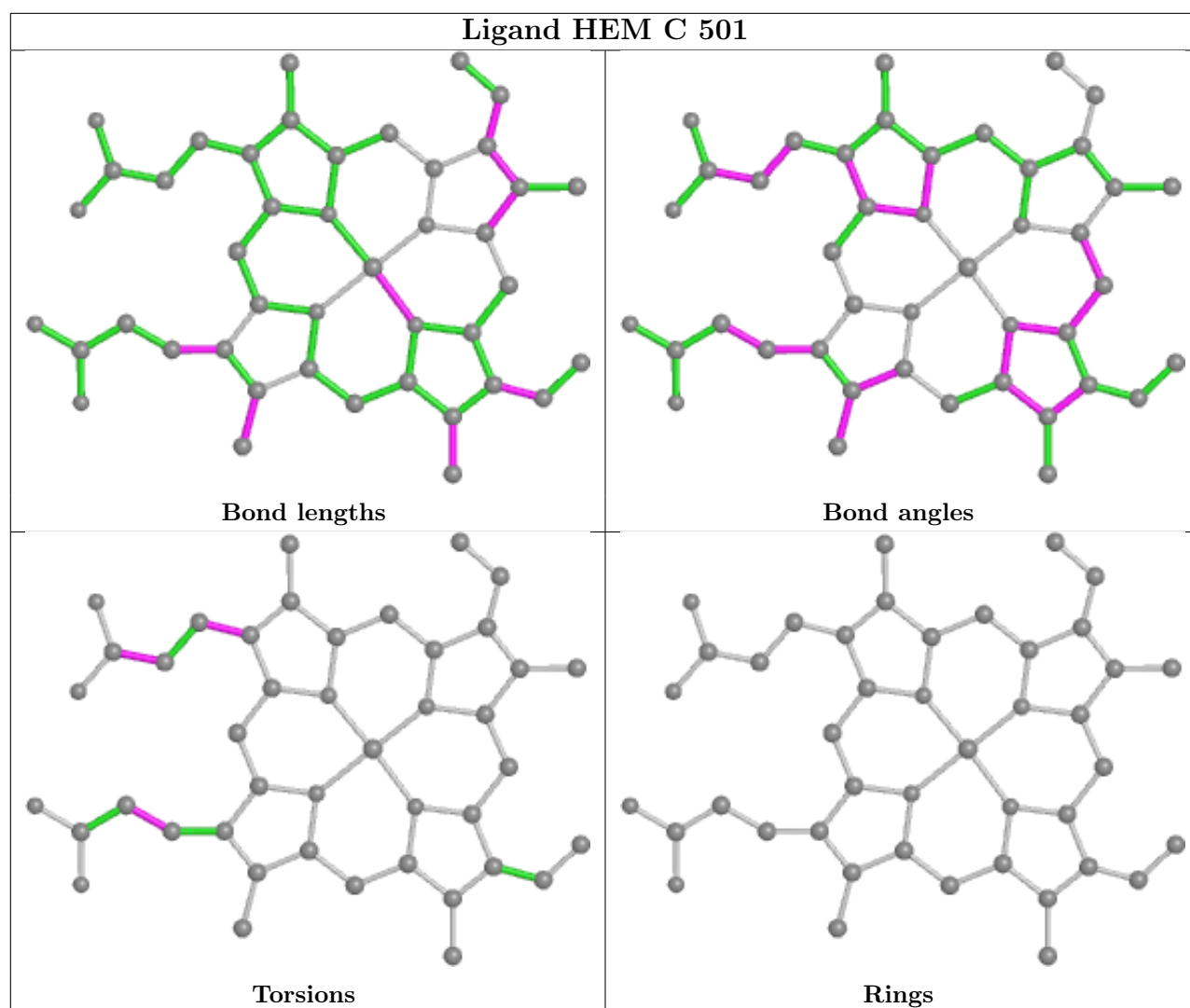
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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











4.7 Other polymers [i](#)

There are no such residues in this entry.

4.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

5 Fit of model and data

5.1 Protein, DNA and RNA chains

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

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

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

5.3 Carbohydrates

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

5.4 Ligands

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

5.5 Other polymers

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