



# wwPDB X-ray Structure Validation Summary Report ⓘ

May 16, 2020 – 11:57 am BST

PDB ID : 4L38  
Title : Nitrite complex of TvNiR, low dose data set  
Authors : Trofimov, A.A.; Polyakov, K.M.; Lazarenko, V.A.; Popov, A.N.; Tikhonova, T.V.; Tikhonov, A.V.; Popov, V.O.  
Deposited on : 2013-06-05  
Resolution : 1.80 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

---

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.11  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.11

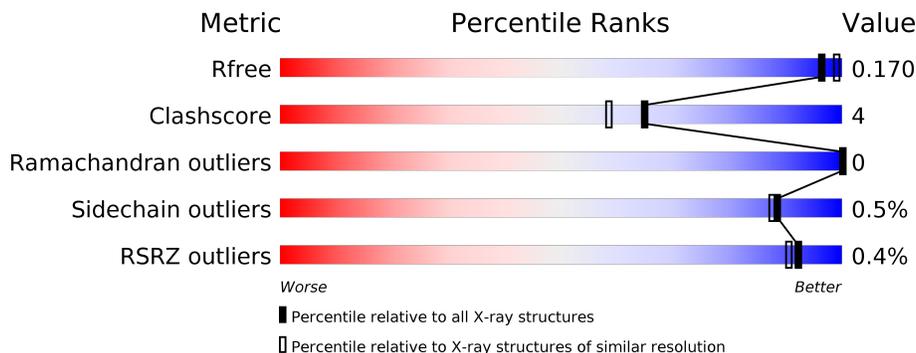
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.80 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)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	5950 (1.80-1.80)
Clashscore	141614	6793 (1.80-1.80)
Ramachandran outliers	138981	6697 (1.80-1.80)
Sidechain outliers	138945	6696 (1.80-1.80)
RSRZ outliers	127900	5850 (1.80-1.80)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	520	
1	B	520	

## 2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 10419 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.

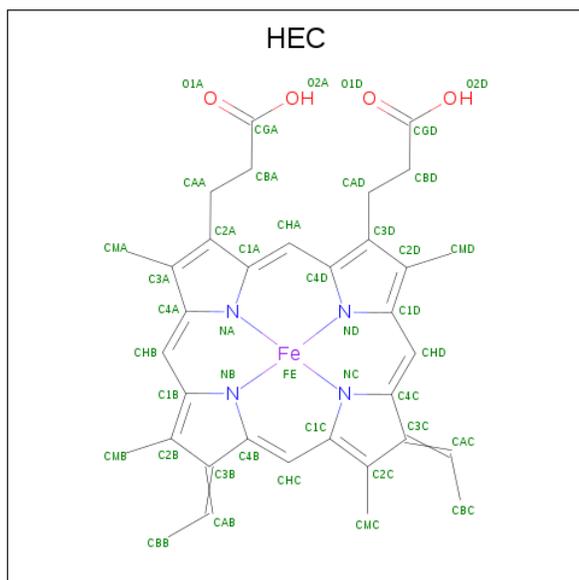
- Molecule 1 is a protein called Eight-heme nitrite reductase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	520	Total 4178	C 2588	N 758	O 798	S 34	0	18	0
1	B	520	Total 4181	C 2591	N 759	O 797	S 34	0	16	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	524	VAL	-	EXPRESSION TAG	UNP L0DSL2
B	524	VAL	-	EXPRESSION TAG	UNP L0DSL2

- Molecule 2 is HEME C (three-letter code: HEC) (formula:  $C_{34}H_{34}FeN_4O_4$ ).



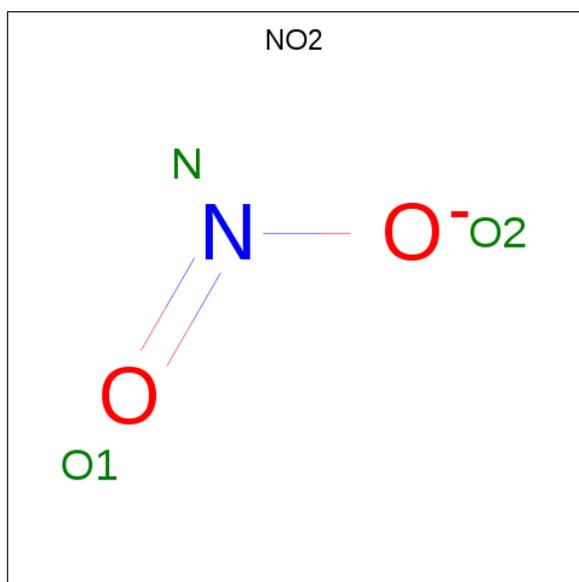
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	Fe	N	O		
2	A	1	Total 43	C 34	Fe 1	N 4	O 4	0	0

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
2	A	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	A	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	A	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	A	1	Total 38	C 31	Fe 1	N 4	O 2	0	0
2	A	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	A	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	A	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	B	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	B	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	B	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	B	1	Total 47	C 36	Fe 1	N 4	O 6	0	1
2	B	1	Total 39	C 32	Fe 1	N 4	O 2	0	0
2	B	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	B	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	B	1	Total 43	C 34	Fe 1	N 4	O 4	0	0

- Molecule 3 is NITRITE ION (three-letter code: NO2) (formula: NO<sub>2</sub>).

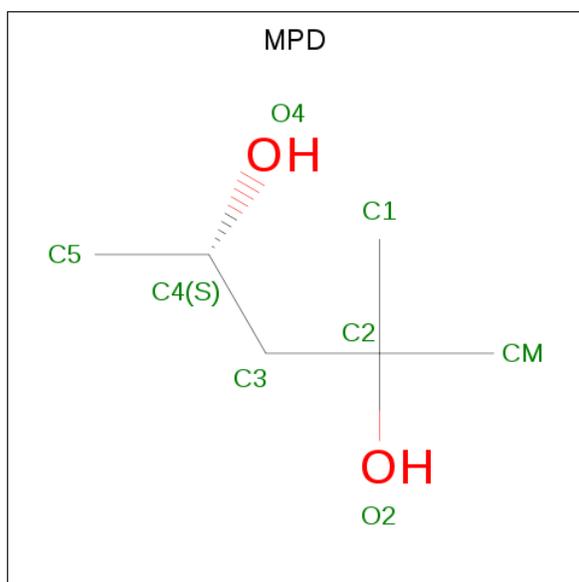


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total N O 3 1 2	0	0
3	A	1	Total N O 3 1 2	0	0
3	A	1	Total N O 3 1 2	0	0
3	B	1	Total N O 3 1 2	0	0
3	B	1	Total N O 3 1 2	0	0
3	B	1	Total N O 3 1 2	0	0

- Molecule 4 is CALCIUM ION (three-letter code: CA) (formula: Ca).

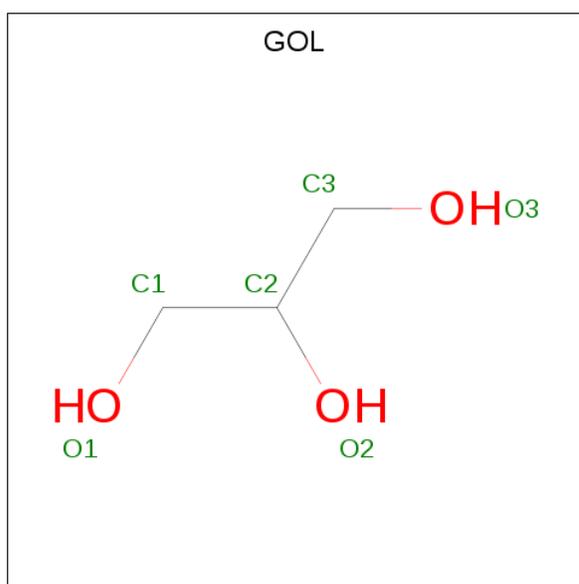
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	2	Total Ca 2 2	0	0
4	A	2	Total Ca 2 2	0	0

- Molecule 5 is (4S)-2-METHYL-2,4-PENTANEDIOL (three-letter code: MPD) (formula: C<sub>6</sub>H<sub>14</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			8	6	2		
5	B	1	Total	C	O	0	0
			8	6	2		

- Molecule 6 is GLYCEROL (three-letter code: GOL) (formula:  $C_3H_8O_3$ ).



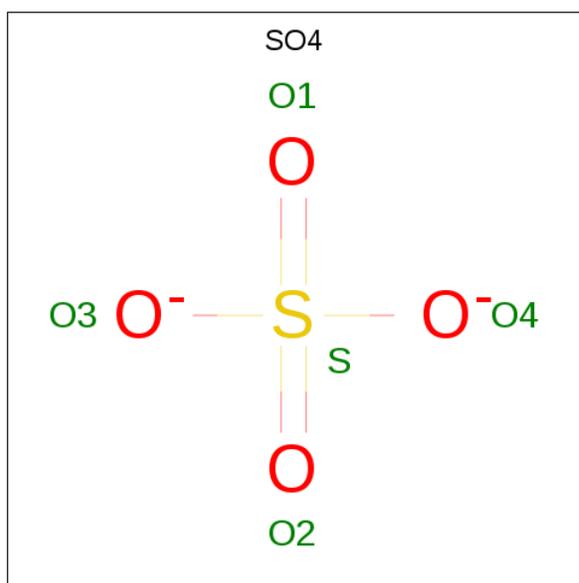
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	1
			7	3	4		
6	A	1	Total	C	O	0	0
			6	3	3		

*Continued on next page...*

Continued from previous page...

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	1
			8	3	5		
6	B	1	Total	C	O	0	1
			7	3	4		
6	B	1	Total	C	O	0	0
			6	3	3		

- Molecule 7 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total	O	S	0	0
			5	4	1		
7	B	1	Total	O	S	0	0
			5	4	1		

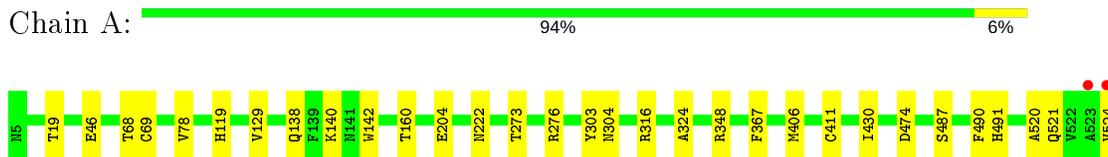
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	636	Total	O	0	0
			636	636		
8	B	659	Total	O	0	0
			659	659		

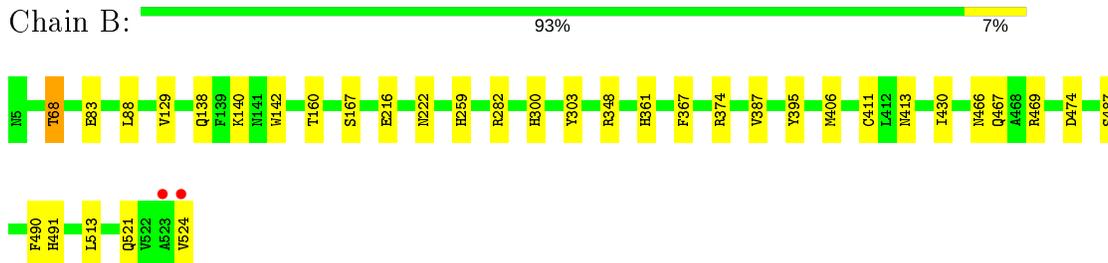
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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 electron 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 dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). 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: Eight-heme nitrite reductase



- Molecule 1: Eight-heme nitrite reductase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 3	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	193.97Å 193.97Å 193.97Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.95 – 1.80 29.93 – 1.80	Depositor EDS
% Data completeness (in resolution range)	99.4 (29.95-1.80) 99.4 (29.93-1.80)	Depositor EDS
$R_{merge}$	0.13	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.93 (at 1.80Å)	Xtrriage
Refinement program	REFMAC 5.7.0029	Depositor
R, $R_{free}$	0.153 , 0.170 0.153 , 0.170	Depositor DCC
$R_{free}$ test set	11117 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	13.0	Xtrriage
Anisotropy	0.000	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.38 , 51.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.054 for l,-k,h	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	10419	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	14.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.77% 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.

## 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: GOL, MPD, CA, SO4, HEC, NO2

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	0.72	0/4381	0.79	4/5944 (0.1%)
1	B	0.72	2/4369 (0.0%)	0.79	1/5928 (0.0%)
All	All	0.72	2/8750 (0.0%)	0.79	5/11872 (0.0%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	83	GLU	CD-OE1	5.59	1.31	1.25
1	B	411	CYS	CB-SG	-5.12	1.73	1.81

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	282	ARG	NE-CZ-NH2	-5.39	117.60	120.30
1	A	276	ARG	NE-CZ-NH2	-5.16	117.72	120.30
1	A	348[A]	ARG	NE-CZ-NH1	5.13	122.87	120.30
1	A	348[B]	ARG	NE-CZ-NH1	5.13	122.87	120.30
1	A	411	CYS	CB-CA-C	-5.07	100.27	110.40

There are no chirality outliers.

There are no planarity outliers.

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

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4178	0	3879	25	0
1	B	4181	0	3892	35	0
2	A	339	0	236	11	0
2	B	344	0	214	7	0
3	A	9	0	0	0	0
3	B	9	0	0	1	0
4	A	2	0	0	0	0
4	B	2	0	0	0	0
5	A	8	0	14	1	0
5	B	8	0	14	5	0
6	A	21	0	24	0	0
6	B	13	0	12	0	0
7	A	5	0	0	1	0
7	B	5	0	0	1	0
8	A	636	0	0	11	0
8	B	659	0	0	15	0
All	All	10419	0	8285	72	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 4.

The worst 5 of 72 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:138[B]:GLN:NE2	8:B:1150:HOH:O	1.66	1.24
1:B:138[B]:GLN:CD	8:B:1150:HOH:O	1.79	1.16
1:B:222[B]:ASN:ND2	8:B:1151:HOH:O	1.83	1.08
7:B:615:SO4:O1	8:B:1250:HOH:O	1.72	1.07
1:A:222[A]:ASN:ND2	8:A:1120:HOH:O	1.88	1.06

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

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

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

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	536/520 (103%)	508 (95%)	28 (5%)	0	100	100
1	B	534/520 (103%)	511 (96%)	23 (4%)	0	100	100
All	All	1070/1040 (103%)	1019 (95%)	51 (5%)	0	100	100

There are no Ramachandran outliers to report.

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

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

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	456/439 (104%)	454 (100%)	2 (0%)	91	89
1	B	454/439 (103%)	451 (99%)	3 (1%)	84	81
All	All	910/878 (104%)	905 (100%)	5 (0%)	88	87

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	316	ARG
1	A	406	MET
1	B	68[A]	THR
1	B	68[B]	THR
1	B	406	MET

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	138	GLN
1	B	388	GLN
1	B	413	ASN
1	B	466	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

### 5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

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

Of 39 ligands modelled in this entry, 4 are monoatomic - leaving 35 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	NO2	A	609	2	1,2,2	0.41	0	0,1,1	0.00	-
3	NO2	A	618	-	1,2,2	0.23	0	0,1,1	0.00	-
5	MPD	B	612	-	7,7,7	0.63	0	9,10,10	1.04	1 (11%)
6	GOL	A	613[B]	-	5,5,5	0.64	0	5,5,5	0.78	0
6	GOL	A	613[A]	-	5,5,5	0.56	0	5,5,5	0.41	0
6	GOL	B	614	-	5,5,5	0.46	0	5,5,5	0.53	0
2	HEC	B	606	1	26,50,50	2.18	9 (34%)	18,82,82	2.74	7 (38%)
2	HEC	A	603	1,4	26,50,50	1.87	7 (26%)	18,82,82	3.37	12 (66%)
3	NO2	B	616	-	1,2,2	0.16	0	0,1,1	0.00	-
2	HEC	B	604[B]	4	26,50,50	1.88	8 (30%)	18,82,82	2.80	8 (44%)
6	GOL	A	614	-	5,5,5	0.51	0	5,5,5	0.29	0
2	HEC	B	608	1	26,50,50	2.24	7 (26%)	18,82,82	3.13	9 (50%)
3	NO2	B	617	-	1,2,2	0.20	0	0,1,1	0.00	-
2	HEC	A	601	1,8,3	26,50,50	1.78	8 (30%)	18,82,82	2.28	6 (33%)
2	HEC	B	601	1,8,3	26,50,50	1.89	6 (23%)	18,82,82	2.84	7 (38%)
2	HEC	B	603	1,4	26,50,50	1.66	5 (19%)	18,82,82	3.09	11 (61%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	HEC	B	604[A]	-	26,50,50	1.88	8 (30%)	18,82,82	2.90	8 (44%)
2	HEC	A	606	1	26,50,50	2.11	8 (30%)	18,82,82	2.93	6 (33%)
6	GOL	A	615[B]	-	5,5,5	0.52	0	5,5,5	0.34	0
2	HEC	B	605	1	25,46,50	2.36	11 (44%)	18,77,82	3.02	8 (44%)
6	GOL	A	615[A]	-	5,5,5	0.45	0	5,5,5	0.39	0
2	HEC	A	602	1	26,50,50	1.98	7 (26%)	18,82,82	3.38	11 (61%)
2	HEC	B	602	1	26,50,50	1.69	6 (23%)	18,82,82	2.73	8 (44%)
2	HEC	A	604	1	26,50,50	1.86	6 (23%)	18,82,82	3.28	10 (55%)
5	MPD	A	612	-	7,7,7	0.73	0	9,10,10	0.83	0
2	HEC	A	607	1	26,50,50	1.88	7 (26%)	18,82,82	2.69	8 (44%)
2	HEC	B	607	1	26,50,50	1.88	7 (26%)	18,82,82	2.72	9 (50%)
3	NO2	B	609	2	1,2,2	0.18	0	0,1,1	0.00	-
7	SO4	B	615	-	4,4,4	0.65	0	6,6,6	0.36	0
6	GOL	B	613[A]	-	5,5,5	0.70	0	5,5,5	0.34	0
6	GOL	B	613[B]	-	5,5,5	0.79	0	5,5,5	0.84	0
3	NO2	A	617	-	1,2,2	0.02	0	0,1,1	0.00	-
2	HEC	A	608	1	26,50,50	2.06	7 (26%)	18,82,82	2.94	7 (38%)
2	HEC	A	605	1	24,45,50	3.23	12 (50%)	16,75,82	2.84	7 (43%)
7	SO4	A	616	-	4,4,4	0.40	0	6,6,6	0.36	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	MPD	B	612	-	-	0/5/5/5	-
6	GOL	A	613[B]	-	-	0/4/4/4	-
6	GOL	A	613[A]	-	-	0/4/4/4	-
6	GOL	B	614	-	-	0/4/4/4	-
2	HEC	B	606	1	-	0/6/54/54	-
2	HEC	A	603	1,4	-	0/6/54/54	-
2	HEC	B	604[B]	4	-	0/6/54/54	-
6	GOL	A	614	-	-	0/4/4/4	-
2	HEC	B	608	1	-	0/6/54/54	-
2	HEC	B	604[A]	-	-	0/6/54/54	-
2	HEC	A	601	1,8,3	-	0/6/54/54	-
2	HEC	B	601	1,8,3	-	0/6/54/54	-
2	HEC	B	603	1,4	-	0/6/54/54	-
2	HEC	A	606	1	-	0/6/54/54	-

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	GOL	A	615[B]	-	-	2/4/4/4	-
2	HEC	B	605	1	-	0/3/49/54	-
6	GOL	A	615[A]	-	-	2/4/4/4	-
2	HEC	A	602	1	-	0/6/54/54	-
2	HEC	B	602	1	-	0/6/54/54	-
2	HEC	A	604	1	-	0/6/54/54	-
5	MPD	A	612	-	-	0/5/5/5	-
2	HEC	A	607	1	-	0/6/54/54	-
2	HEC	B	607	1	-	0/6/54/54	-
6	GOL	B	613[A]	-	-	0/4/4/4	-
6	GOL	B	613[B]	-	-	0/4/4/4	-
2	HEC	A	608	1	-	0/6/54/54	-
2	HEC	A	605	1	-	0/3/49/54	-

The worst 5 of 129 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	605	HEC	C3D-C4D	9.46	1.50	1.39
2	B	608	HEC	C3C-C2C	6.31	1.47	1.40
2	B	606	HEC	C3B-C2B	5.98	1.47	1.40
2	B	605	HEC	C3C-C2C	5.93	1.46	1.40
2	A	602	HEC	C3C-C2C	5.69	1.46	1.40

The worst 5 of 143 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	604	HEC	CBA-CAA-C2A	-8.60	96.64	112.48
2	B	608	HEC	CMC-C2C-C3C	7.24	134.33	125.82
2	A	602	HEC	C1D-C2D-C3D	-7.21	101.98	107.00
2	B	601	HEC	C1D-C2D-C3D	-6.98	102.14	107.00
2	A	606	HEC	CAA-CBA-CGA	-6.92	101.05	112.67

There are no chirality outliers.

All (4) torsion outliers are listed below:

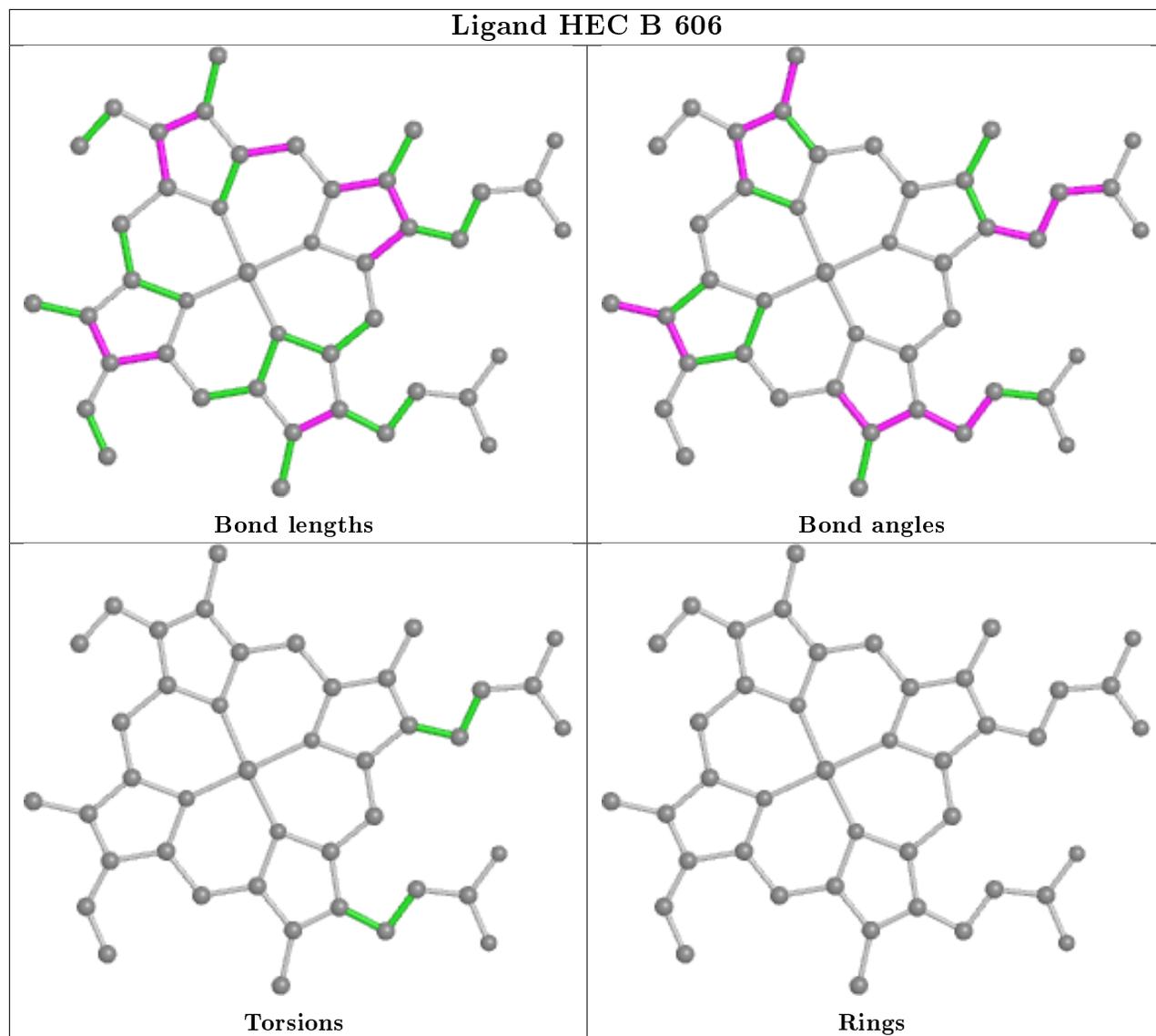
Mol	Chain	Res	Type	Atoms
6	A	615[B]	GOL	C1-C2-C3-O3
6	A	615[B]	GOL	O2-C2-C3-O3
6	A	615[A]	GOL	O2-C2-C3-O3
6	A	615[A]	GOL	C1-C2-C3-O3

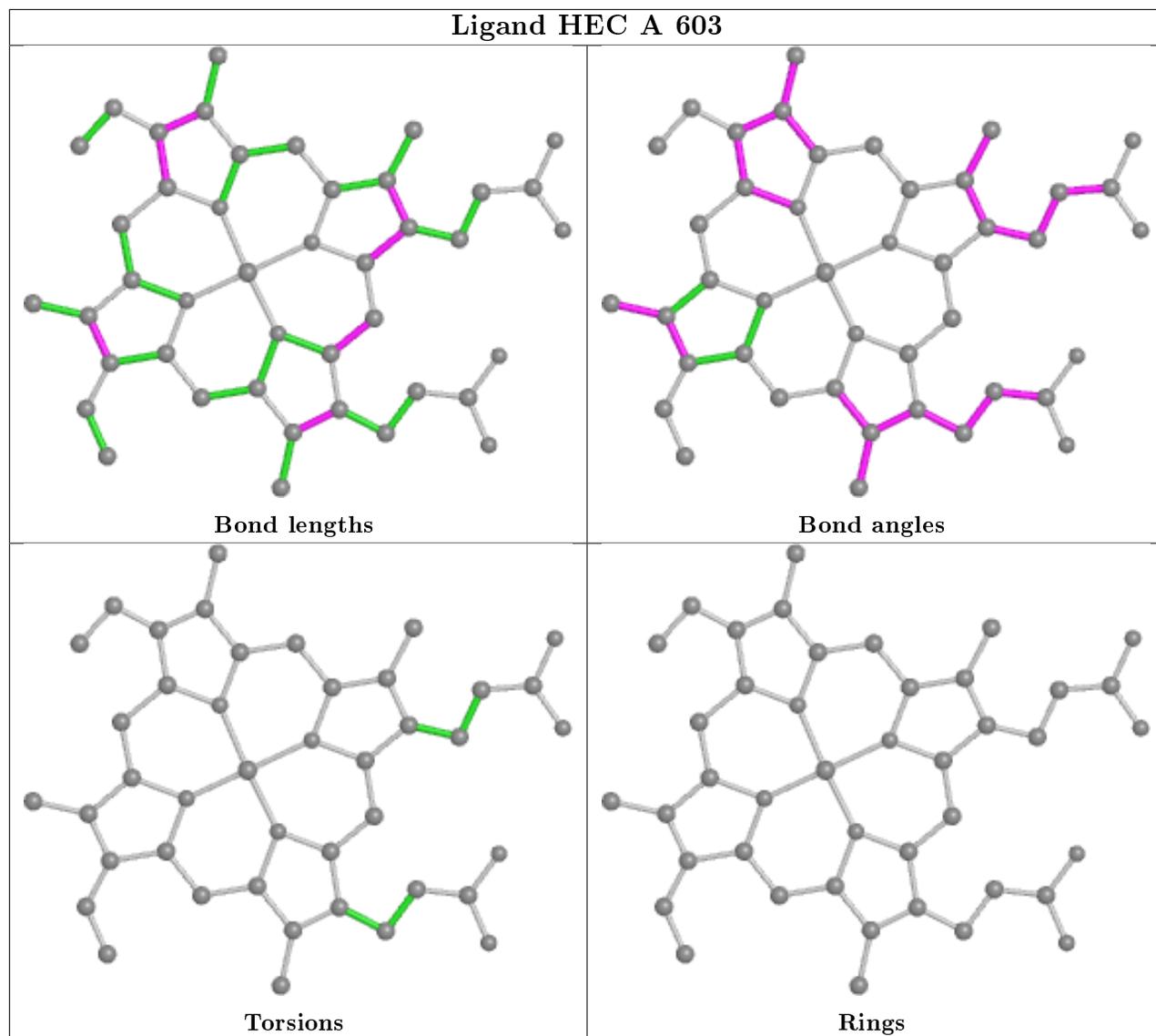
There are no ring outliers.

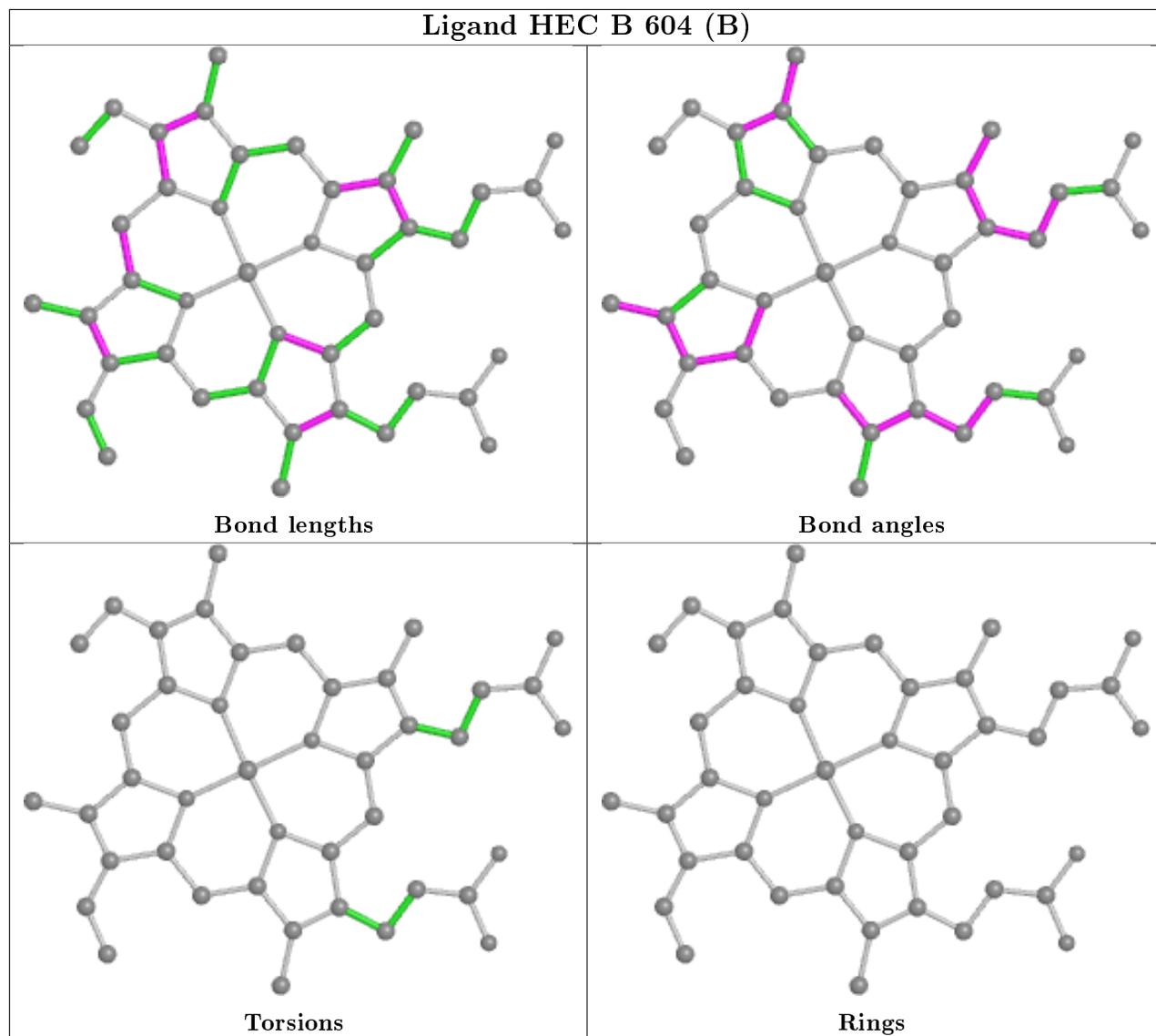
16 monomers are involved in 27 short contacts:

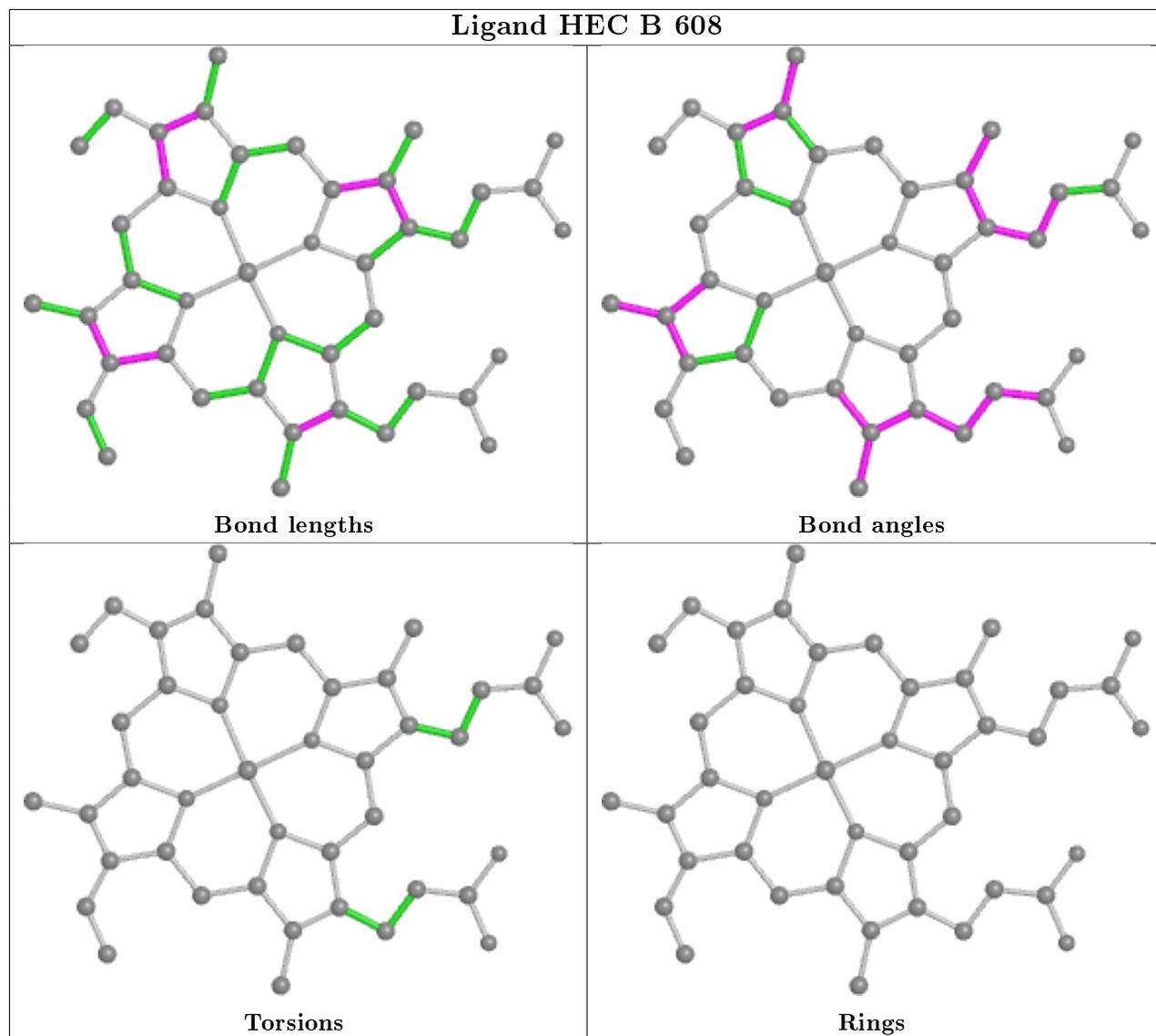
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	612	MPD	5	0
2	B	606	HEC	2	0
2	A	603	HEC	2	0
2	B	604[B]	HEC	1	0
2	A	601	HEC	2	0
2	B	601	HEC	3	0
2	B	603	HEC	1	0
2	A	606	HEC	1	0
2	B	605	HEC	1	0
2	A	604	HEC	4	0
5	A	612	MPD	1	0
3	B	609	NO2	1	0
7	B	615	SO4	1	0
2	A	608	HEC	1	0
2	A	605	HEC	2	0
7	A	616	SO4	1	0

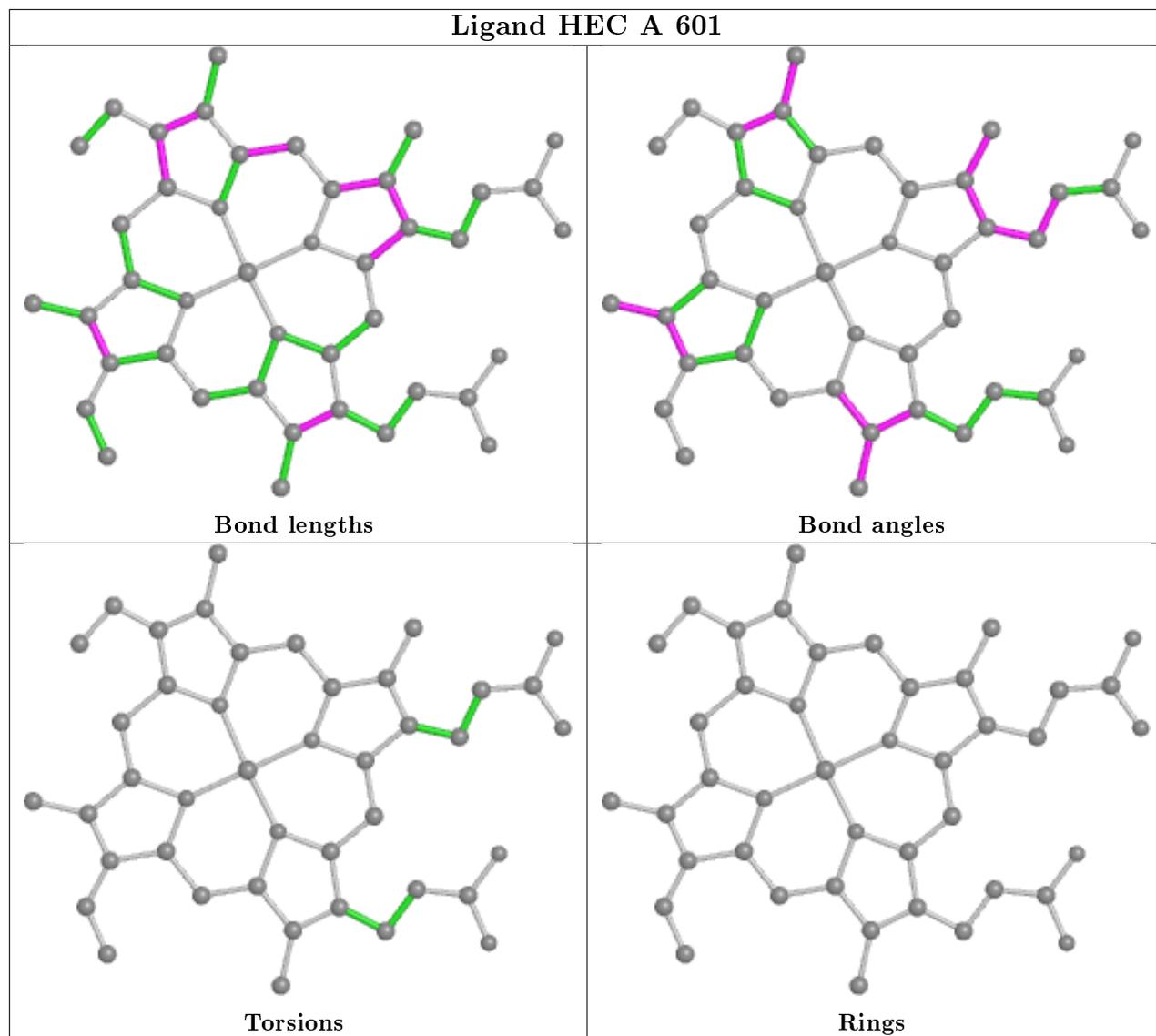
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

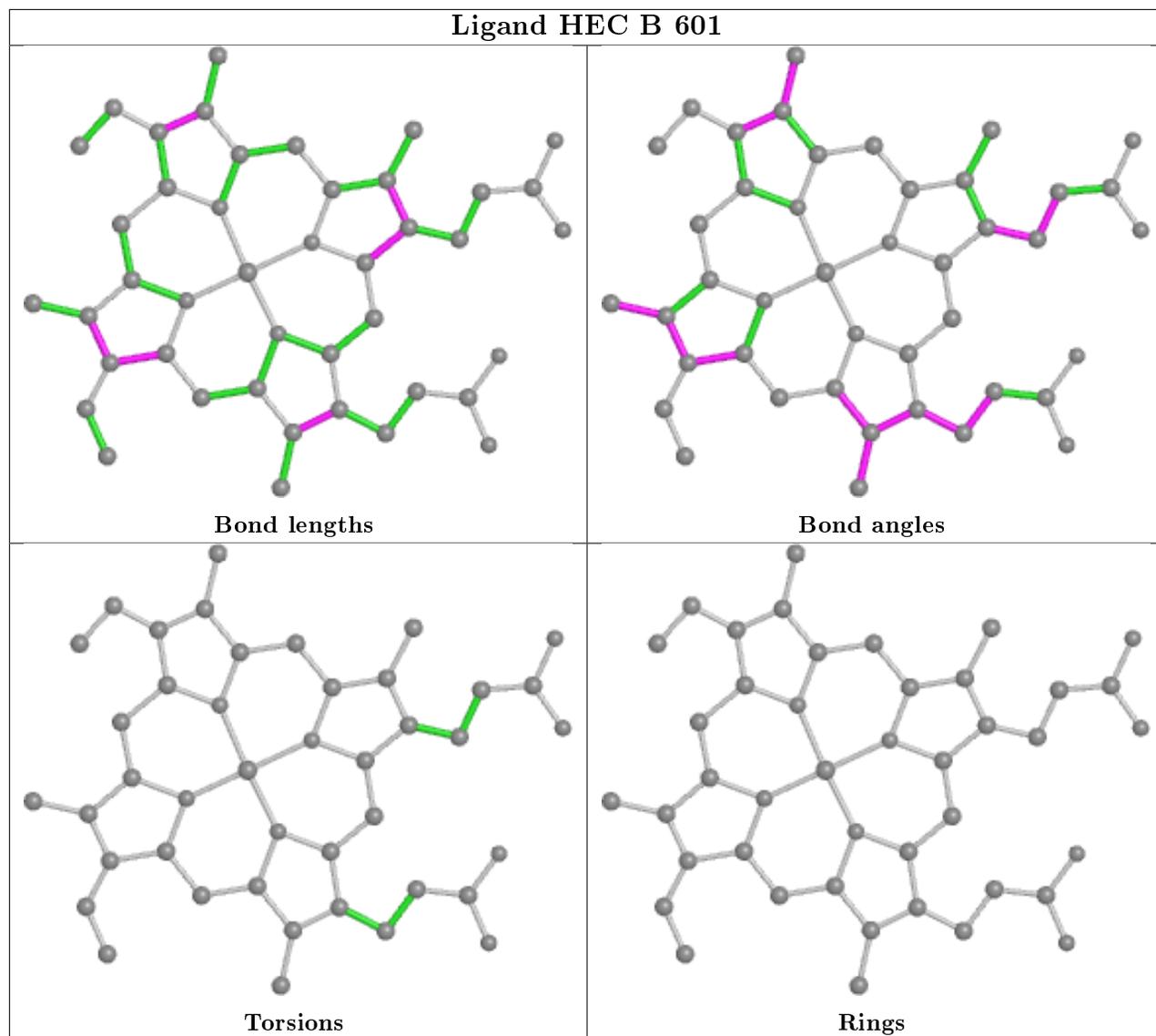


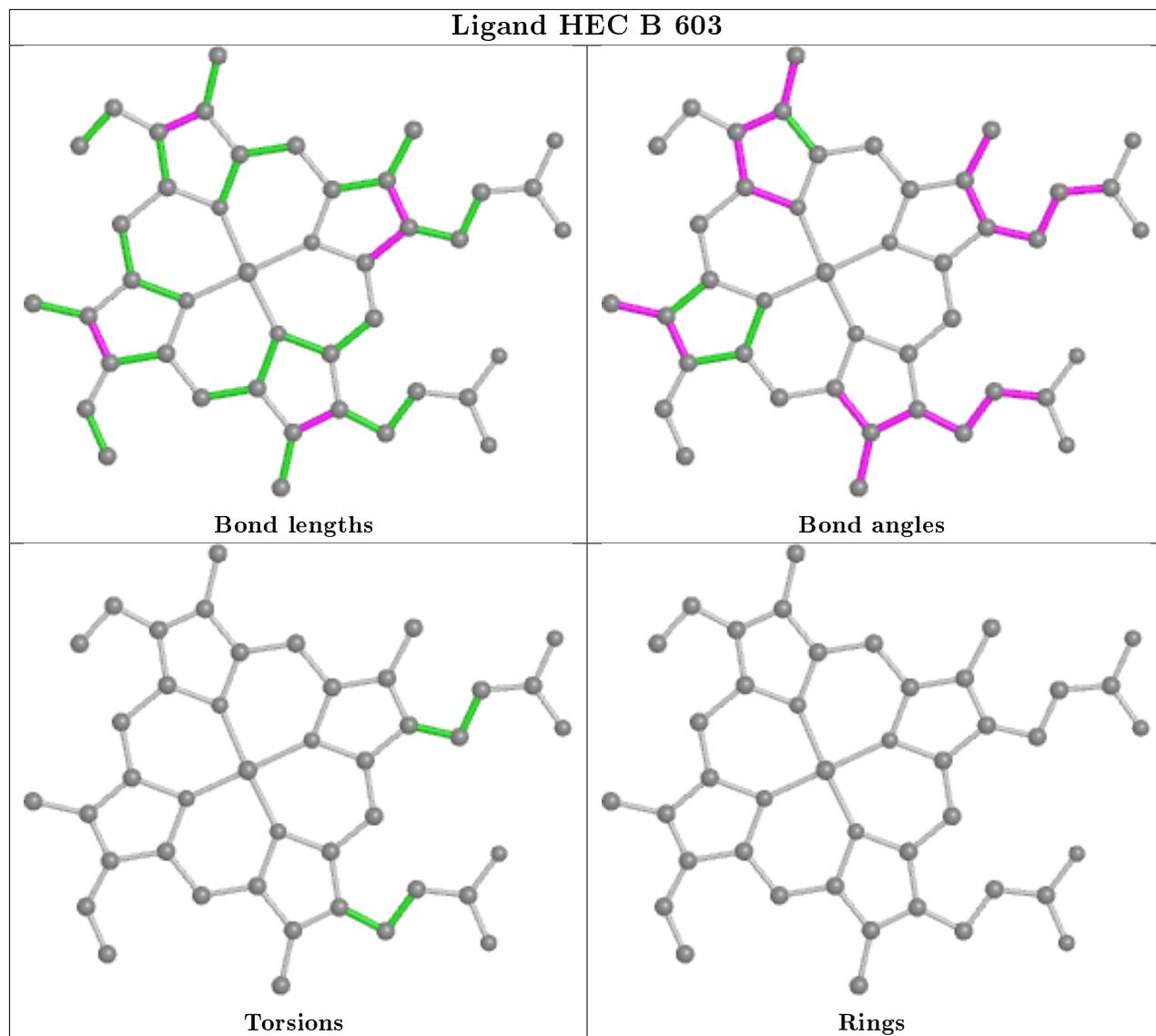


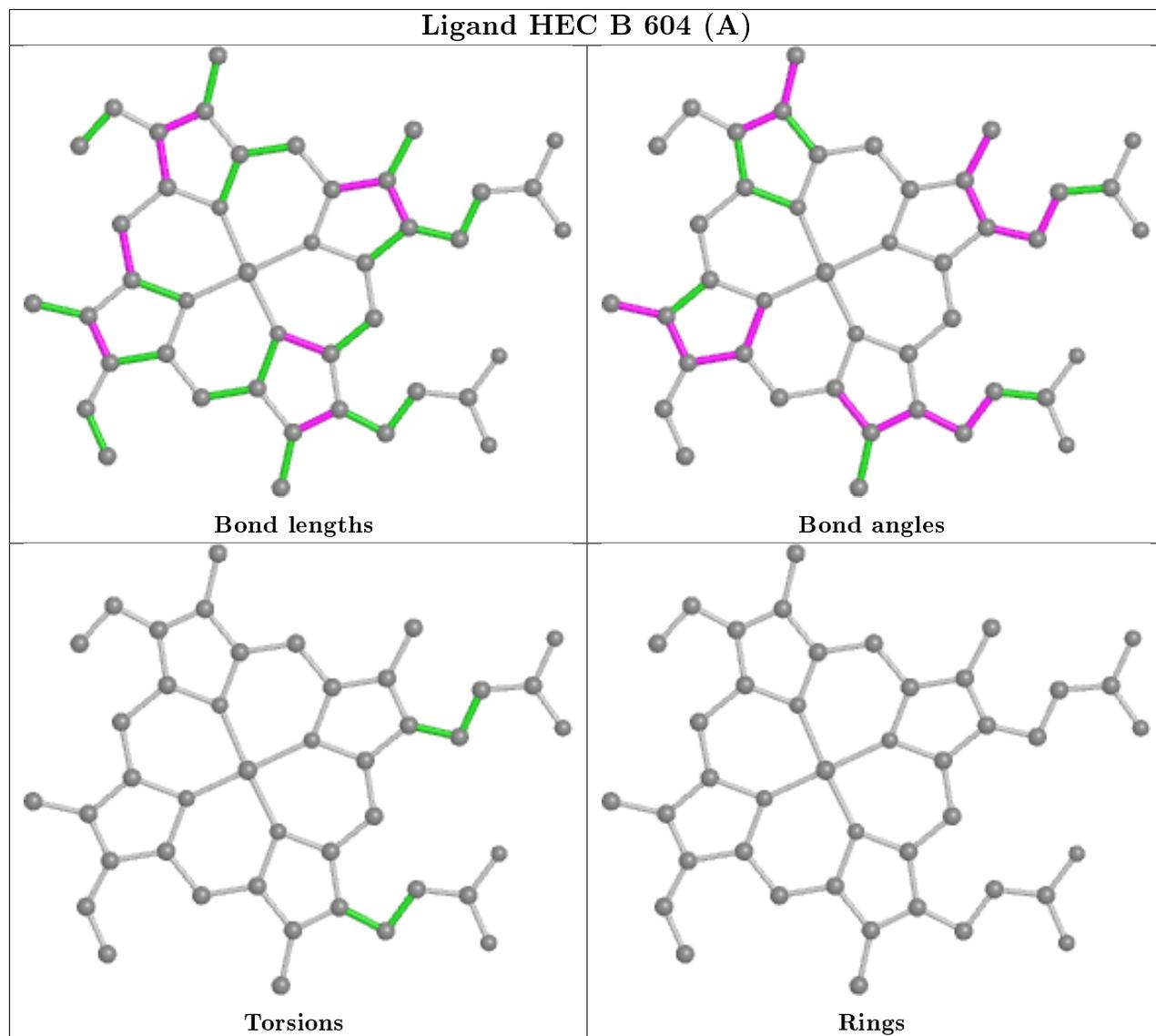


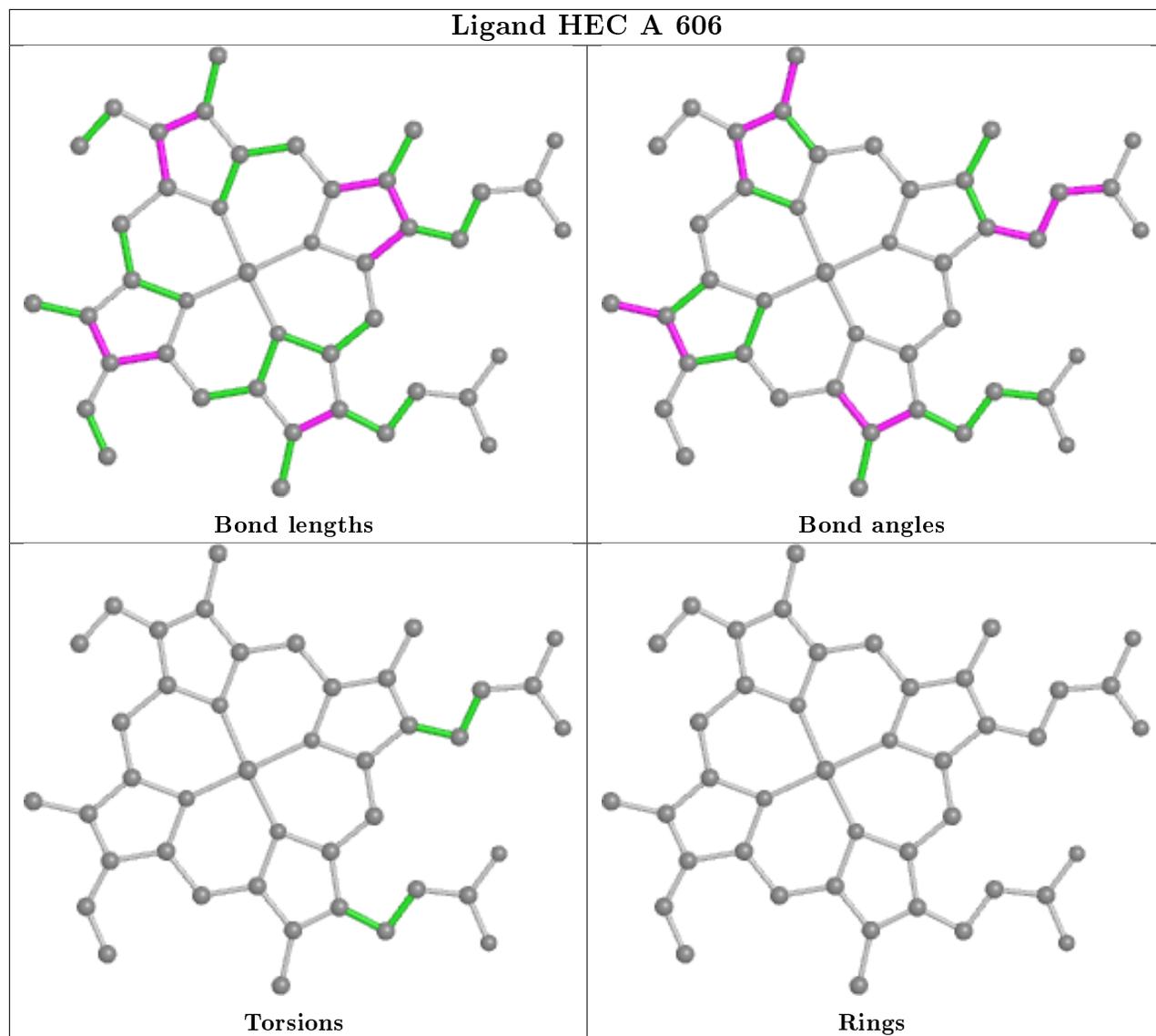


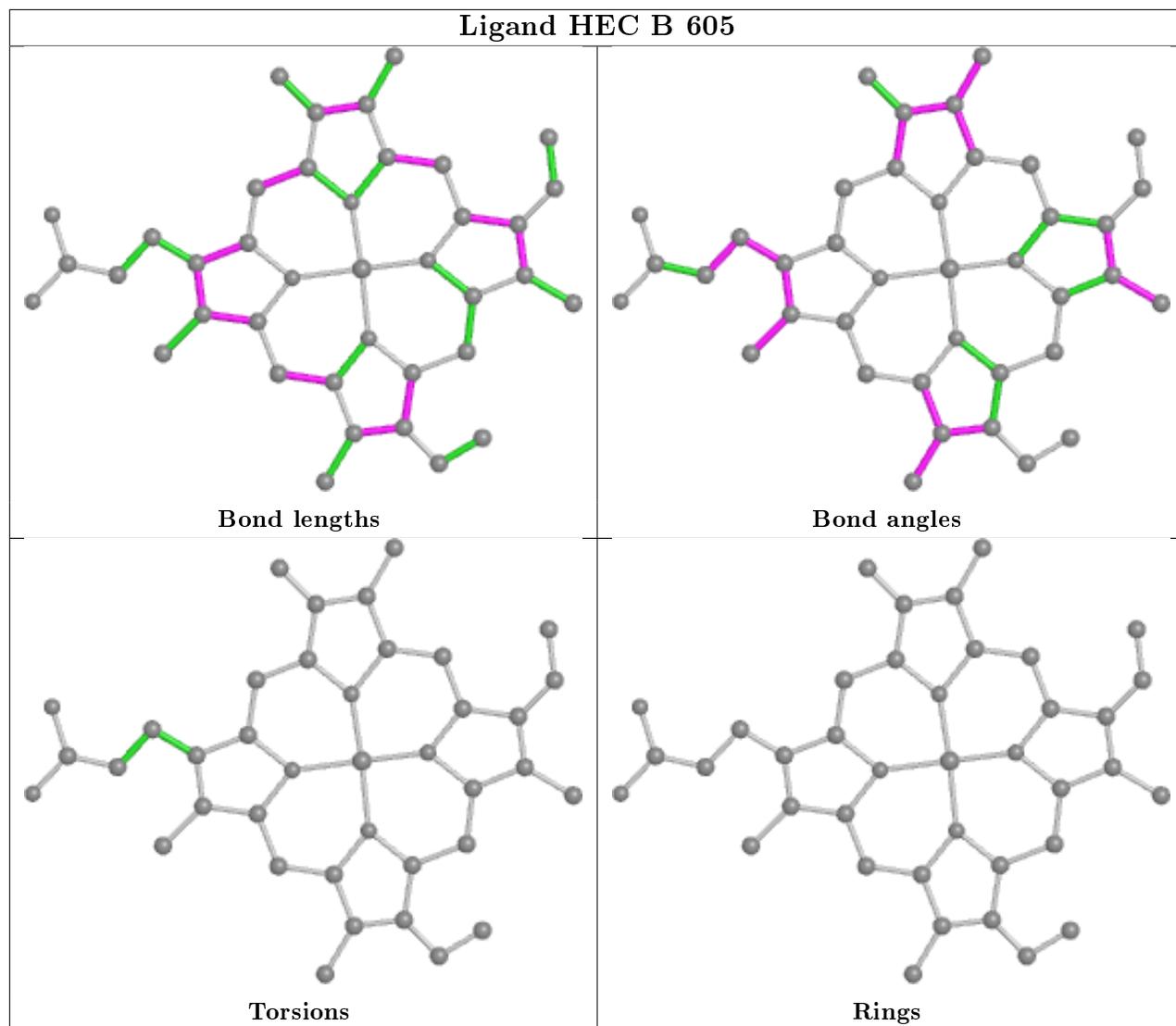


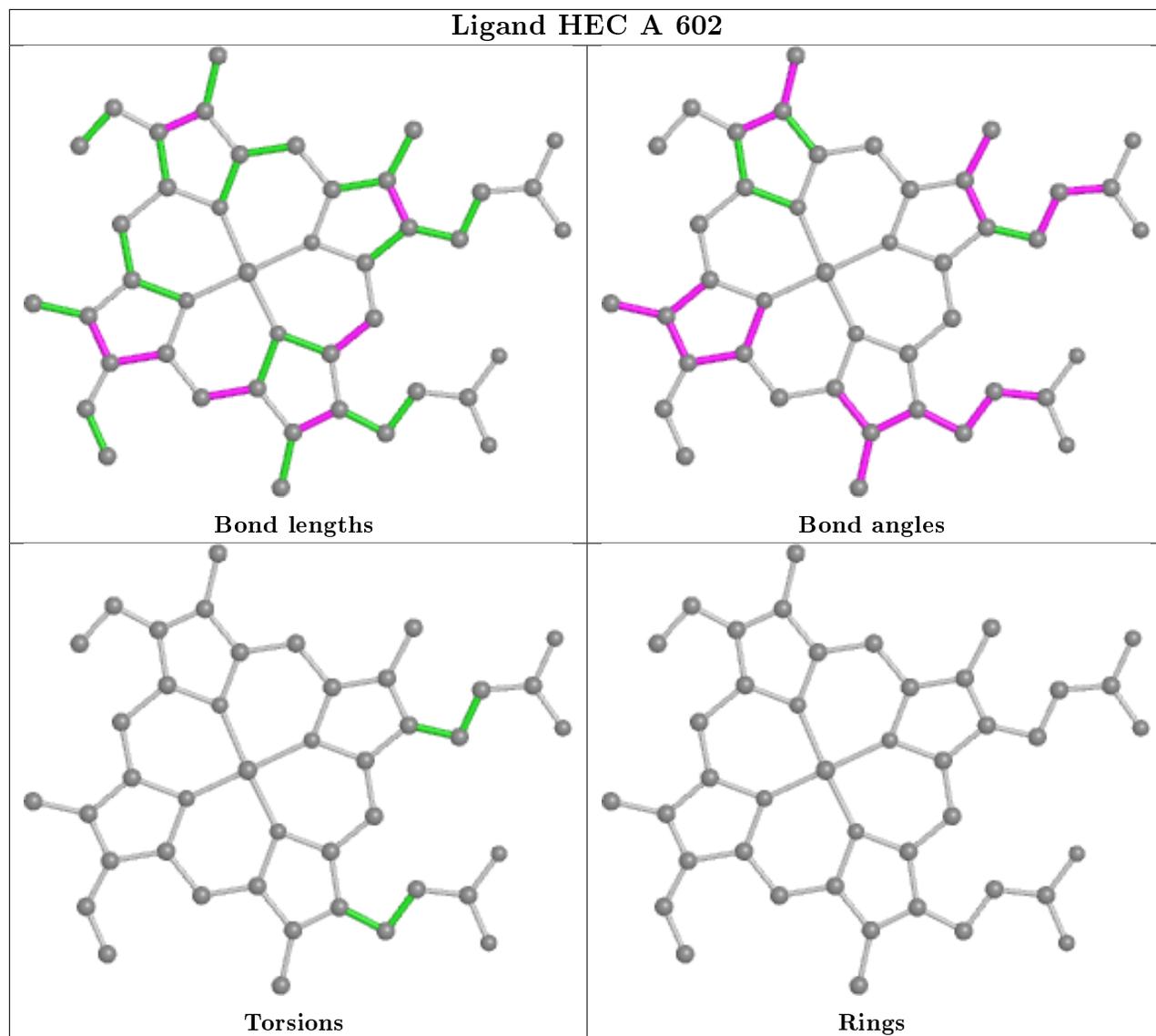


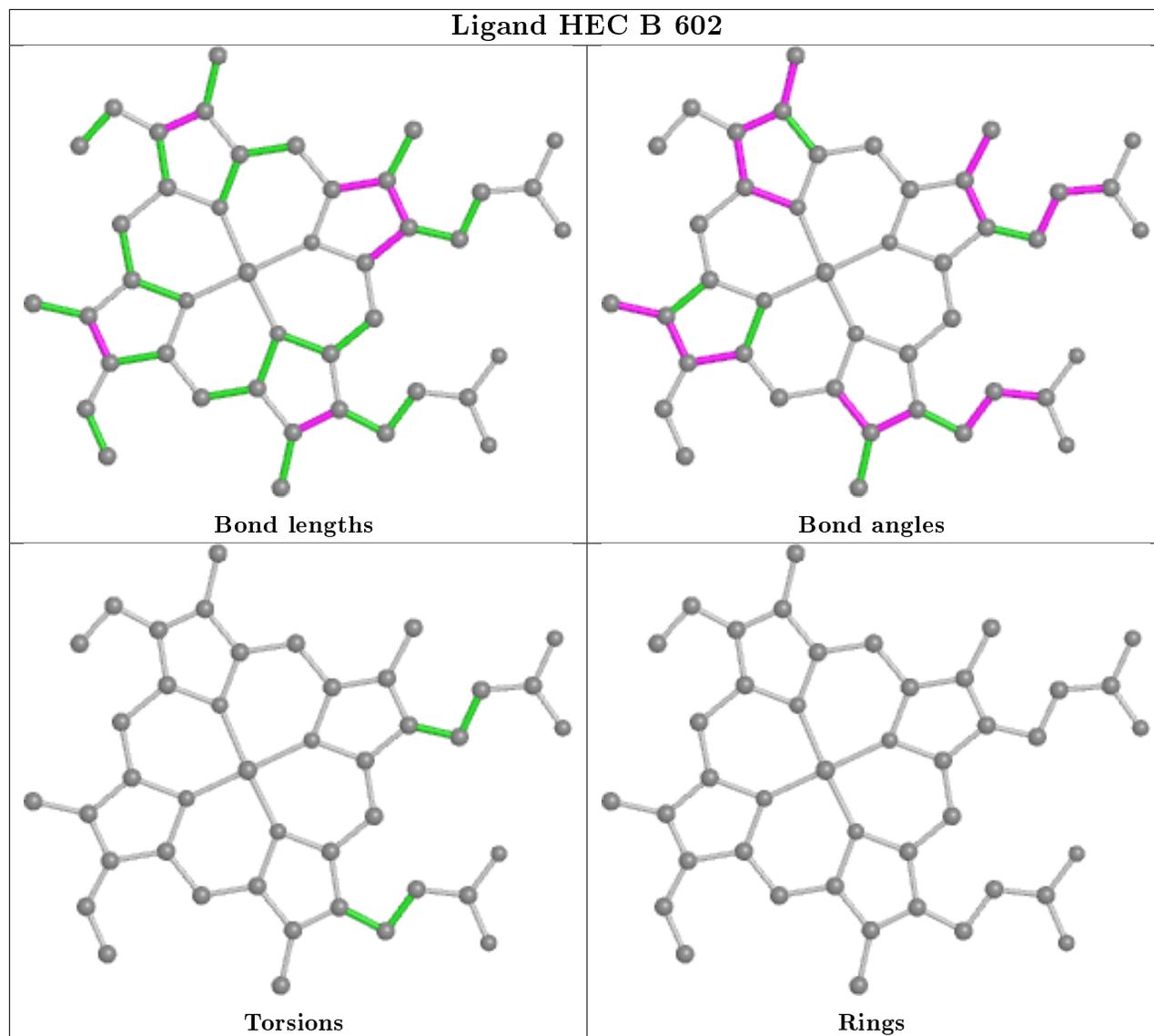


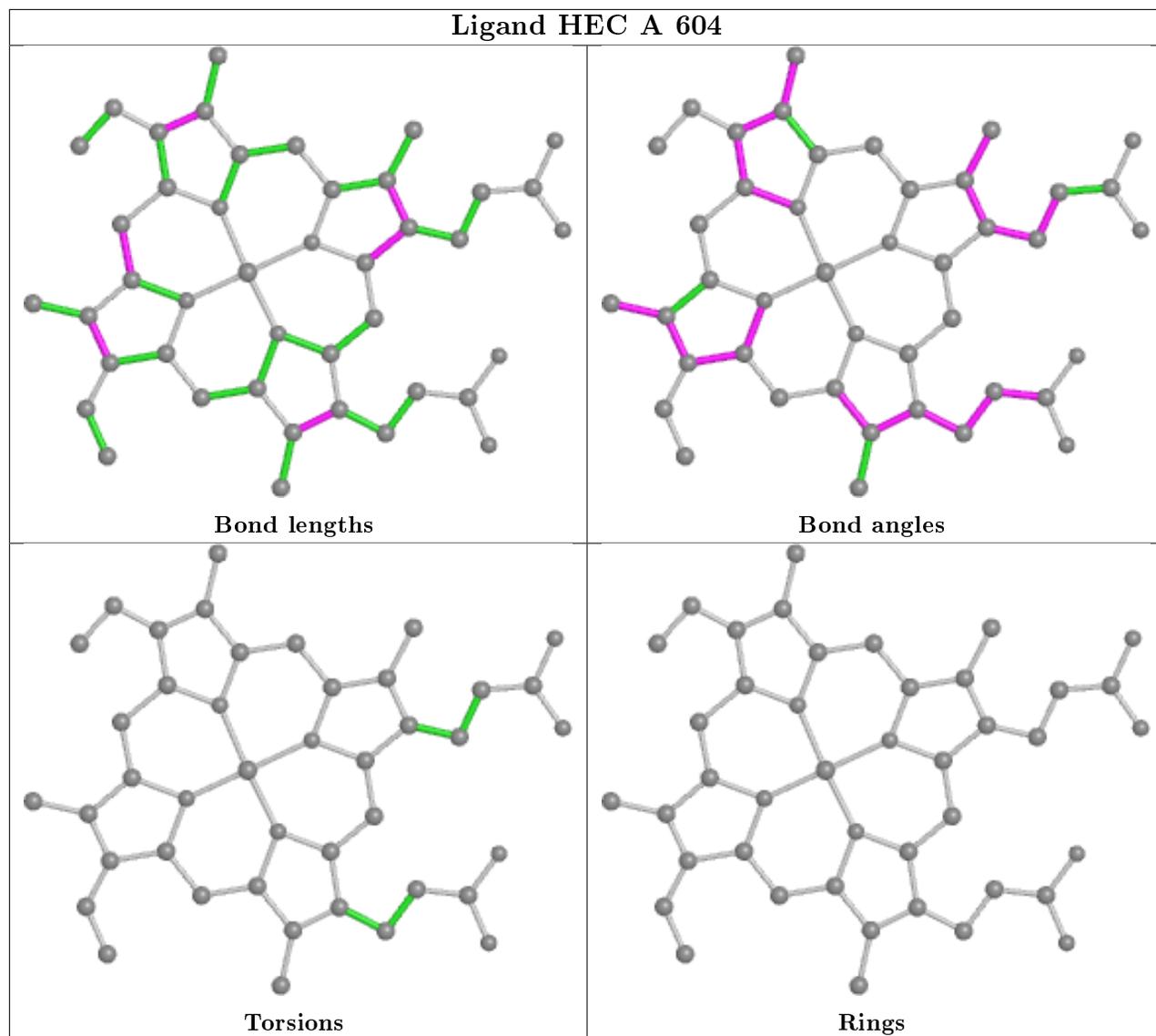


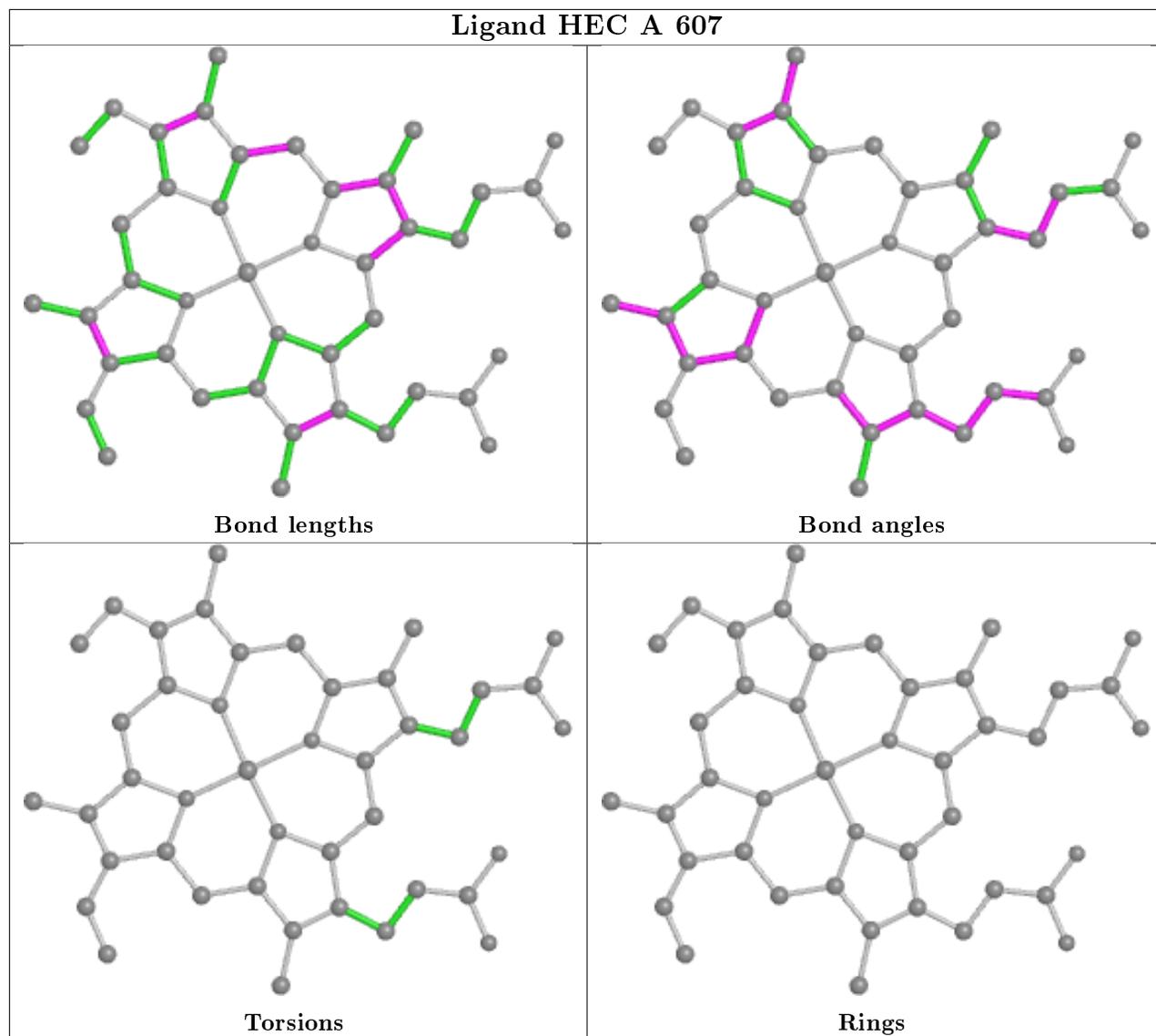


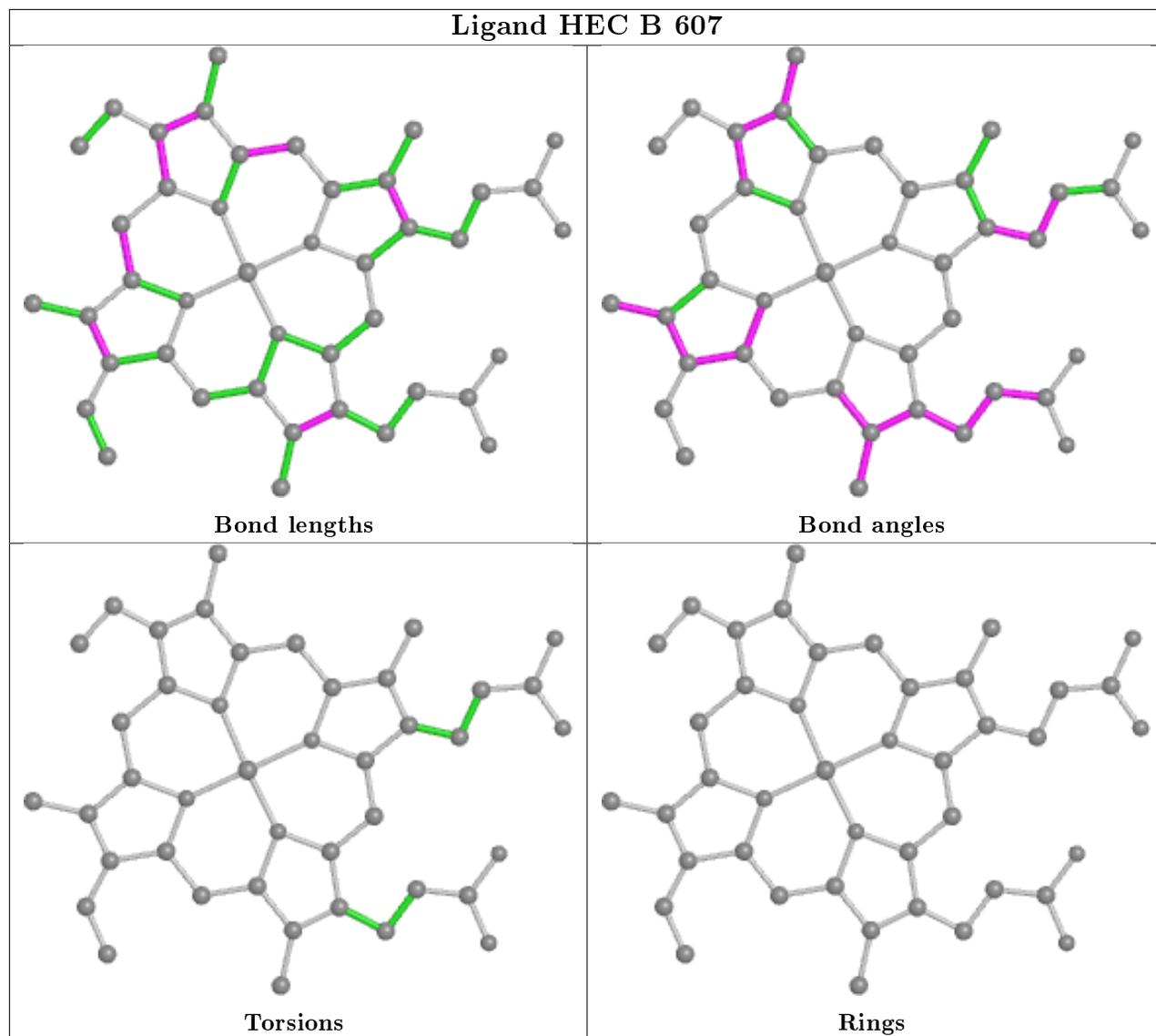


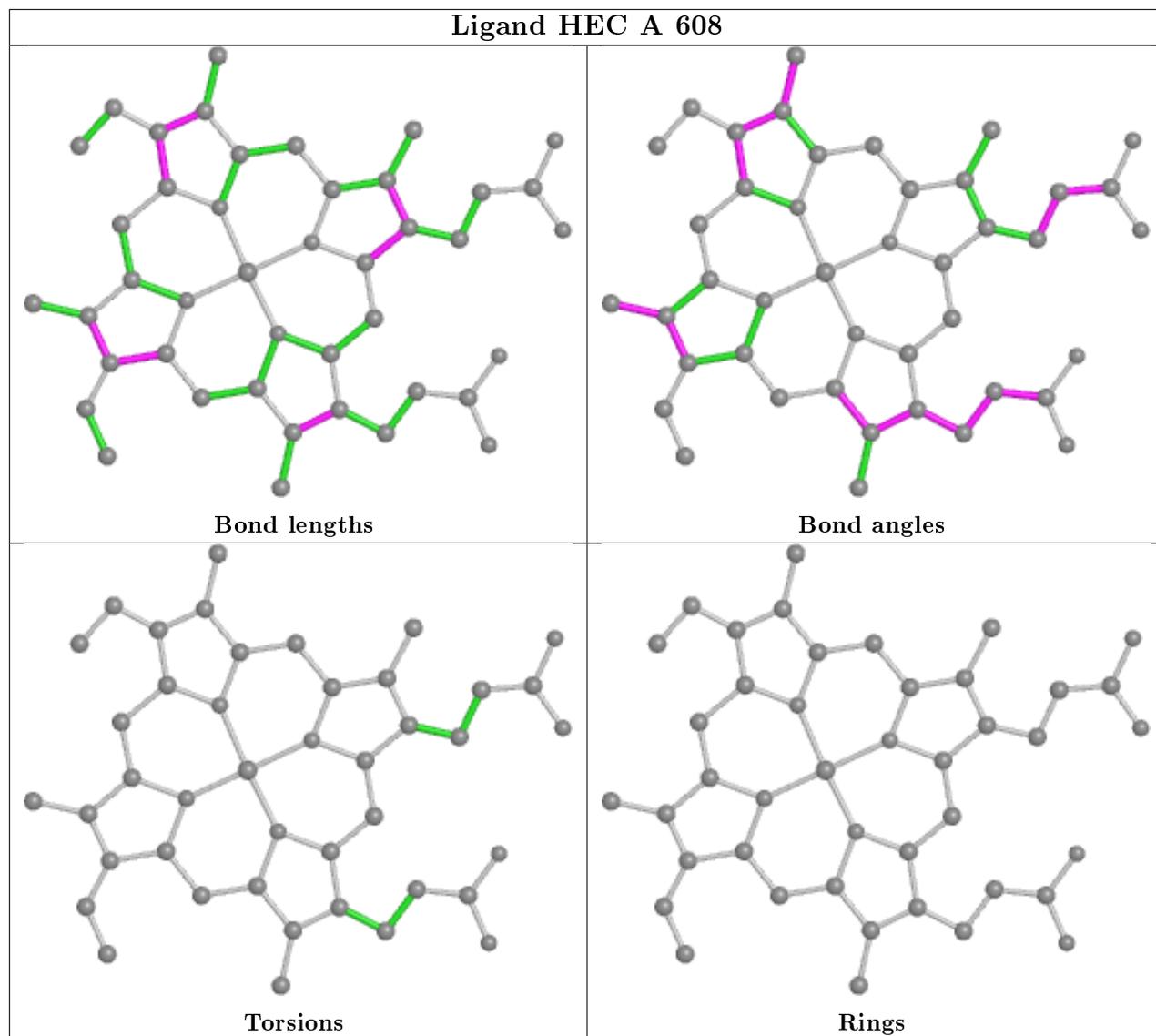


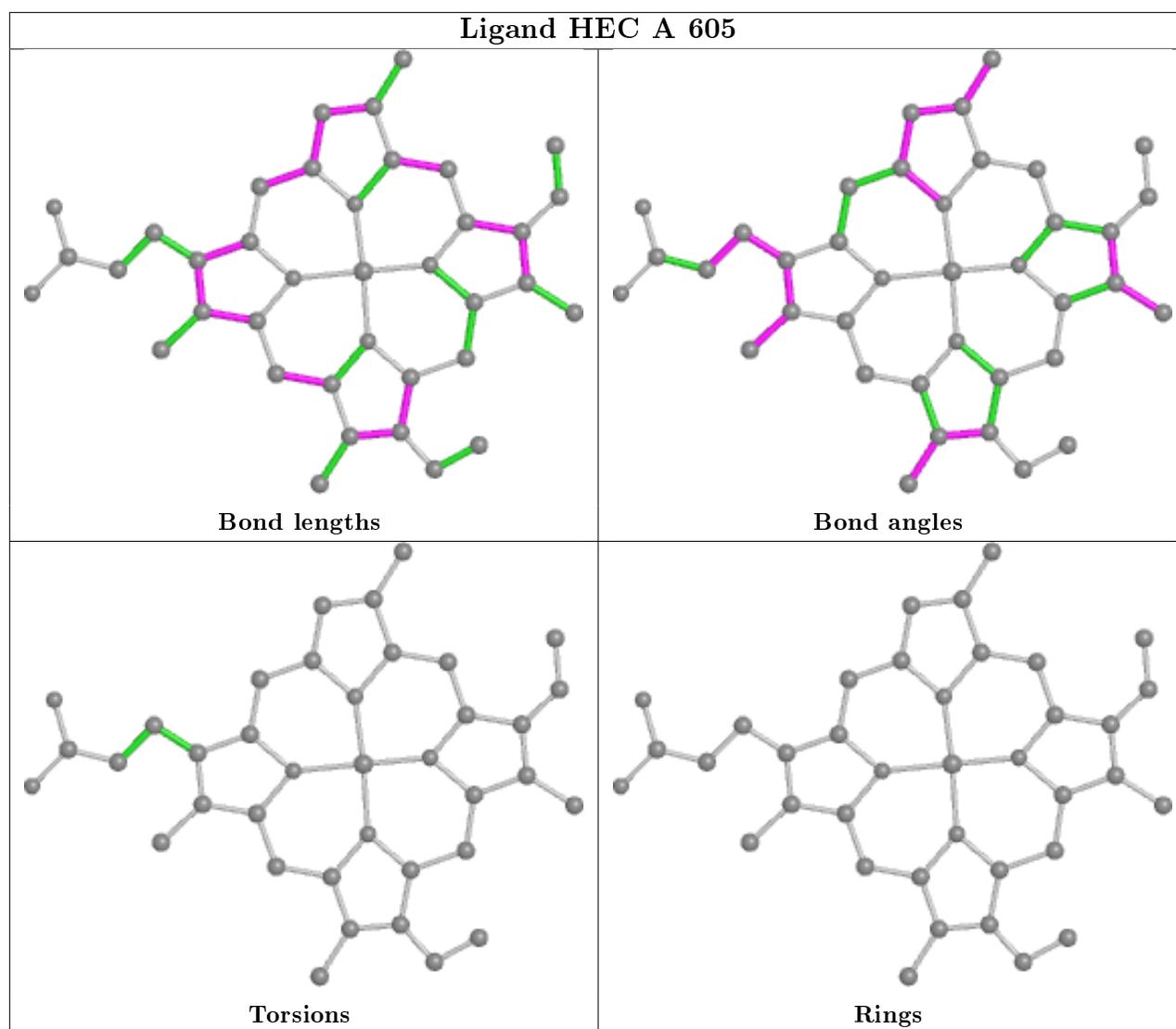












## 5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [\(i\)](#)

There are no chain breaks in this entry.

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

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

In the following table, the column labelled '#RSRZ > 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q < 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ > 2	OWAB(Å <sup>2</sup> )	Q < 0.9
1	A	520/520 (100%)	-0.62	2 (0%) 92   90	8, 13, 24, 49	1 (0%)
1	B	520/520 (100%)	-0.67	2 (0%) 92   90	7, 11, 23, 46	0
All	All	1040/1040 (100%)	-0.64	4 (0%) 92   90	7, 12, 24, 49	1 (0%)

All (4) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	524	VAL	4.4
1	A	524	VAL	3.6
1	A	523	ALA	3.0
1	B	523	ALA	2.6

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

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

### 6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

### 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q < 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q < 0.9
6	GOL	A	615[B]	6/6	0.66	0.26	29,35,38,43	2

*Continued on next page...*

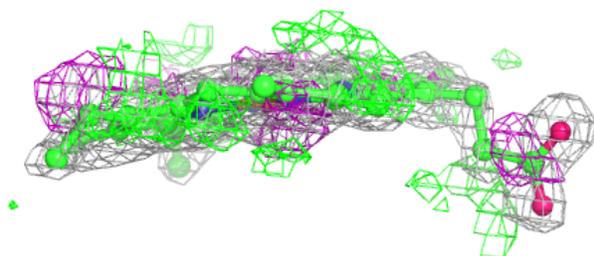
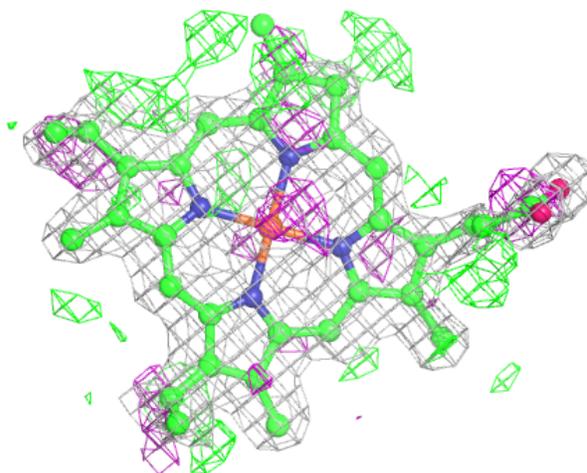
Continued from previous page...

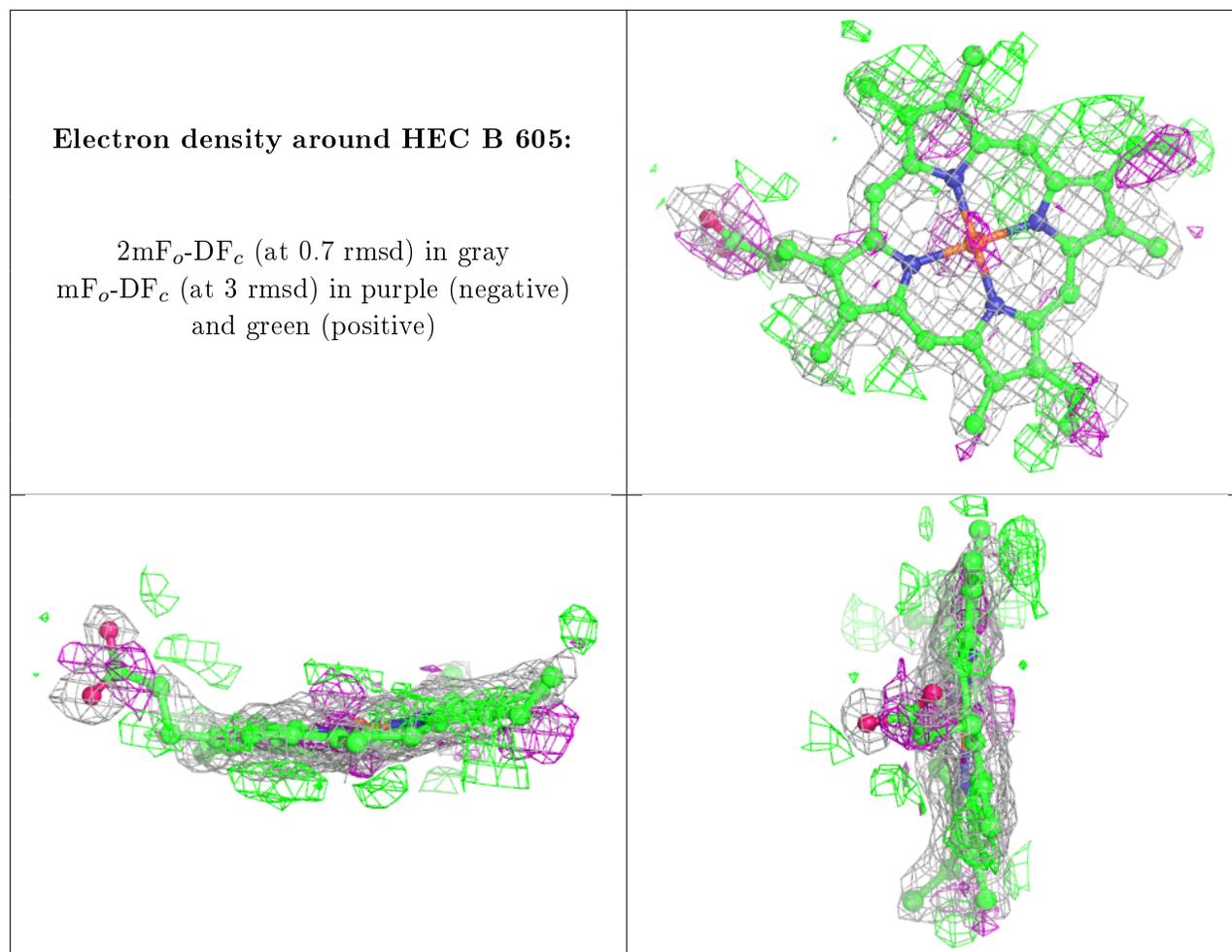
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
6	GOL	A	615[A]	6/6	0.66	0.26	27,31,36,43	2
5	MPD	A	612	8/8	0.91	0.14	17,20,23,24	0
5	MPD	B	612	8/8	0.92	0.11	17,19,20,20	0
7	SO4	B	615	5/5	0.92	0.17	14,15,17,18	5
7	SO4	A	616	5/5	0.93	0.16	20,20,22,23	5
6	GOL	B	613[B]	6/6	0.95	0.10	10,11,12,12	1
2	HEC	A	605	38/43	0.95	0.15	19,26,40,42	0
6	GOL	B	613[A]	6/6	0.95	0.10	8,10,11,12	1
6	GOL	A	613[B]	6/6	0.96	0.10	12,14,15,16	1
6	GOL	A	613[A]	6/6	0.96	0.10	11,13,14,16	1
2	HEC	B	605	39/43	0.96	0.13	16,23,38,43	0
6	GOL	B	614	6/6	0.97	0.10	12,17,19,19	0
2	HEC	A	604	43/43	0.98	0.08	7,8,11,17	0
2	HEC	A	607	43/43	0.98	0.08	9,10,21,32	0
2	HEC	B	607	43/43	0.98	0.09	8,9,19,29	0
3	NO2	B	609	3/3	0.98	0.14	8,8,8,9	3
3	NO2	A	618	3/3	0.98	0.06	20,20,21,22	3
6	GOL	A	614	6/6	0.98	0.10	15,19,20,20	0
2	HEC	B	608	43/43	0.98	0.07	11,14,16,20	0
2	HEC	A	602	43/43	0.98	0.07	8,9,15,20	0
2	HEC	B	602	43/43	0.98	0.08	7,8,15,19	0
2	HEC	B	604[B]	43/43	0.99	0.08	6,7,8,10	4
3	NO2	A	609	3/3	0.99	0.15	11,11,11,12	3
4	CA	A	610	1/1	0.99	0.03	14,14,14,14	0
2	HEC	B	606	43/43	0.99	0.08	8,10,11,12	0
2	HEC	B	604[A]	43/43	0.99	0.08	6,7,8,8	4
4	CA	A	611	1/1	0.99	0.06	12,12,12,12	1
2	HEC	A	601	43/43	0.99	0.09	8,9,10,11	0
4	CA	B	611	1/1	0.99	0.05	9,9,9,9	1
2	HEC	B	601	43/43	0.99	0.09	6,7,8,8	0
2	HEC	B	603	43/43	0.99	0.09	6,6,7,8	0
3	NO2	B	617	3/3	0.99	0.04	11,11,12,12	3
2	HEC	A	606	43/43	0.99	0.07	9,10,11,12	0
3	NO2	A	617	3/3	0.99	0.06	13,13,13,14	3
2	HEC	A	608	43/43	0.99	0.06	10,12,14,18	0
2	HEC	A	603	43/43	0.99	0.09	7,8,9,10	0
3	NO2	B	616	3/3	0.99	0.06	14,14,15,15	3
4	CA	B	610	1/1	1.00	0.03	12,12,12,12	0

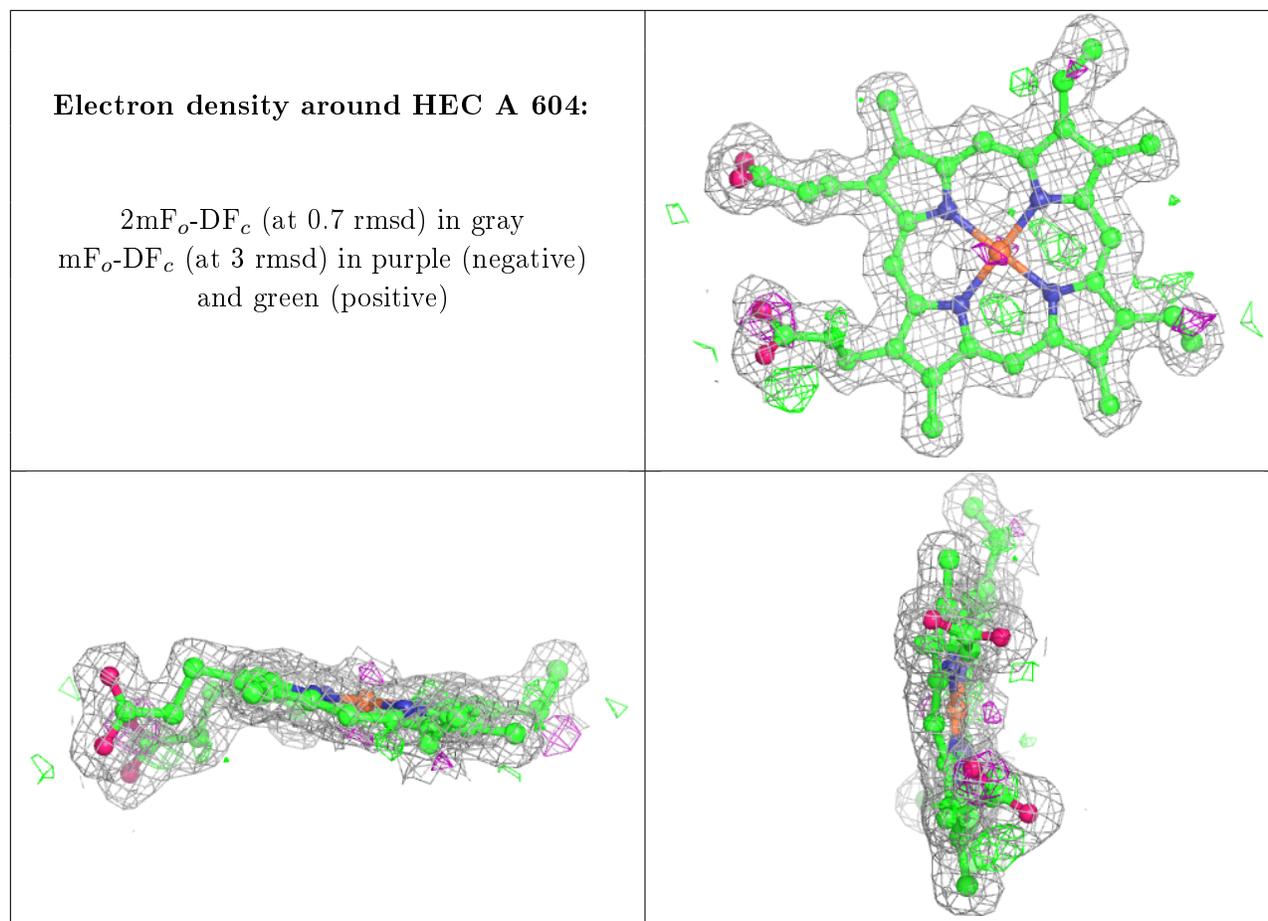
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

**Electron density around HEC A 605:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

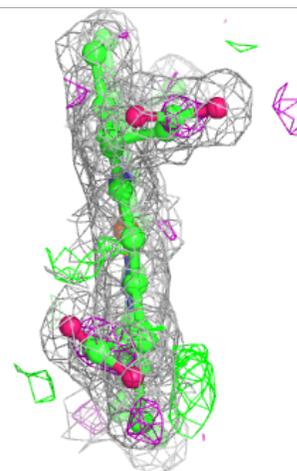
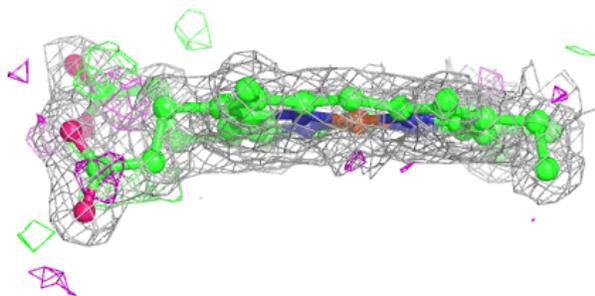
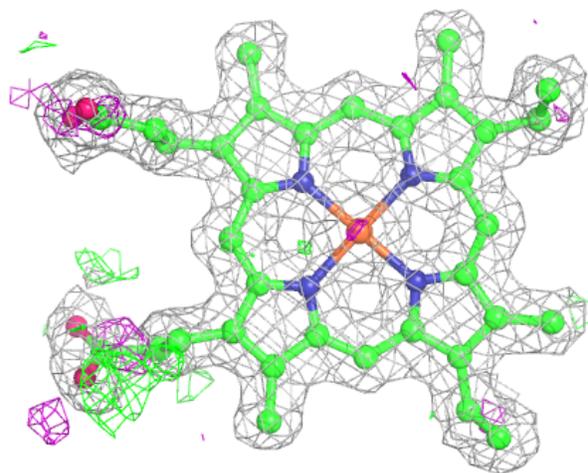


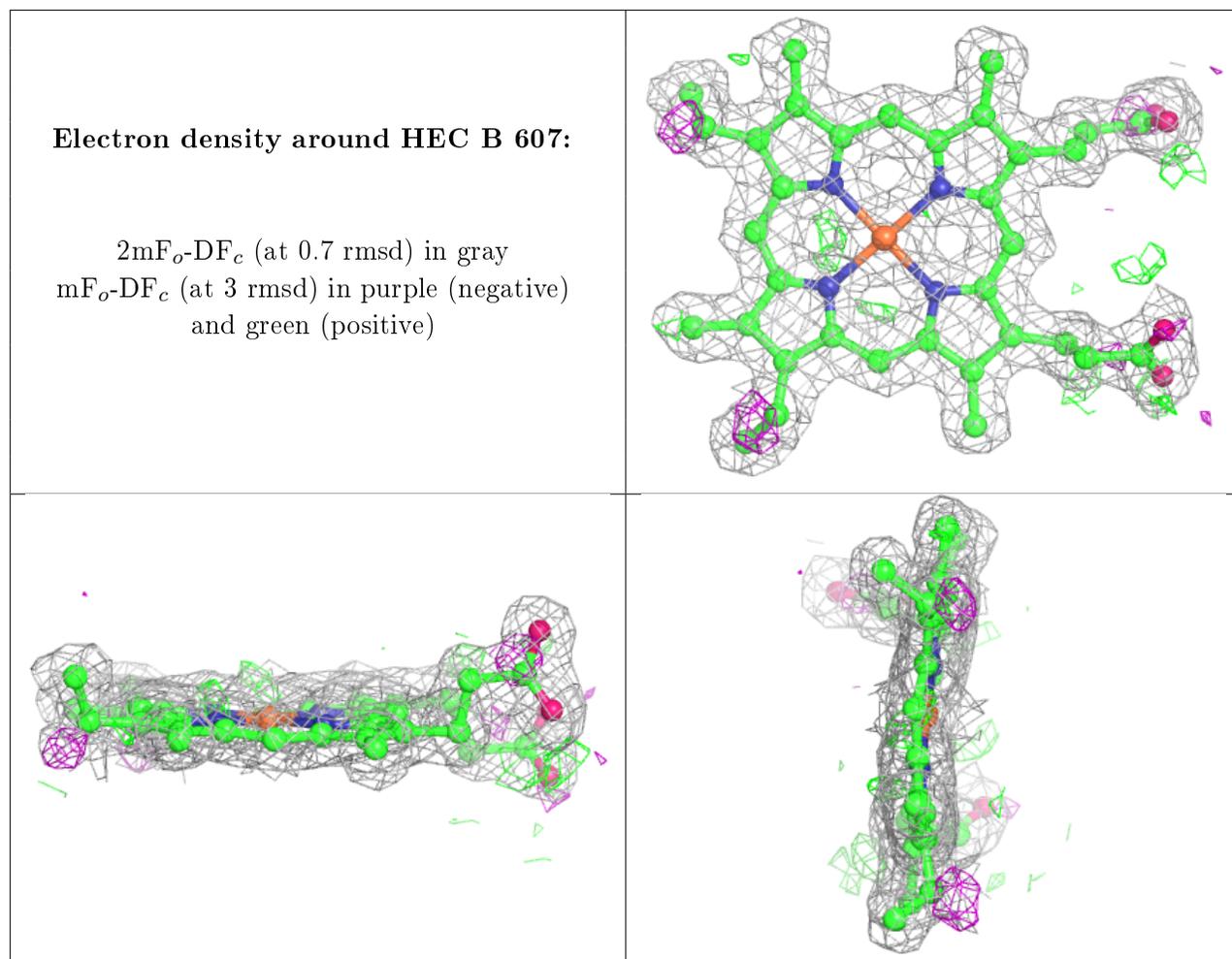


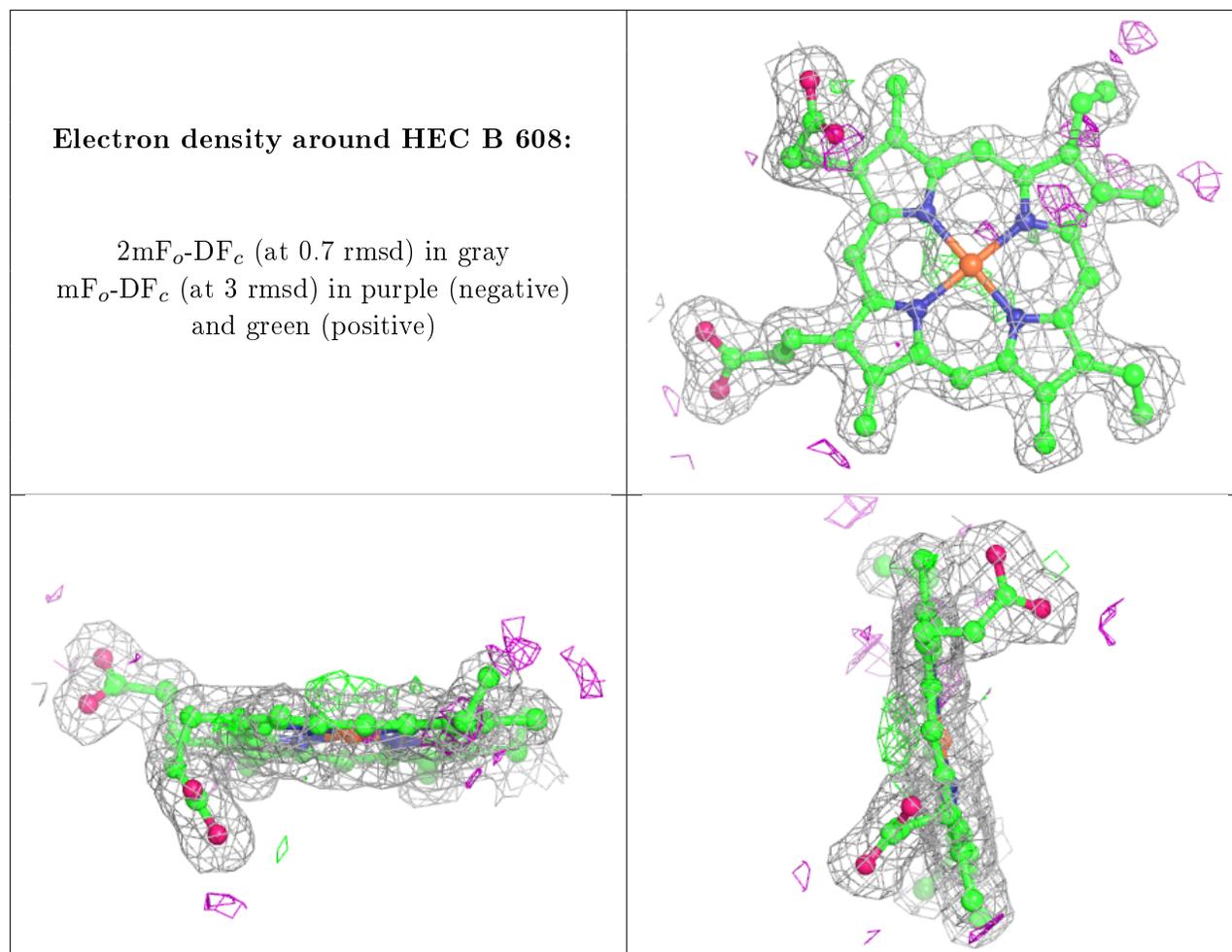


**Electron density around HEC A 607:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

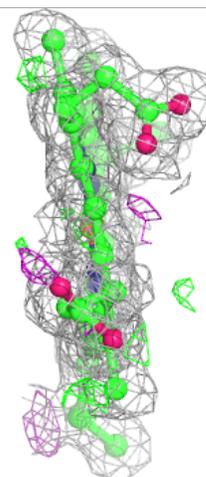
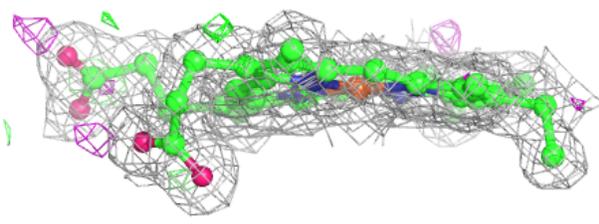
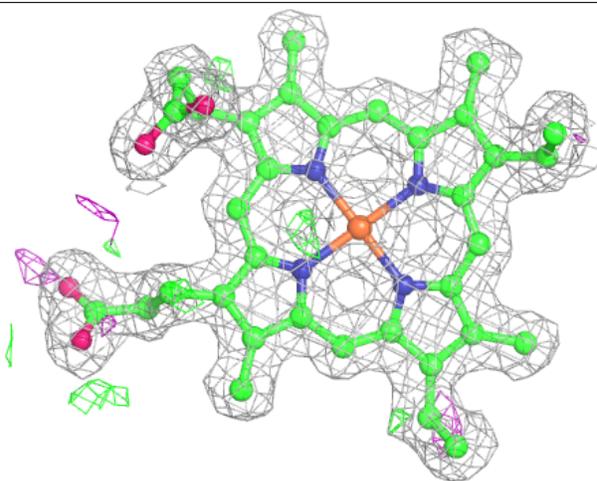


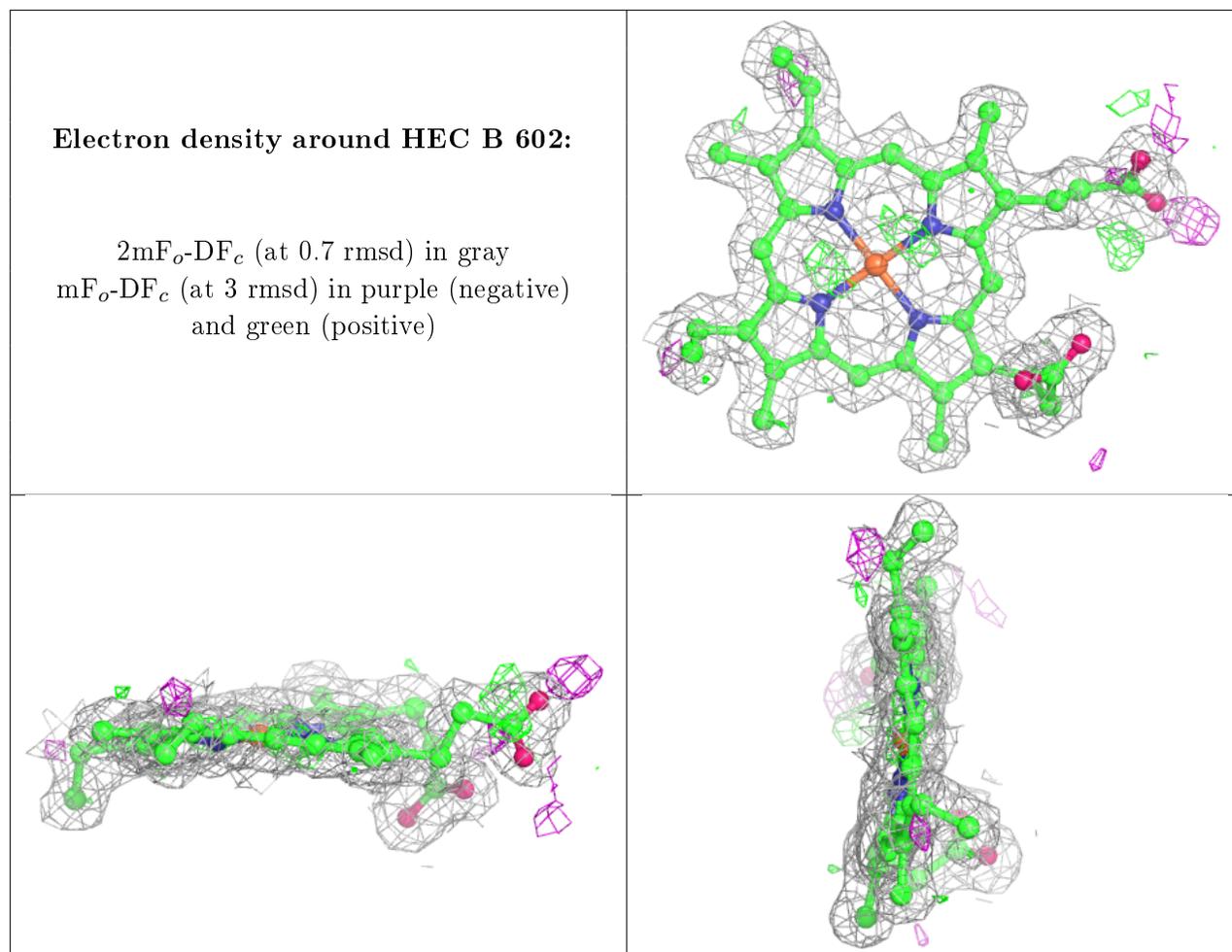




**Electron density around HEC A 602:**

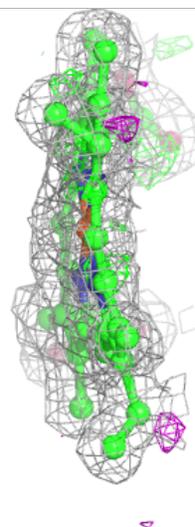
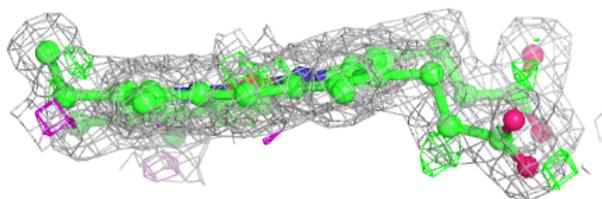
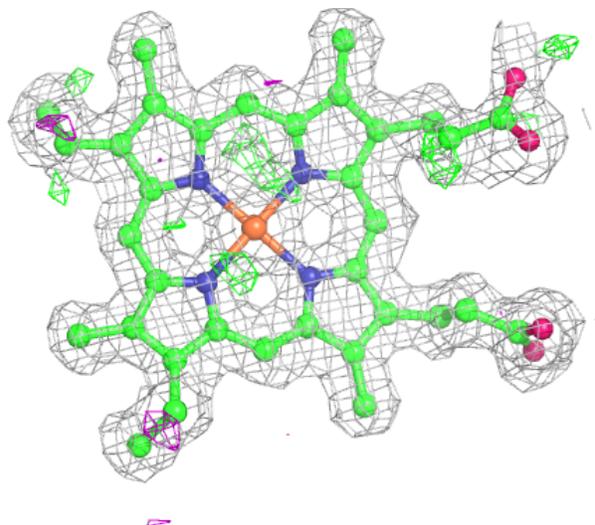
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

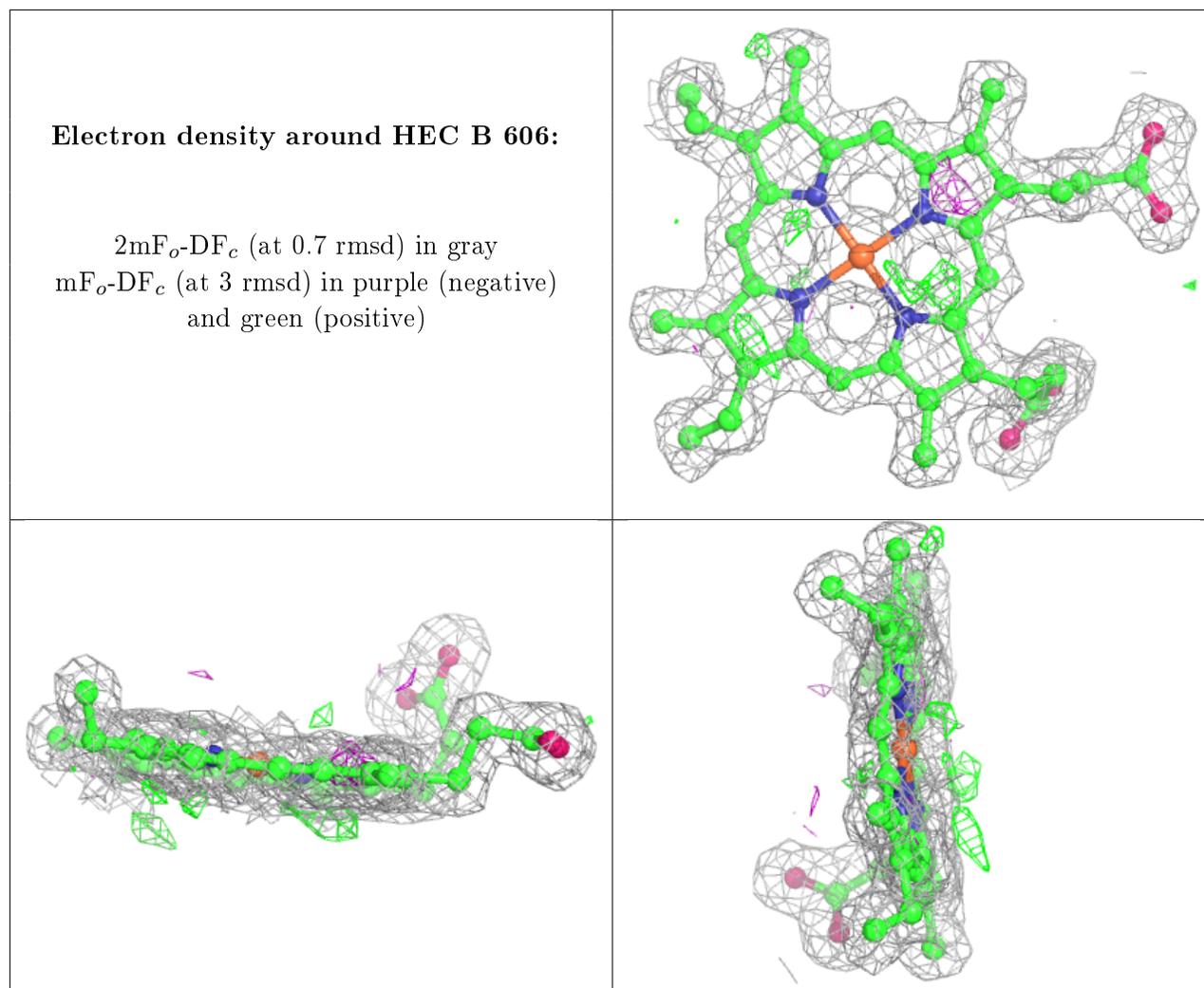




**Electron density around HEC B 604 (B):**

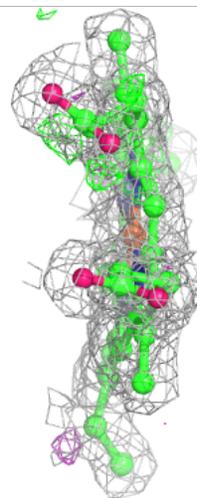
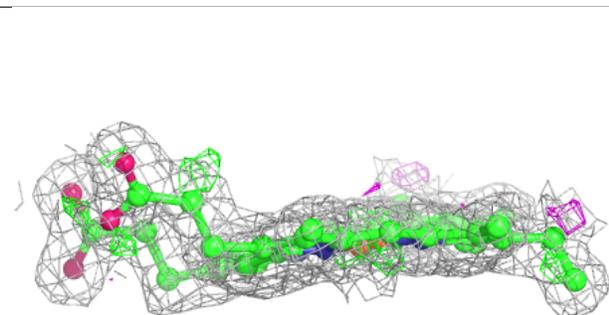
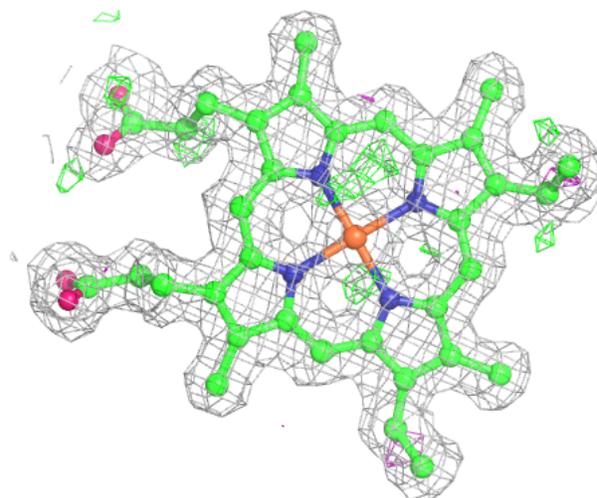
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





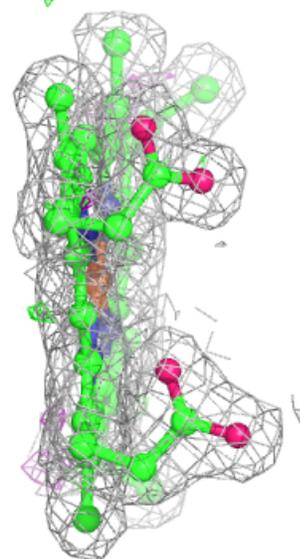
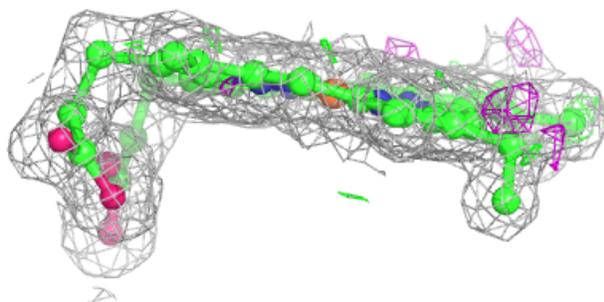
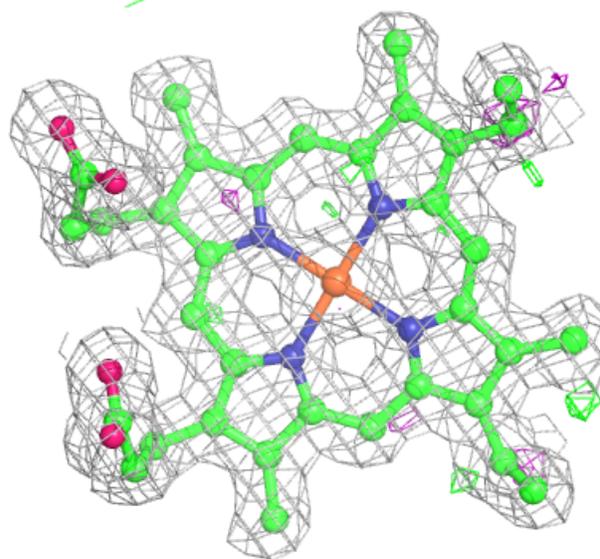
**Electron density around HEC B 604 (A):**

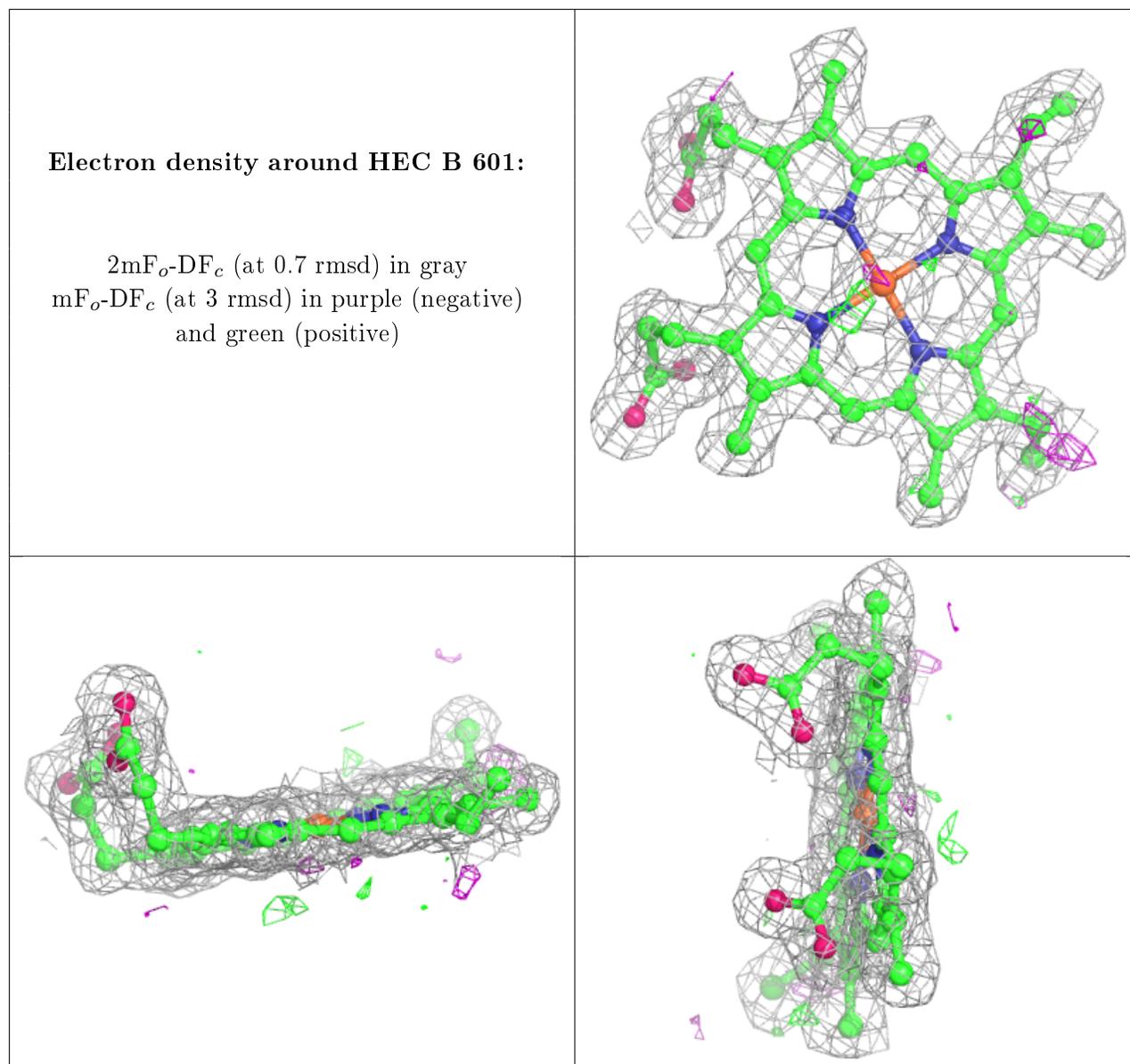
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

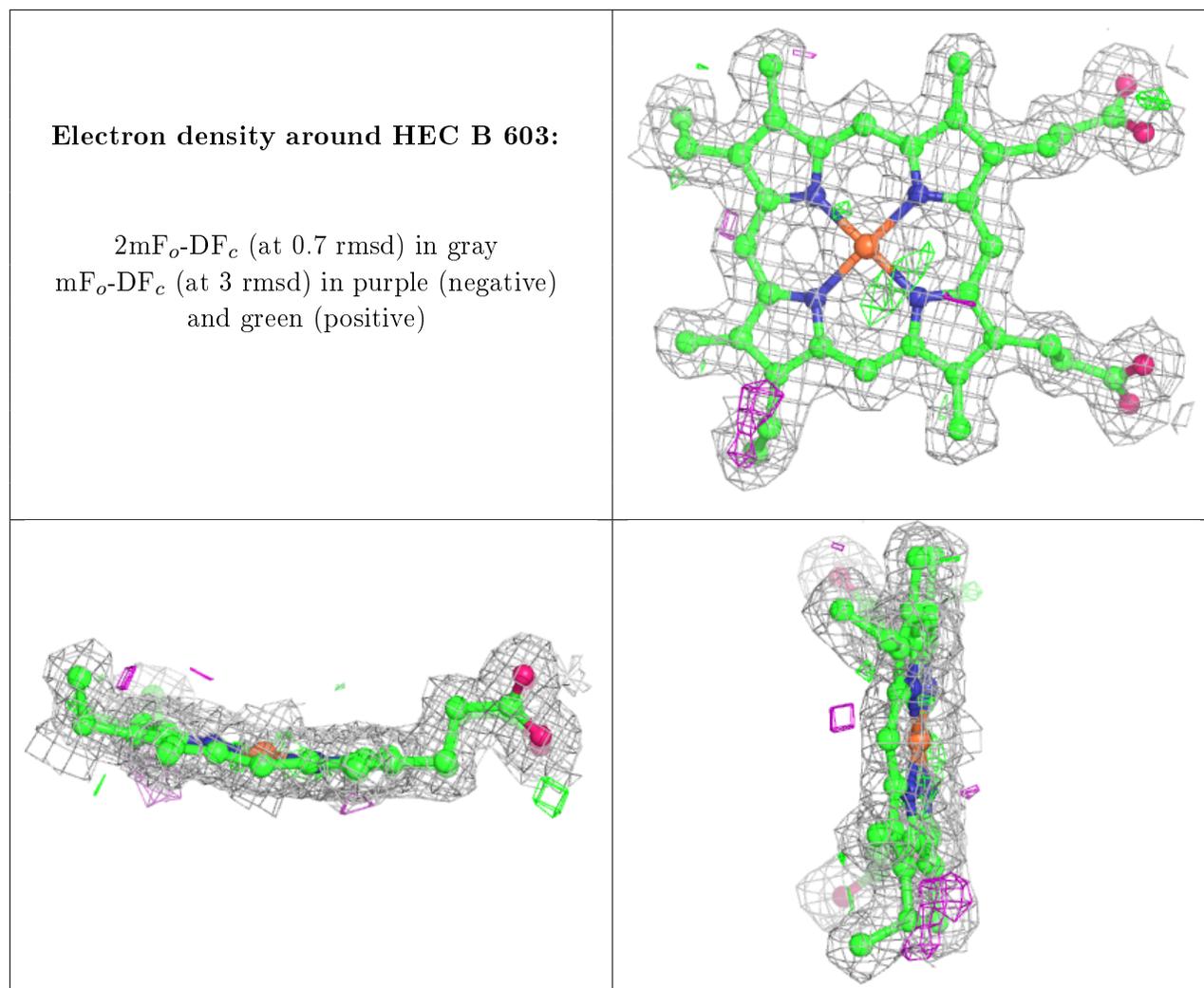


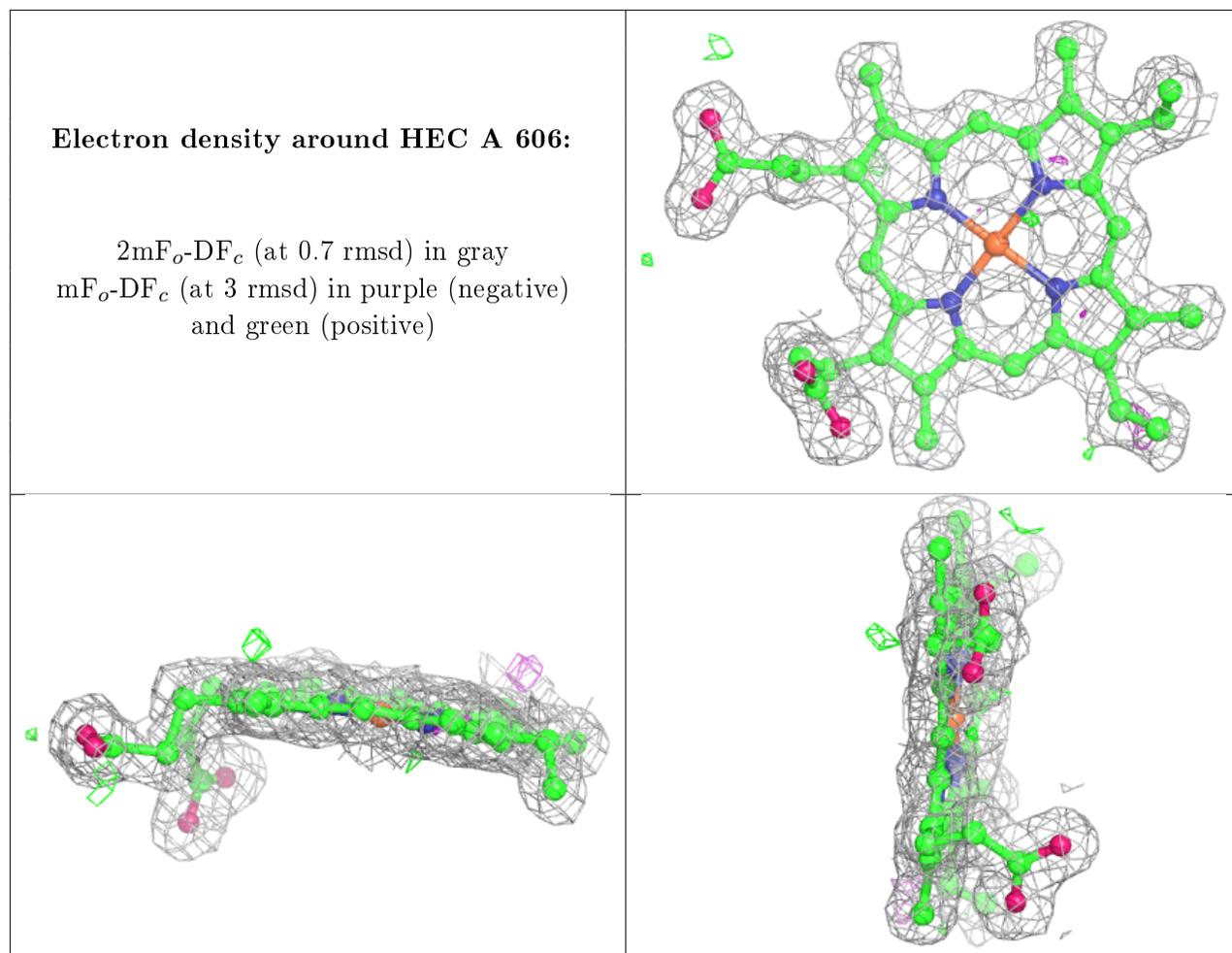
**Electron density around HEC A 601:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



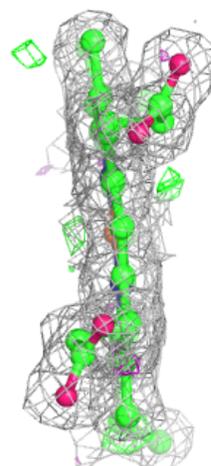
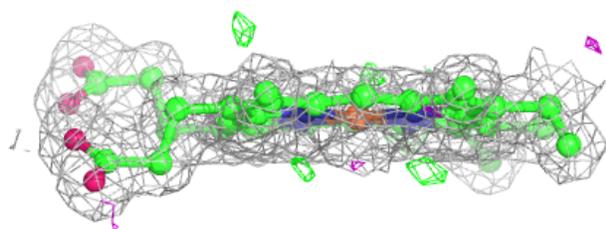
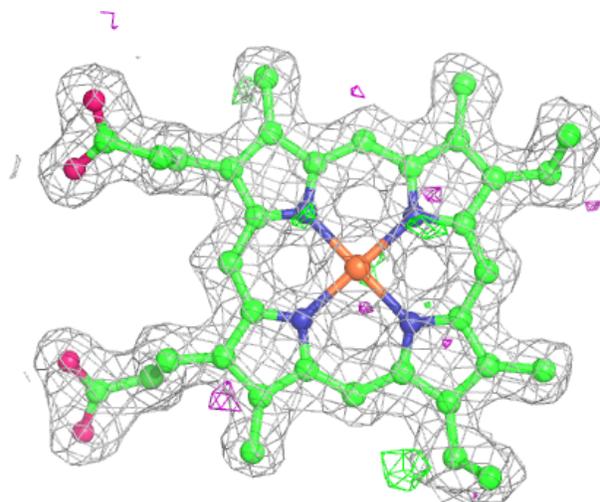


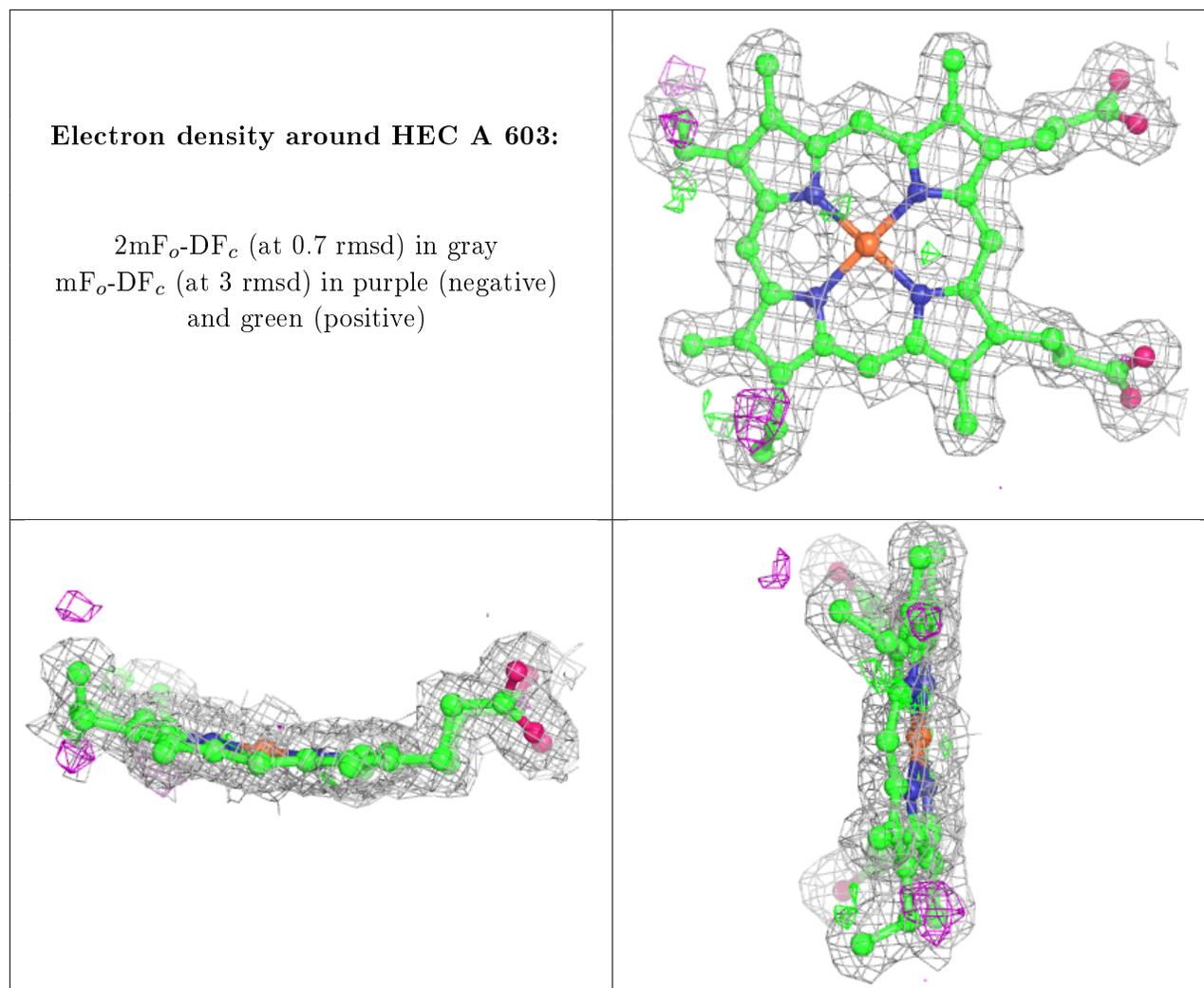




**Electron density around HEC A 608:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





## 6.5 Other polymers [i](#)

There are no such residues in this entry.