



wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 17, 2026 – 07:20 pm BST

PDB ID : 5C2W / pdb_00005c2w
Title : Kuenenia stuttgartiensis Hydrazine Synthase Pressurized with 20 bar Xenon
Authors : Dietl, A.; Ferousi, C.; Maalcke, W.J.; Menzel, A.; de Vries, S.; Keltjens, J.T.;
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Deposited on : 2015-06-16
Resolution : 3.20 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

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 : 4-5-2 with Phenix2.0
Mogul : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.015 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.50

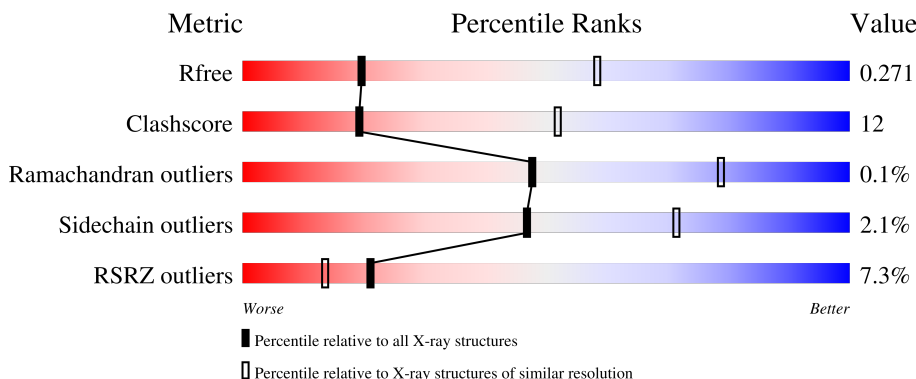
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.20 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}	180053	1466 (3.20-3.20)
Clashscore	190562	1573 (3.20-3.20)
Ramachandran outliers	187476	1548 (3.20-3.20)
Sidechain outliers	187428	1547 (3.20-3.20)
RSRZ outliers	180081	1466 (3.20-3.20)

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 of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	782	% 83% 14% ..
1	D	782	5% 80% 18% ..
2	B	352	% 78% 21% .
2	E	352	23% 60% 30% 9% .
3	C	314	3% 79% 21%

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Mol	Chain	Length	Quality of chain
3	F	314	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	XE	D	901	-	-	-	X
5	CL	A	903[A]	-	-	X	-
8	HEC	A	908	X	-	-	-
8	HEC	C	404	X	-	-	-
8	HEC	C	405	X	-	-	-
8	HEC	D	907	X	-	-	-
8	HEC	D	908	X	-	-	-
8	HEC	F	404	X	-	-	-
8	HEC	F	405	X	-	-	-

2 Entry composition

There are 11 unique types of molecules in this entry. The entry contains 23386 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 HYDRAZINE SYNTHASE ALPHA SUBUNIT.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	768	Total	C	N	O	S	0	0	0
			6081	3867	1045	1144	25			
1	D	770	Total	C	N	O	S	0	0	0
			6087	3871	1044	1147	25			

- Molecule 2 is a protein called HYDRAZINE SYNTHASE BETA SUBUNIT.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	352	Total	C	N	O	S	0	1	0
			2706	1697	464	531	14			
2	E	352	Total	C	N	O	S	0	1	0
			2692	1688	459	531	14			

- Molecule 3 is a protein called Hypothetical (Di heme) protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	314	Total	C	N	O	S	0	0	0
			2457	1543	432	472	10			
3	F	314	Total	C	N	O	S	0	0	0
			2443	1534	427	472	10			

- Molecule 4 is XENON (CCD ID: XE) (formula: Xe).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	2	Total	Xe	0	0
			2	2		
4	D	2	Total	Xe	0	0
			2	2		

- Molecule 5 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total Cl 2 2	0	1
5	D	1	Total Cl 1 1	0	0

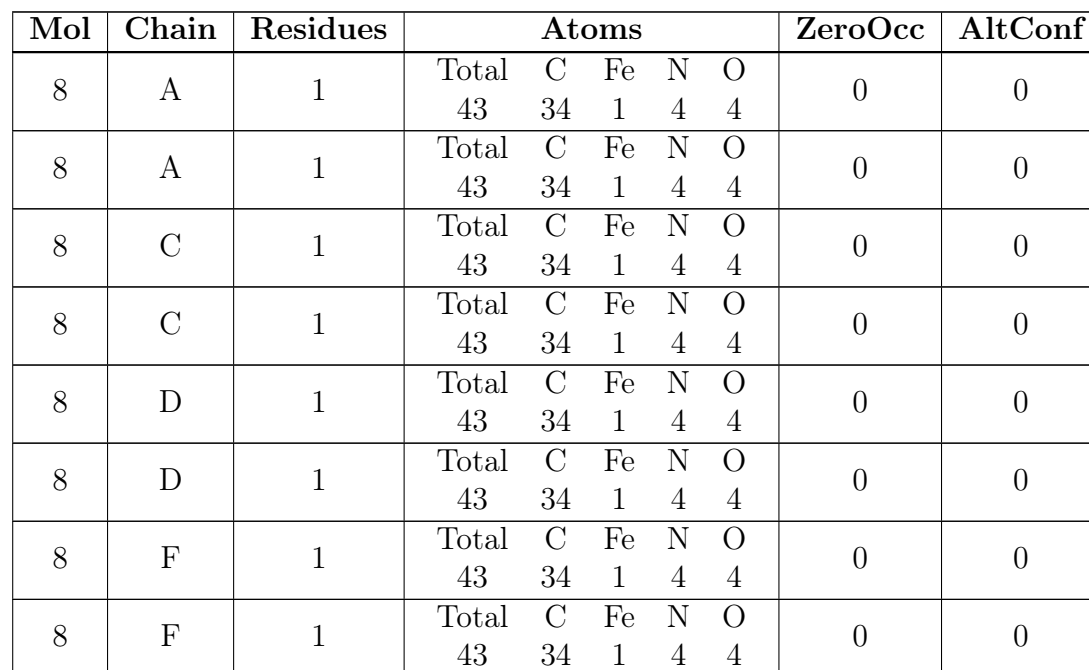
- Molecule 6 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	2	Total Ca 2 2	0	0
6	B	1	Total Ca 1 1	0	0
6	C	3	Total Ca 3 3	0	0
6	D	2	Total Ca 2 2	0	0
6	E	1	Total Ca 1 1	0	0
6	F	3	Total Ca 3 3	0	0

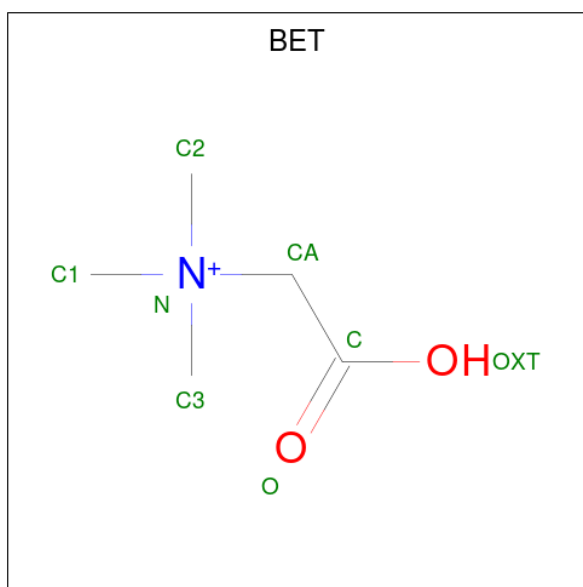
- Molecule 7 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total Zn 1 1	0	0
7	D	1	Total Zn 1 1	0	0

- Molecule 8 is HEME C (CCD ID: HEC) (formula: C₃₄H₃₆FeN₄O₄).



- Molecule 9 is TRIMETHYL GLYCINE (CCD ID: BET) (formula: $\text{C}_5\text{H}_{12}\text{NO}_2$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
9	A	1	Total	C	N	O	0	0
			8	5	1	2		
9	A	1	Total	C	N	O	0	0
			8	5	1	2		
9	A	1	Total	C	N	O	0	0
			8	5	1	2		
9	B	1	Total	C	N	O	0	0
			8	5	1	2		
9	C	1	Total	C	N	O	0	0
			8	5	1	2		
9	D	1	Total	C	N	O	0	0
			8	5	1	2		
9	E	1	Total	C	N	O	0	0
			8	5	1	2		

- Molecule 10 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	B	1	Total	Mg	0	0
			1	1		
10	E	1	Total	Mg	0	0
			1	1		

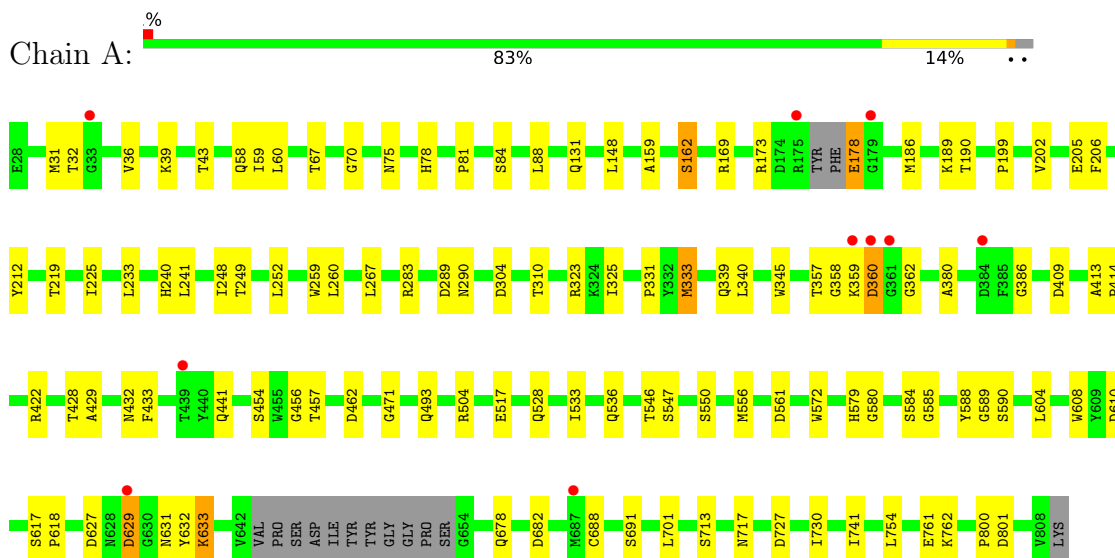
- Molecule 11 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
11	A	163	Total 163	O 163	0	0
11	B	59	Total 59	O 59	0	0
11	C	88	Total 88	O 88	0	0
11	D	112	Total 112	O 112	0	0
11	E	30	Total 30	O 30	0	0
11	F	45	Total 45	O 45	0	0

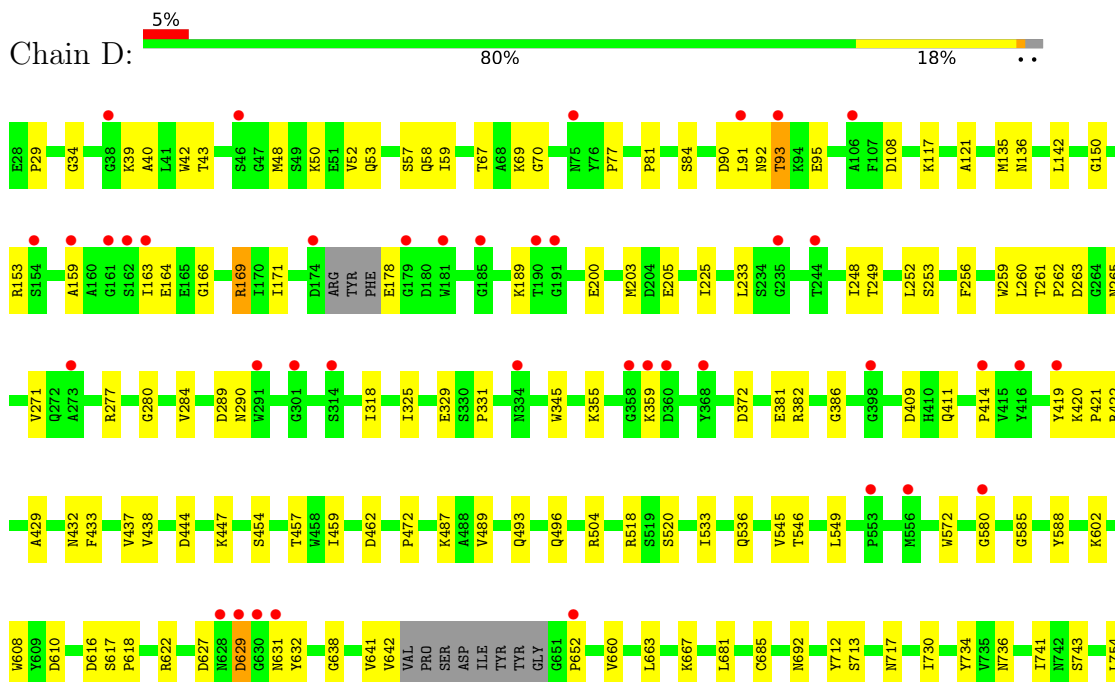
3 Residue-property plots

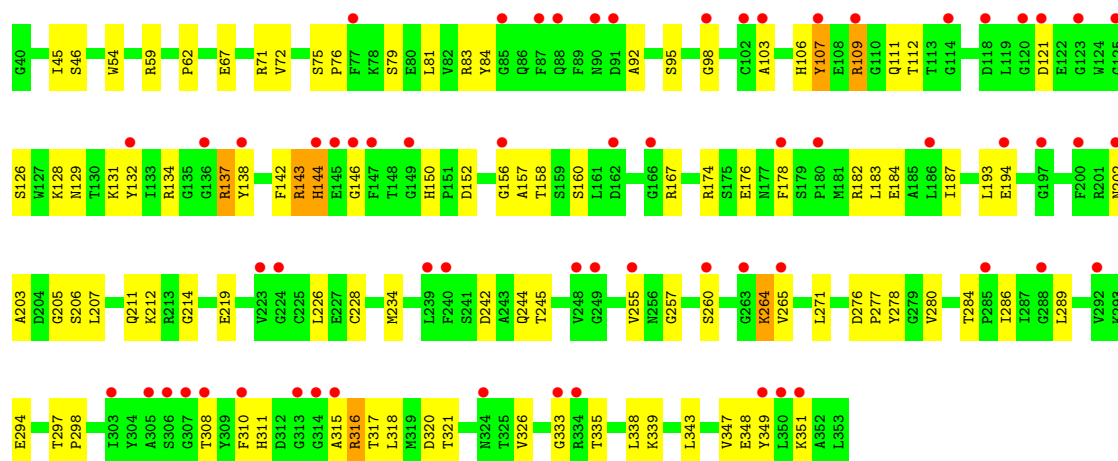
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: HYDRAZINE SYNTHASE ALPHA SUBUNIT



• Molecule 1: HYDRAZINE SYNTHASE ALPHA SUBUNIT





4 Data and refinement statistics

Property	Value	Source
Space group	H 3 2	Depositor
Cell constants a, b, c, α , β , γ	464.12Å 464.12Å 145.45Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	48.50 – 3.20 48.50 – 3.20	Depositor EDS
% Data completeness (in resolution range)	100.0 (48.50-3.20) 100.0 (48.50-3.20)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.91 (at 3.19Å)	Xtriage
Refinement program	PHENIX 1.9_1692	Depositor
R, R_{free}	0.231 , 0.267 0.237 , 0.271	Depositor DCC
R_{free} test set	4865 reflections (4.97%)	wwPDB-VP
Wilson B-factor (Å ²)	67.8	Xtriage
Anisotropy	0.505	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.30 , 54.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.90	EDS
Total number of atoms	23386	wwPDB-VP
Average B, all atoms (Å ²)	70.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.81% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: HEC, BET, CA, XE, CL, MG, ZN

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	0.27	0/6259	0.73	2/8503 (0.0%)
1	D	0.28	0/6266	0.76	2/8514 (0.0%)
2	B	0.31	0/2758	0.80	2/3752 (0.1%)
2	E	0.66	6/2744 (0.2%)	1.30	45/3737 (1.2%)
3	C	0.29	0/2522	0.76	3/3421 (0.1%)
3	F	0.33	0/2508	0.86	9/3406 (0.3%)
All	All	0.36	6/23057 (0.0%)	0.85	63/31333 (0.2%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
2	E	0	5

The worst 5 of 6 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	89	VAL	CA-CB	6.18	1.60	1.54
2	E	117	ASP	N-CA	5.74	1.53	1.46
2	E	136	ILE	CA-CB	-5.62	1.46	1.54
2	E	119	GLN	CA-C	5.40	1.60	1.52
2	E	119	GLN	N-CA	5.20	1.52	1.46

The worst 5 of 63 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	79	GLN	N-CA-C	17.10	135.39	110.59
2	E	90	GLN	CB-CA-C	-11.45	103.07	111.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	85	VAL	N-CA-C	10.57	125.12	108.85
2	E	120	ARG	CA-CB-CG	9.49	133.08	114.10
1	D	93	THR	N-CA-C	-9.46	100.31	112.23

There are no chirality outliers.

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	E	118	ILE	Peptide
2	E	119	GLN	Peptide
2	E	120	ARG	Peptide
2	E	42	VAL	Peptide
2	E	78	THR	Peptide

5.2 Too-close contacts ⓘ

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	6081	0	5782	81	0
1	D	6087	0	5784	101	0
2	B	2706	0	2675	54	0
2	E	2692	0	2642	183	0
3	C	2457	0	2324	49	0
3	F	2443	0	2290	90	0
4	A	2	0	0	1	0
4	D	2	0	0	0	0
5	A	2	0	0	3	0
5	D	1	0	0	1	0
6	A	2	0	0	0	0
6	B	1	0	0	0	0
6	C	3	0	0	0	0
6	D	2	0	0	0	0
6	E	1	0	0	0	0
6	F	3	0	0	0	0
7	A	1	0	0	0	0
7	D	1	0	0	0	0
8	A	86	0	60	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
8	C	86	0	59	5	0
8	D	86	0	60	6	0
8	F	86	0	59	7	0
9	A	24	0	33	0	0
9	B	8	0	11	0	0
9	C	8	0	11	0	0
9	D	8	0	11	0	0
9	E	8	0	11	0	0
10	B	1	0	0	0	0
10	E	1	0	0	0	0
11	A	163	0	0	2	0
11	B	59	0	0	2	0
11	C	88	0	0	6	0
11	D	112	0	0	4	0
11	E	30	0	0	1	0
11	F	45	0	0	5	0
All	All	23386	0	21812	523	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 12.

The worst 5 of 523 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)
3:F:228:CYS:SG	8:F:405:HEC:CAC	2.02	1.47
3:C:105:CYS:SG	8:C:404:HEC:CAC	2.04	1.46
2:E:120:ARG:HD3	2:E:122:GLN:H	1.00	1.09
2:E:88:ARG:HD2	2:E:110:SER:HB2	1.34	1.09
3:C:107:TYR:HD2	3:C:108:GLU:H	1.14	0.92

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	762/782 (97%)	728 (96%)	34 (4%)	0	100	100
1	D	764/782 (98%)	740 (97%)	24 (3%)	0	100	100
2	B	351/352 (100%)	344 (98%)	7 (2%)	0	100	100
2	E	351/352 (100%)	332 (95%)	16 (5%)	3 (1%)	14	47
3	C	312/314 (99%)	296 (95%)	16 (5%)	0	100	100
3	F	312/314 (99%)	294 (94%)	18 (6%)	0	100	100
All	All	2852/2896 (98%)	2734 (96%)	115 (4%)	3 (0%)	48	79

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	E	118	ILE
2	E	136	ILE
2	E	119	GLN

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all 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	641/653 (98%)	632 (99%)	9 (1%)	59	77
1	D	642/653 (98%)	635 (99%)	7 (1%)	65	79
2	B	303/302 (100%)	297 (98%)	6 (2%)	48	72
2	E	300/302 (99%)	283 (94%)	17 (6%)	18	51
3	C	262/264 (99%)	257 (98%)	5 (2%)	50	73
3	F	259/264 (98%)	253 (98%)	6 (2%)	44	70
All	All	2407/2438 (99%)	2357 (98%)	50 (2%)	47	71

5 of 50 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	E	85	VAL
2	E	167	LYS
3	F	316	ARG
2	E	88	ARG
2	E	126	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 36 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	678	GLN
3	F	150	HIS
1	D	736	ASN
2	E	79	GLN
3	C	337	HIS

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 38 ligands modelled in this entry, 23 are monoatomic - leaving 15 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
9	BET	B	403	-	7,7,7	2.52	1 (14%)	10,10,10	1.98	2 (20%)
9	BET	A	909	-	7,7,7	2.55	1 (14%)	10,10,10	1.87	2 (20%)
8	HEC	A	908	1	50,50,50	1.77	6 (12%)	68,82,82	1.43	7 (10%)
8	HEC	A	907	1,7	50,50,50	1.86	5 (10%)	68,82,82	1.37	5 (7%)
8	HEC	D	907	1,7	50,50,50	1.84	5 (10%)	68,82,82	1.40	5 (7%)
8	HEC	D	908	1	50,50,50	1.81	5 (10%)	68,82,82	1.42	6 (8%)
9	BET	A	911	-	7,7,7	2.51	1 (14%)	10,10,10	1.93	2 (20%)
9	BET	D	909	-	7,7,7	2.57	1 (14%)	10,10,10	1.94	2 (20%)
9	BET	A	910	-	7,7,7	2.53	1 (14%)	10,10,10	1.95	2 (20%)
8	HEC	F	404	11,3	50,50,50	1.79	6 (12%)	68,82,82	1.35	5 (7%)
8	HEC	C	405	3	50,50,50	1.80	6 (12%)	68,82,82	1.37	5 (7%)
9	BET	E	403	-	7,7,7	2.47	1 (14%)	10,10,10	1.96	2 (20%)
9	BET	C	406	-	7,7,7	2.54	1 (14%)	10,10,10	1.87	2 (20%)
8	HEC	C	404	11,3	50,50,50	1.80	6 (12%)	68,82,82	1.36	5 (7%)
8	HEC	F	405	3	50,50,50	1.83	5 (10%)	68,82,82	1.33	6 (8%)

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
9	BET	B	403	-	-	5/5/5/5	-
9	BET	A	909	-	-	5/5/5/5	-
8	HEC	A	908	1	1/1/3/7	4/14/54/54	-
8	HEC	D	907	1,7	1/1/3/7	4/14/54/54	-
8	HEC	D	908	1	1/1/3/7	6/14/54/54	-
8	HEC	A	907	1,7	-	4/14/54/54	-
9	BET	A	911	-	-	5/5/5/5	-
9	BET	D	909	-	-	5/5/5/5	-
9	BET	A	910	-	-	5/5/5/5	-
8	HEC	F	404	11,3	1/1/3/7	2/14/54/54	-
8	HEC	C	405	3	1/1/3/7	2/14/54/54	-
9	BET	E	403	-	-	5/5/5/5	-
9	BET	C	406	-	-	5/5/5/5	-
8	HEC	C	404	11,3	1/1/3/7	4/14/54/54	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
8	HEC	F	405	3	1/1/3/7	0/14/54/54	-

The worst 5 of 51 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	F	404	HEC	C3D-C2D	8.15	1.54	1.36
8	C	405	HEC	C3D-C2D	8.09	1.53	1.36
8	D	908	HEC	C3D-C2D	8.08	1.53	1.36
8	F	405	HEC	C3D-C2D	8.08	1.53	1.36
8	D	907	HEC	C3D-C2D	8.03	1.53	1.36

The worst 5 of 58 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	C	404	HEC	C1D-ND-C4D	6.57	111.86	105.07
8	D	908	HEC	C1D-ND-C4D	6.57	111.86	105.07
8	F	404	HEC	C1D-ND-C4D	6.37	111.66	105.07
8	A	908	HEC	C1D-ND-C4D	6.37	111.65	105.07
8	C	405	HEC	C1D-ND-C4D	6.28	111.56	105.07

5 of 7 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
8	A	908	HEC	NA
8	C	404	HEC	NA
8	C	405	HEC	NA
8	D	907	HEC	NA
8	D	908	HEC	NA

5 of 61 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
9	A	909	BET	C-CA-N-C2
9	A	909	BET	O-C-CA-N
9	A	909	BET	OXT-C-CA-N
9	A	910	BET	O-C-CA-N
9	A	910	BET	OXT-C-CA-N

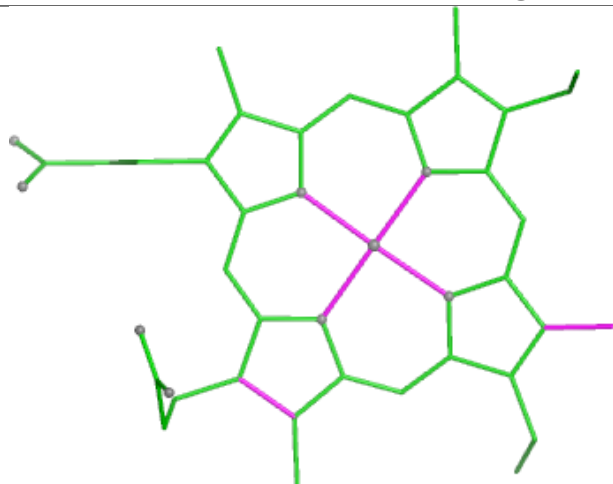
There are no ring outliers.

6 monomers are involved in 21 short contacts:

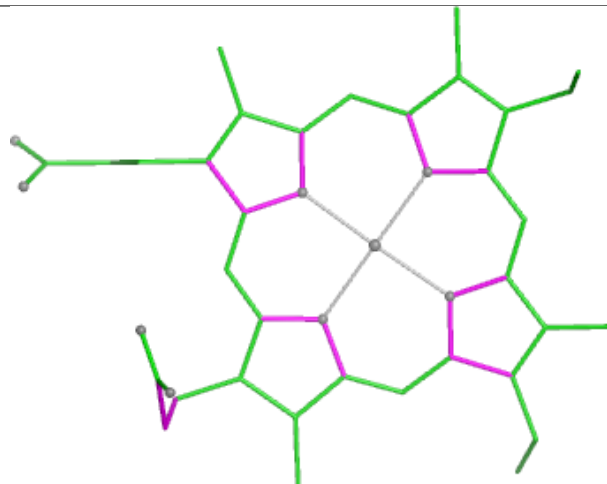
Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	A	908	HEC	3	0
8	D	907	HEC	2	0
8	D	908	HEC	4	0
8	F	404	HEC	4	0
8	C	404	HEC	5	0
8	F	405	HEC	3	0

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.

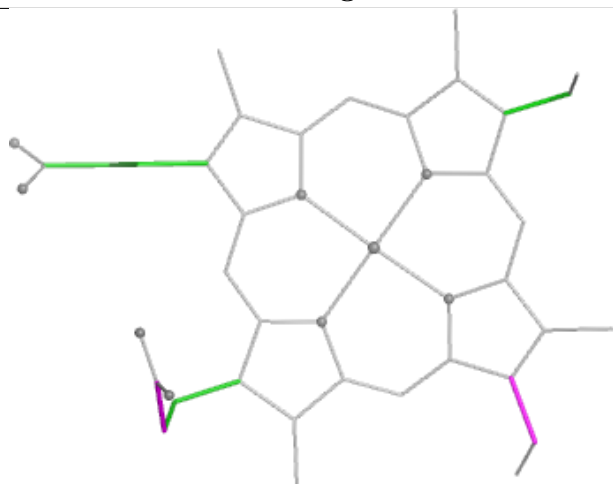
Ligand HEC A 908



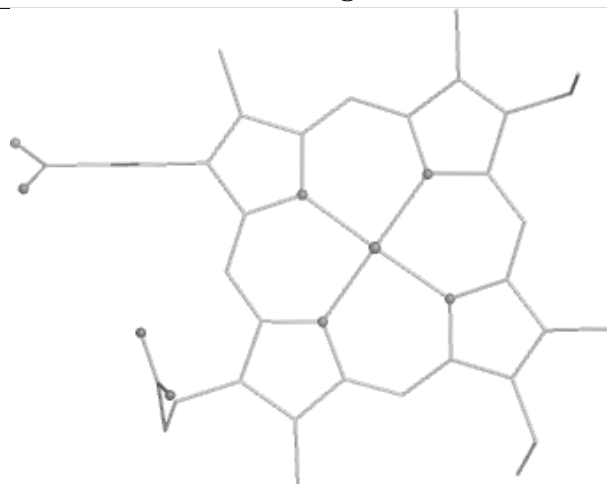
Bond lengths



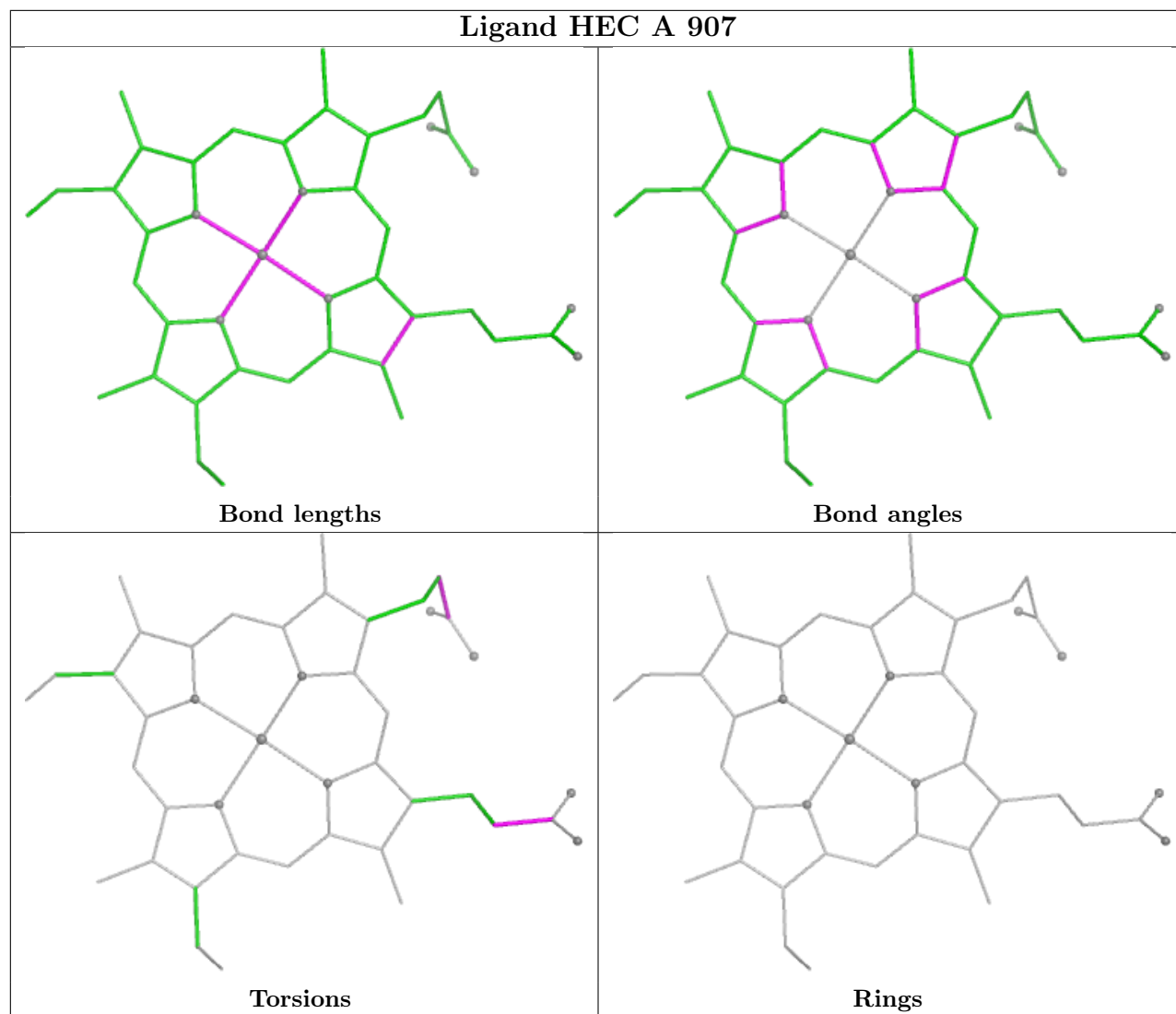
Bond angles

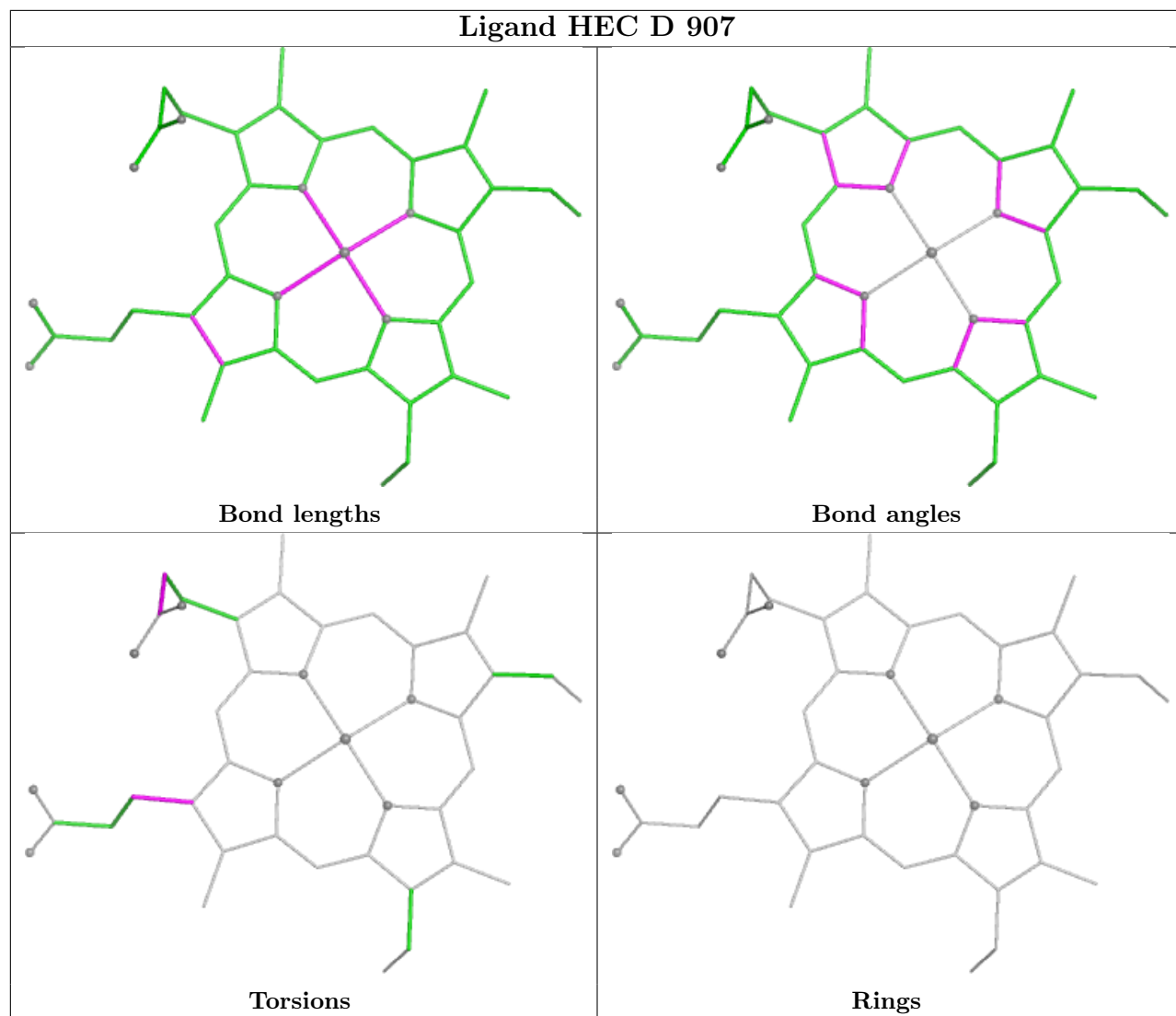


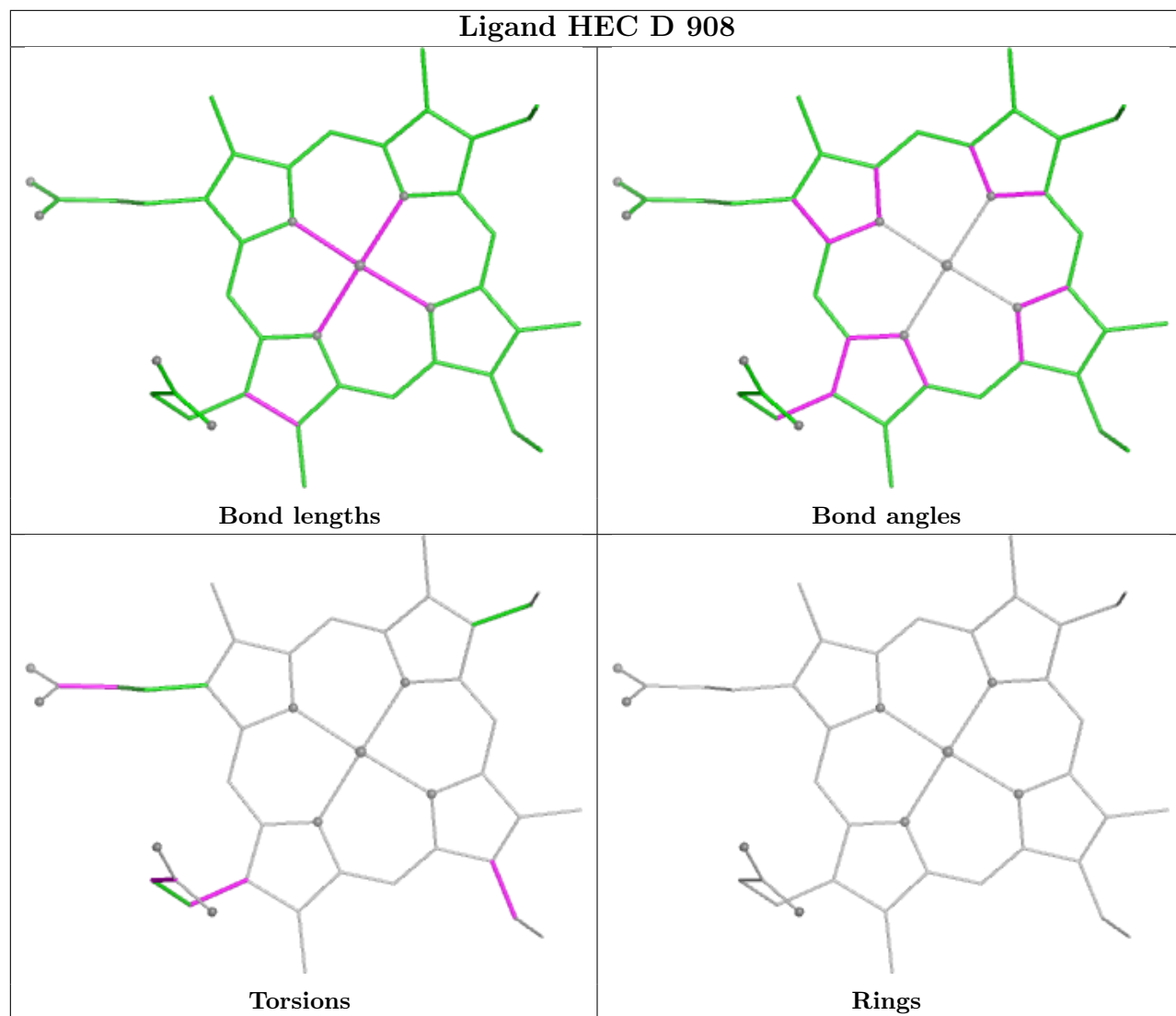
Torsions



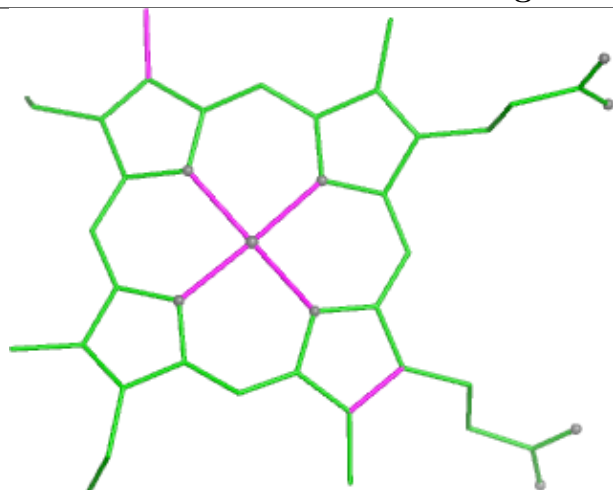
Rings



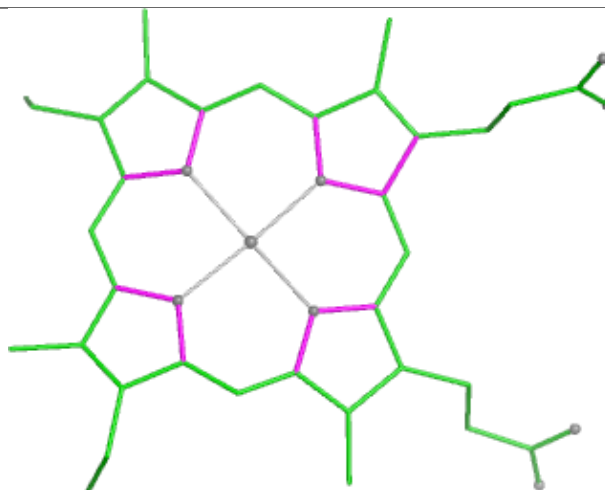




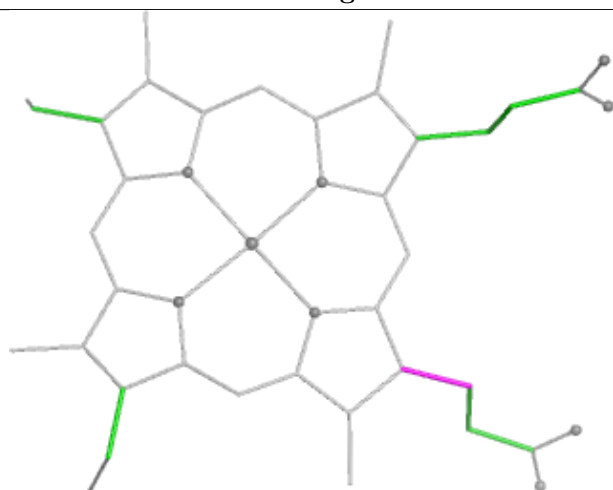
Ligand HEC F 404



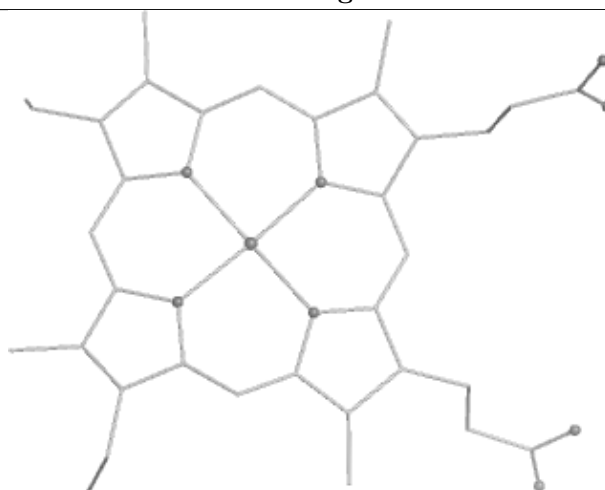
Bond lengths



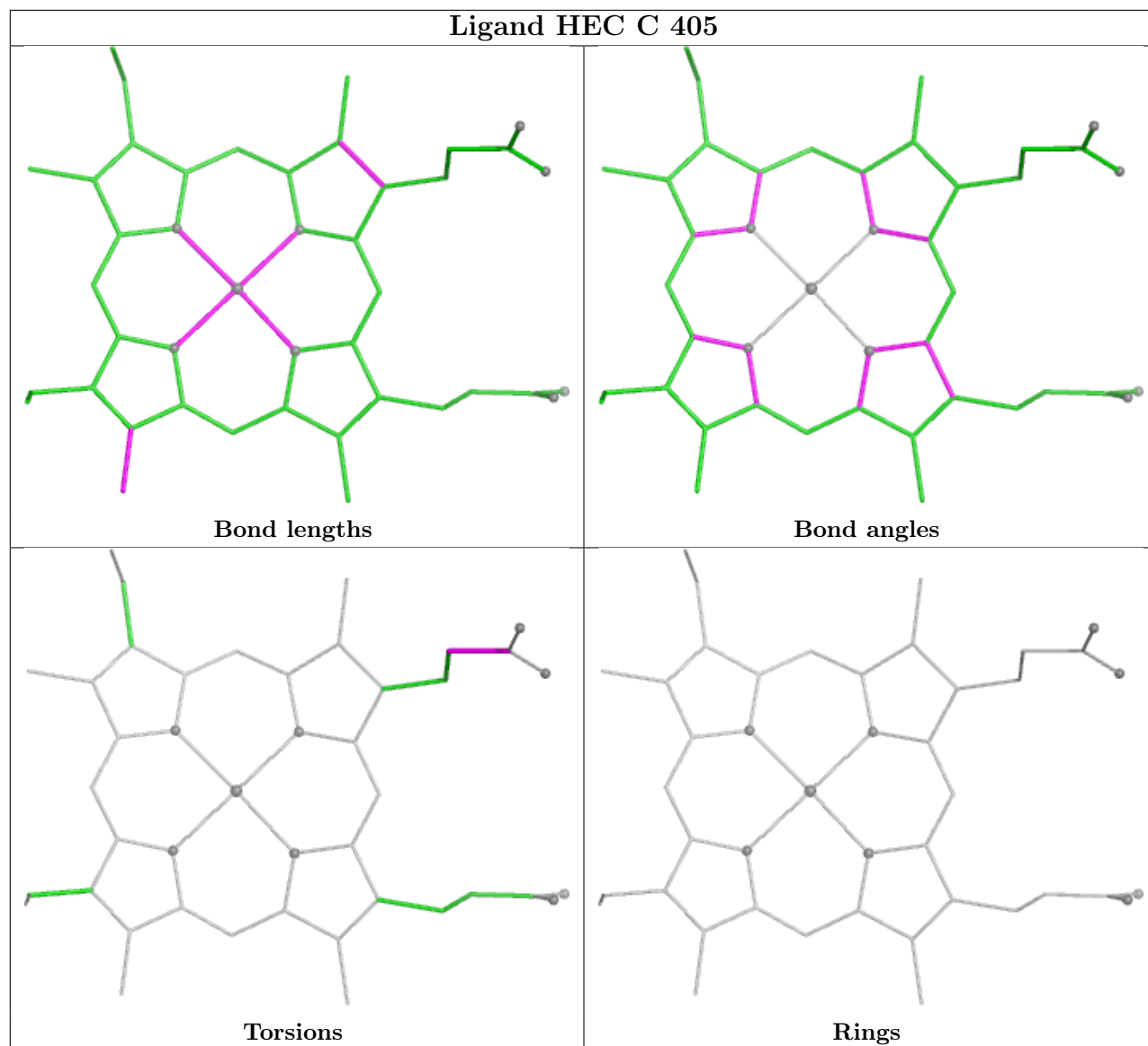
Bond angles

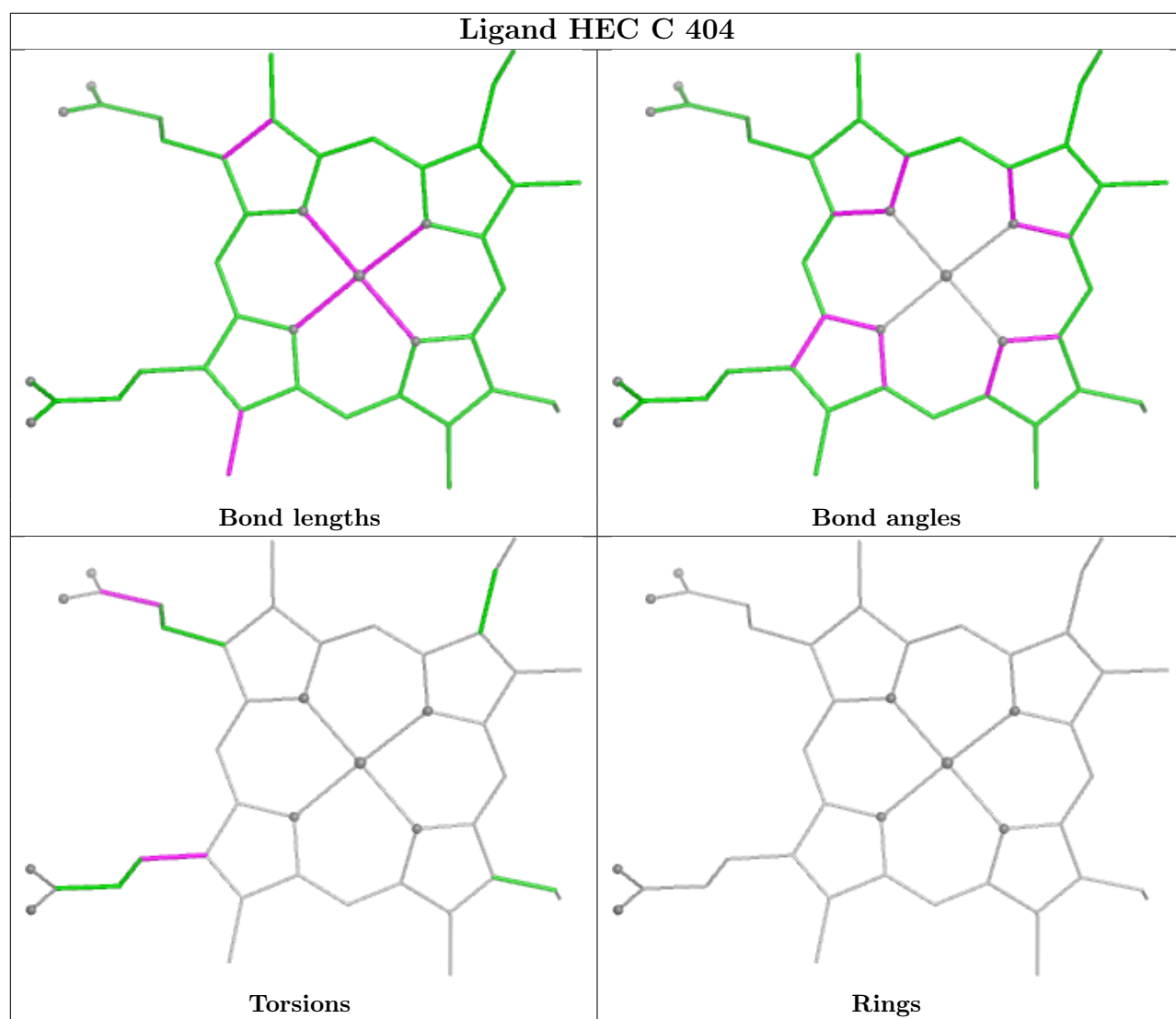


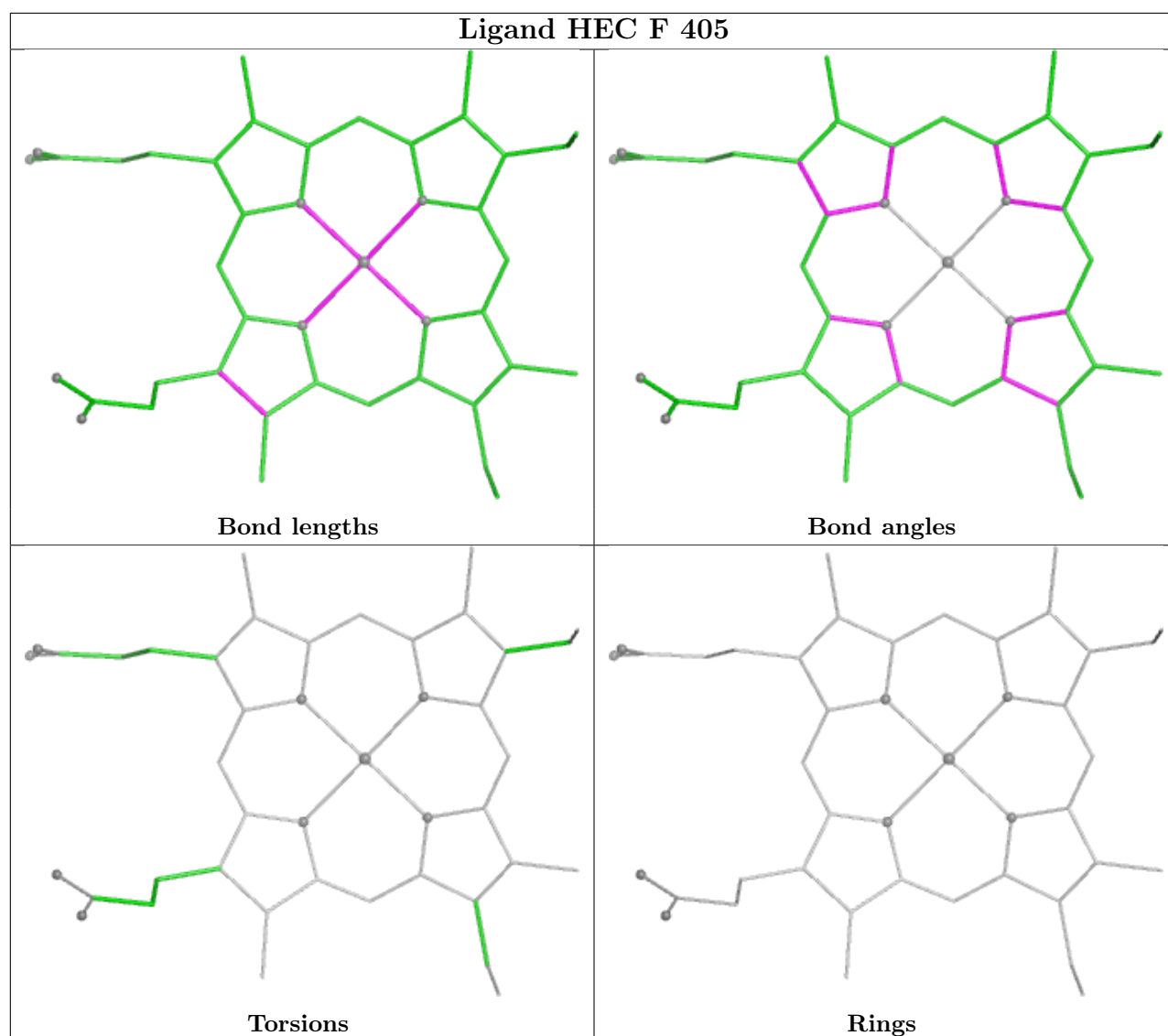
Torsions



Rings







5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 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, 95th 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 ²)	Q<0.9
1	A	768/782 (98%)	0.27	10 (1%) 75 55	35, 60, 83, 111	0
1	D	770/782 (98%)	0.70	40 (5%) 33 21	42, 70, 94, 113	0
2	B	352/352 (100%)	0.54	5 (1%) 73 54	30, 65, 85, 102	1 (0%)
2	E	352/352 (100%)	1.38	81 (23%) 2 2	31, 90, 117, 136	1 (0%)
3	C	314/314 (100%)	0.49	10 (3%) 50 31	41, 63, 85, 95	0
3	F	314/314 (100%)	1.38	63 (20%) 3 2	60, 86, 105, 116	0
All	All	2870/2896 (99%)	0.70	209 (7%) 21 13	30, 70, 100, 136	2 (0%)

The worst 5 of 209 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	E	35	GLY	6.0
3	F	307	GLY	5.3
2	B	109	GLU	5.2
3	F	107	TYR	4.4
2	E	134	SER	4.3

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 oligosaccharides in this entry.

6.4 Ligands ⓘ

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, 95th 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 ²)	Q<0.9
4	XE	D	901	1/1	0.72	0.54	250,250,250,250	0
9	BET	D	909	8/8	0.83	0.23	76,85,90,93	0
9	BET	A	911	8/8	0.85	0.18	68,75,85,90	0
9	BET	C	406	8/8	0.88	0.16	58,70,75,78	0
9	BET	A	909	8/8	0.88	0.20	40,72,83,91	0
6	CA	F	401	1/1	0.89	0.12	91,91,91,91	0
6	CA	C	403	1/1	0.90	0.10	54,54,54,54	0
5	CL	D	903	1/1	0.90	0.12	61,61,61,61	0
9	BET	A	910	8/8	0.91	0.15	68,71,78,85	0
8	HEC	F	405	43/43	0.92	0.17	62,90,103,105	0
9	BET	B	403	8/8	0.92	0.17	40,46,59,70	0
6	CA	C	401	1/1	0.92	0.09	57,57,57,57	0
6	CA	F	403	1/1	0.92	0.07	73,73,73,73	0
4	XE	D	902	1/1	0.93	0.21	178,178,178,178	0
6	CA	F	402	1/1	0.93	0.08	82,82,82,82	0
6	CA	A	905	1/1	0.93	0.07	80,80,80,80	0
5	CL	A	903[A]	1/1	0.93	0.27	17,17,17,17	1
5	CL	A	903[B]	1/1	0.93	0.27	39,39,39,39	1
9	BET	E	403	8/8	0.93	0.14	58,69,81,81	0
10	MG	E	401	1/1	0.94	0.11	53,53,53,53	0
8	HEC	F	404	43/43	0.95	0.16	52,77,99,100	0
4	XE	A	901	1/1	0.96	0.12	127,127,127,127	0
6	CA	B	402	1/1	0.96	0.07	68,68,68,68	0
6	CA	E	402	1/1	0.96	0.08	90,90,90,90	0
8	HEC	C	405	43/43	0.96	0.11	48,69,77,82	0
10	MG	B	401	1/1	0.96	0.09	30,30,30,30	0
8	HEC	D	907	43/43	0.96	0.12	41,62,80,82	0
8	HEC	A	907	43/43	0.97	0.09	31,45,55,56	0
8	HEC	C	404	43/43	0.97	0.11	37,52,69,77	0
6	CA	A	904	1/1	0.97	0.06	75,75,75,75	0
8	HEC	D	908	43/43	0.98	0.09	35,54,67,77	0
6	CA	C	402	1/1	0.98	0.05	70,70,70,70	0
8	HEC	A	908	43/43	0.98	0.09	39,57,68,71	0
4	XE	A	902	1/1	0.98	0.04	81,81,81,81	0
6	CA	D	904	1/1	0.98	0.04	70,70,70,70	0
6	CA	D	905	1/1	0.98	0.05	84,84,84,84	0
7	ZN	A	906	1/1	0.99	0.05	54,54,54,54	0

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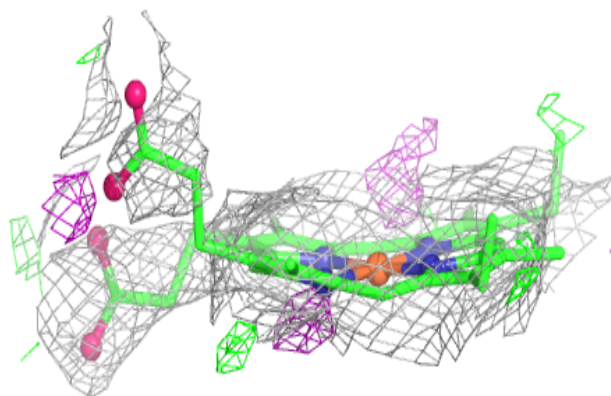
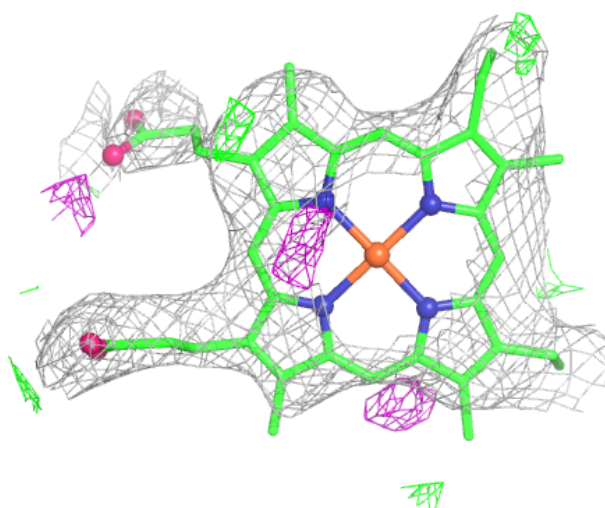
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
7	ZN	D	906	1/1	1.00	0.05	55,55,55,55	0

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.

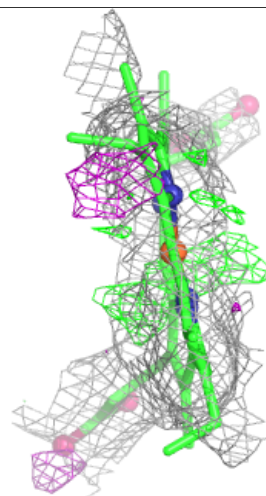
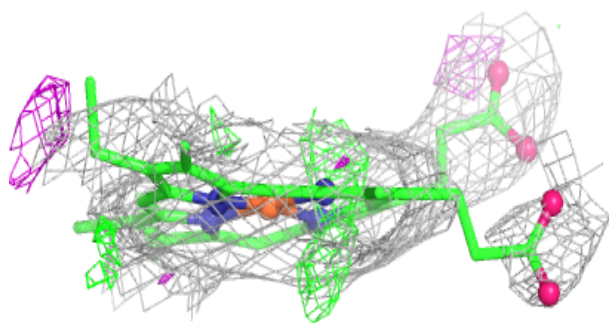
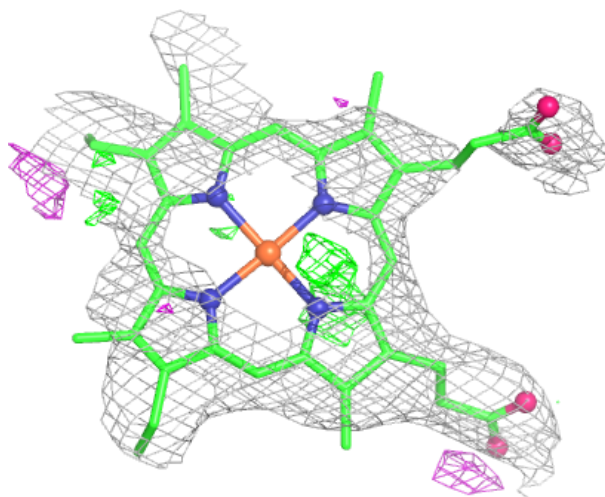
Electron density around HEC F 405:

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



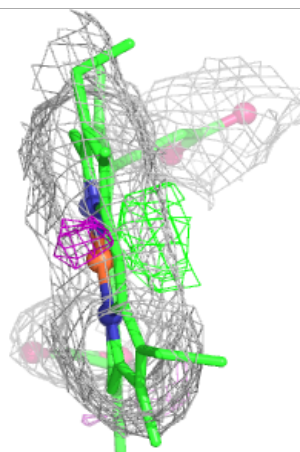
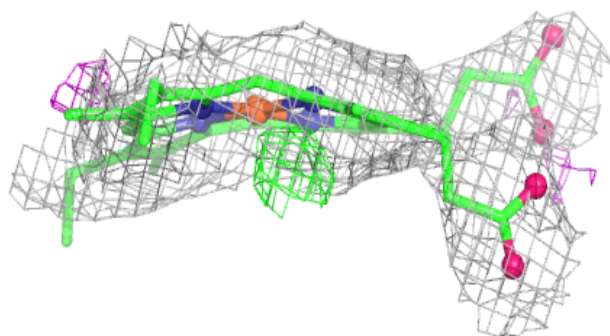
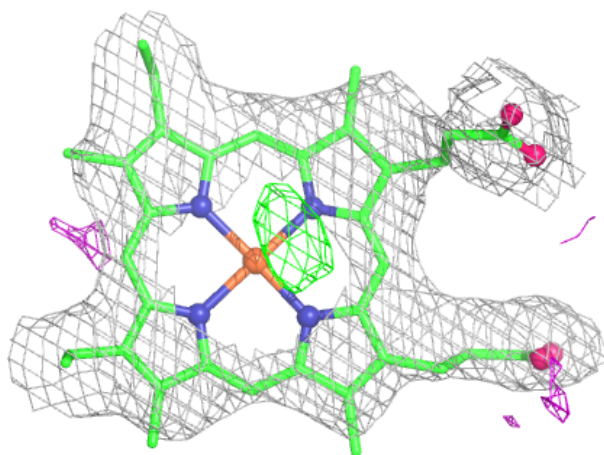
Electron density around HEC F 404:

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



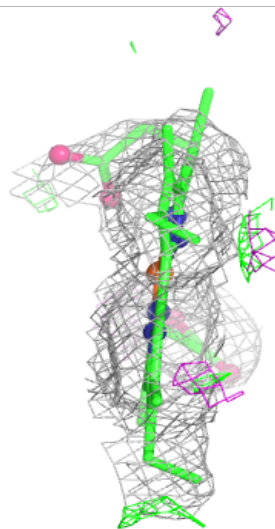
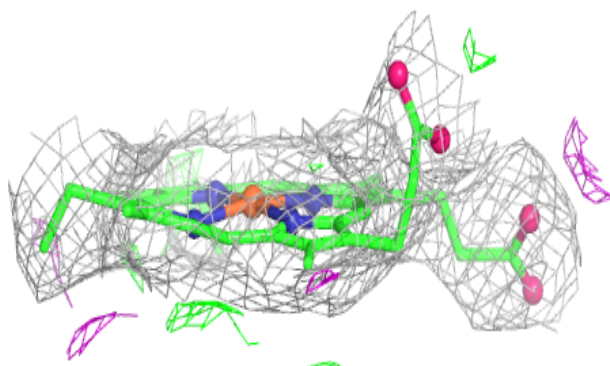
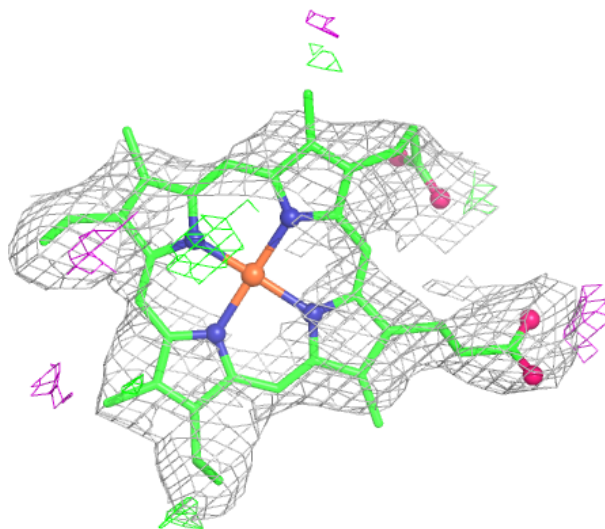
Electron density around HEC C 405:

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and green (positive)



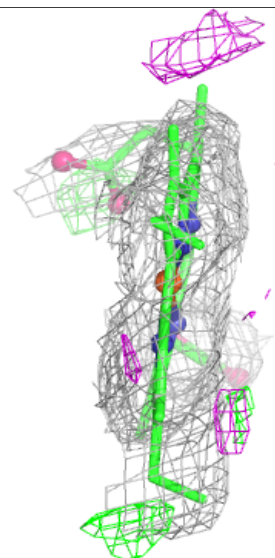
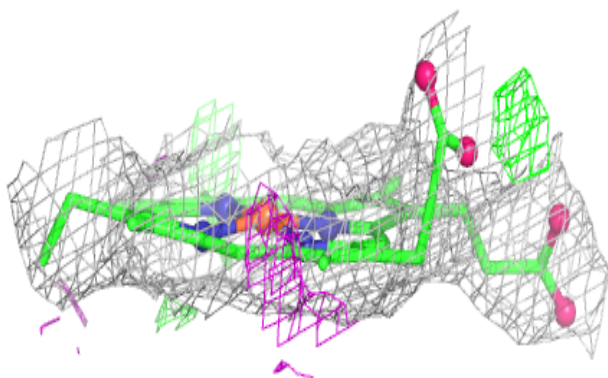
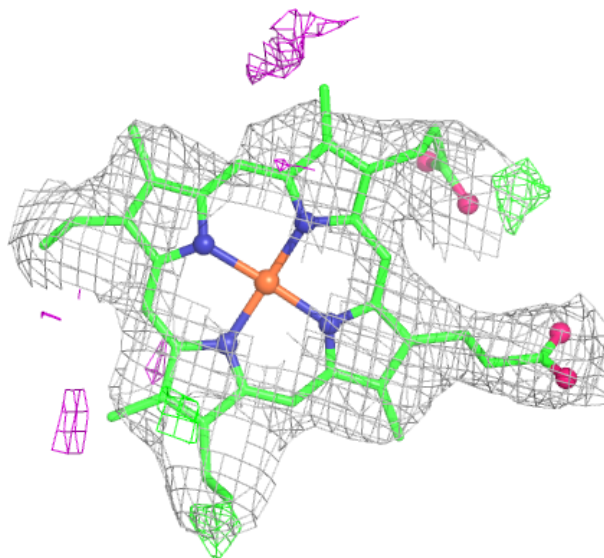
Electron density around HEC D 907:

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and green (positive)



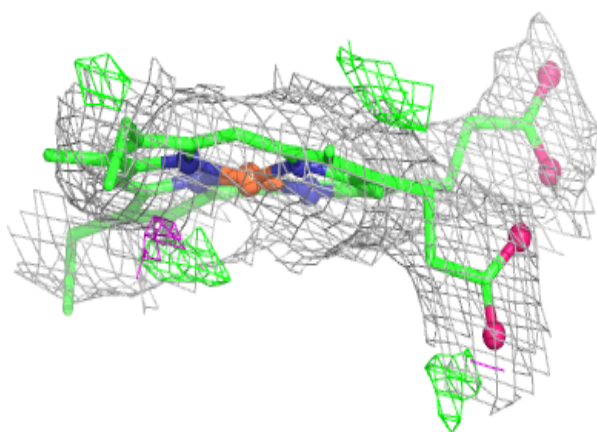
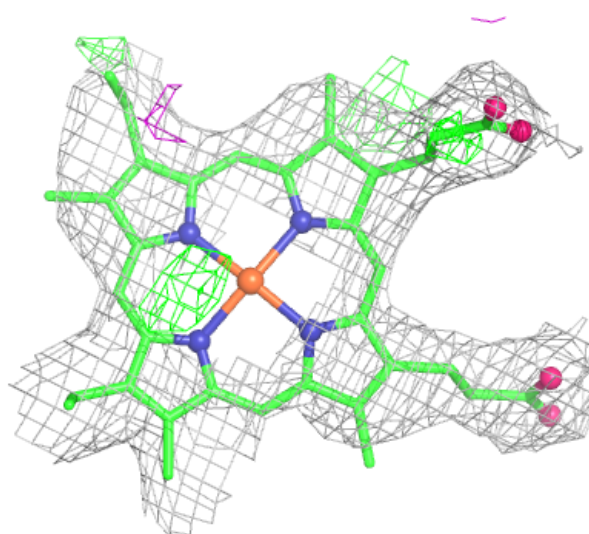
Electron density around HEC A 907:

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and green (positive)



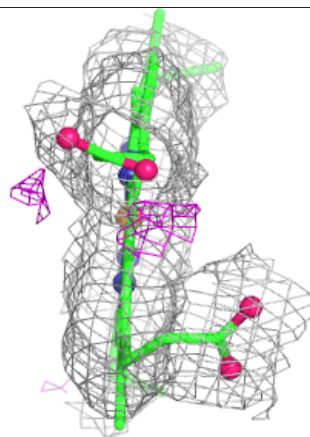
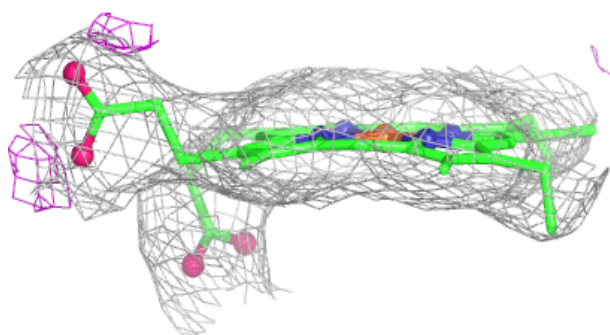
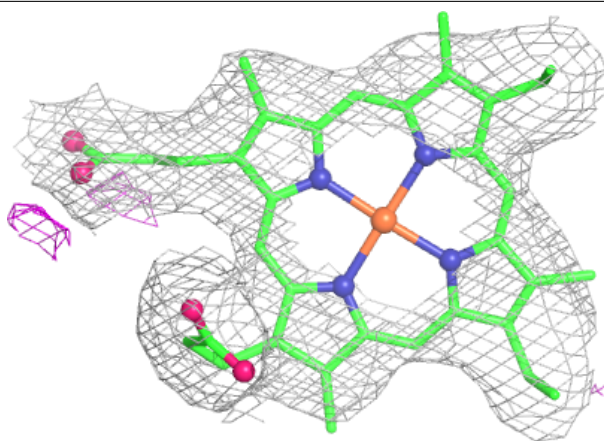
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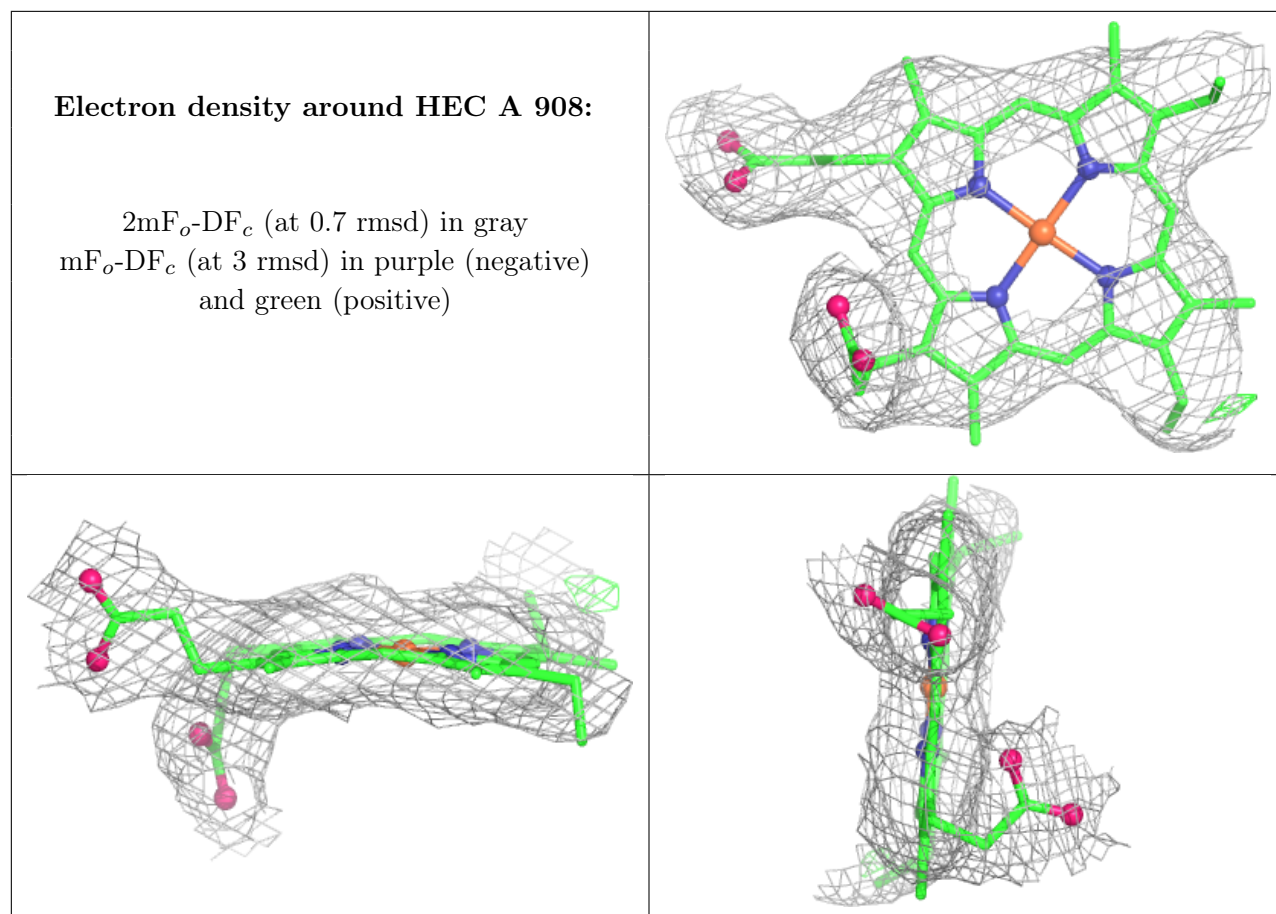
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mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around HEC D 908:

$2mF_o-DF_c$ (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.