



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 2, 2025 – 12:18 PM EDT

PDB ID : 9Q4I / pdb_00009q4i
Title : Structure of human neuronal nitric oxide synthase R354A/G357D mutant heme domain bound with 6-((5-(2-(ethyl(methyl)amino)ethyl)-2,3-difluorophenyl)methyl)-4-methylpyridin-2-amine
Authors : Li, H.; Poulos, T.L.
Deposited on : 2025-08-20
Resolution : 2.09 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	:	4-5-2 with Phenix2.0rc1
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.45.1

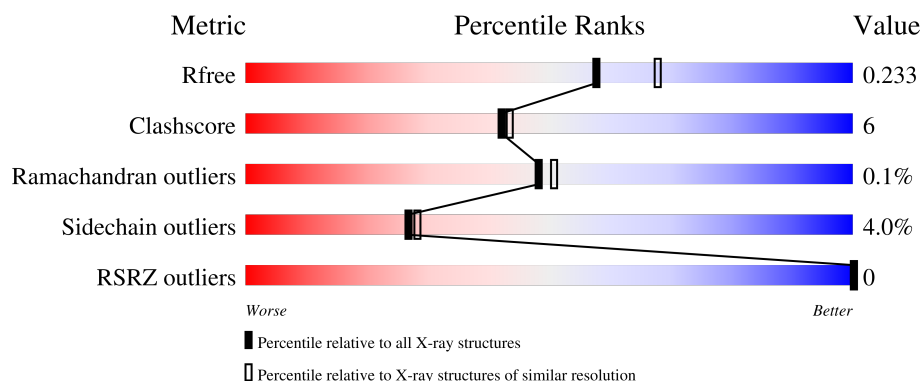
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION





The reported resolution of this entry is 2.09 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}	164625	6234 (2.10-2.10)
Clashscore	180529	6893 (2.10-2.10)
Ramachandran outliers	177936	6839 (2.10-2.10)
Sidechain outliers	177891	6840 (2.10-2.10)
RSRZ outliers	164620	6234 (2.10-2.10)

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	423	 82% 16% ..
1	B	423	 83% 14% ..
1	C	423	 82% 16% ..
1	D	423	 81% 16% .

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 14852 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, brain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	419	Total	C	N	O	S	0	4	0
			3432	2195	589	627	21			
1	B	413	Total	C	N	O	S	0	2	0
			3371	2161	574	615	21			
1	C	418	Total	C	N	O	S	0	3	0
			3417	2186	585	625	21			
1	D	410	Total	C	N	O	S	0	2	0
			3349	2147	571	610	21			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	354	ALA	ARG	engineered mutation	UNP P29475
A	357	ASP	GLY	engineered mutation	UNP P29475
A	723	LEU	-	expression tag	UNP P29475
A	724	VAL	-	expression tag	UNP P29475
B	354	ALA	ARG	engineered mutation	UNP P29475
B	357	ASP	GLY	engineered mutation	UNP P29475
B	723	LEU	-	expression tag	UNP P29475
B	724	VAL	-	expression tag	UNP P29475
C	354	ALA	ARG	engineered mutation	UNP P29475
C	357	ASP	GLY	engineered mutation	UNP P29475
C	723	LEU	-	expression tag	UNP P29475
C	724	VAL	-	expression tag	UNP P29475
D	354	ALA	ARG	engineered mutation	UNP P29475
D	357	ASP	GLY	engineered mutation	UNP P29475
D	723	LEU	-	expression tag	UNP P29475
D	724	VAL	-	expression tag	UNP P29475

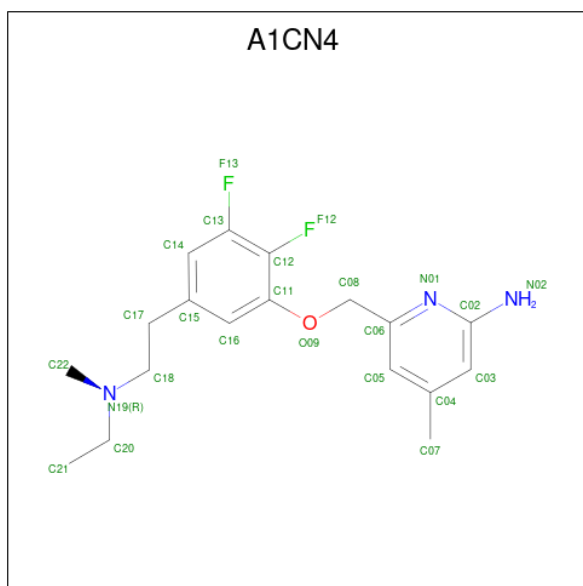
- Molecule 2 is PROTOPORPHYRIN IX CONTAINING FE (CCD ID: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).



-
- The chemical structure of H4B (Hydroxybutyrate) is shown with stereochemistry. The molecule consists of a four-carbon chain with a carboxylate group at the end. The stereochemistry is indicated by wedges and dashes: the hydroxyl group on the second carbon is on a wedge, and the hydroxyl group on the third carbon is on a dash. The atoms are numbered as follows: C1 (carboxyl carbon), C2 (alpha carbon), C3 (beta carbon), and C4 (gamma carbon). The hydroxyl groups are labeled O1 and O2. The carboxylate group is labeled O3 and O4. The nitrogen atom is labeled N1. The hydrogen atoms are labeled H1, H2, H3, H4, H5, H6, H7, H8, H9, H10, H11, H12, H13, H14, H15, H16, H17, H18, H19, H20, H21, H22, H23, H24, H25, H26, H27, H28, H29, H30, H31, H32, H33, H34, H35, H36, H37, H38, H39, H40, H41, H42, H43, H44, H45, H46, H47, H48, H49, H50, H51, H52, H53, H54, H55, H56, H57, H58, H59, H60, H61, H62, H63, H64, H65, H66, H67, H68, H69, H70, H71, H72, H73, H74, H75, H76, H77, H78, H79, H80, H81, H82, H83, H84, H85, H86, H87, H88, H89, H90, H91, H92, H93, H94, H95, H96, H97, H98, H99, H100, H101, H102, H103, H104, H105, H106, H107, H108, H109, H110, H111, H112, H113, H114, H115, H116, H117, H118, H119, H120, H121, H122, H123, H124, H125, H126, H127, H128, H129, H130, H131, H132, H133, H134, H135, H136, H137, H138, H139, H140, H141, H142, H143, H144, H145, H146, H147, H148, H149, H150, H151, H152, H153, H154, H155, H156, H157, H158, H159, H160, H161, H162, H163, H164, H165, H166, H167, H168, H169, H170, H171, H172, H173, H174, H175, H176, H177, H178, H179, H180, H181, H182, H183, H184, H185, H186, H187, H188, H189, H190, H191, H192, H193, H194, H195, H196, H197, H198, H199, H200, H201, H202, H203, H204, H205, H206, H207, H208, H209, H210, H211, H212, H213, H214, H215, H216, H217, H218, H219, H220, H221, H222, H223, H224, H225, H226, H227, H228, H229, H230, H231, H232, H233, H234, H235, H236, H237, H238, H239, H240, H241, H242, H243, H244, H245, H246, H247, H248, H249, H250, H251, H252, H253, H254, H255, H256, H257, H258, H259, H260, H261, H262, H263, H264, H265, H266, H267, H268, H269, H270, H271, H272, H273, H274, H275, H276, H277, H278, H279, H280, H281, H282, H283, H284, H285, H286, H287, H288, H289, H290, H291, H292, H293, H294, H295, H296, H297, H298, H299, H300, H301, H302, H303, H304, H305, H306, H307, H308, H309, H310, H311, H312, H313, H314, H315, H316, H317, H318, H319, H320, H321, H322, H323, H324, H325, H326, H327, H328, H329, H330, H331, H332, H333, H334, H335, H336, H337, H338, H339, H340, H341, H342, H343, H344, H345, H346, H347, H348, H349, H350, H351, H352, H353, H354, H355, H356, H357, H358, H359, H360, H361, H362, H363, H364, H365, H366, H367, H368, H369, H370, H371, H372, H373, H374, H375, H376, H377, H378, H379, H380, H381, H382, H383, H384, H385, H386, H387, H388, H389, H390, H391, H392, H393, H394, H395, H396, H397, H398, H399, H400, H401, H402, H403, H404, H405, H406, H407, H408, H409, H410, H411, H412, H413, H414, H415, H416, H417, H418, H419, H420, H421, H422, H423, H424, H425, H426, H427, H428, H429, H430, H431, H432, H433, H434, H435, H436, H437, H438, H439, H440, H441, H442, H443, H444, H445, H446, H447, H448, H449, H450, H451, H452, H453, H454, H455, H456, H457, H458, H459, H460, H461, H462, H463, H464, H465, H466, H467, H468, H469, H470, H471, H472, H473, H474, H475, H476, H477, H478, H479, H480, H481, H482, H483, H484, H485, H486, H487, H488, H489, H490, H491, H492, H493, H494, H495, H496, H497, H498, H499, H500, H501, H502, H503, H504, H505, H506, H507, H508, H509, H510, H511, H512, H513, H514, H515, H516, H517, H518, H519, H520, H521, H522, H523, H524, H525, H526, H527, H528, H529, H530, H531, H532, H533, H534, H535, H536, H537, H538, H539, H540, H541, H542, H543, H544, H545, H546, H547, H548, H549, H550, H551, H552, H553, H554, H555, H556, H557, H558, H559, H560, H561, H562, H563, H564, H565, H566, H567, H568, H569, H570, H571, H572, H573, H574, H575, H576, H577, H578, H579, H580, H581, H582, H583, H584, H585, H586, H587, H588, H589, H590, H591, H592, H593, H594, H595, H596, H597, H598, H599, H600, H601, H602, H603, H604, H605, H606, H607, H608, H609, H610, H611, H612, H613, H614, H615, H616, H617, H618, H619, H620, H621, H622, H623, H624, H625, H626, H627, H628, H629, H630, H631, H632, H633, H634, H635, H636, H637, H638, H639, H640, H641, H642, H643, H644, H645, H646, H647, H648, H649, H650, H651, H652, H653, H654, H655, H656, H657, H658, H659, H660, H661, H662, H663, H664, H665, H666, H667, H668, H669, H670, H671, H672, H673, H674, H675, H676, H677, H678, H679, H680, H681, H682, H683, H684, H685, H686, H687, H688, H689, H690, H691, H692, H693, H694, H695, H696, H697, H698, H699, H700, H701, H702, H703, H704, H705, H706, H707, H708, H709, H710, H711, H712, H713, H714, H715, H716, H717, H718, H719, H720, H721, H722, H723, H724, H725, H726, H727, H728, H729, H730, H731, H732, H733, H734, H735, H736, H737, H738, H739, H740, H741, H742, H743, H744, H745, H746, H747, H748, H749, H750, H751, H752, H753, H754, H755, H756, H757, H758, H759, H760, H761, H762, H763, H764, H765, H766, H767, H768, H769, H770, H771, H772, H773, H774, H775, H776, H777, H778, H779, H780, H781, H782, H783, H784, H785, H786, H787, H788, H789, H790, H791, H792, H793, H794, H795, H796, H797, H798, H799, H800, H801, H802, H803, H804, H8

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			17	9	5	3		
3	A	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 6-[(5-{2-[ethyl(methyl)amino]ethyl}-2,3-difluorophenoxy)methyl]-4-methylpyridin-2-amine (CCD ID: A1CN4) (formula: $C_{18}H_{23}F_2N_3O$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	F	N	O	0	1
			48	36	4	6	2		
4	B	1	Total	C	F	N	O	0	1
			48	36	4	6	2		
4	C	1	Total	C	F	N	O	0	1
			48	36	4	6	2		
4	D	1	Total	C	F	N	O	0	1
			48	36	4	6	2		

- Molecule 5 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



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

- Molecule 6 is ZINC ION (CCD ID: ZN) (formula: Zn).

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

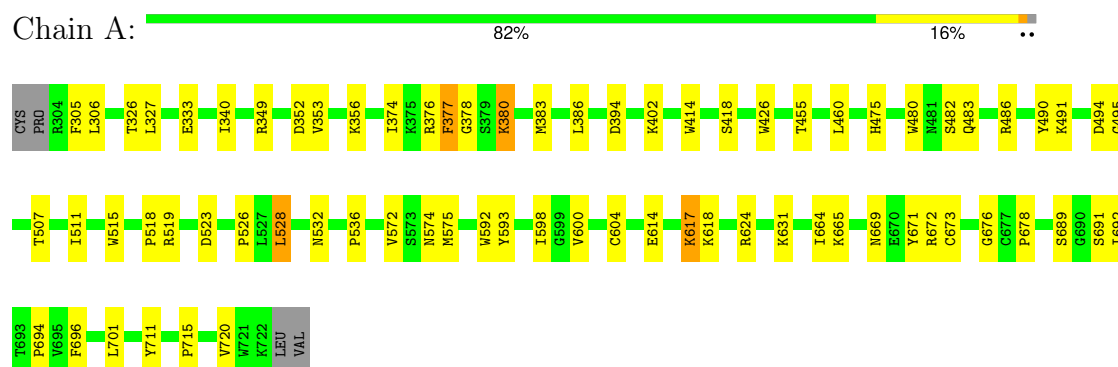
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	195	Total 195	O 195	0	0
7	B	222	Total 222	O 222	0	0
7	C	178	Total 178	O 178	0	0
7	D	212	Total 212	O 212	0	0

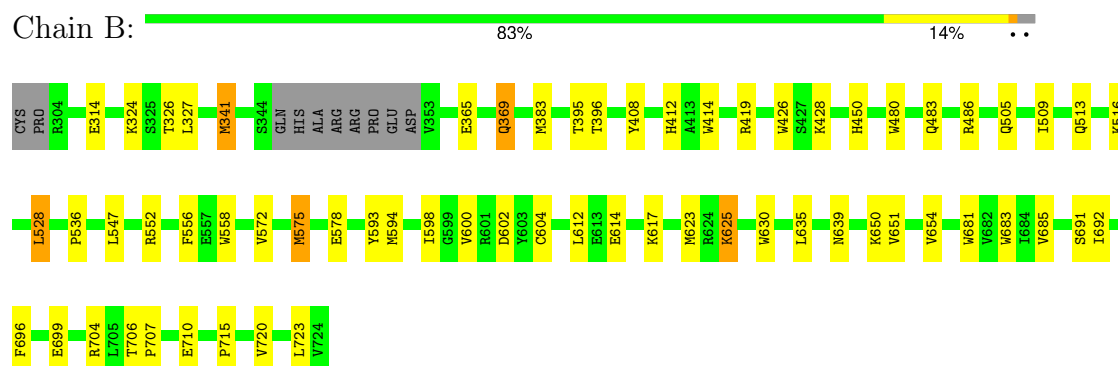
3 Residue-property plots

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.

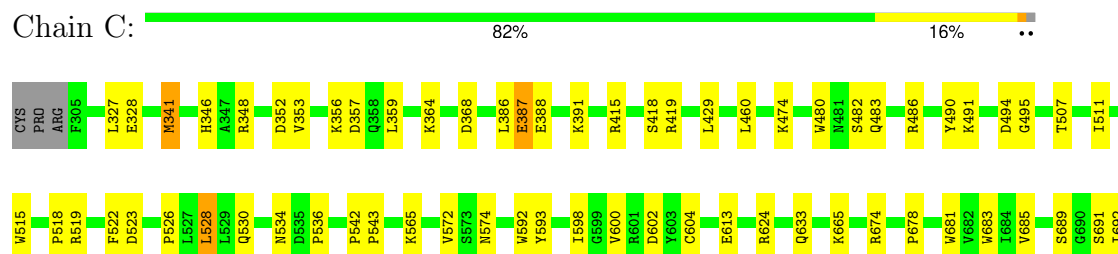
- Molecule 1: Nitric oxide synthase, brain



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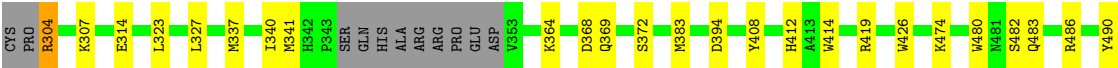
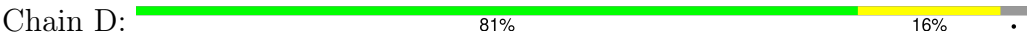


- Molecule 1: Nitric oxide synthase, brain





● Molecule 1: Nitric oxide synthase, brain



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	51.98Å 163.28Å 117.59Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.54 – 2.09 47.54 – 2.09	Depositor EDS
% Data completeness (in resolution range)	98.3 (47.54-2.09) 98.4 (47.54-2.09)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.09 (at 2.08Å)	Xtriage
Refinement program	PHENIX (1.11.1_2575: ???)	Depositor
R, R_{free}	0.185 , 0.237 0.180 , 0.233	Depositor DCC
R_{free} test set	5733 reflections (3.34%)	wwPDB-VP
Wilson B-factor (Å ²)	36.5	Xtriage
Anisotropy	0.835	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 38.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.35$	Xtriage
Estimated twinning fraction	0.470 for h,-k,-l	Xtriage
F_o, F_c correlation	0.98	EDS
Total number of atoms	14852	wwPDB-VP
Average B, all atoms (Å ²)	48.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.08% 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: A1CN4, GOL, H4B, ZN, HEM

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	0.30	0/3542	0.49	0/4808
1	B	0.34	0/3472	0.52	0/4710
1	C	0.29	0/3524	0.46	0/4783
1	D	0.32	0/3450	0.49	0/4681
All	All	0.31	0/13988	0.49	0/18982

There are no bond length outliers.

There are no bond angle outliers.

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	3432	0	3347	44	0
1	B	3371	0	3291	37	0
1	C	3417	0	3327	42	0
1	D	3349	0	3266	37	0
2	A	43	0	30	4	0
2	B	43	0	30	5	0
2	C	43	0	30	3	0
2	D	43	0	30	7	0
3	A	34	0	30	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	C	17	0	15	0	0
3	D	17	0	15	0	0
4	A	48	0	0	7	0
4	B	48	0	0	4	0
4	C	48	0	0	3	0
4	D	48	0	0	4	0
5	A	12	0	16	0	0
5	B	12	0	16	1	0
5	C	12	0	16	1	0
5	D	6	0	8	0	0
6	A	1	0	0	0	0
6	C	1	0	0	0	0
7	A	195	0	0	3	0
7	B	222	0	0	2	0
7	C	178	0	0	2	0
7	D	212	0	0	1	0
All	All	14852	0	13467	170	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 6.

All (170) 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)
2:B:801:HEM:O1D	7:B:901:HOH:O	1.99	0.80
1:A:528:LEU:HD22	1:A:536:PRO:HB2	1.64	0.79
2:C:801:HEM:O1D	7:C:901:HOH:O	2.01	0.79
1:B:528:LEU:HD22	1:B:536:PRO:HB2	1.67	0.76
1:A:575:MET:SD	4:A:803[B]:A1CN4:F13	2.36	0.73
1:C:528:LEU:HD22	1:C:536:PRO:HB2	1.71	0.71
2:A:801:HEM:HBD2	4:A:803[B]:A1CN4:C12	2.20	0.71
1:A:378:GLY:HA2	1:A:383:MET:HE2	1.75	0.68
1:A:614:GLU:HA	1:A:617:LYS:HE3	1.73	0.68
1:B:575:MET:SD	4:B:802[B]:A1CN4:F13	2.41	0.68
1:D:528:LEU:HD22	1:D:536:PRO:HB2	1.76	0.66
1:D:613:GLU:HG3	1:D:623:MET:HE1	1.77	0.66
1:A:572:VAL:HG21	4:A:803[B]:A1CN4:C12	2.27	0.65
2:C:801:HEM:HBC2	2:C:801:HEM:HMC2	1.78	0.64
2:B:801:HEM:HMC2	2:B:801:HEM:HBC2	1.80	0.64
2:A:801:HEM:HMC2	2:A:801:HEM:HBC2	1.80	0.64
1:B:480:TRP:HB2	1:B:528:LEU:HB3	1.79	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:801:HEM:HBD1	4:D:803[B]:A1CN4:C13	2.28	0.63
2:D:801:HEM:HBC2	2:D:801:HEM:HMC2	1.79	0.63
1:A:376:ARG:HA	1:C:346:HIS:HE2	1.62	0.63
1:B:552:ARG:HH11	5:B:803:GOL:H2	1.64	0.63
2:B:801:HEM:HBD1	4:B:802[B]:A1CN4:C12	2.29	0.61
1:A:374:ILE:HG13	1:A:376:ARG:HG2	1.82	0.61
1:D:480:TRP:HB2	1:D:528:LEU:HB3	1.83	0.61
1:A:483:GLN:OE1	1:A:486:ARG:HD2	2.01	0.61
2:D:801:HEM:HBB2	2:D:801:HEM:HHC	1.83	0.61
1:C:572:VAL:HG21	4:C:803[B]:A1CN4:F12	1.92	0.60
1:C:483:GLN:OE1	1:C:486:ARG:HD2	2.01	0.60
1:D:711:TYR:OH	2:D:801:HEM:O2D	2.16	0.60
2:B:801:HEM:HBD1	4:B:802[B]:A1CN4:C13	2.31	0.60
1:C:364:LYS:NZ	1:C:368:ASP:OD2	2.36	0.59
2:A:801:HEM:HBB2	2:A:801:HEM:HHC	1.84	0.59
1:B:327:LEU:HD13	1:B:704:ARG:HG2	1.85	0.59
1:B:414:TRP:CE3	1:B:426:TRP:HA	2.38	0.59
1:B:483:GLN:OE1	1:B:486:ARG:HD2	2.03	0.59
2:D:801:HEM:O1D	7:D:901:HOH:O	2.17	0.58
1:C:429:LEU:O	5:C:805:GOL:H31	2.03	0.58
1:C:624:ARG:NH2	7:C:906:HOH:O	2.36	0.58
1:C:387:GLU:O	1:C:391:LYS:HG2	2.04	0.57
1:A:349:ARG:NH2	1:A:352:ASP:O	2.37	0.57
1:C:518:PRO:HG2	1:C:523:ASP:CG	2.29	0.57
1:C:327:LEU:HD21	1:C:348:ARG:HG3	1.86	0.57
2:D:801:HEM:HBD1	4:D:803[B]:A1CN4:C12	2.35	0.56
1:A:669:ASN:OD1	1:A:672:ARG:NH2	2.39	0.56
1:D:419:ARG:HD3	1:D:683:TRP:CD2	2.40	0.56
1:C:482:SER:HA	1:C:574:ASN:HB3	1.89	0.55
1:A:518:PRO:HG2	1:A:523:ASP:CG	2.32	0.55
1:C:699:GLU:HB3	1:D:340:ILE:HD13	1.90	0.54
1:D:575:MET:SD	4:D:803[B]:A1CN4:F13	2.55	0.54
1:B:572:VAL:HG21	4:B:802[B]:A1CN4:C12	2.38	0.54
1:D:414:TRP:CE3	1:D:426:TRP:HA	2.43	0.54
2:C:801:HEM:HHC	2:C:801:HEM:HBB2	1.89	0.54
1:C:600:VAL:O	1:C:604:CYS:HB2	2.09	0.53
1:D:327:LEU:HD11	1:D:704:ARG:HD2	1.91	0.53
1:D:480:TRP:CE2	1:D:715:PRO:HB2	2.43	0.53
1:D:524:VAL:HG21	1:D:546:VAL:HG11	1.90	0.53
1:D:483:GLN:OE1	1:D:486:ARG:HD2	2.10	0.52
1:C:480:TRP:CE2	1:C:715:PRO:HB2	2.46	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:515:TRP:CE2	1:C:526:PRO:HD3	2.45	0.51
1:C:572:VAL:HG21	4:C:803[B]:A1CN4:C12	2.41	0.51
1:A:480:TRP:HB2	1:A:528:LEU:HB3	1.93	0.50
1:A:482:SER:HA	1:A:574:ASN:HB3	1.93	0.50
1:A:515:TRP:CE2	1:A:526:PRO:HD3	2.46	0.50
1:D:600:VAL:HG22	1:D:635:LEU:HD11	1.93	0.50
1:D:691:SER:HA	1:D:696:PHE:CG	2.46	0.50
1:C:681:TRP:CZ2	1:C:685:VAL:HG21	2.47	0.49
1:A:691:SER:HA	1:A:696:PHE:CG	2.47	0.49
1:B:706:THR:HA	1:B:707:PRO:C	2.36	0.49
1:D:623:MET:HA	1:D:630:TRP:CD1	2.47	0.49
1:A:480:TRP:CE2	1:A:715:PRO:HB2	2.47	0.49
1:B:480:TRP:CE2	1:B:715:PRO:HB2	2.48	0.49
1:C:494:ASP:OD2	1:C:495:GLY:N	2.46	0.49
1:B:419:ARG:HD3	1:B:683:TRP:CD2	2.48	0.49
1:A:483:GLN:HG2	4:A:803[A]:A1CN4:C12	2.42	0.49
1:A:671:TYR:CE2	1:A:676:GLY:HA2	2.48	0.48
1:C:483:GLN:HG2	4:C:803[A]:A1CN4:C12	2.43	0.48
1:D:364:LYS:NZ	1:D:368:ASP:OD2	2.44	0.48
1:D:556:PHE:HB3	1:D:558:TRP:CE2	2.49	0.48
1:A:600:VAL:O	1:A:604:CYS:HB2	2.13	0.48
1:B:341:MET:HE2	1:B:341:MET:HB2	1.74	0.48
1:C:691:SER:HA	1:C:696:PHE:CG	2.49	0.48
1:A:377:PHE:N	7:A:910:HOH:O	2.47	0.48
1:A:418[B]:SER:OG	1:A:678:PRO:HB2	2.13	0.48
1:C:490:TYR:CE1	1:C:519:ARG:HA	2.48	0.47
1:B:600:VAL:HG13	1:B:635:LEU:HD11	1.96	0.47
1:B:556:PHE:HB3	1:B:558:TRP:CE2	2.50	0.47
1:A:490:TYR:CE1	1:A:519:ARG:HA	2.49	0.47
1:A:673:CYS:O	1:C:357:ASP:HB3	2.14	0.47
1:D:598:ILE:HA	1:D:602:ASP:HB2	1.96	0.47
2:B:801:HEM:HBB2	2:B:801:HEM:HHC	1.96	0.47
1:D:419:ARG:HD3	1:D:683:TRP:CE2	2.50	0.47
1:C:689:SER:HB3	1:C:692:ILE:HD11	1.97	0.47
1:A:380:LYS:HE2	1:C:328:GLU:OE1	2.15	0.46
1:B:395:THR:HB	1:B:396:THR:HG23	1.97	0.46
1:B:547:LEU:HD21	1:B:651:VAL:HG22	1.98	0.46
1:B:408:TYR:CE1	1:B:412:HIS:CE1	3.04	0.46
1:A:624:ARG:NH2	7:A:913:HOH:O	2.47	0.46
1:A:507:THR:O	1:A:511:ILE:HG13	2.16	0.46
1:C:460:LEU:HD12	1:C:592:TRP:HB3	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:691:SER:HA	1:B:696:PHE:CG	2.51	0.45
1:C:522:PHE:HB2	1:C:565:LYS:HE3	1.97	0.45
1:B:327:LEU:HB2	1:B:704:ARG:HB3	1.98	0.45
1:A:306:LEU:HB2	1:A:701:LEU:HD11	1.99	0.45
1:D:483:GLN:HG3	1:D:572:VAL:HA	1.99	0.45
1:D:483:GLN:HG2	4:D:803[A]:A1CN4:C12	2.47	0.45
1:C:419:ARG:HD3	1:C:683:TRP:CD2	2.52	0.44
1:B:706:THR:HG23	7:B:1083:HOH:O	2.17	0.44
1:D:594:MET:HA	1:D:654:VAL:O	2.17	0.44
1:A:333:GLU:OE1	1:A:333:GLU:N	2.45	0.44
1:A:593:TYR:CD1	1:A:598:ILE:HD11	2.52	0.44
1:C:480:TRP:HB2	1:C:528:LEU:HB3	1.99	0.44
1:D:304:ARG:HB3	1:D:323:LEU:HD21	2.00	0.44
1:D:490:TYR:CE1	1:D:519:ARG:HA	2.53	0.44
1:B:623:MET:HA	1:B:630:TRP:CD1	2.52	0.44
1:D:600:VAL:O	1:D:604:CYS:HB2	2.17	0.44
1:D:706:THR:HA	1:D:707:PRO:C	2.42	0.44
1:C:633:GLN:NE2	1:D:637:GLU:OE2	2.52	0.43
1:A:356:LYS:NZ	1:A:394:ASP:OD2	2.46	0.43
1:A:592:TRP:O	4:A:803[A]:A1CN4:N02	2.52	0.43
1:B:600:VAL:HG22	1:B:639:ASN:HD21	1.84	0.43
1:A:494:ASP:OD2	1:A:495:GLY:N	2.51	0.42
1:B:575:MET:HE2	1:B:710:GLU:O	2.19	0.42
1:D:369:GLN:HG2	1:D:408:TYR:OH	2.19	0.42
1:B:612:LEU:HA	1:B:612:LEU:HD23	1.77	0.42
1:B:593:TYR:CD1	1:B:598:ILE:HD11	2.54	0.42
1:C:348:ARG:CZ	1:C:706:THR:HG21	2.49	0.42
1:D:341:MET:HB2	1:D:341:MET:HE2	1.83	0.42
1:A:455:THR:HA	1:A:460:LEU:HD22	2.02	0.42
1:A:631:LYS:HB3	1:B:692:ILE:HD12	2.02	0.42
1:C:341:MET:HE2	1:C:341:MET:HB2	1.93	0.42
1:C:507:THR:O	1:C:511:ILE:HG13	2.20	0.42
1:A:592:TRP:O	4:A:803[B]:A1CN4:N02	2.52	0.42
1:A:689:SER:HB3	1:A:692:ILE:HD11	2.00	0.42
1:D:408:TYR:CE1	1:D:412:HIS:CE1	3.08	0.42
1:D:681:TRP:CZ2	1:D:685:VAL:HG21	2.55	0.42
2:D:801:HEM:HHC	2:D:801:HEM:CBB	2.50	0.42
1:A:414:TRP:CE3	1:A:426:TRP:HA	2.54	0.42
1:B:594:MET:HA	1:B:654:VAL:O	2.20	0.41
1:A:376:ARG:HB3	7:A:910:HOH:O	2.19	0.41
1:D:515:TRP:CD1	1:D:526:PRO:HG3	2.55	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:509:ILE:O	1:B:513:GLN:HG2	2.21	0.41
1:B:598:ILE:HA	1:B:602:ASP:HB2	2.02	0.41
1:D:689:SER:HB3	1:D:692:ILE:HG12	2.02	0.41
1:D:704:ARG:HG3	1:D:704:ARG:HH11	1.85	0.41
1:C:593:TYR:CD1	1:C:598:ILE:HD11	2.54	0.41
1:A:664:ILE:HG13	1:A:694:PRO:HB2	2.03	0.41
1:B:327:LEU:HD22	1:B:704:ARG:HD3	2.02	0.41
1:C:387:GLU:HG3	1:C:388:GLU:N	2.36	0.41
1:A:475:HIS:HB3	1:A:532:ASN:OD1	2.21	0.41
1:B:625:LYS:HE3	1:B:625:LYS:HB2	1.84	0.41
1:B:681:TRP:CE2	1:B:685:VAL:HG21	2.56	0.41
1:C:415:ARG:NH1	1:C:674:ARG:HD2	2.36	0.41
1:C:530:GLN:HG3	1:C:534:ASN:O	2.21	0.41
1:A:572:VAL:HG11	4:A:803[B]:A1CN4:F13	2.10	0.41
1:C:542:PRO:HA	1:C:543:PRO:HD3	1.92	0.41
1:C:598:ILE:HA	1:C:602:ASP:HB2	2.02	0.41
1:A:340:ILE:HD13	1:B:699:GLU:HB3	2.02	0.41
1:A:711:TYR:OH	2:A:801:HEM:O1D	2.31	0.41
1:D:482:SER:HA	1:D:574:ASN:HB3	2.03	0.41
1:D:722:LYS:HB3	1:D:722:LYS:HE2	1.79	0.41
1:C:418[B]:SER:OG	1:C:678:PRO:HB2	2.21	0.40
1:C:689:SER:HB3	1:C:692:ILE:CG1	2.51	0.40
1:C:691:SER:O	1:C:697:HIS:NE2	2.42	0.40
1:D:595:GLY:HA2	1:D:653:ILE:HD11	2.03	0.40
1:B:600:VAL:O	1:B:604:CYS:HB2	2.21	0.40
1:C:460:LEU:HD12	1:C:592:TRP:CB	2.52	0.40
1:B:480:TRP:CZ2	1:B:536:PRO:HG3	2.56	0.40
1:A:515:TRP:CD1	1:A:526:PRO:HG3	2.57	0.40
1:B:369:GLN:HG3	1:B:408:TYR:OH	2.22	0.40
1:B:450:HIS:CD2	1:B:450:HIS:C	3.00	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all 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	421/423 (100%)	403 (96%)	16 (4%)	2 (0%)	25	23
1	B	411/423 (97%)	404 (98%)	7 (2%)	0	100	100
1	C	419/423 (99%)	411 (98%)	8 (2%)	0	100	100
1	D	408/423 (96%)	401 (98%)	7 (2%)	0	100	100
All	All	1659/1692 (98%)	1619 (98%)	38 (2%)	2 (0%)	48	51

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	305	PHE
1	A	377	PHE

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	378/378 (100%)	366 (97%)	12 (3%)	34	37
1	B	371/378 (98%)	352 (95%)	19 (5%)	20	19
1	C	376/378 (100%)	363 (96%)	13 (4%)	31	34
1	D	368/378 (97%)	353 (96%)	15 (4%)	26	27
All	All	1493/1512 (99%)	1434 (96%)	59 (4%)	27	28

All (59) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	326	THR
1	A	327	LEU
1	A	353	VAL
1	A	380	LYS
1	A	386	LEU
1	A	402	LYS

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Mol	Chain	Res	Type
1	A	491	LYS
1	A	528	LEU
1	A	617	LYS
1	A	618	LYS
1	A	665	LYS
1	A	720	VAL
1	B	314	GLU
1	B	324	LYS
1	B	326	THR
1	B	341	MET
1	B	365	GLU
1	B	369	GLN
1	B	383	MET
1	B	428	LYS
1	B	505	GLN
1	B	516	LYS
1	B	528	LEU
1	B	575	MET
1	B	578	GLU
1	B	614	GLU
1	B	617	LYS
1	B	625	LYS
1	B	650	LYS
1	B	720	VAL
1	B	723	LEU
1	C	341	MET
1	C	352	ASP
1	C	353	VAL
1	C	356	LYS
1	C	359	LEU
1	C	386	LEU
1	C	387	GLU
1	C	474	LYS
1	C	491	LYS
1	C	528	LEU
1	C	613	GLU
1	C	665	LYS
1	C	720	VAL
1	D	304	ARG
1	D	307	LYS
1	D	314	GLU
1	D	337	MET

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Mol	Chain	Res	Type
1	D	372	SER
1	D	383	MET
1	D	394	ASP
1	D	474	LYS
1	D	505	GLN
1	D	528	LEU
1	D	540	GLN
1	D	578	GLU
1	D	618	LYS
1	D	650	LYS
1	D	720	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	513	GLN
1	B	412	HIS
1	B	505	GLN
1	C	369	GLN
1	C	390	ASN
1	C	469	GLN
1	C	513	GLN
1	D	505	GLN

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 25 ligands modelled in this entry, 2 are monoatomic - leaving 23 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	GOL	A	804	-	5,5,5	0.39	0	5,5,5	0.28	0
4	A1CN4	C	803[B]	-	25,25,25	0.36	0	32,34,34	1.76	5 (15%)
4	A1CN4	B	802[B]	-	25,25,25	0.38	0	32,34,34	1.46	4 (12%)
4	A1CN4	C	803[A]	-	25,25,25	0.29	0	32,34,34	1.69	5 (15%)
4	A1CN4	B	802[A]	-	25,25,25	0.39	0	32,34,34	1.70	6 (18%)
2	HEM	B	801	1	42,50,50	1.55	7 (16%)	46,82,82	1.84	5 (10%)
5	GOL	D	804	-	5,5,5	0.38	0	5,5,5	0.30	0
3	H4B	C	802	-	16,18,18	0.75	0	14,26,26	2.35	6 (42%)
5	GOL	C	804	-	5,5,5	0.38	0	5,5,5	0.34	0
3	H4B	A	802	-	16,18,18	0.72	0	14,26,26	2.32	5 (35%)
2	HEM	D	801	1	42,50,50	1.57	6 (14%)	46,82,82	1.90	5 (10%)
5	GOL	A	805	-	5,5,5	0.25	0	5,5,5	0.66	0
5	GOL	B	804	-	5,5,5	0.37	0	5,5,5	0.48	0
4	A1CN4	D	803[B]	-	25,25,25	0.34	0	32,34,34	1.40	4 (12%)
4	A1CN4	D	803[A]	-	25,25,25	0.28	0	32,34,34	1.77	5 (15%)
2	HEM	C	801	1	42,50,50	1.49	6 (14%)	46,82,82	1.80	8 (17%)
5	GOL	C	805	-	5,5,5	0.42	0	5,5,5	0.65	0
4	A1CN4	A	803[B]	-	25,25,25	0.38	0	32,34,34	1.37	2 (6%)
3	H4B	D	802	-	16,18,18	0.70	0	14,26,26	2.21	5 (35%)
3	H4B	A	807	-	16,18,18	0.81	0	14,26,26	2.27	6 (42%)
4	A1CN4	A	803[A]	-	25,25,25	0.34	0	32,34,34	1.61	5 (15%)
5	GOL	B	803	-	5,5,5	0.39	0	5,5,5	0.38	0
2	HEM	A	801	1	42,50,50	1.50	6 (14%)	46,82,82	1.97	11 (23%)

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	GOL	A	804	-	-	3/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	A1CN4	C	803[B]	-	-	2/12/12/12	0/2/2/2
4	A1CN4	B	802[B]	-	-	7/12/12/12	0/2/2/2
4	A1CN4	C	803[A]	-	-	1/12/12/12	0/2/2/2
4	A1CN4	B	802[A]	-	-	2/12/12/12	0/2/2/2
2	HEM	B	801	1	-	4/12/54/54	-
5	GOL	D	804	-	-	2/4/4/4	-
3	H4B	C	802	-	-	0/8/17/17	0/2/2/2
5	GOL	C	804	-	-	2/4/4/4	-
3	H4B	A	802	-	-	0/8/17/17	0/2/2/2
2	HEM	D	801	1	-	4/12/54/54	-
5	GOL	A	805	-	-	2/4/4/4	-
5	GOL	B	804	-	-	1/4/4/4	-
4	A1CN4	D	803[B]	-	-	1/12/12/12	0/2/2/2
4	A1CN4	D	803[A]	-	-	0/12/12/12	0/2/2/2
2	HEM	C	801	1	-	2/12/54/54	-
5	GOL	C	805	-	-	2/4/4/4	-
4	A1CN4	A	803[B]	-	-	9/12/12/12	0/2/2/2
3	H4B	D	802	-	-	0/8/17/17	0/2/2/2
3	H4B	A	807	-	-	0/8/17/17	0/2/2/2
4	A1CN4	A	803[A]	-	-	0/12/12/12	0/2/2/2
5	GOL	B	803	-	-	2/4/4/4	-
2	HEM	A	801	1	-	0/12/54/54	-

All (25) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	801	HEM	C3C-C4C	3.87	1.47	1.41
2	B	801	HEM	C3C-C4C	3.82	1.47	1.41
2	A	801	HEM	C3C-C2C	-3.64	1.35	1.40
2	B	801	HEM	C3C-C2C	-3.54	1.35	1.40
2	C	801	HEM	C3C-C2C	-3.49	1.35	1.40
2	D	801	HEM	C3C-C2C	-3.45	1.35	1.40
2	A	801	HEM	CAB-C3B	3.21	1.55	1.47
2	C	801	HEM	C3C-CAC	3.20	1.54	1.47
2	C	801	HEM	CAB-C3B	3.19	1.55	1.47
2	B	801	HEM	C3C-CAC	3.17	1.54	1.47
2	D	801	HEM	CAB-C3B	3.09	1.55	1.47
2	B	801	HEM	CAB-C3B	3.09	1.55	1.47
2	A	801	HEM	C3C-CAC	2.92	1.54	1.47
2	D	801	HEM	C3C-CAC	2.88	1.54	1.47

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	801	HEM	CMD-C2D	2.45	1.55	1.50
2	A	801	HEM	C3C-C4C	2.43	1.44	1.41
2	C	801	HEM	C3C-C4C	2.40	1.44	1.41
2	B	801	HEM	CMB-C2B	2.28	1.55	1.50
2	C	801	HEM	CMB-C2B	2.24	1.55	1.50
2	D	801	HEM	CMB-C2B	2.23	1.55	1.50
2	A	801	HEM	CMB-C2B	2.21	1.55	1.50
2	C	801	HEM	CMD-C2D	2.19	1.55	1.50
2	B	801	HEM	CMD-C2D	2.15	1.55	1.50
2	B	801	HEM	FE-NB	2.06	2.09	1.98
2	A	801	HEM	FE-NB	2.04	2.09	1.98

All (87) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	801	HEM	CBA-CAA-C2A	-8.60	98.07	112.54
2	A	801	HEM	CBA-CAA-C2A	-8.23	98.70	112.54
2	B	801	HEM	CBA-CAA-C2A	-7.96	99.16	112.54
2	C	801	HEM	CBA-CAA-C2A	-6.30	101.94	112.54
4	B	802[A]	A1CN4	C02-N01-C06	5.68	122.32	118.07
4	C	803[A]	A1CN4	C02-N01-C06	5.46	122.16	118.07
4	D	803[A]	A1CN4	C02-N01-C06	5.29	122.03	118.07
3	C	802	H4B	C8A-C4A-C4	5.27	119.30	114.50
4	C	803[B]	A1CN4	C17-C18-N19	-5.26	104.27	112.58
4	B	802[B]	A1CN4	C02-N01-C06	5.20	121.96	118.07
4	A	803[B]	A1CN4	C02-N01-C06	5.17	121.94	118.07
3	A	807	H4B	C8A-C4A-C4	5.14	119.18	114.50
4	A	803[A]	A1CN4	C02-N01-C06	5.14	121.91	118.07
4	C	803[B]	A1CN4	C02-N01-C06	5.12	121.90	118.07
4	D	803[A]	A1CN4	C08-O09-C11	5.12	127.89	117.76
3	A	802	H4B	C8A-C4A-C4	5.10	119.14	114.50
3	D	802	H4B	C8A-C4A-C4	5.01	119.06	114.50
4	D	803[B]	A1CN4	C02-N01-C06	4.70	121.58	118.07
4	B	802[A]	A1CN4	C08-O09-C11	4.65	126.96	117.76
2	B	801	HEM	C4B-CHC-C1C	4.54	128.55	122.56
4	A	803[A]	A1CN4	C08-O09-C11	4.28	126.24	117.76
2	D	801	HEM	C4B-CHC-C1C	4.25	128.17	122.56
2	A	801	HEM	C4B-CHC-C1C	3.98	127.81	122.56
2	C	801	HEM	C4B-CHC-C1C	3.81	127.58	122.56
4	C	803[A]	A1CN4	C08-O09-C11	3.75	125.18	117.76
3	A	802	H4B	C2-N3-C4	3.73	121.15	115.96
3	D	802	H4B	C2-N3-C4	3.58	120.94	115.96

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	801	HEM	CBD-CAD-C3D	-3.37	103.22	112.53
3	A	802	H4B	N1-C2-N3	-3.32	120.40	125.48
4	D	803[B]	A1CN4	C17-C18-N19	-3.31	107.35	112.58
4	B	802[A]	A1CN4	C05-C06-N01	-3.28	119.00	122.73
4	D	803[A]	A1CN4	O09-C08-C06	-3.27	100.52	109.56
4	C	803[A]	A1CN4	C05-C06-N01	-3.10	119.20	122.73
3	C	802	H4B	C2-N3-C4	3.08	120.24	115.96
2	C	801	HEM	C3B-C2B-C1B	3.07	108.72	106.41
3	C	802	H4B	N1-C2-N3	-3.07	120.78	125.48
3	A	807	H4B	N1-C2-N3	-3.06	120.79	125.48
4	A	803[A]	A1CN4	C05-C06-N01	-3.06	119.24	122.73
2	A	801	HEM	CBD-CAD-C3D	-3.05	104.11	112.53
3	D	802	H4B	N1-C2-N3	-3.01	120.86	125.48
4	C	803[B]	A1CN4	O09-C11-C12	2.94	120.36	115.92
3	A	807	H4B	C2-N3-C4	2.87	119.96	115.96
4	C	803[A]	A1CN4	C17-C18-N19	-2.86	108.07	112.58
3	A	807	H4B	N2-C2-N3	2.83	121.47	117.22
2	A	801	HEM	CAD-C3D-C2D	-2.81	122.61	127.87
4	A	803[B]	A1CN4	C05-C06-N01	-2.73	119.62	122.73
2	C	801	HEM	C3D-C4D-ND	-2.72	107.19	110.17
2	D	801	HEM	CAD-C3D-C4D	-2.71	119.97	124.70
4	D	803[A]	A1CN4	C05-C06-N01	-2.71	119.64	122.73
2	A	801	HEM	C3D-C4D-ND	-2.64	107.27	110.17
4	C	803[B]	A1CN4	C05-C06-N01	-2.62	119.75	122.73
4	B	802[B]	A1CN4	C05-C06-N01	-2.61	119.76	122.73
3	C	802	H4B	C2-N1-C8A	2.57	120.70	114.59
2	D	801	HEM	CMC-C2C-C3C	2.55	129.78	124.68
2	C	801	HEM	C4D-ND-C1D	2.53	108.20	105.21
2	C	801	HEM	CHD-C1D-ND	2.51	127.13	124.44
3	D	802	H4B	C4-C4A-N5	2.50	122.14	118.57
3	A	807	H4B	C2-N1-C8A	2.49	120.51	114.59
3	A	802	H4B	C2-N1-C8A	2.48	120.49	114.59
3	A	807	H4B	C4-C4A-N5	2.47	122.10	118.57
4	C	803[B]	A1CN4	C08-C06-N01	2.45	120.63	115.69
2	A	801	HEM	C3B-C2B-C1B	2.43	108.24	106.41
4	B	802[B]	A1CN4	C17-C15-C14	-2.39	116.53	120.54
2	B	801	HEM	CMA-C3A-C4A	-2.38	124.97	128.46
4	B	802[A]	A1CN4	C20-N19-C18	-2.37	108.03	112.03
3	C	802	H4B	N2-C2-N3	2.37	120.78	117.22
2	A	801	HEM	CMA-C3A-C4A	-2.36	125.00	128.46
4	C	803[A]	A1CN4	C08-C06-N01	2.35	120.44	115.69
2	B	801	HEM	CMC-C2C-C3C	2.35	129.37	124.68

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	802	H4B	C4-C4A-N5	2.34	121.91	118.57
2	A	801	HEM	C4D-ND-C1D	2.33	107.96	105.21
2	B	801	HEM	C3D-C4D-ND	-2.28	107.67	110.17
4	A	803[A]	A1CN4	C08-C06-N01	2.26	120.25	115.69
3	D	802	H4B	C2-N1-C8A	2.24	119.92	114.59
4	A	803[A]	A1CN4	C17-C18-N19	-2.22	109.08	112.58
2	A	801	HEM	C3B-C4B-NB	-2.21	107.88	109.47
4	B	802[B]	A1CN4	N02-C02-N01	2.20	120.12	116.59
4	B	802[A]	A1CN4	C08-C06-N01	2.19	120.11	115.69
4	B	802[A]	A1CN4	N02-C02-N01	2.17	120.08	116.59
2	A	801	HEM	CMC-C2C-C3C	2.16	128.99	124.68
3	A	802	H4B	C4-C4A-N5	2.14	121.63	118.57
2	A	801	HEM	CAD-C3D-C4D	2.14	128.42	124.70
4	D	803[B]	A1CN4	C05-C06-N01	-2.14	120.29	122.73
4	D	803[B]	A1CN4	C08-C06-N01	2.12	119.96	115.69
4	D	803[A]	A1CN4	C17-C18-N19	-2.09	109.28	112.58
2	C	801	HEM	CMC-C2C-C3C	2.05	128.78	124.68
2	D	801	HEM	CHA-C4D-ND	2.02	126.88	124.37

There are no chirality outliers.

All (46) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	801	HEM	C2D-C3D-CAD-CBD
2	D	801	HEM	C4D-C3D-CAD-CBD
4	A	803[B]	A1CN4	C12-C11-O09-C08
4	A	803[B]	A1CN4	C17-C18-N19-C22
4	A	803[B]	A1CN4	C21-C20-N19-C22
4	B	802[B]	A1CN4	C12-C11-O09-C08
4	B	802[B]	A1CN4	C17-C18-N19-C22
4	B	802[B]	A1CN4	C21-C20-N19-C22
4	C	803[B]	A1CN4	C12-C11-O09-C08
5	A	804	GOL	O1-C1-C2-C3
5	B	803	GOL	O1-C1-C2-C3
5	C	804	GOL	C1-C2-C3-O3
4	B	802[A]	A1CN4	C15-C17-C18-N19
5	A	805	GOL	O1-C1-C2-C3
5	C	805	GOL	O1-C1-C2-C3
5	D	804	GOL	O1-C1-C2-C3
5	A	805	GOL	O1-C1-C2-O2
5	A	804	GOL	O1-C1-C2-O2
5	B	803	GOL	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
5	C	804	GOL	O2-C2-C3-O3
5	C	805	GOL	O1-C1-C2-O2
5	D	804	GOL	O1-C1-C2-O2
2	B	801	HEM	C2D-C3D-CAD-CBD
2	B	801	HEM	C4D-C3D-CAD-CBD
4	B	802[B]	A1CN4	C16-C15-C17-C18
4	B	802[A]	A1CN4	C21-C20-N19-C22
4	B	802[B]	A1CN4	C14-C15-C17-C18
5	A	804	GOL	O2-C2-C3-O3
4	D	803[B]	A1CN4	C12-C11-O09-C08
4	B	802[B]	A1CN4	C16-C11-O09-C08
4	C	803[B]	A1CN4	C16-C11-O09-C08
4	A	803[B]	A1CN4	C17-C18-N19-C20
4	A	803[B]	A1CN4	C16-C11-O09-C08
5	B	804	GOL	O2-C2-C3-O3
4	A	803[B]	A1CN4	C06-C08-O09-C11
4	B	802[B]	A1CN4	C06-C08-O09-C11
2	B	801	HEM	CAD-CBD-CGD-O2D
2	B	801	HEM	CAD-CBD-CGD-O1D
4	C	803[A]	A1CN4	C21-C20-N19-C18
2	D	801	HEM	CAD-CBD-CGD-O1D
4	A	803[B]	A1CN4	C21-C20-N19-C18
2	D	801	HEM	CAD-CBD-CGD-O2D
2	C	801	HEM	CAD-CBD-CGD-O2D
4	A	803[B]	A1CN4	C16-C15-C17-C18
2	C	801	HEM	CAD-CBD-CGD-O1D
4	A	803[B]	A1CN4	C14-C15-C17-C18

There are no ring outliers.

13 monomers are involved in 34 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	803[B]	A1CN4	2	0
4	B	802[B]	A1CN4	4	0
4	C	803[A]	A1CN4	1	0
2	B	801	HEM	5	0
2	D	801	HEM	7	0
4	D	803[B]	A1CN4	3	0
4	D	803[A]	A1CN4	1	0
2	C	801	HEM	3	0
5	C	805	GOL	1	0
4	A	803[B]	A1CN4	5	0

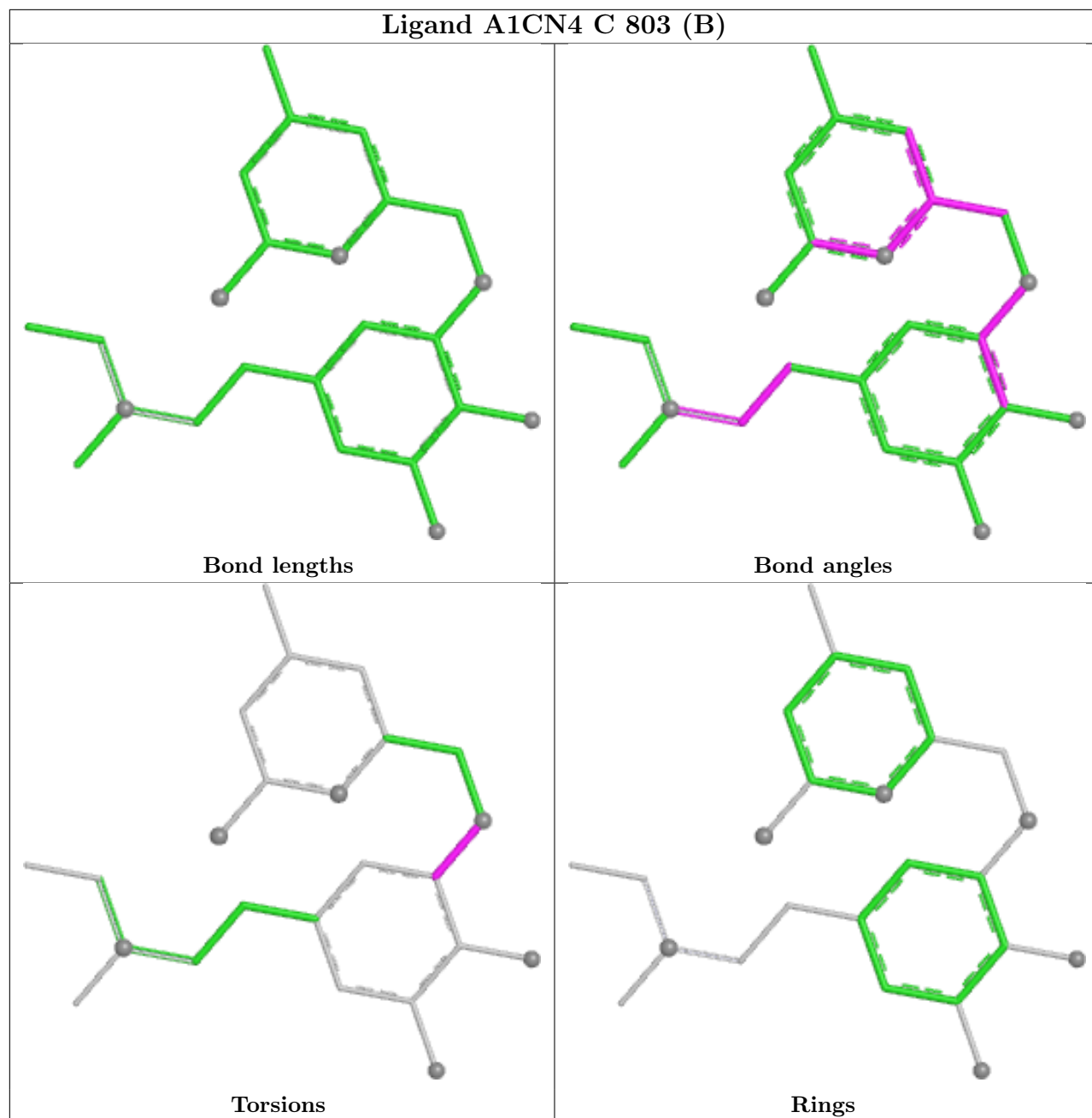
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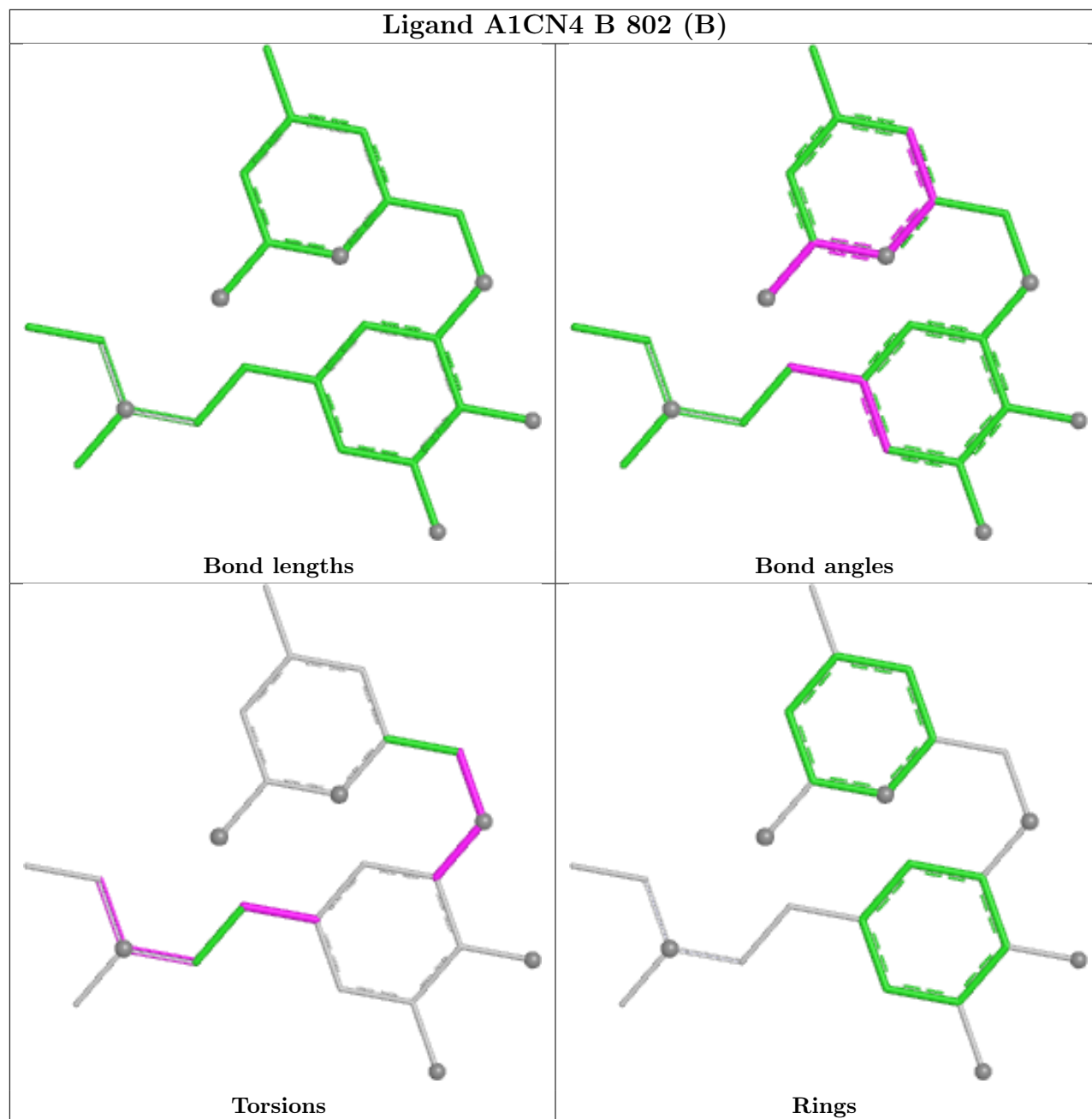
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	803[A]	A1CN4	2	0
5	B	803	GOL	1	0
2	A	801	HEM	4	0

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.

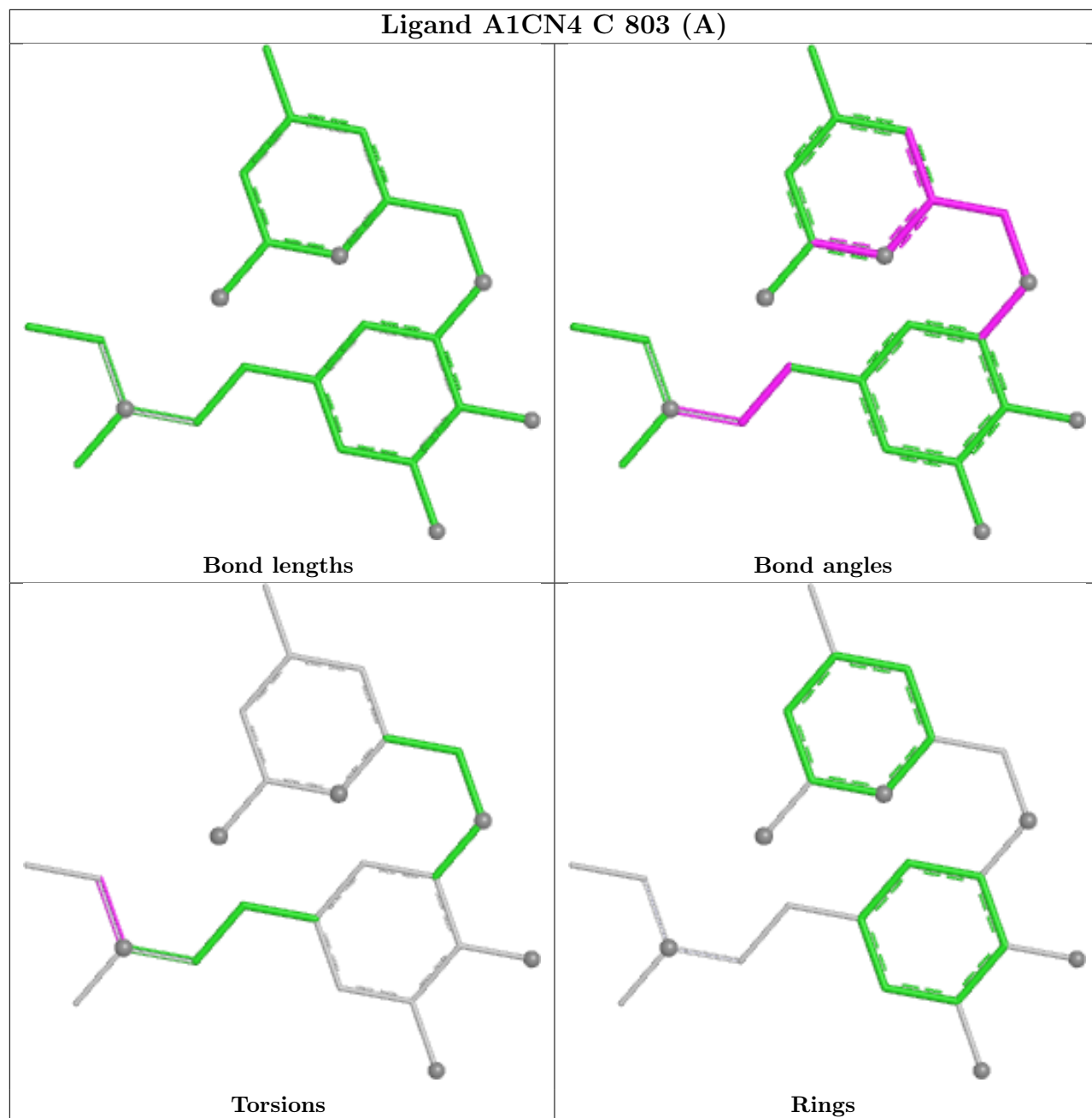
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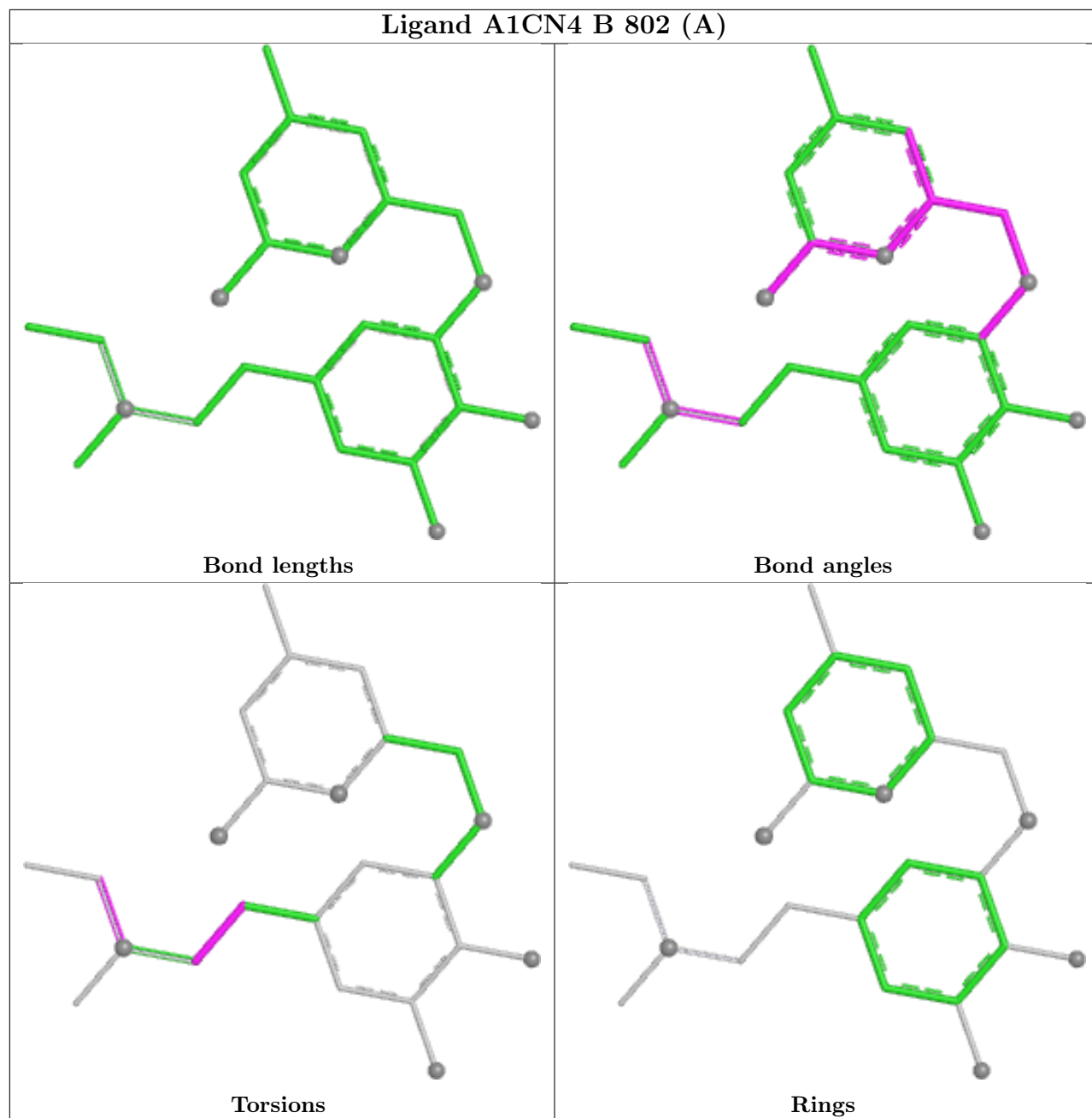
Ligand A1CN4 B 802 (B)

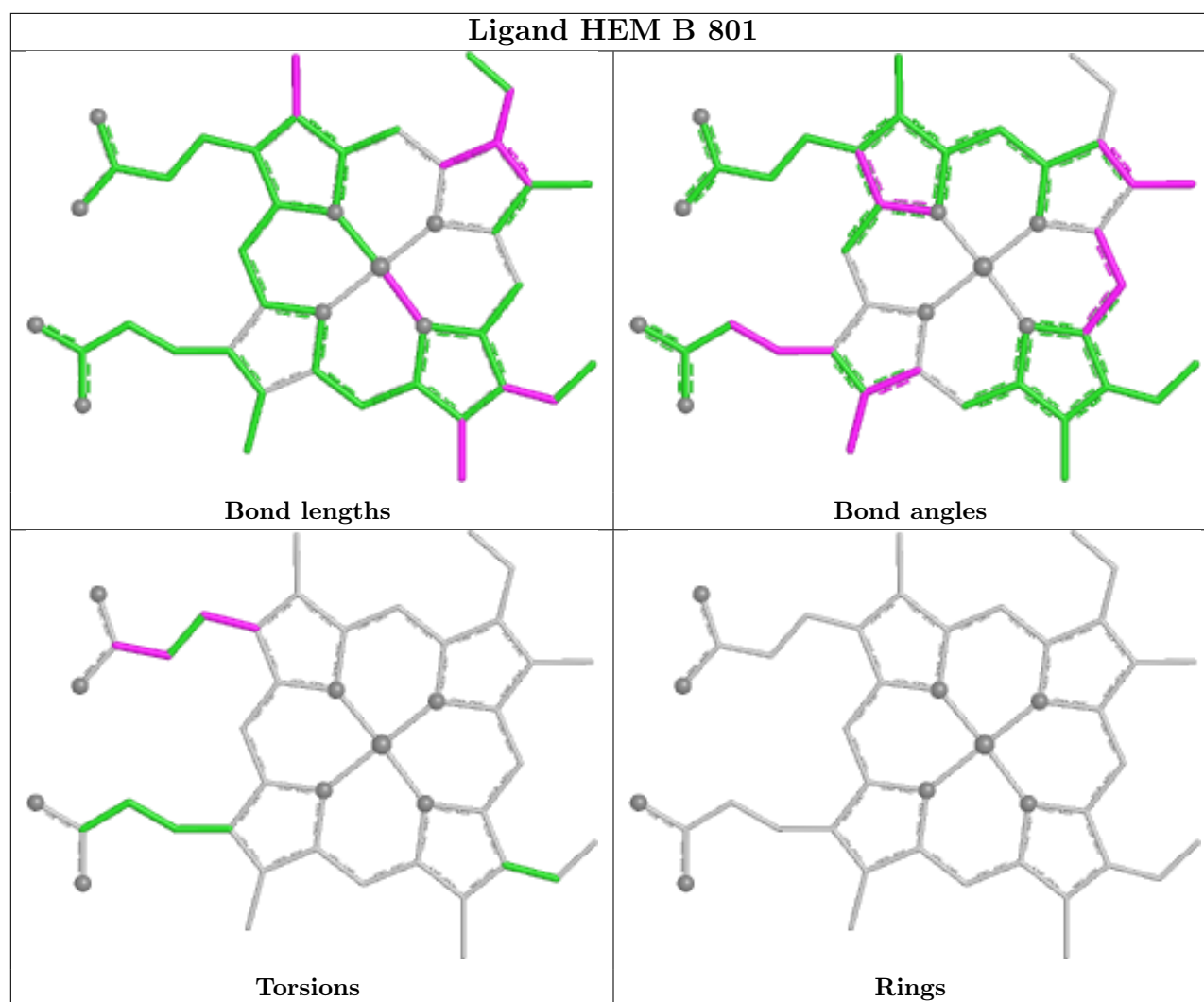


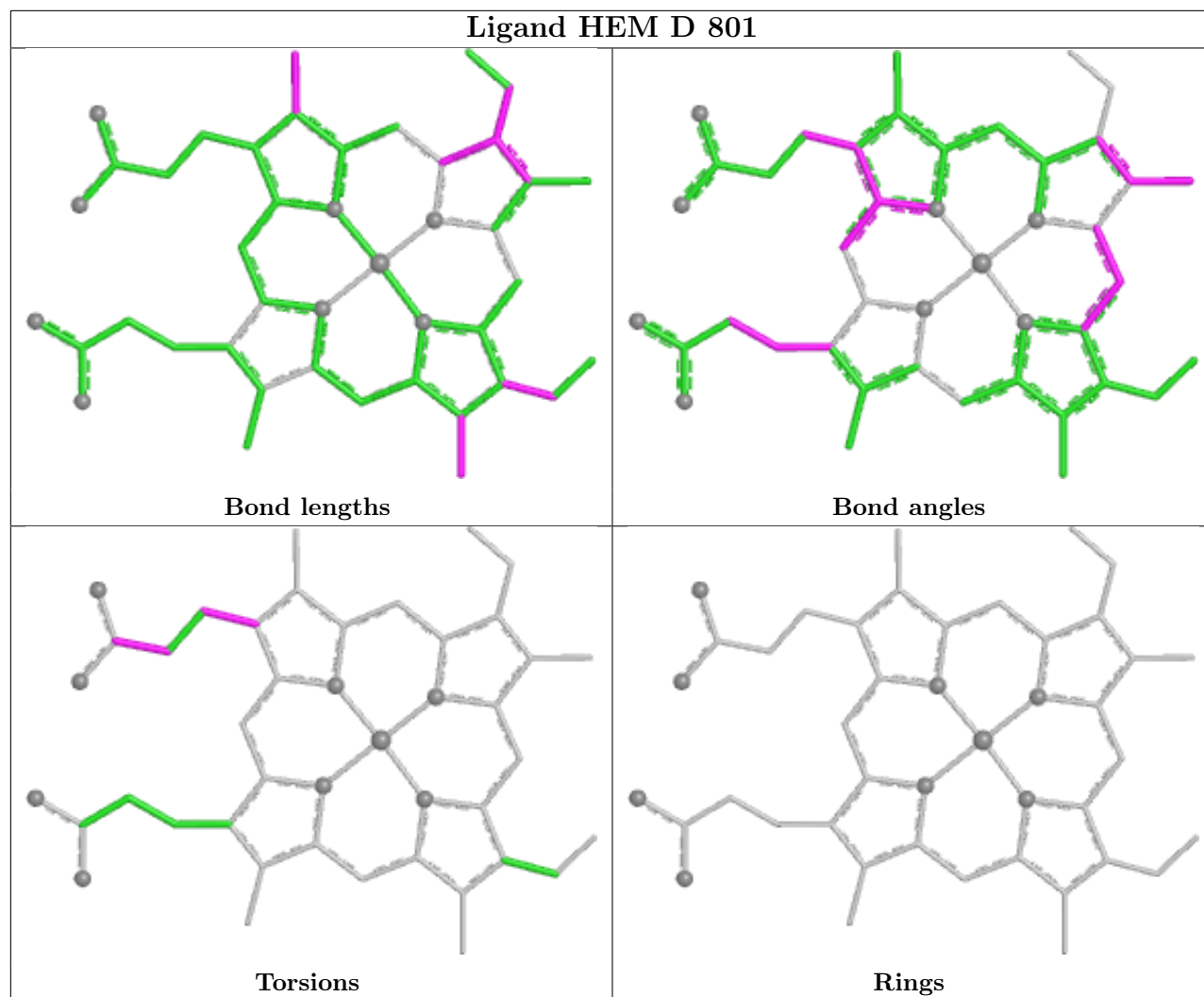
Ligand A1CN4 C 803 (A)



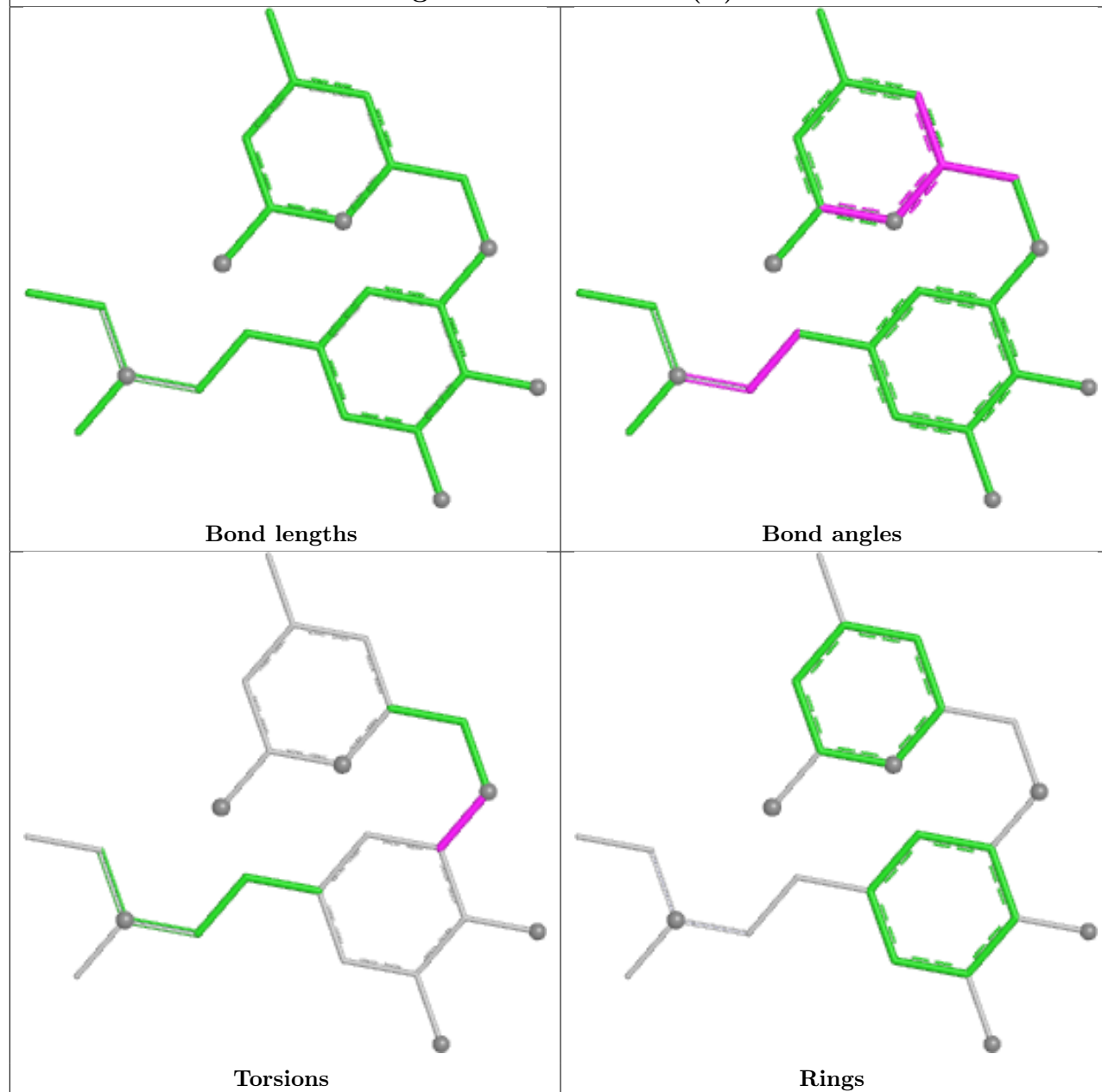
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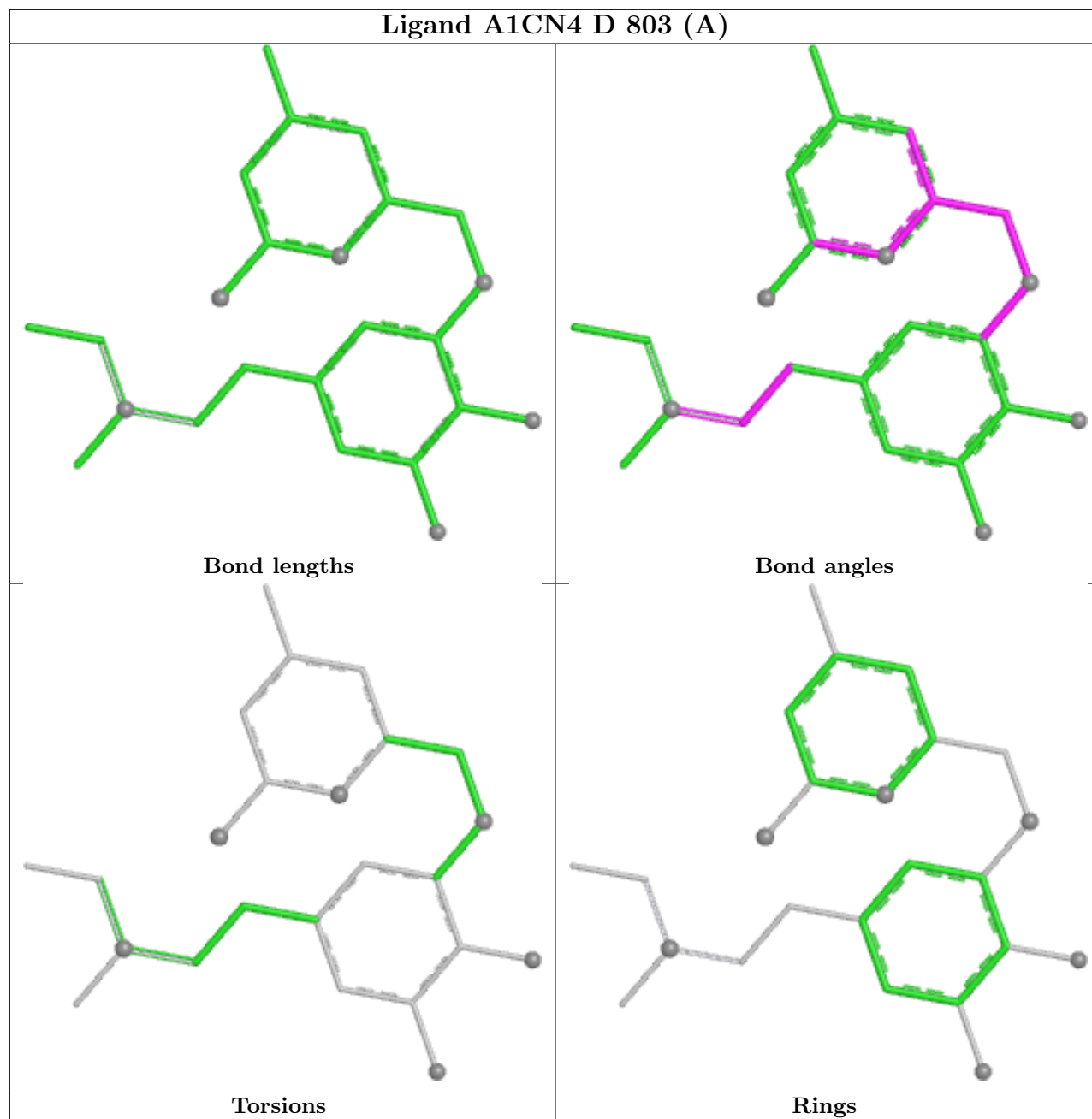


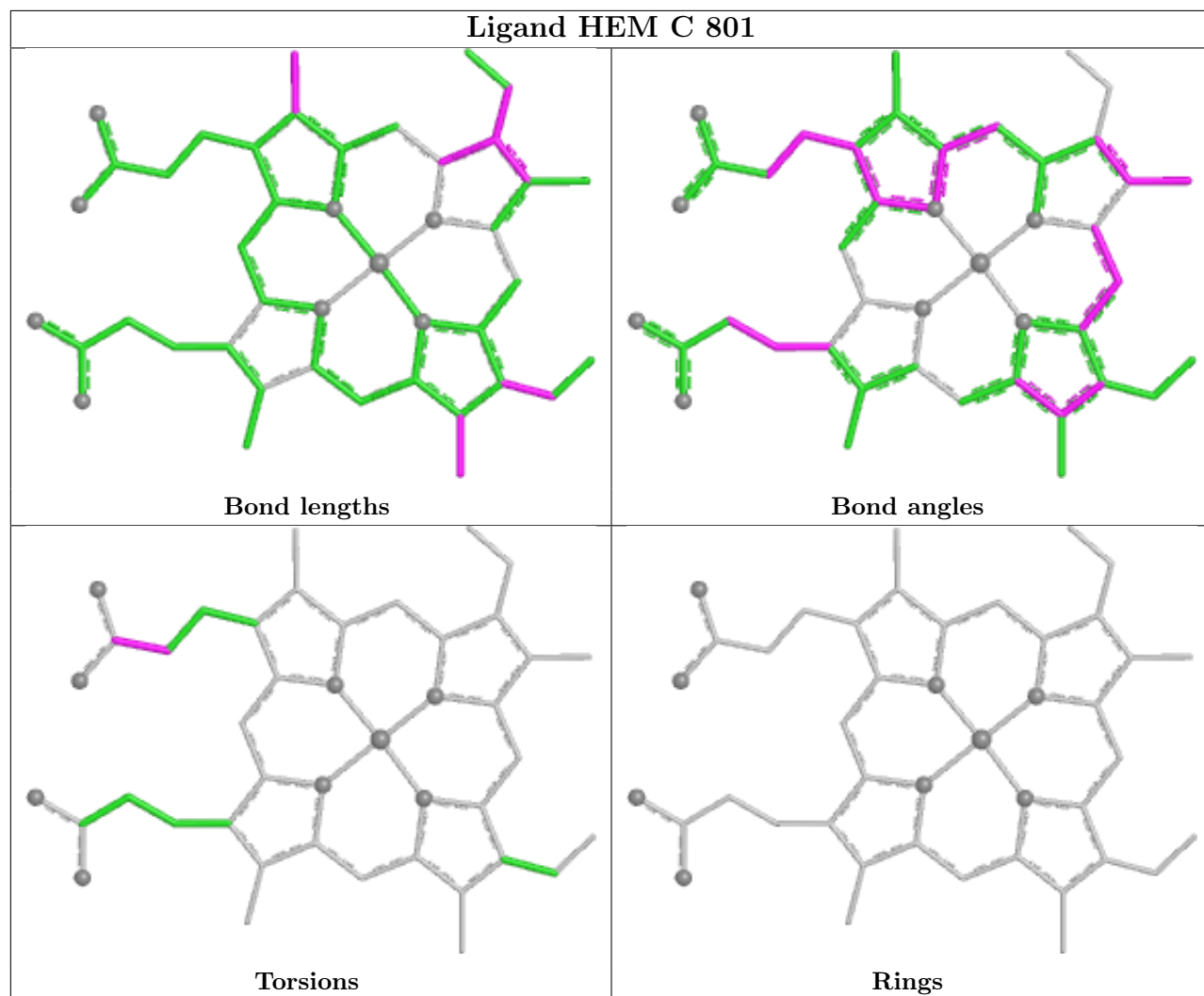


Ligand A1CN4 D 803 (B)

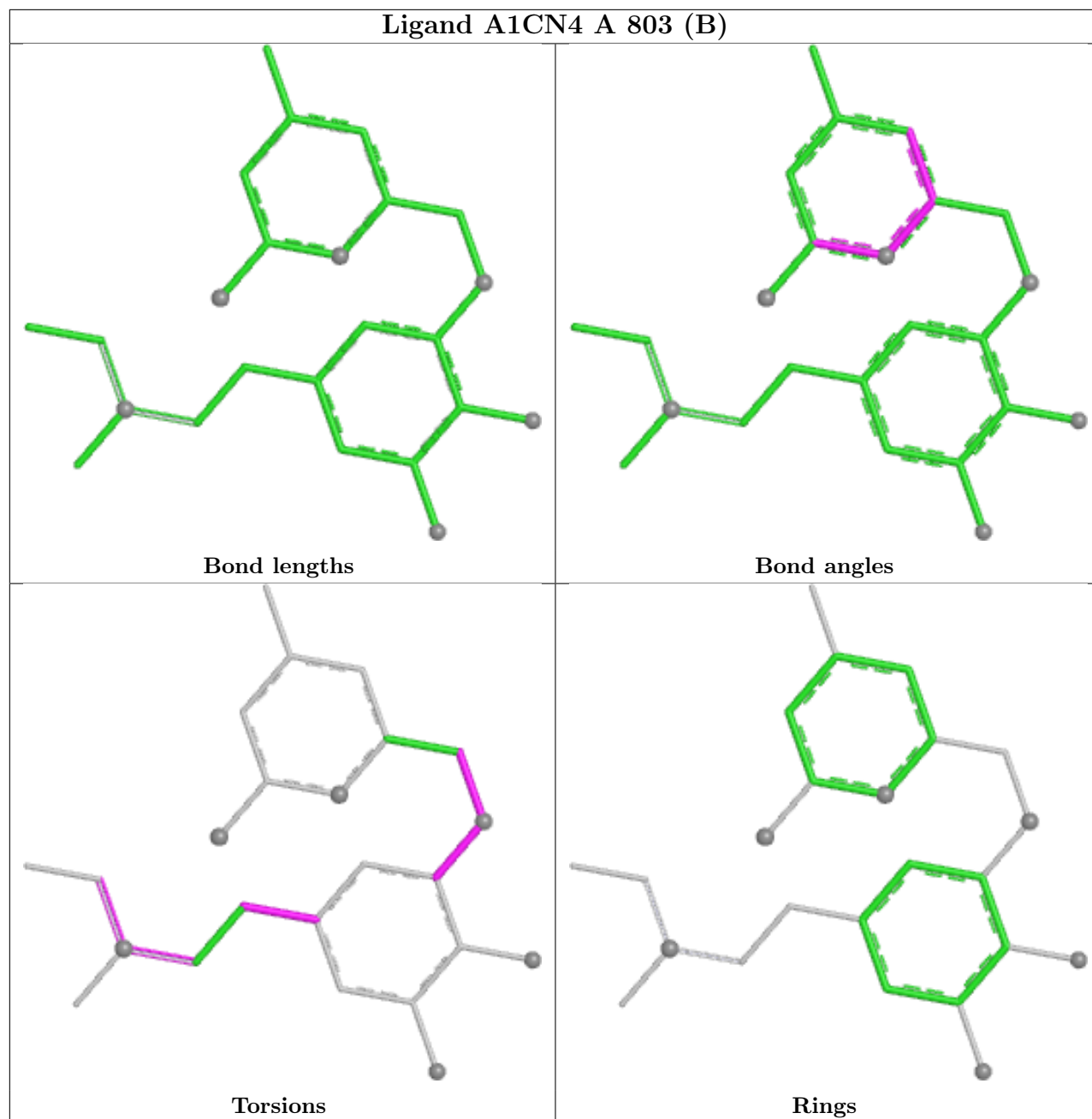


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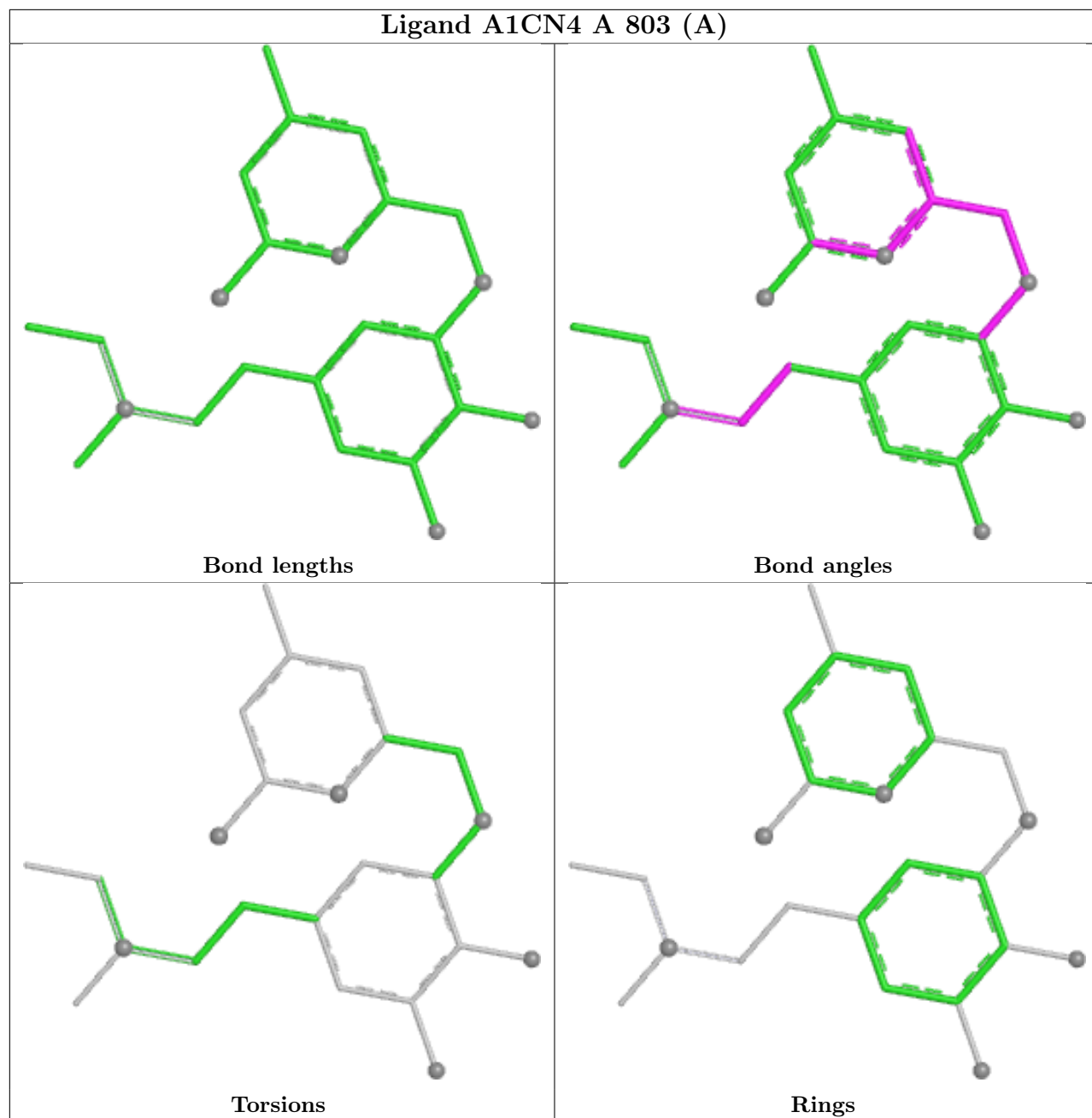


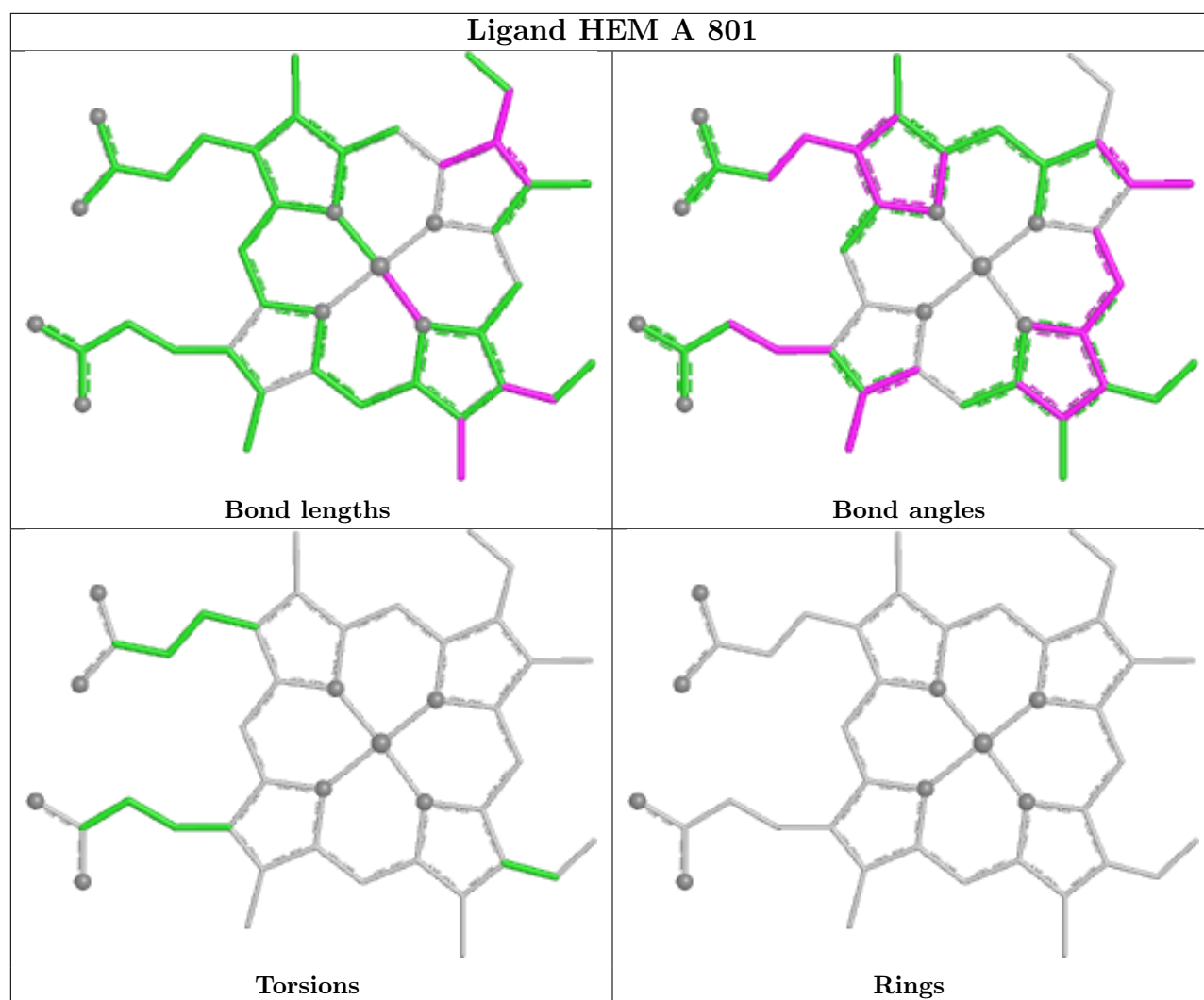


Ligand A1CN4 A 803 (B)



Ligand A1CN4 A 803 (A)





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 ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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	419/423 (99%)	-1.45	0 100 100	21, 47, 82, 120	4 (0%)
1	B	413/423 (97%)	-1.52	0 100 100	20, 41, 68, 90	2 (0%)
1	C	418/423 (98%)	-1.43	0 100 100	21, 48, 82, 122	3 (0%)
1	D	410/423 (96%)	-1.50	0 100 100	22, 42, 70, 99	2 (0%)
All	All	1660/1692 (98%)	-1.48	0 100 100	20, 44, 77, 122	11 (0%)

There are no RSRZ outliers to report.

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

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

6.3 Carbohydrates ⓘ

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	A1CN4	B	802[A]	24/24	0.98	0.10	32,85,95,99	24
4	A1CN4	B	802[B]	24/24	0.98	0.10	32,86,106,112	24
5	GOL	B	803	6/6	0.98	0.04	77,79,82,84	0
5	GOL	C	804	6/6	0.98	0.06	70,86,87,88	0

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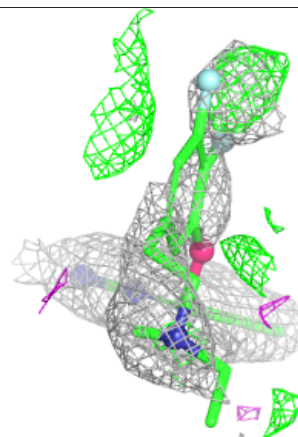
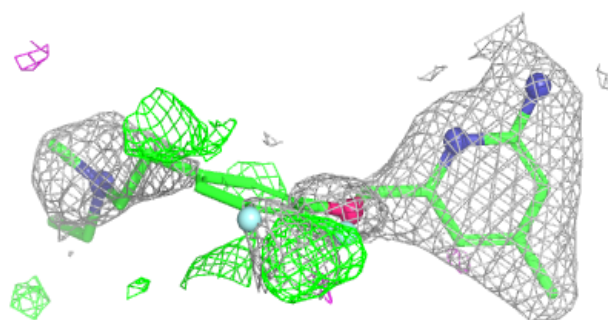
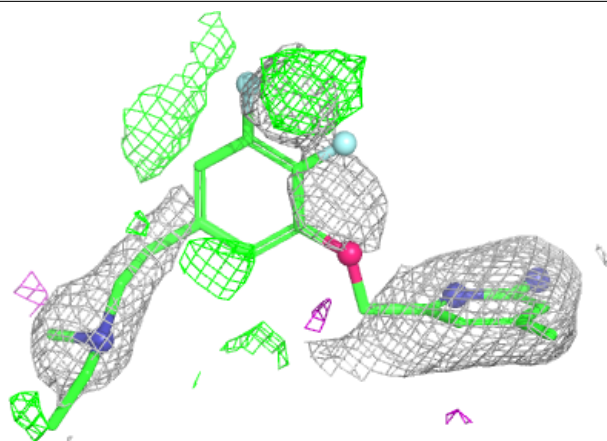
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
5	GOL	D	804	6/6	0.98	0.07	73,78,82,82	0
4	A1CN4	A	803[B]	24/24	0.99	0.08	32,99,119,126	24
3	H4B	A	802	17/17	0.99	0.03	31,40,43,43	0
3	H4B	A	807	17/17	0.99	0.03	22,41,48,49	0
4	A1CN4	C	803[A]	24/24	0.99	0.08	28,81,95,97	24
4	A1CN4	C	803[B]	24/24	0.99	0.08	29,90,100,104	24
4	A1CN4	D	803[A]	24/24	0.99	0.07	30,74,83,86	24
4	A1CN4	D	803[B]	24/24	0.99	0.07	30,77,93,98	24
5	GOL	A	804	6/6	0.99	0.06	68,79,83,83	0
5	GOL	A	805	6/6	0.99	0.04	50,59,63,66	0
3	H4B	C	802	17/17	0.99	0.03	30,41,47,47	0
5	GOL	B	804	6/6	0.99	0.05	65,66,70,71	0
3	H4B	D	802	17/17	0.99	0.03	35,40,48,48	0
5	GOL	C	805	6/6	0.99	0.04	56,61,66,75	0
4	A1CN4	A	803[A]	24/24	0.99	0.08	31,80,104,111	24
2	HEM	D	801	43/43	1.00	0.03	23,34,52,56	0
2	HEM	A	801	43/43	1.00	0.03	26,35,52,56	0
2	HEM	B	801	43/43	1.00	0.03	25,32,48,56	0
2	HEM	C	801	43/43	1.00	0.03	31,39,52,66	0
6	ZN	A	806	1/1	1.00	0.01	35,35,35,35	0
6	ZN	C	806	1/1	1.00	0.02	33,33,33,33	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.

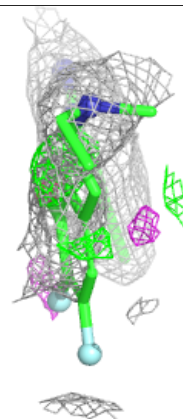
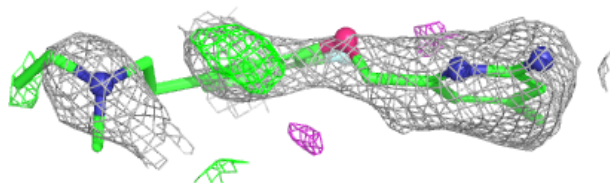
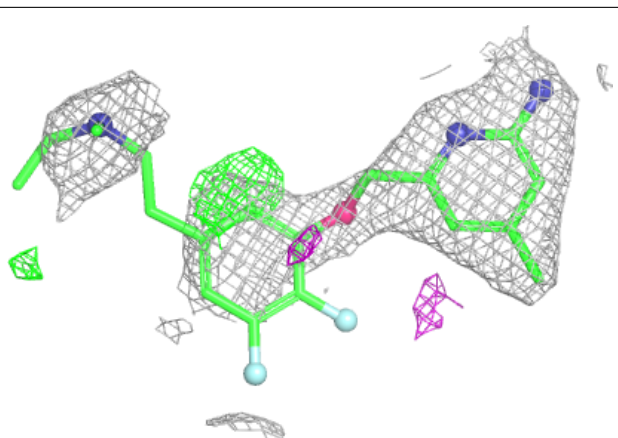
Electron density around A1CN4 B 802 (A):

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

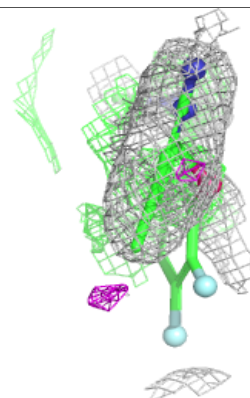
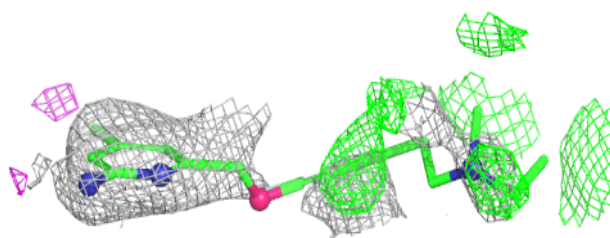
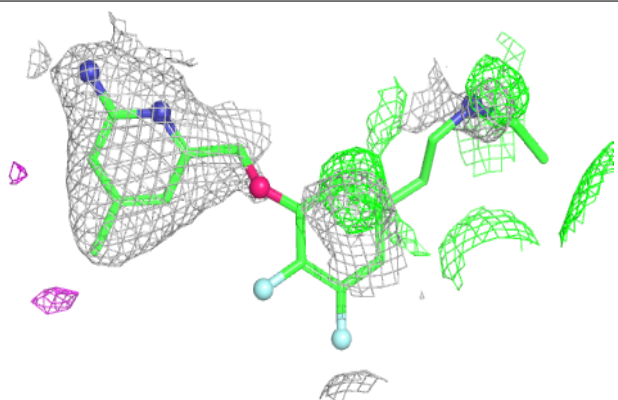


Electron density around A1CN4 B 802 (B):

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

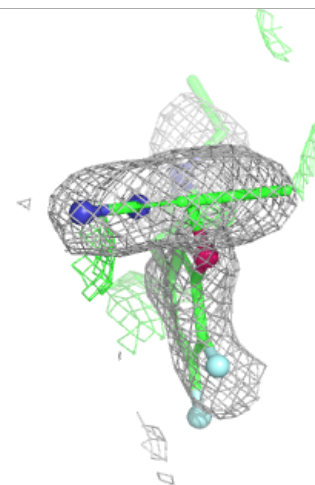
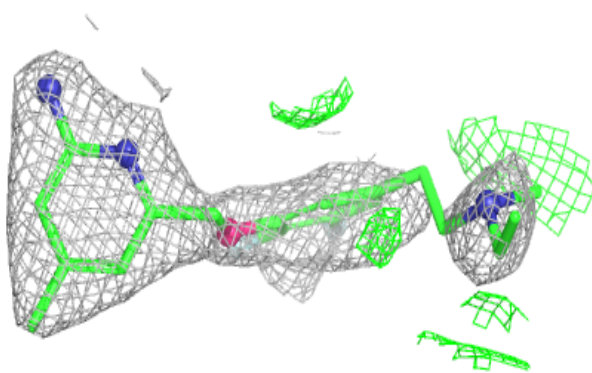
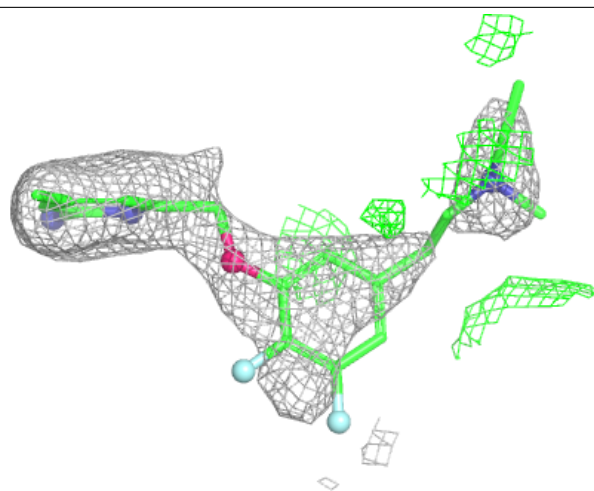
**Electron density around A1CN4 A 803 (B):**

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



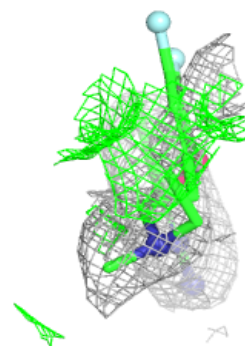
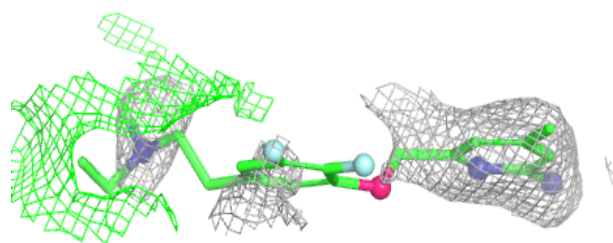
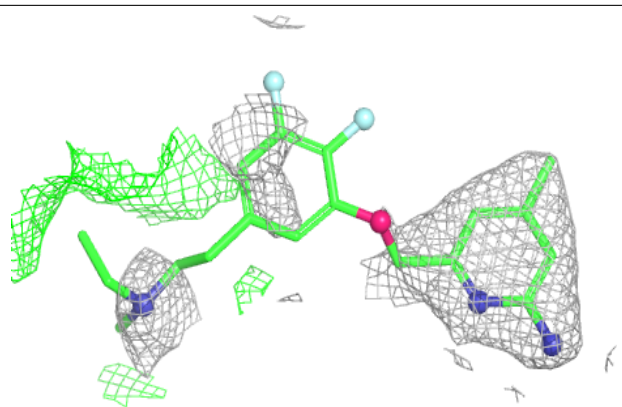
Electron density around A1CN4 C 803 (A):

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



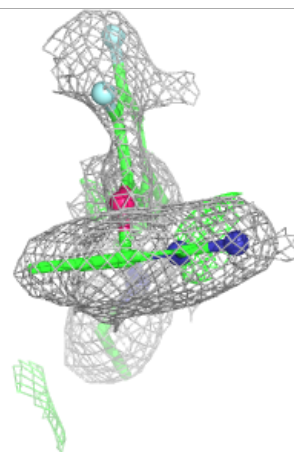
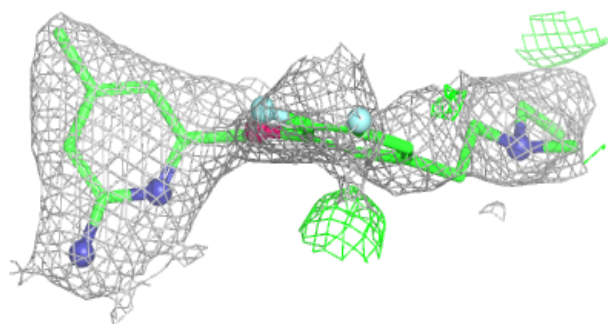
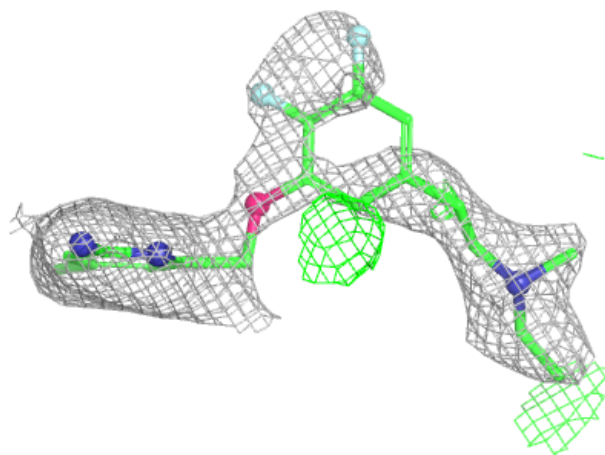
Electron density around A1CN4 C 803 (B):

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



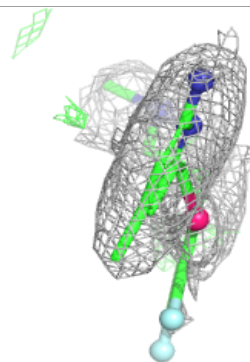
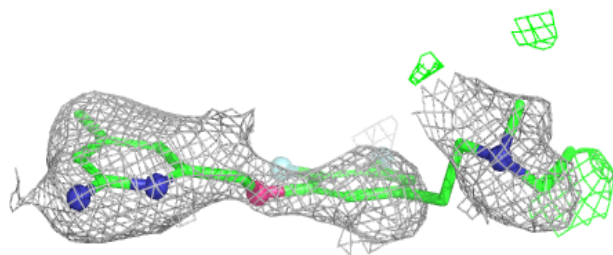
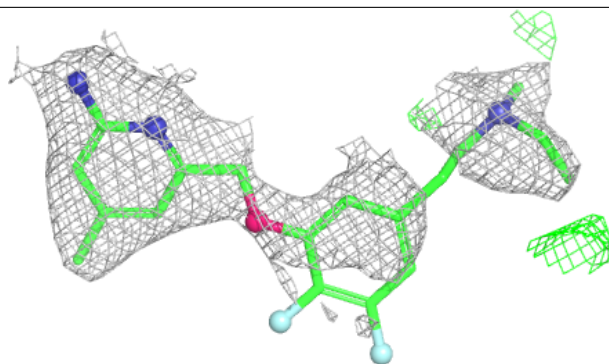
Electron density around A1CN4 D 803 (A):

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

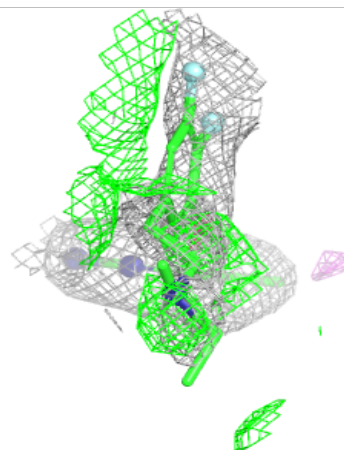
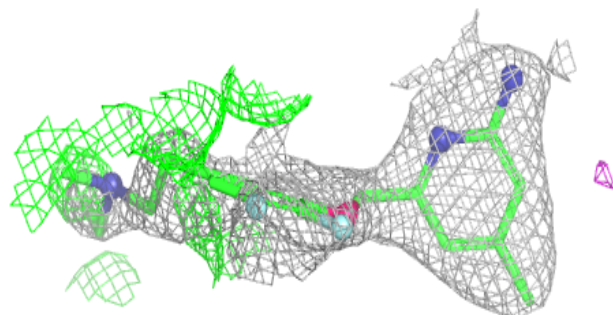
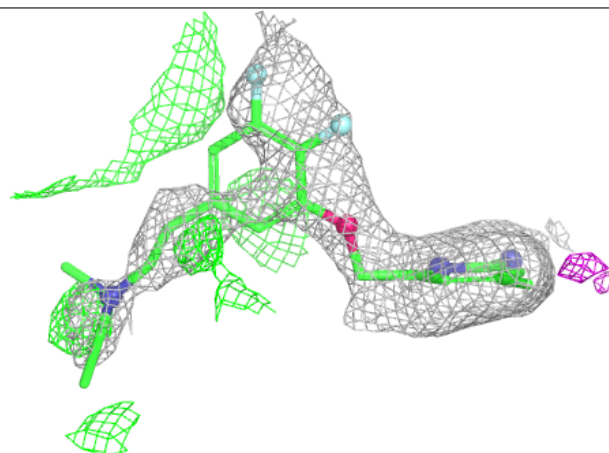


Electron density around A1CN4 D 803 (B):

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

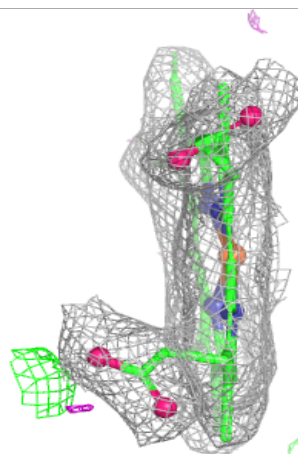
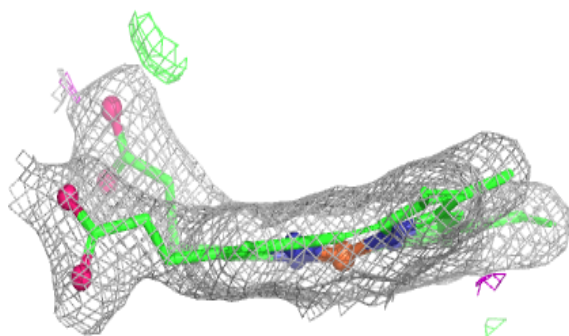
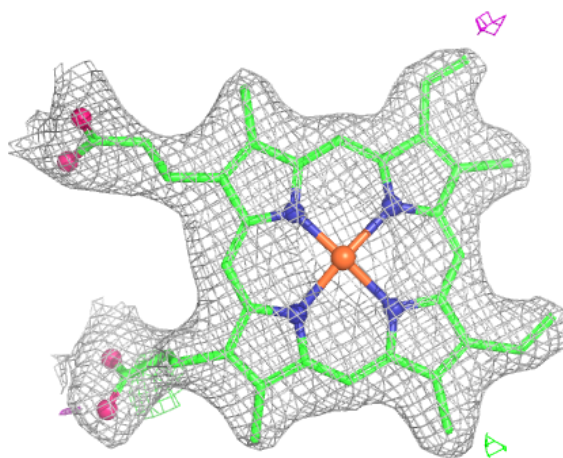
**Electron density around A1CN4 A 803 (A):**

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



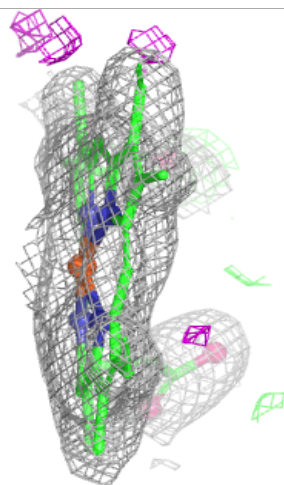
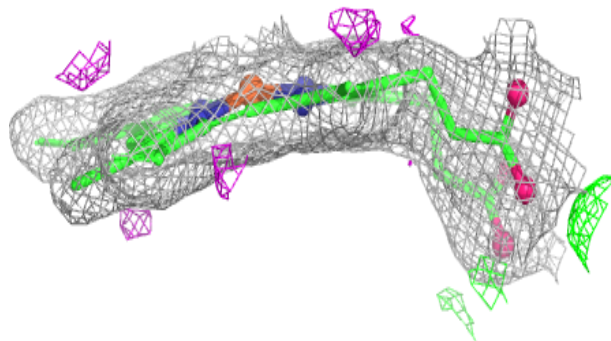
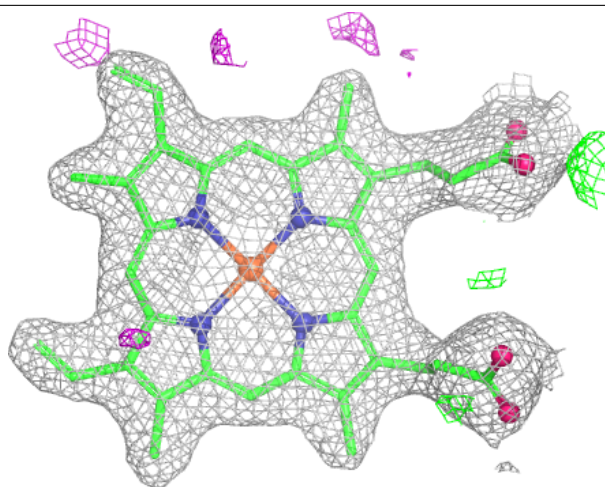
Electron density around HEM D 801:

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



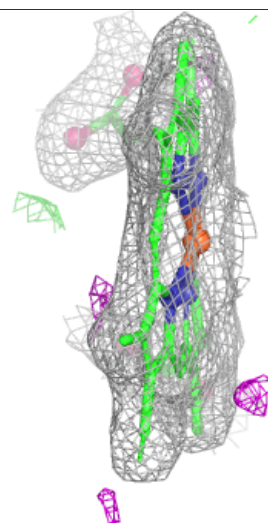
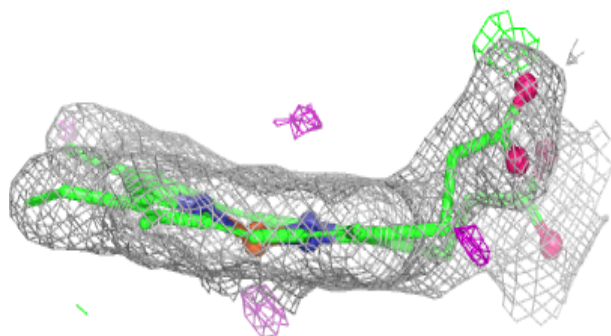
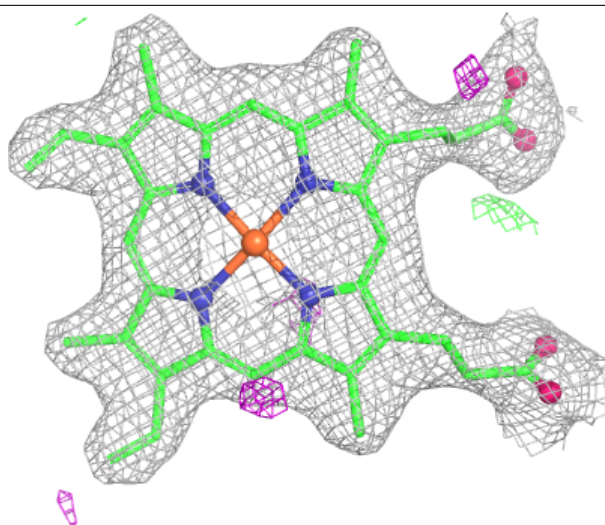
Electron density around HEM A 801:

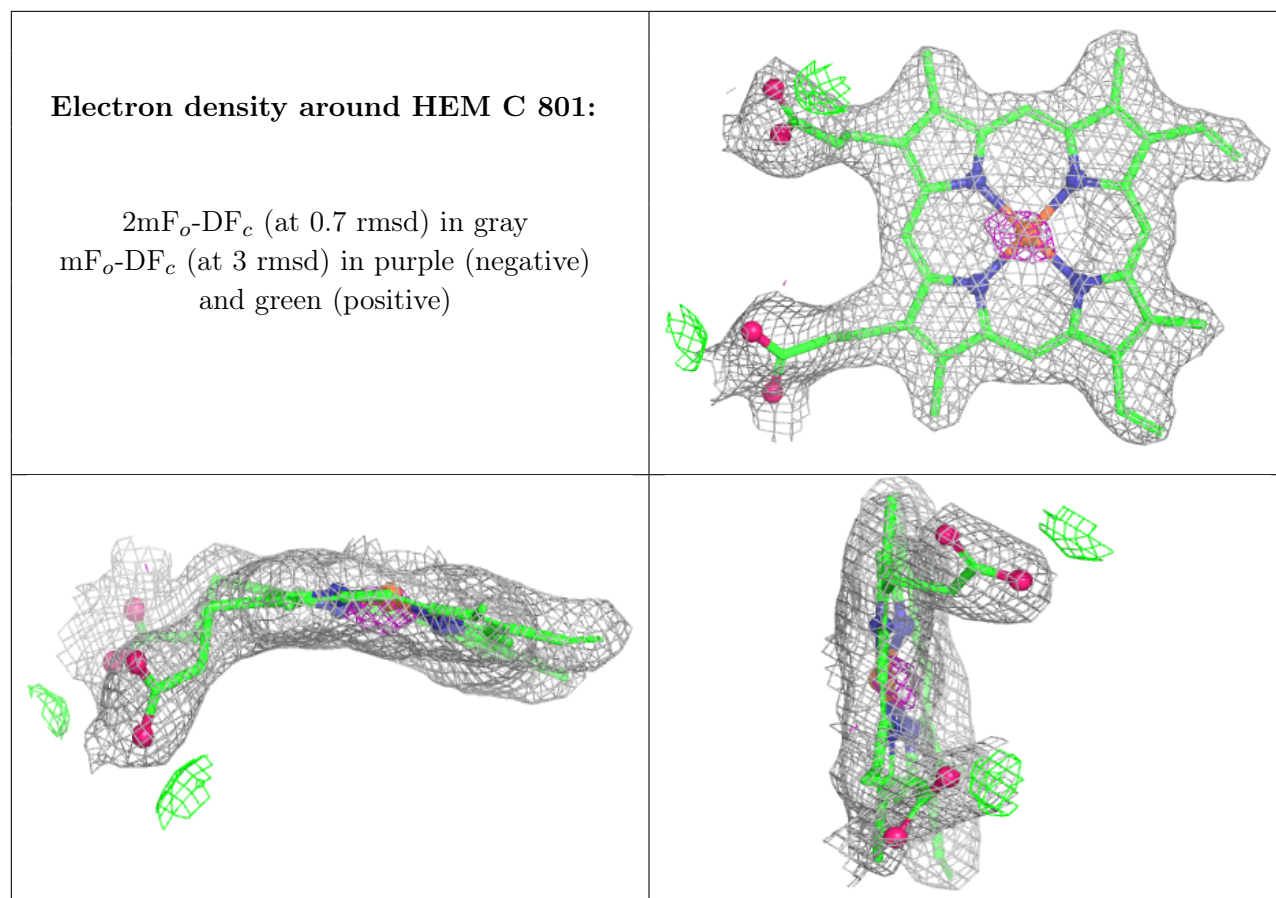
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around HEM B 801:

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





6.5 Other polymers ⓘ

There are no such residues in this entry.