



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 01:58 AM UTC

PDB ID : 6ZXX / pdb_00006zxx
Title : Catabolic reductive dehalogenase NpRdhA, N-terminally tagged.
Authors : Leys, D.; Halliwell, T.
Deposited on : 2020-07-30
Resolution : 1.99 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 Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
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 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

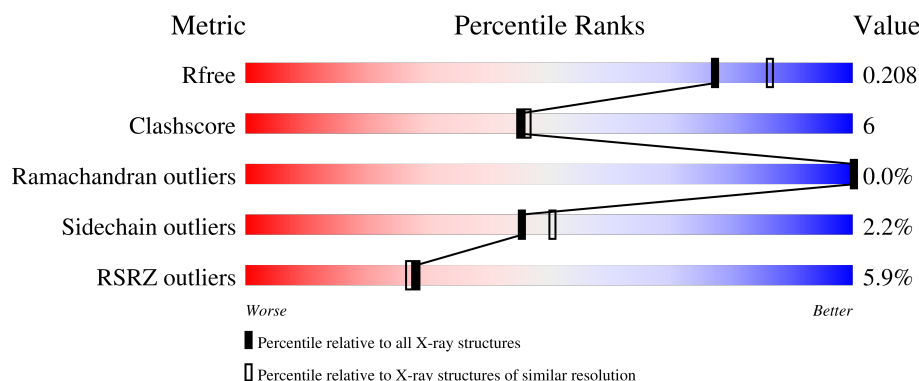
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.99 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	10052 (2.00-2.00)
Clashscore	190562	11152 (2.00-2.00)
Ramachandran outliers	187476	11031 (2.00-2.00)
Sidechain outliers	187428	11029 (2.00-2.00)
RSRZ outliers	180081	10067 (2.00-2.00)

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	725	15% 87% 8% ..
1	B	725	86% 9% ..
1	C	725	15% 84% 11% ..

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
3	B12	A	703	X	-	-	-
3	B12	B	703	X	-	-	-
3	B12	C	803	X	-	-	-
5	QSH	A	705[A]	-	-	X	-
5	QSH	B	705[A]	-	-	X	-
7	BR	A	707[A]	-	-	X	-
7	BR	B	707[A]	-	-	X	-
7	BR	C	807[A]	-	-	X	-

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 16958 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 Oxidoreductase, NAD-binding/iron-sulfur cluster-binding protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	700	Total	C	N	O	S	0	1	0
			5322	3320	976	986	40			
1	B	695	Total	C	N	O	S	0	3	0
			5312	3310	967	994	41			
1	C	696	Total	C	N	O	S	0	1	0
			5180	3238	942	960	40			

There are 81 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-26	MET	-	initiating methionine	UNP K2MB66
A	-25	VAL	-	expression tag	UNP K2MB66
A	-24	GLN	-	expression tag	UNP K2MB66
A	-23	THR	-	expression tag	UNP K2MB66
A	-22	SER	-	expression tag	UNP K2MB66
A	-21	PHE	-	expression tag	UNP K2MB66
A	-20	GLU	-	expression tag	UNP K2MB66
A	-19	HIS	-	expression tag	UNP K2MB66
A	-18	HIS	-	expression tag	UNP K2MB66
A	-17	HIS	-	expression tag	UNP K2MB66
A	-16	HIS	-	expression tag	UNP K2MB66
A	-15	HIS	-	expression tag	UNP K2MB66
A	-14	HIS	-	expression tag	UNP K2MB66
A	-13	SER	-	expression tag	UNP K2MB66
A	-12	ALA	-	expression tag	UNP K2MB66
A	-11	GLY	-	expression tag	UNP K2MB66
A	-10	GLU	-	expression tag	UNP K2MB66
A	-9	ASN	-	expression tag	UNP K2MB66
A	-8	LEU	-	expression tag	UNP K2MB66
A	-7	TYR	-	expression tag	UNP K2MB66
A	-6	PHE	-	expression tag	UNP K2MB66
A	-5	GLN	-	expression tag	UNP K2MB66

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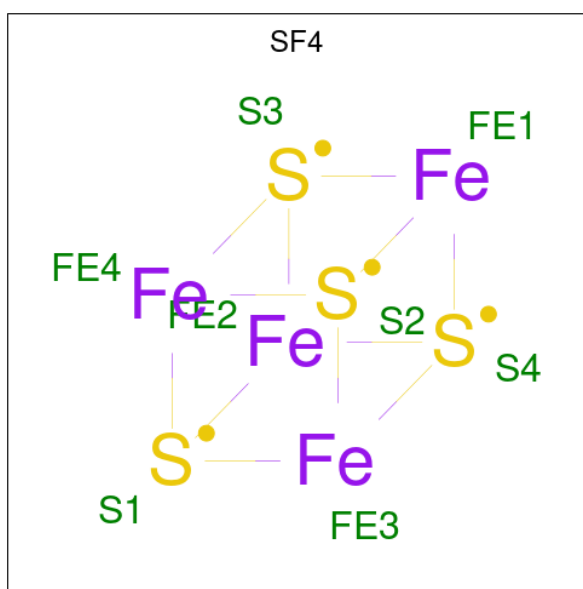
Chain	Residue	Modelled	Actual	Comment	Reference
A	-4	GLY	-	expression tag	UNP K2MB66
A	-3	ALA	-	expression tag	UNP K2MB66
A	-2	GLN	-	expression tag	UNP K2MB66
A	-1	ILE	-	expression tag	UNP K2MB66
A	0	SER	-	expression tag	UNP K2MB66
B	-26	MET	-	initiating methionine	UNP K2MB66
B	-25	VAL	-	expression tag	UNP K2MB66
B	-24	GLN	-	expression tag	UNP K2MB66
B	-23	THR	-	expression tag	UNP K2MB66
B	-22	SER	-	expression tag	UNP K2MB66
B	-21	PHE	-	expression tag	UNP K2MB66
B	-20	GLU	-	expression tag	UNP K2MB66
B	-19	HIS	-	expression tag	UNP K2MB66
B	-18	HIS	-	expression tag	UNP K2MB66
B	-17	HIS	-	expression tag	UNP K2MB66
B	-16	HIS	-	expression tag	UNP K2MB66
B	-15	HIS	-	expression tag	UNP K2MB66
B	-14	HIS	-	expression tag	UNP K2MB66
B	-13	SER	-	expression tag	UNP K2MB66
B	-12	ALA	-	expression tag	UNP K2MB66
B	-11	GLY	-	expression tag	UNP K2MB66
B	-10	GLU	-	expression tag	UNP K2MB66
B	-9	ASN	-	expression tag	UNP K2MB66
B	-8	LEU	-	expression tag	UNP K2MB66
B	-7	TYR	-	expression tag	UNP K2MB66
B	-6	PHE	-	expression tag	UNP K2MB66
B	-5	GLN	-	expression tag	UNP K2MB66
B	-4	GLY	-	expression tag	UNP K2MB66
B	-3	ALA	-	expression tag	UNP K2MB66
B	-2	GLN	-	expression tag	UNP K2MB66
B	-1	ILE	-	expression tag	UNP K2MB66
B	0	SER	-	expression tag	UNP K2MB66
C	-23	MET	-	initiating methionine	UNP K2MB66
C	-22	VAL	-	expression tag	UNP K2MB66
C	-21	GLN	-	expression tag	UNP K2MB66
C	-20	THR	-	expression tag	UNP K2MB66
C	-19	SER	-	expression tag	UNP K2MB66
C	-18	PHE	-	expression tag	UNP K2MB66
C	-17	GLU	-	expression tag	UNP K2MB66
C	-16	HIS	-	expression tag	UNP K2MB66
C	-15	HIS	-	expression tag	UNP K2MB66
C	-14	HIS	-	expression tag	UNP K2MB66

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-13	HIS	-	expression tag	UNP K2MB66
C	-12	HIS	-	expression tag	UNP K2MB66
C	-11	HIS	-	expression tag	UNP K2MB66
C	-10	SER	-	expression tag	UNP K2MB66
C	-9	ALA	-	expression tag	UNP K2MB66
C	-8	GLY	-	expression tag	UNP K2MB66
C	-7	GLU	-	expression tag	UNP K2MB66
C	-6	ASN	-	expression tag	UNP K2MB66
C	-5	LEU	-	expression tag	UNP K2MB66
C	-4	TYR	-	expression tag	UNP K2MB66
C	-3	PHE	-	expression tag	UNP K2MB66
C	-2	GLN	-	expression tag	UNP K2MB66
C	-1	GLY	-	expression tag	UNP K2MB66
C	0	ALA	-	expression tag	UNP K2MB66
C	1	GLN	-	expression tag	UNP K2MB66
C	2	ILE	-	expression tag	UNP K2MB66
C	3	SER	-	expression tag	UNP K2MB66

- Molecule 2 is IRON/SULFUR CLUSTER (CCD ID: SF4) (formula: Fe_4S_4).



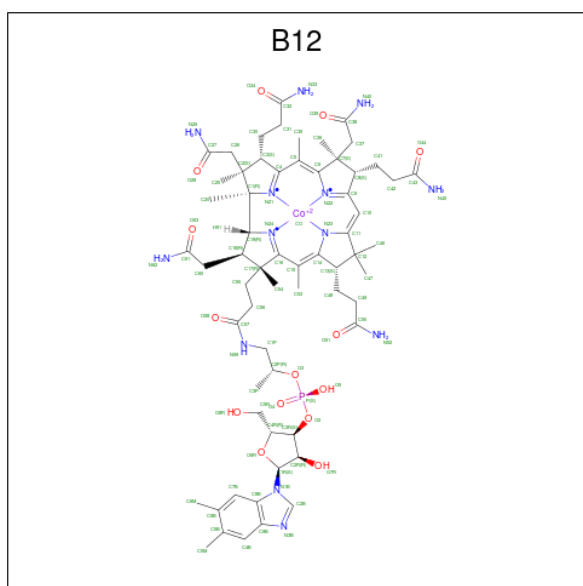
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	Fe	S	0	0
			8	4	4		
2	A	1	Total	Fe	S	0	0
			8	4	4		
2	B	1	Total	Fe	S	0	0
			8	4	4		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	B	1	Total	Fe	S	0	0
			8	4	4		
2	C	1	Total	Fe	S	0	0
			8	4	4		
2	C	1	Total	Fe	S	0	0
			8	4	4		

- Molecule 3 is COBALAMIN (CCD ID: B12) (formula: $C_{62}H_{89}CoN_{13}O_{14}P$) (labeled as "Ligand of Interest" by depositor).

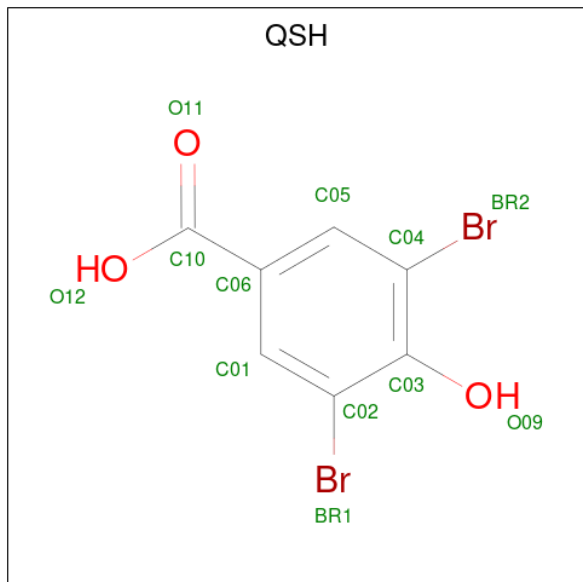


Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
3	A	1	Total	C	Co	N	O	P	0	0
			91	62	1	13	14	1		
3	B	1	Total	C	Co	N	O	P	0	0
			91	62	1	13	14	1		
3	C	1	Total	C	Co	N	O	P	0	0
			91	62	1	13	14	1		

- Molecule 4 is SODIUM ION (CCD ID: NA) (formula: Na).

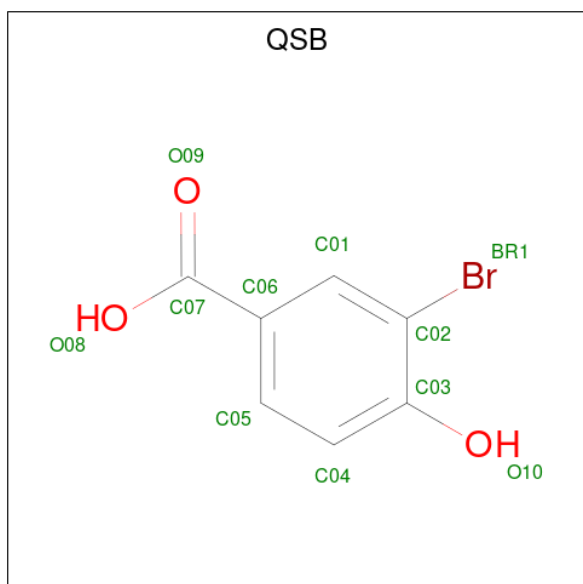
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total Na 1 1	0	0
4	B	1	Total Na 1 1	0	0
4	C	1	Total Na 1 1	0	0

- Molecule 5 is 3,5-bis(bromanyl)-4-oxidanyl-benzoic acid (CCD ID: QSH) (formula: $C_7H_4Br_2O_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	Br	C	O	0	1
			12	2	7	3		
5	B	1	Total	Br	C	O	0	1
			12	2	7	3		
5	C	1	Total	Br	C	O	0	1
			12	2	7	3		

- Molecule 6 is 3 bromo 4 hydroxybenzoic acid (CCD ID: QSB) (formula: $C_7H_5BrO_3$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	1	Total	Br	C	O	0	1
			11	1	7	3		
6	B	1	Total	Br	C	O	0	1
			11	1	7	3		
6	C	1	Total	Br	C	O	0	1
			11	1	7	3		

- Molecule 7 is BROMIDE ION (CCD ID: BR) (formula: Br).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	1	Total	Br	0	1
			1	1		
7	B	1	Total	Br	0	1
			1	1		
7	C	1	Total	Br	0	1
			1	1		

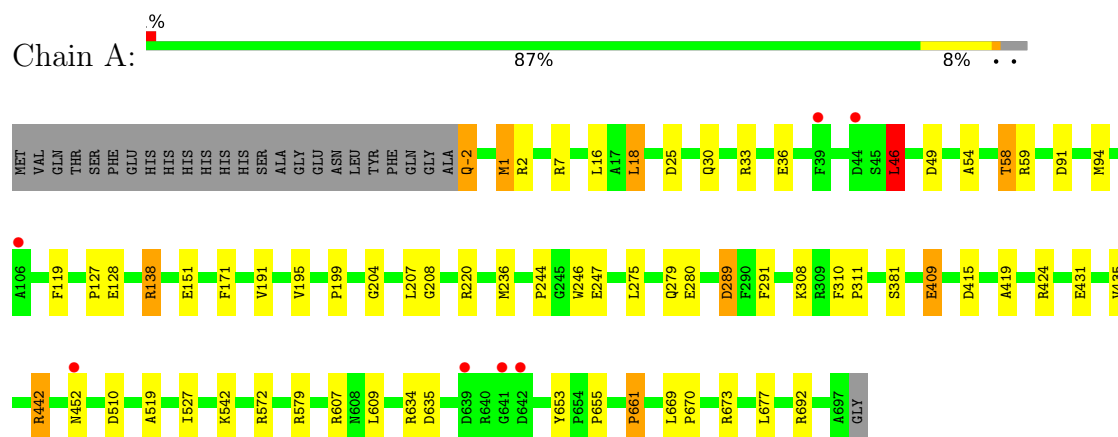
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	314	Total	O	0	6
			314	314		
8	B	304	Total	O	0	0
			304	304		
8	C	130	Total	O	0	0
			130	130		

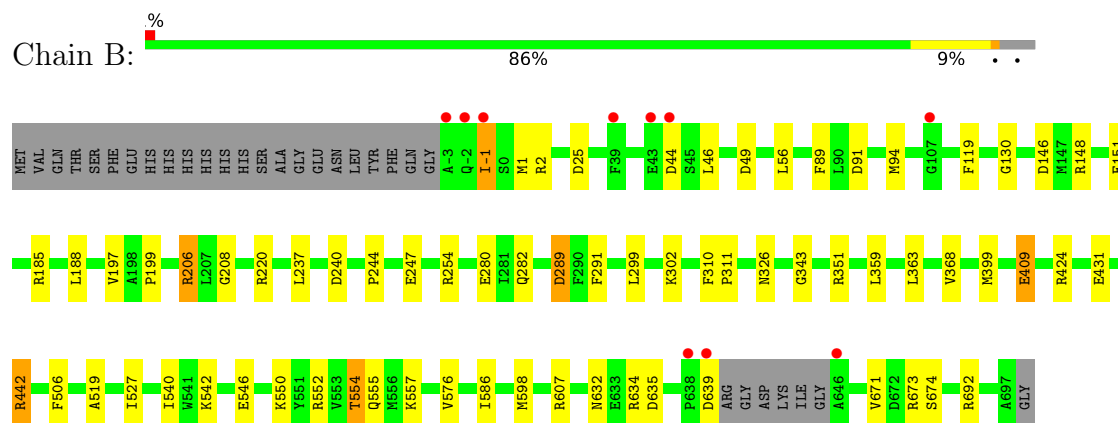
3 Residue-property plots [i](#)

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.

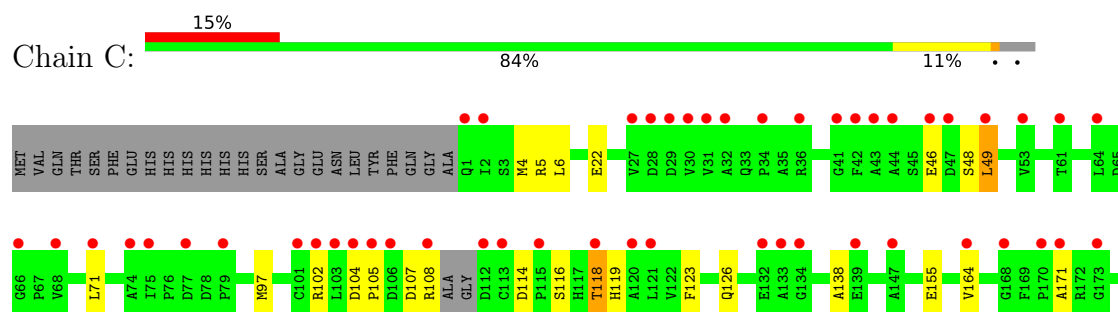
- Molecule 1: Oxidoreductase, NAD-binding/iron-sulfur cluster-binding protein

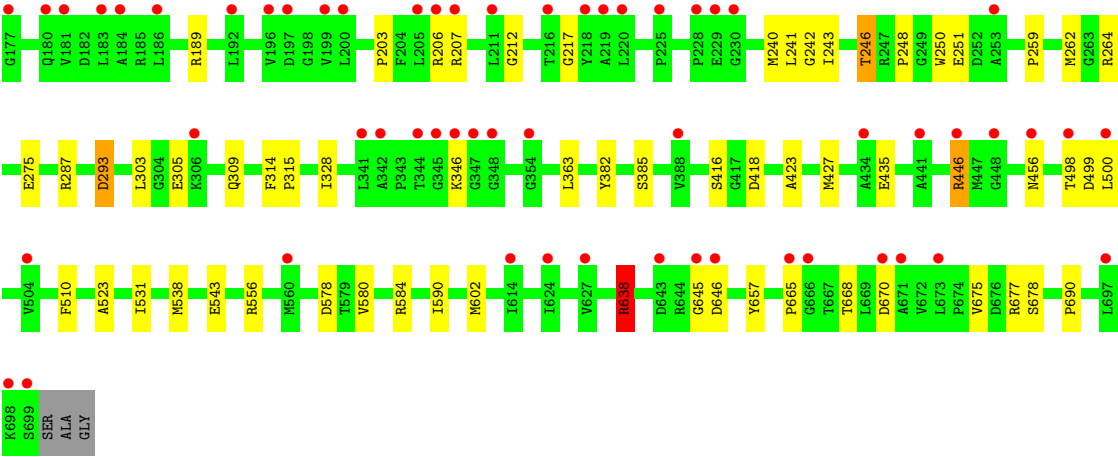


- Molecule 1: Oxidoreductase, NAD-binding/iron-sulfur cluster-binding protein



- Molecule 1: Oxidoreductase, NAD-binding/iron-sulfur cluster-binding protein





4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	180.18Å 170.39Å 107.96Å 90.00° 99.16° 90.00°	Depositor
Resolution (Å)	106.58 – 1.99 106.58 – 1.99	Depositor EDS
% Data completeness (in resolution range)	94.5 (106.58-1.99) 46.7 (106.58-1.99)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.20 (at 1.98Å)	Xtriage
Refinement program	REFMAC 5.7.0029	Depositor
R, R_{free}	0.182 , 0.218 (Not available) , 0.208	Depositor DCC
R_{free} test set	5033 reflections (2.28%)	wwPDB-VP
Wilson B-factor (Å ²)	27.6	Xtriage
Anisotropy	0.196	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 37.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	16958	wwPDB-VP
Average B, all atoms (Å ²)	31.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.26% 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: SF4, B12, BR, QSH, NA, QSB

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	0.99	1/5434 (0.0%)	1.00	3/7358 (0.0%)
1	B	0.93	3/5424 (0.1%)	0.99	2/7346 (0.0%)
1	C	0.88	1/5290 (0.0%)	1.00	9/7178 (0.1%)
All	All	0.93	5/16148 (0.0%)	1.00	14/21882 (0.1%)

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	-2	GLN	C-N	20.02	1.54	1.33
1	B	-1	ILE	N-CA	5.15	1.53	1.46
1	C	107	ASP	CA-C	5.11	1.59	1.52
1	B	-1	ILE	CA-CB	5.09	1.61	1.54
1	B	302	LYS	N-CA	5.00	1.52	1.46

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	646	ASP	N-CA-C	-7.84	102.82	112.38
1	C	678	SER	CB-CA-C	-6.57	100.57	110.88
1	A	46	LEU	N-CA-CB	-5.98	101.29	110.44
1	B	674	SER	CB-CA-C	-5.83	101.73	110.88
1	C	138	ALA	CA-C-N	5.68	128.16	120.38
1	C	138	ALA	C-N-CA	5.68	128.16	120.38
1	C	638	ARG	CG-CD-NE	-5.67	99.53	112.00
1	B	254	ARG	CB-CA-C	-5.63	100.93	108.87
1	C	206	ARG	CA-C-N	-5.30	114.20	122.73
1	C	206	ARG	C-N-CA	-5.30	114.20	122.73
1	A	7	ARG	CB-CA-C	-5.17	100.43	110.46
1	C	118	THR	N-CA-CB	-5.06	103.86	110.59
1	C	275	GLU	CB-CA-C	5.05	116.14	108.86

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	204	GLY	N-CA-C	-5.02	106.25	112.33

There are no chirality outliers.

There are no planarity outliers.

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	5322	0	5204	46	0
1	B	5312	0	5164	45	0
1	C	5180	0	4969	60	0
2	A	16	0	0	0	0
2	B	16	0	0	0	0
2	C	16	0	0	0	0
3	A	91	0	87	14	0
3	B	91	0	87	12	0
3	C	91	0	87	7	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
5	A	12	0	0	4	0
5	B	12	0	0	5	0
5	C	12	0	0	3	0
6	A	11	0	0	3	0
6	B	11	0	0	2	0
6	C	11	0	0	2	0
7	A	1	0	0	2	0
7	B	1	0	0	2	0
7	C	1	0	0	2	0
8	A	314	0	0	9	0
8	B	304	0	0	4	0
8	C	130	0	0	1	0
All	All	16958	0	15598	187	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 (187) 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:148:ARG:NH1	1:B:431:GLU:OE1	1.90	1.03
5:C:805[A]:QSH:BR2	7:C:807[A]:BR:BR	1.03	1.03
5:A:705[A]:QSH:C04	7:A:707[A]:BR:BR	2.65	0.98
5:B:705[A]:QSH:BR2	7:B:707[A]:BR:BR	0.94	0.94
1:C:538:MET:HE1	1:C:543:GLU:HB2	1.51	0.92
1:A:127:PRO:O	1:A:138:ARG:NH2	2.03	0.92
1:C:498:THR:HG22	1:C:500:LEU:H	1.35	0.92
1:C:259:PRO:HD2	1:C:262:MET:HE2	1.53	0.91
5:B:705[A]:QSH:C04	7:B:707[A]:BR:BR	2.74	0.90
3:A:703:B12:H362	3:A:703:B12:H351	1.54	0.90
5:B:705[A]:QSH:BR1	6:B:706[A]:QSB:BR1	0.89	0.89
3:B:703:B12:H362	3:B:703:B12:H351	1.55	0.88
5:A:705[A]:QSH:BR1	6:A:706[A]:QSB:BR1	0.88	0.88
1:C:108:ARG:C	8:C:908:HOH:O	2.21	0.84
5:A:705[A]:QSH:BR2	7:A:707[A]:BR:BR	0.82	0.82
1:A:54:ALA:O	1:A:58:THR:HG23	1.81	0.81
1:A:452[A]:ASN:ND2	8:A:801[A]:HOH:O	2.01	0.81
1:B:146:ASP:OD1	1:B:206:ARG:HG2	1.84	0.78
1:C:48:SER:O	1:C:446:ARG:NH2	2.16	0.78
1:B:351:ARG:NH1	8:B:801:HOH:O	2.18	0.76
3:B:703:B12:H552	3:B:703:B12:H531	1.67	0.76
1:B:282:GLN:NE2	8:B:802:HOH:O	2.19	0.76
3:B:703:B12:H481	3:B:703:B12:H533	1.70	0.74
3:A:703:B12:H531	3:A:703:B12:H552	1.70	0.73
3:C:803:B12:H552	3:C:803:B12:H531	1.71	0.73
1:A:49:ASP:OD2	1:A:442:ARG:NH2	2.23	0.72
1:B:550:LYS:O	1:B:554:THR:HB	1.90	0.71
1:C:126:GLN:HE21	1:C:207:ARG:HG2	1.55	0.71
1:C:118:THR:HG22	1:C:217:GLY:HA2	1.73	0.70
3:C:803:B12:H362	3:C:803:B12:H351	1.73	0.70
1:B:148:ARG:NH2	1:B:363:LEU:O	2.25	0.69
1:C:538:MET:HE1	1:C:543:GLU:CB	2.24	0.68
1:A:59:ARG:NH1	8:A:804:HOH:O	2.26	0.67
1:A:91:ASP:OD2	1:A:424:ARG:NH1	2.27	0.67
1:A:1:MET:CE	1:A:579:ARG:HG3	2.25	0.67
1:A:572:ARG:NH2	8:A:805:HOH:O	2.28	0.67
3:A:703:B12:H481	3:A:703:B12:H533	1.77	0.67
1:C:118:THR:HG23	1:C:119:HIS:ND1	2.11	0.65
1:C:242:GLY:HA2	1:C:246:THR:HG22	1.76	0.65
3:B:703:B12:H351	3:B:703:B12:C36	2.27	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:289:ASP:HA	3:A:703:B12:H59	1.63	0.64
1:B:44:ASP:HB2	1:B:343:GLY:H	1.62	0.63
3:B:703:B12:H533	3:B:703:B12:C48	2.30	0.62
1:C:259:PRO:HD2	1:C:262:MET:CE	2.28	0.62
1:A:-2:GLN:N	8:A:806:HOH:O	2.31	0.62
1:B:91:ASP:OD2	1:B:424:ARG:NH1	2.31	0.62
5:C:805[A]:QSH:O11	6:C:806[A]:QSB:O09	0.61	0.60
1:A:2:ARG:HG2	1:A:244:PRO:HD3	1.83	0.60
5:A:705[A]:QSH:O11	6:A:706[A]:QSB:O08	0.59	0.59
1:A:49:ASP:CG	1:A:442:ARG:NH2	2.60	0.59
5:B:705[A]:QSH:O11	6:B:706[A]:QSB:O08	0.59	0.59
1:C:418:ASP:OD2	1:C:638:ARG:NH1	2.32	0.58
1:A:58:THR:HG22	1:A:171:PHE:CE1	2.39	0.58
1:C:5:ARG:HG2	1:C:248:PRO:HD3	1.84	0.58
1:C:49:LEU:HD13	1:C:363:LEU:HD11	1.86	0.58
1:B:2:ARG:HG2	1:B:244:PRO:HD3	1.86	0.57
1:B:552:ARG:HH12	5:B:705[A]:QSH:C03	2.18	0.57
1:C:102:ARG:O	1:C:189:ARG:NH1	2.36	0.57
1:B:607:ARG:NH1	1:B:635:ASP:OD1	2.38	0.56
1:B:291:PHE:CD2	3:B:703:B12:H532	2.41	0.56
1:A:310:PHE:CD1	1:A:311:PRO:HD3	2.40	0.56
1:C:668:THR:HG23	1:C:670:ASP:H	1.69	0.56
1:A:1:MET:HE2	1:A:579:ARG:HG3	1.85	0.56
3:A:703:B12:H533	3:A:703:B12:C48	2.35	0.55
1:B:280:GLU:OE2	1:B:692:ARG:NH2	2.40	0.55
1:C:456[A]:ASN:HD21	5:C:805[A]:QSH:C10	2.20	0.55
3:A:703:B12:H351	3:A:703:B12:C36	2.30	0.54
1:B:49:ASP:CG	1:B:442:ARG:HH11	2.15	0.54
1:A:291:PHE:CD2	3:A:703:B12:H532	2.43	0.54
1:C:538:MET:HE2	1:C:543:GLU:HA	1.89	0.54
1:A:607:ARG:NH1	1:A:635:ASP:OD1	2.41	0.54
1:C:97:MET:HE1	1:C:203:PRO:O	2.08	0.54
1:C:287:ARG:HD3	1:C:382:TYR:O	2.09	0.53
1:A:381:SER:OG	1:A:661:PRO:O	2.22	0.53
1:B:94:MET:HE1	1:B:199:PRO:O	2.09	0.53
1:A:25:ASP:OD1	1:A:220:ARG:NH1	2.39	0.53
1:B:555:GLN:NE2	1:B:632:ASN:OD1	2.41	0.53
1:C:385:SER:OG	1:C:665:PRO:O	2.25	0.53
1:B:289:ASP:OD1	1:B:289:ASP:C	2.51	0.53
1:A:94:MET:HE1	1:A:199:PRO:O	2.10	0.52
3:A:703:B12:H3	3:A:703:B12:O28	2.10	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:498:THR:HG22	1:C:499:ASP:N	2.24	0.52
1:B:1:MET:HE2	1:B:576:VAL:HG12	1.91	0.52
3:C:803:B12:H531	3:C:803:B12:C55	2.40	0.51
1:B:409:GLU:HG3	8:B:990:HOH:O	2.11	0.51
1:B:25:ASP:OD1	1:B:220:ARG:NH1	2.40	0.51
1:B:310:PHE:CD2	1:B:311:PRO:HD3	2.45	0.50
1:A:607:ARG:HD3	1:A:634:ARG:O	2.11	0.50
1:A:236:MET:HE3	1:A:246:TRP:HE3	1.76	0.50
1:C:328:ILE:HD13	1:C:427:MET:HE2	1.94	0.50
1:C:264:ARG:NH2	1:C:578:ASP:OD2	2.39	0.50
1:A:415:ASP:HB2	8:A:966:HOH:O	2.13	0.49
1:C:314:PHE:CD2	1:C:315:PRO:HD3	2.47	0.49
1:B:607:ARG:HD3	1:B:634:ARG:O	2.11	0.49
1:A:289:ASP:OD1	1:A:289:ASP:C	2.54	0.49
1:C:293:ASP:OD1	1:C:293:ASP:C	2.55	0.49
1:B:237:LEU:HD12	1:C:602:MET:HG3	1.93	0.49
1:B:46:LEU:CD2	1:B:359:LEU:HD11	2.42	0.49
3:B:703:B12:H601	3:B:703:B12:H262	1.94	0.49
1:A:46:LEU:HD11	1:A:435:VAL:CG1	2.43	0.49
1:B:89:PHE:CZ	1:B:424:ARG:HD3	2.48	0.49
3:C:803:B12:H481	3:C:803:B12:H533	1.94	0.49
1:C:4:MET:HE2	1:C:580:VAL:HG22	1.95	0.48
1:C:303:LEU:CD2	1:C:675:VAL:HG21	2.43	0.48
1:C:538:MET:CE	1:C:543:GLU:HA	2.44	0.48
3:C:803:B12:H533	3:C:803:B12:C48	2.43	0.48
1:B:299:LEU:CD2	1:B:671:VAL:HG21	2.43	0.48
3:A:703:B12:H531	3:A:703:B12:C55	2.43	0.48
1:B:598:MET:HG3	1:C:241:LEU:HD12	1.96	0.48
1:A:419:ALA:HA	6:A:706[A]:QSB:BR1	2.69	0.47
1:A:151:GLU:OE1	1:A:431:GLU:OE1	2.32	0.47
1:A:46:LEU:HD11	1:A:435:VAL:HG12	1.96	0.47
1:B:546:GLU:OE2	1:B:673:ARG:HD2	2.15	0.47
1:B:519:ALA:HA	1:B:527:ILE:HB	1.97	0.47
1:C:164:VAL:CG1	1:C:171:ALA:CB	2.92	0.47
3:C:803:B12:H353	3:C:803:B12:H302	1.97	0.47
3:B:703:B12:H531	3:B:703:B12:C55	2.42	0.46
1:C:423:ALA:HA	6:C:806[A]:QSB:BR1	2.70	0.46
1:C:523:ALA:HA	1:C:531:ILE:HB	1.98	0.46
1:A:519:ALA:HA	1:A:527:ILE:HB	1.98	0.46
1:C:538:MET:HE3	1:C:690:PRO:HA	1.97	0.46
1:A:510:ASP:OD2	8:A:802:HOH:O	2.21	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:538:MET:HE3	1:C:690:PRO:HG3	1.96	0.46
1:A:409:GLU:HG3	8:A:1021:HOH:O	2.16	0.45
1:A:653:TYR:OH	1:A:673:ARG:HA	2.16	0.45
3:B:703:B12:C48	3:B:703:B12:C53	2.95	0.45
1:C:538:MET:HE1	1:C:543:GLU:CA	2.46	0.45
1:C:123:PHE:CZ	1:C:212:GLY:HA3	2.52	0.45
1:C:155:GLU:OE1	1:C:435:GLU:OE2	2.35	0.45
1:C:538:MET:HE3	1:C:690:PRO:CB	2.47	0.45
1:C:538:MET:HE3	1:C:690:PRO:CA	2.47	0.44
1:A:310:PHE:CG	1:A:311:PRO:HD3	2.53	0.44
1:C:242:GLY:CA	1:C:246:THR:HG22	2.43	0.44
1:B:49:ASP:CG	1:B:442:ARG:NH1	2.76	0.44
3:B:703:B12:H482	3:B:703:B12:H471	1.81	0.44
1:B:244:PRO:HD2	1:B:247:GLU:OE1	2.17	0.44
1:A:279:GLN:NE2	8:A:803:HOH:O	2.23	0.43
1:B:506:PHE:HB2	1:B:586:ILE:HG12	1.99	0.43
1:B:240:ASP:HB2	8:B:1005:HOH:O	2.17	0.43
1:C:248:PRO:HD2	1:C:251:GLU:OE1	2.18	0.43
1:B:368:VAL:HG22	1:B:399:MET:HG2	2.00	0.43
3:B:703:B12:O28	3:B:703:B12:H3	2.17	0.43
1:C:328:ILE:HD13	1:C:427:MET:CE	2.48	0.43
3:C:803:B12:H482	3:C:803:B12:H471	1.78	0.43
1:A:1:MET:HE3	1:A:579:ARG:HG3	1.98	0.43
1:A:18:LEU:CD2	8:A:1035:HOH:O	2.65	0.43
1:B:130:GLY:O	1:B:351:ARG:NH2	2.52	0.43
3:A:703:B12:H601	3:A:703:B12:H262	2.00	0.43
1:C:104:ASP:HB2	1:C:105:PRO:CD	2.48	0.42
1:C:510:PHE:HB2	1:C:590:ILE:HG12	2.00	0.42
1:C:46:GLU:O	1:C:346:LYS:HE2	2.19	0.42
1:A:542:LYS:HA	1:A:542:LYS:HD2	1.89	0.42
1:B:151:GLU:OE1	1:B:431:GLU:OE2	2.36	0.42
3:B:703:B12:H253	3:B:703:B12:H301	1.87	0.42
1:C:538:MET:HE2	1:C:538:MET:HA	2.02	0.42
1:C:416:SER:OG	1:C:638:ARG:HB2	2.19	0.42
1:C:240:MET:HE3	1:C:250:TRP:HE3	1.84	0.42
1:C:114:ASP:OD2	1:C:116:SER:OG	2.32	0.42
1:A:244:PRO:HD2	1:A:247:GLU:OE1	2.20	0.41
1:A:669:LEU:O	1:A:670:PRO:C	2.62	0.41
1:A:58:THR:HG22	1:A:171:PHE:CZ	2.56	0.41
1:A:609:LEU:HD23	1:A:609:LEU:HA	1.91	0.41
1:C:446:ARG:HE	1:C:446:ARG:HB2	1.45	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:119:PHE:CZ	1:B:208:GLY:HA3	2.56	0.41
1:B:310:PHE:CG	1:B:311:PRO:HD3	2.55	0.41
1:A:58:THR:HG22	1:A:171:PHE:HE1	1.84	0.41
1:B:-1:ILE:HA	1:C:584:ARG:NH1	2.36	0.41
1:B:44:ASP:HB2	1:B:343:GLY:N	2.33	0.41
1:C:242:GLY:HA2	1:C:246:THR:CG2	2.47	0.41
1:C:314:PHE:CG	1:C:315:PRO:HD3	2.56	0.41
3:A:703:B12:H482	3:A:703:B12:H471	1.74	0.41
1:B:542:LYS:HA	1:B:542:LYS:HD2	1.91	0.41
1:C:385:SER:CB	1:C:665:PRO:O	2.68	0.41
3:A:703:B12:C48	3:A:703:B12:C53	2.99	0.41
1:A:119:PHE:CZ	1:A:208:GLY:HA3	2.55	0.40
3:A:703:B12:H1P2	3:A:703:B12:H4R	2.02	0.40
1:B:56:LEU:HD11	1:B:326:ASN:HB3	2.04	0.40
1:C:657:TYR:OH	1:C:677:ARG:HA	2.21	0.40
3:A:703:B12:C15	3:A:703:B12:H492	2.50	0.40
1:B:94:MET:HG2	1:B:188:LEU:HD22	2.04	0.40
1:B:557:LYS:HE3	1:B:632:ASN:ND2	2.36	0.40
1:C:305:GLU:O	1:C:309:GLN:HG3	2.22	0.40
1:C:556:ARG:NH2	7:C:807[A]:BR:BR	3.10	0.40
1:A:280:GLU:OE1	1:A:692:ARG:NH2	2.54	0.40
1:B:598:MET:HE2	1:C:243:ILE:HD13	2.03	0.40
1:A:30:GLN:HG3	1:A:191:VAL:HG21	2.04	0.40
1:A:33:ARG:NH1	1:A:36:GLU:HG2	2.37	0.40

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	699/725 (96%)	686 (98%)	13 (2%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	694/725 (96%)	681 (98%)	13 (2%)	0	100	100
1	C	693/725 (96%)	679 (98%)	13 (2%)	1 (0%)	48	46
All	All	2086/2175 (96%)	2046 (98%)	39 (2%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	645	GLY

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	533/569 (94%)	516 (97%)	17 (3%)	34	35
1	B	534/569 (94%)	525 (98%)	9 (2%)	53	60
1	C	504/569 (89%)	496 (98%)	8 (2%)	55	62
All	All	1571/1707 (92%)	1537 (98%)	34 (2%)	45	50

All (34) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1	MET
1	A	16	LEU
1	A	18	LEU
1	A	46	LEU
1	A	58	THR
1	A	128	GLU
1	A	138	ARG
1	A	195	VAL
1	A	207	LEU
1	A	275	LEU
1	A	289	ASP
1	A	308	LYS
1	A	409	GLU

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Mol	Chain	Res	Type
1	A	442	ARG
1	A	655	PRO
1	A	661	PRO
1	A	677	LEU
1	B	185	ARG
1	B	197	VAL
1	B	206	ARG
1	B	289	ASP
1	B	409	GLU
1	B	442	ARG
1	B	540	ILE
1	B	554	THR
1	B	639	ASP
1	C	6	LEU
1	C	22	GLU
1	C	49	LEU
1	C	71	LEU
1	C	246	THR
1	C	293	ASP
1	C	446	ARG
1	C	638	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	421	GLN
1	A	525	ASN
1	B	82	ASN
1	B	439	HIS
1	B	525	ASN
1	B	555	GLN
1	B	632	ASN
1	B	647	ASN
1	C	15	HIS
1	C	33	GLN
1	C	85	ASN
1	C	329	GLN
1	C	330	ASN
1	C	407	GLN
1	C	443	HIS
1	C	518	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 21 ligands modelled in this entry, 6 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$
2	SF4	A	702	1	0,12,12	-	-	-		
2	SF4	C	802	1	0,12,12	-	-	-		
5	QSH	C	805[A]	6	12,12,12	0.96	1 (8%)	17,17,17	1.04	1 (5%)
6	QSB	B	706[A]	5	11,11,11	0.72	0	15,15,15	1.53	4 (26%)
2	SF4	C	801	1	0,12,12	-	-	-		
2	SF4	B	701	1	0,12,12	-	-	-		
2	SF4	B	702	1	0,12,12	-	-	-		
3	B12	B	703	-	94,101,101	1.34	9 (9%)	149,166,166	2.24	40 (26%)
5	QSH	A	705[A]	6	12,12,12	0.77	0	17,17,17	1.52	5 (29%)
6	QSB	A	706[A]	5	11,11,11	0.61	0	15,15,15	2.12	5 (33%)
6	QSB	C	806[A]	5	11,11,11	0.80	0	15,15,15	1.83	3 (20%)
2	SF4	A	701	1	0,12,12	-	-	-		
3	B12	C	803	-	94,101,101	1.29	10 (10%)	149,166,166	2.22	34 (22%)
3	B12	A	703	-	94,101,101	1.40	9 (9%)	149,166,166	2.64	40 (26%)
5	QSH	B	705[A]	6	12,12,12	0.97	0	17,17,17	1.28	1 (5%)

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
2	SF4	A	702	1	-	-	0/6/5/5
5	QSH	C	805[A]	6	-	0/4/4/4	0/1/1/1
2	SF4	C	802	1	-	-	0/6/5/5
6	QSB	B	706[A]	5	-	0/4/4/4	0/1/1/1
2	SF4	C	801	1	-	-	0/6/5/5
2	SF4	B	701	1	-	-	0/6/5/5
2	SF4	B	702	1	-	-	0/6/5/5
3	B12	B	703	-	1/1/36/38	8/56/223/223	0/3/11/11
5	QSH	A	705[A]	6	-	0/4/4/4	0/1/1/1
6	QSB	A	706[A]	5	-	0/4/4/4	0/1/1/1
6	QSB	C	806[A]	5	-	0/4/4/4	0/1/1/1
2	SF4	A	701	1	-	-	0/6/5/5
3	B12	C	803	-	1/1/36/38	8/56/223/223	0/3/11/11
3	B12	A	703	-	1/1/36/38	8/56/223/223	0/3/11/11
5	QSH	B	705[A]	6	-	0/4/4/4	0/1/1/1

All (29) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	703	B12	C8B-C9B	5.00	1.48	1.40
3	B	703	B12	C8B-C9B	4.93	1.48	1.40
3	A	703	B12	C16-C15	-4.75	1.31	1.44
3	C	803	B12	C19-N24	-4.68	1.43	1.49
3	B	703	B12	C19-N24	-4.65	1.43	1.49
3	A	703	B12	C19-N24	-4.61	1.43	1.49
3	C	803	B12	C9-N22	4.44	1.41	1.30
3	C	803	B12	C8B-C9B	4.19	1.47	1.40
3	B	703	B12	C16-C15	-3.96	1.33	1.44
3	B	703	B12	C6B-C5B	3.69	1.49	1.40
3	C	803	B12	C8B-N1B	-3.53	1.32	1.39
3	C	803	B12	C16-C15	-3.51	1.34	1.44
3	A	703	B12	C6B-C5B	3.23	1.48	1.40
3	A	703	B12	C9-N22	2.95	1.37	1.30
3	C	803	B12	C6B-C5B	2.81	1.47	1.40
3	A	703	B12	C1P-N59	-2.81	1.39	1.46
3	A	703	B12	C2B-N3B	2.81	1.37	1.31
3	B	703	B12	C9-N22	2.74	1.37	1.30
3	C	803	B12	C10-C9	2.70	1.46	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	703	B12	C2B-N3B	2.62	1.36	1.31
3	C	803	B12	C14-C15	2.60	1.49	1.38
3	C	803	B12	C9B-N3B	-2.31	1.35	1.39
3	B	703	B12	C47-C12	-2.27	1.49	1.54
3	A	703	B12	O6R-C1R	2.27	1.47	1.42
3	A	703	B12	C1-C19	-2.25	1.50	1.55
3	B	703	B12	C14-C15	2.21	1.48	1.38
3	B	703	B12	C11-N23	-2.11	1.33	1.36
3	C	803	B12	O7R-C2R	2.05	1.48	1.43
5	C	805[A]	QSH	C03-C02	-2.04	1.35	1.39

All (133) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	703	B12	C20-C1-C19	-15.30	94.62	109.35
3	C	803	B12	C20-C1-C19	-11.66	98.13	109.35
3	B	703	B12	C1-C19-N24	11.45	118.99	106.25
3	B	703	B12	C20-C1-C19	-9.37	100.33	109.35
3	C	803	B12	C1-C19-N24	8.72	115.96	106.25
3	A	703	B12	C1-C19-N24	8.51	115.72	106.25
3	A	703	B12	C13-C14-C15	-7.49	112.93	124.32
3	A	703	B12	C1-C19-C18	6.81	132.95	121.90
3	C	803	B12	C19-C1-N21	6.40	108.73	102.14
3	A	703	B12	C19-C1-N21	6.22	108.55	102.14
3	C	803	B12	C18-C19-N24	6.21	111.67	102.33
3	B	703	B12	C13-C14-C15	-6.10	115.04	124.32
3	C	803	B12	C1-C19-C18	5.94	131.53	121.90
3	B	703	B12	C2-C1-C19	5.77	127.59	118.61
3	B	703	B12	C1-C19-C18	5.63	131.03	121.90
3	A	703	B12	C1P-N59-C57	-5.58	110.72	122.69
3	A	703	B12	O3-C2P-C1P	-5.52	96.01	106.94
3	A	703	B12	C2-C1-C19	5.50	127.17	118.61
3	A	703	B12	C18-C19-N24	5.47	110.55	102.33
3	B	703	B12	C41-C8-C9	-5.35	101.85	111.19
3	B	703	B12	C2P-C1P-N59	-5.32	105.10	112.92
3	A	703	B12	C13-C14-N23	5.23	116.17	109.09
3	A	703	B12	C9-N22-C6	-5.20	99.02	105.28
3	A	703	B12	C8B-C9B-N3B	-4.99	104.60	110.00
3	B	703	B12	C13-C14-N23	4.96	115.81	109.09
3	A	703	B12	O2-P-O3	4.73	116.07	102.87
3	C	803	B12	C17-C16-C15	4.69	133.68	126.26
3	A	703	B12	C9B-N3B-C2B	4.69	110.16	104.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	803	B12	C9-N22-C6	-4.64	99.70	105.28
3	C	803	B12	C35-C5-C6	4.53	129.71	122.41
3	B	703	B12	C18-C19-N24	4.49	109.08	102.33
6	C	806[A]	QSB	C04-C03-C02	4.21	121.24	118.07
6	A	706[A]	QSB	C04-C03-C02	4.17	121.21	118.07
3	C	803	B12	C13-C14-C15	-4.13	118.03	124.32
6	A	706[A]	QSB	C01-C02-C03	-4.11	117.81	120.95
3	A	703	B12	O58-C57-N59	-4.07	115.05	123.03
3	C	803	B12	C2-C1-C19	4.06	124.93	118.61
3	C	803	B12	C17-C16-N24	-4.02	105.03	111.17
6	A	706[A]	QSB	BR1-C02-C03	3.98	122.43	119.38
3	B	703	B12	C8B-C9B-N3B	-3.97	105.70	110.00
3	A	703	B12	C56-C57-N59	3.96	123.57	116.34
3	A	703	B12	C55-C56-C57	-3.96	102.42	111.25
3	A	703	B12	C48-C13-C14	3.93	118.26	108.51
3	C	803	B12	C9-C10-C11	-3.88	120.43	125.97
3	A	703	B12	C17-C16-C15	3.80	132.27	126.26
3	B	703	B12	C9-N22-C6	-3.79	100.71	105.28
6	C	806[A]	QSB	C01-C02-C03	-3.78	118.07	120.95
3	A	703	B12	P-O3-C2P	3.74	133.88	121.10
3	B	703	B12	C35-C5-C6	3.73	128.42	122.41
3	B	703	B12	C17-C16-C15	3.64	132.01	126.26
3	A	703	B12	C8B-N1B-C2B	3.57	109.50	106.26
3	C	803	B12	C48-C13-C14	3.55	117.32	108.51
3	A	703	B12	C10-C9-N22	-3.45	121.80	125.74
3	A	703	B12	N1B-C2B-N3B	-3.37	109.16	113.94
3	B	703	B12	C17-C16-N24	-3.34	106.07	111.17
3	A	703	B12	C41-C8-C9	-3.34	105.37	111.19
3	C	803	B12	C18-C17-C16	3.31	104.68	100.69
6	B	706[A]	QSB	C04-C03-C02	3.28	120.54	118.07
3	C	803	B12	C8B-N1B-C2B	3.27	109.23	106.26
3	B	703	B12	C19-C1-N21	3.26	105.50	102.14
3	C	803	B12	C41-C8-C9	-3.26	105.50	111.19
3	A	703	B12	C35-C5-C6	3.23	127.61	122.41
3	B	703	B12	C9B-N3B-C2B	3.20	108.33	104.40
3	B	703	B12	C9-C10-C11	-3.11	121.52	125.97
3	A	703	B12	C17-C16-N24	-3.11	106.42	111.17
3	A	703	B12	C15-C14-N23	3.07	129.97	126.26
3	A	703	B12	C7B-C8B-C9B	-3.01	118.86	122.47
3	B	703	B12	C8B-N1B-C2B	3.00	108.99	106.26
3	B	703	B12	C48-C13-C14	2.98	115.93	108.51
3	C	803	B12	C13-C14-N23	2.94	113.08	109.09

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	703	B12	C7B-C8B-C9B	-2.93	118.97	122.47
3	A	703	B12	C18-C17-C16	2.92	104.21	100.69
3	C	803	B12	C60-C18-C19	2.92	122.17	114.59
5	B	705[A]	QSH	C01-C06-C10	-2.89	114.78	119.96
3	A	703	B12	C4B-C9B-N3B	2.86	135.33	130.51
3	B	703	B12	C13-C12-C11	2.85	104.16	100.97
3	C	803	B12	C12-C11-C10	-2.82	119.76	123.40
3	A	703	B12	C9B-C8B-N1B	2.82	106.55	105.30
3	B	703	B12	C30-C3-C4	2.76	116.14	109.66
6	B	706[A]	QSB	C01-C02-C03	-2.73	118.87	120.95
3	C	803	B12	C8B-C9B-N3B	-2.67	107.11	110.00
3	B	703	B12	C20-C1-N21	-2.65	105.89	110.26
6	B	706[A]	QSB	BR1-C02-C03	2.64	121.40	119.38
3	C	803	B12	C4B-C9B-N3B	2.63	134.94	130.51
3	C	803	B12	C8-C7-C6	-2.62	96.47	100.92
3	C	803	B12	O63-C61-C60	2.61	126.33	120.87
3	C	803	B12	C35-C5-C4	-2.61	111.50	116.79
5	A	705[A]	QSH	C05-C06-C10	2.61	124.63	119.96
3	C	803	B12	C1-C2-C3	-2.58	98.36	101.60
5	A	705[A]	QSH	BR1-C02-C03	2.55	121.65	118.80
3	C	803	B12	C7-C6-N22	2.53	112.55	107.94
3	A	703	B12	C18-C60-C61	-2.52	107.63	114.04
3	B	703	B12	C2-C26-C27	-2.50	108.24	115.19
3	B	703	B12	C1-C2-C3	-2.49	98.46	101.60
3	B	703	B12	C10-C9-N22	-2.47	122.92	125.74
3	B	703	B12	C25-C2-C1	2.47	117.44	113.75
3	A	703	B12	C2-C26-C27	-2.43	108.42	115.19
5	A	705[A]	QSH	C01-C06-C10	-2.43	115.60	119.96
3	C	803	B12	C4B-C9B-C8B	-2.42	117.94	120.16
3	A	703	B12	C15-C16-N24	-2.41	118.99	122.42
3	B	703	B12	C12-C11-C10	-2.39	120.32	123.40
3	B	703	B12	N1B-C2B-N3B	-2.37	110.58	113.94
3	A	703	B12	C7-C6-N22	2.37	112.24	107.94
5	A	705[A]	QSH	C04-C03-C02	2.36	119.74	116.67
3	B	703	B12	C41-C42-C43	-2.35	104.56	112.55
3	B	703	B12	C2-C1-N21	2.31	104.99	101.78
3	B	703	B12	C15-C14-N23	2.31	129.04	126.26
3	C	803	B12	C2R-C3R-C4R	2.30	107.27	103.24
3	B	703	B12	C4B-C9B-N3B	2.27	134.34	130.51
3	B	703	B12	C9B-C8B-N1B	2.26	106.31	105.30
3	C	803	B12	C2R-C1R-N1B	-2.26	107.70	113.30
5	A	705[A]	QSH	BR2-C04-C05	2.24	122.36	118.28

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	703	B12	C35-C5-C4	-2.23	112.26	116.79
3	C	803	B12	O58-C57-C56	-2.23	117.97	122.02
3	A	703	B12	C16-C15-C14	-2.23	117.86	121.26
3	A	703	B12	C31-C30-C3	-2.23	108.33	114.65
3	C	803	B12	C2-C3-C4	2.22	104.14	101.64
3	B	703	B12	C2R-C1R-N1B	2.20	118.78	113.30
6	C	806[A]	QSB	BR1-C02-C01	2.18	122.26	118.28
6	A	706[A]	QSB	O08-C07-C06	2.17	120.41	114.84
6	A	706[A]	QSB	C04-C05-C06	-2.15	118.50	120.80
3	B	703	B12	C3-C4-C5	2.13	127.39	123.82
3	B	703	B12	O3-C2P-C1P	2.13	111.16	106.94
3	C	803	B12	C47-C12-C46	2.12	112.92	109.41
3	B	703	B12	C7-C6-C5	-2.09	124.81	128.07
3	A	703	B12	C54-C17-C18	-2.07	110.01	112.99
3	A	703	B12	C2P-C1P-N59	-2.07	109.88	112.92
3	C	803	B12	C15-C14-N23	2.07	128.75	126.26
3	A	703	B12	C12-C11-C10	-2.06	120.74	123.40
3	C	803	B12	C36-C7-C8	-2.06	108.25	112.05
5	C	805[A]	QSH	C04-C03-C02	2.01	119.29	116.67
3	B	703	B12	C30-C3-C2	-2.01	114.56	119.00
6	B	706[A]	QSB	C04-C05-C06	-2.01	118.66	120.80

All (3) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
3	A	703	B12	C19
3	B	703	B12	C19
3	C	803	B12	C19

All (24) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	703	B12	C56-C57-N59-C1P
3	A	703	B12	O58-C57-N59-C1P
3	A	703	B12	N59-C1P-C2P-C3P
3	A	703	B12	N59-C1P-C2P-O3
3	A	703	B12	C3P-C2P-O3-P
3	B	703	B12	C38-C37-C7-C6
3	B	703	B12	C38-C37-C7-C36
3	B	703	B12	C1P-C2P-O3-P
3	B	703	B12	C3P-C2P-O3-P
3	B	703	B12	C2P-O3-P-O4

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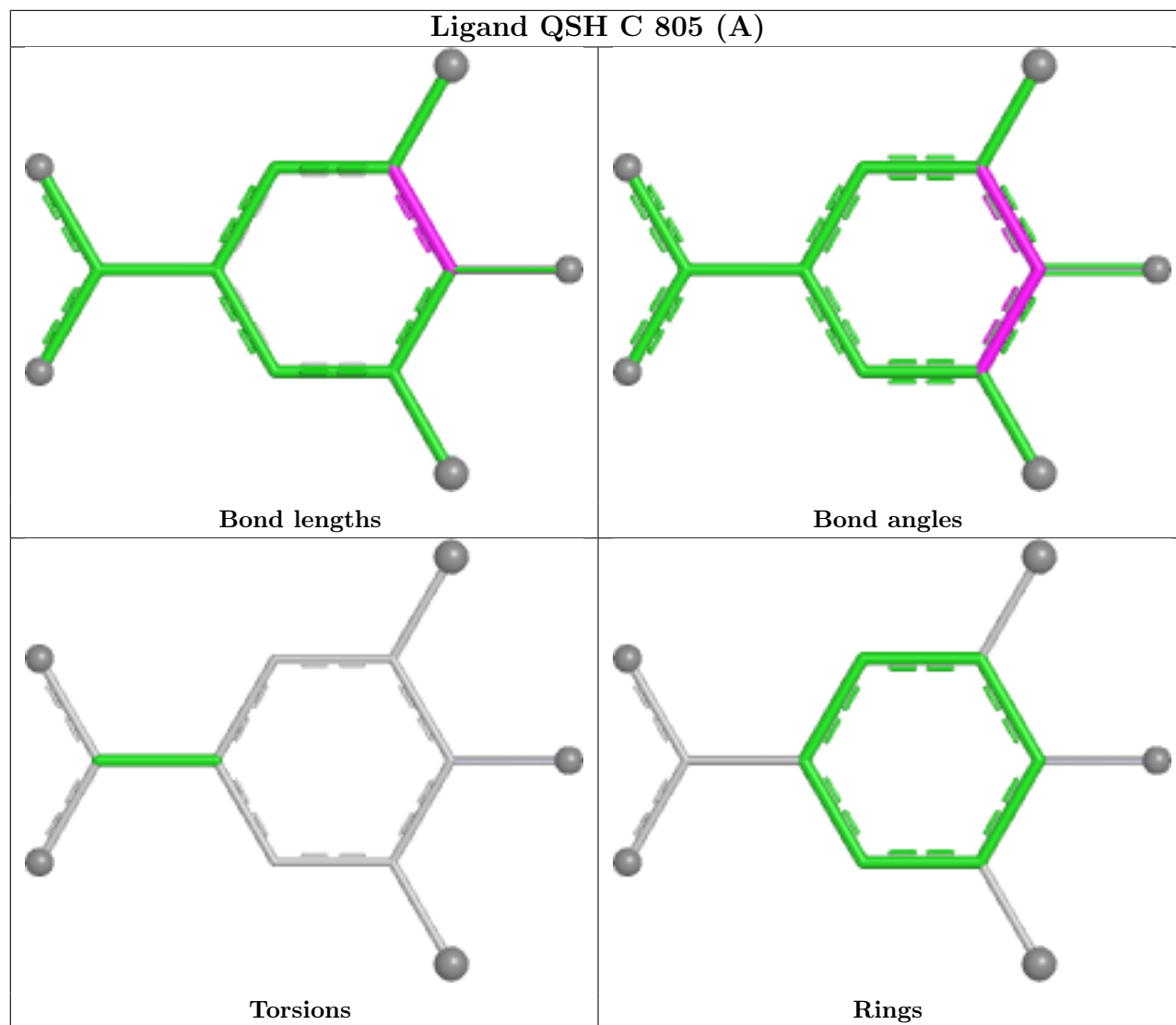
Mol	Chain	Res	Type	Atoms
3	C	803	B12	C38-C37-C7-C6
3	C	803	B12	C1P-C2P-O3-P
3	C	803	B12	C3P-C2P-O3-P
3	C	803	B12	C2P-O3-P-O4
3	C	803	B12	C2P-O3-P-O2
3	A	703	B12	C14-C13-C48-C49
3	C	803	B12	C14-C13-C48-C49
3	B	703	B12	C14-C13-C48-C49
3	A	703	B12	C38-C37-C7-C6
3	A	703	B12	C1P-C2P-O3-P
3	B	703	B12	N59-C1P-C2P-C3P
3	C	803	B12	N59-C1P-C2P-C3P
3	B	703	B12	C2P-O3-P-O5
3	C	803	B12	C2P-O3-P-O5

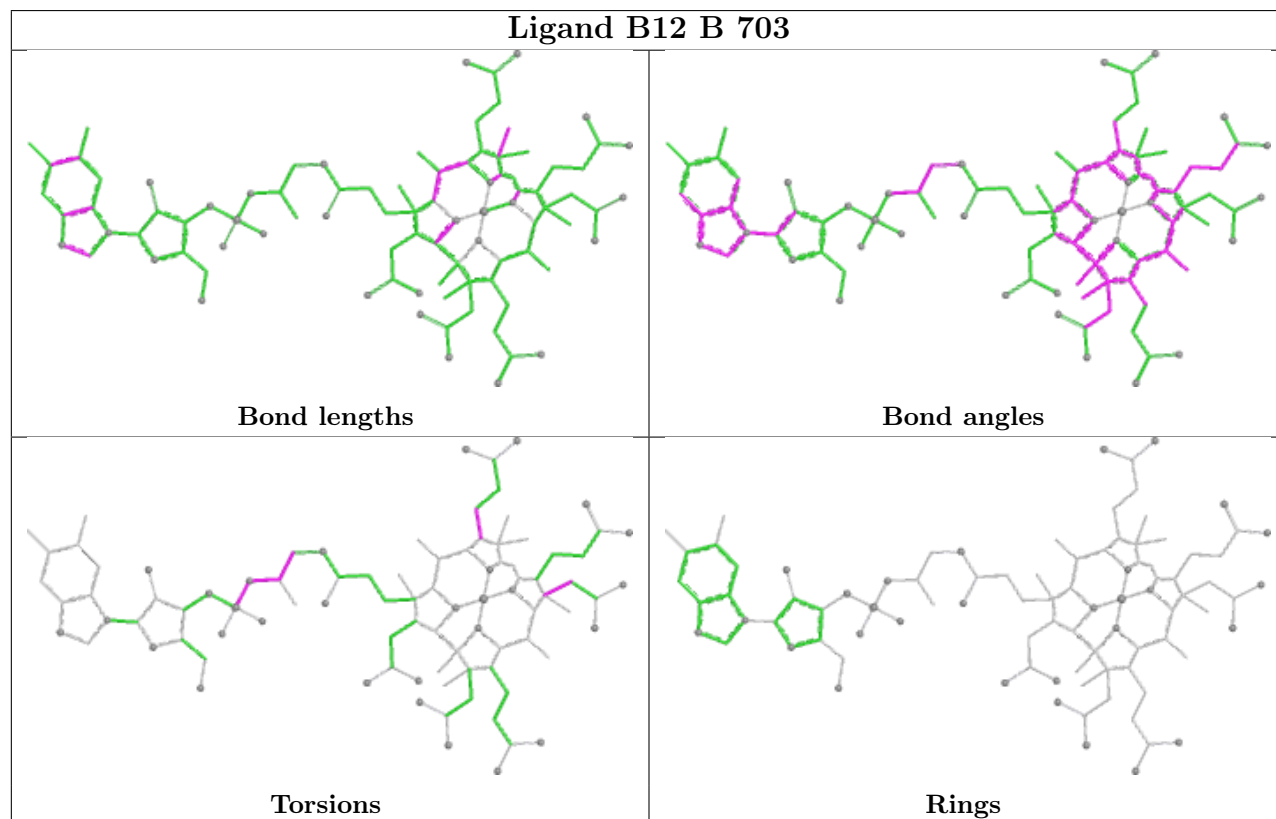
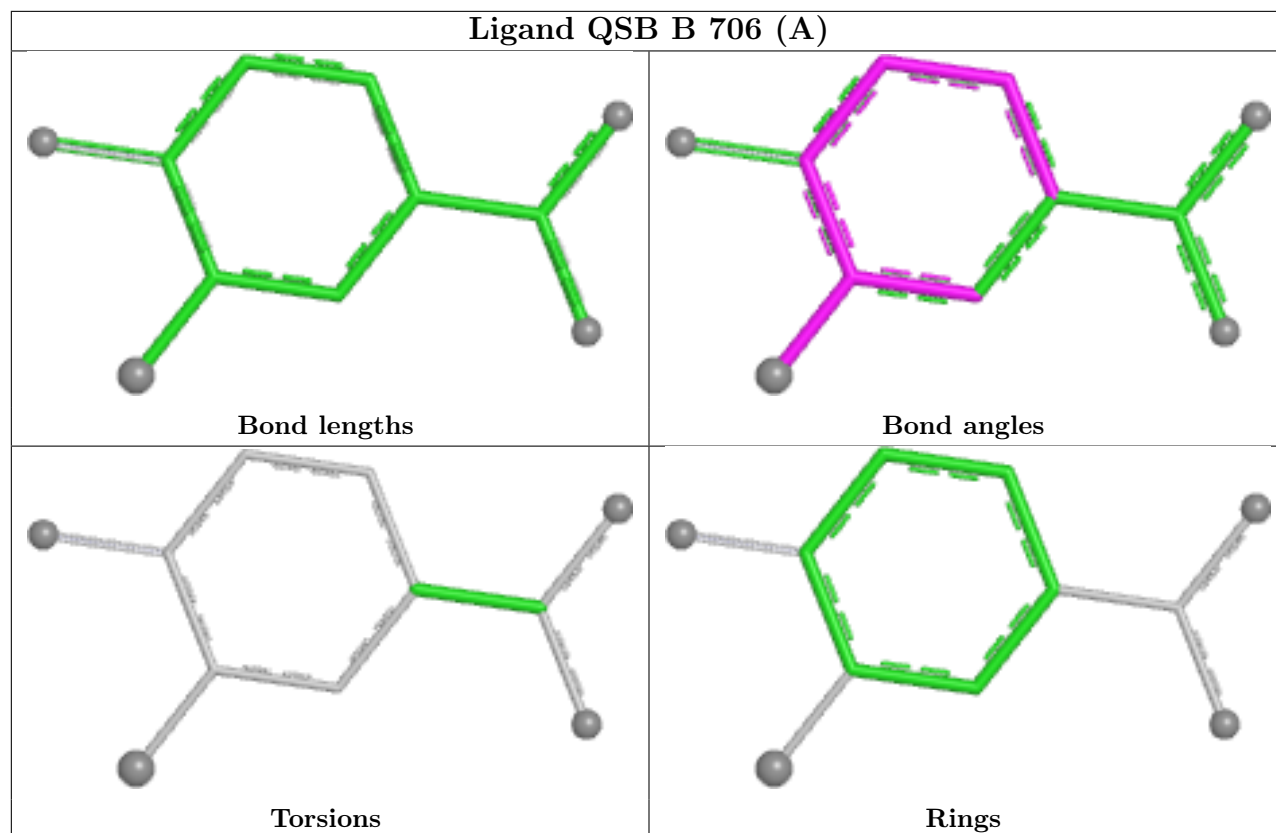
There are no ring outliers.

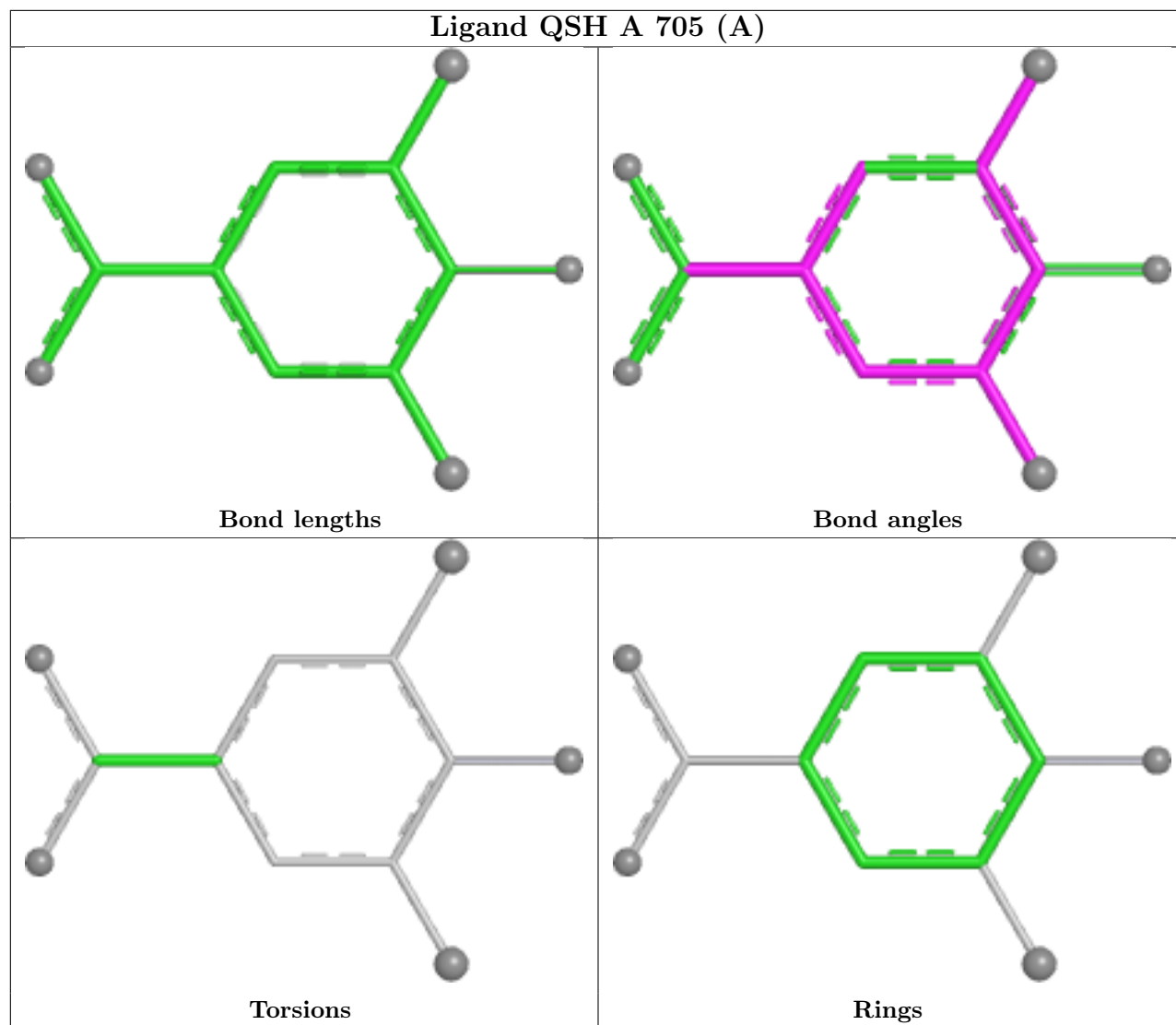
9 monomers are involved in 47 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	C	805[A]	QSH	3	0
6	B	706[A]	QSB	2	0
3	B	703	B12	12	0
5	A	705[A]	QSH	4	0
6	A	706[A]	QSB	3	0
6	C	806[A]	QSB	2	0
3	C	803	B12	7	0
3	A	703	B12	14	0
5	B	705[A]	QSH	5	0

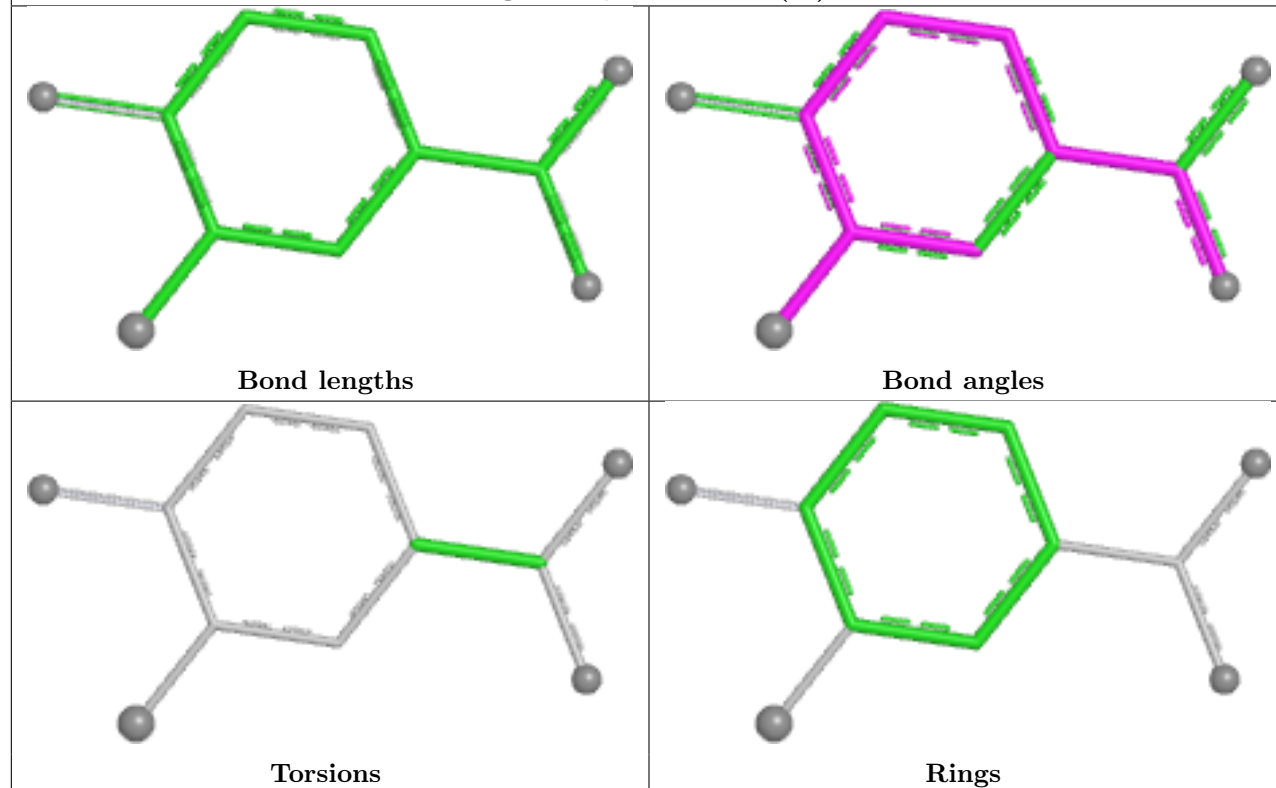
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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



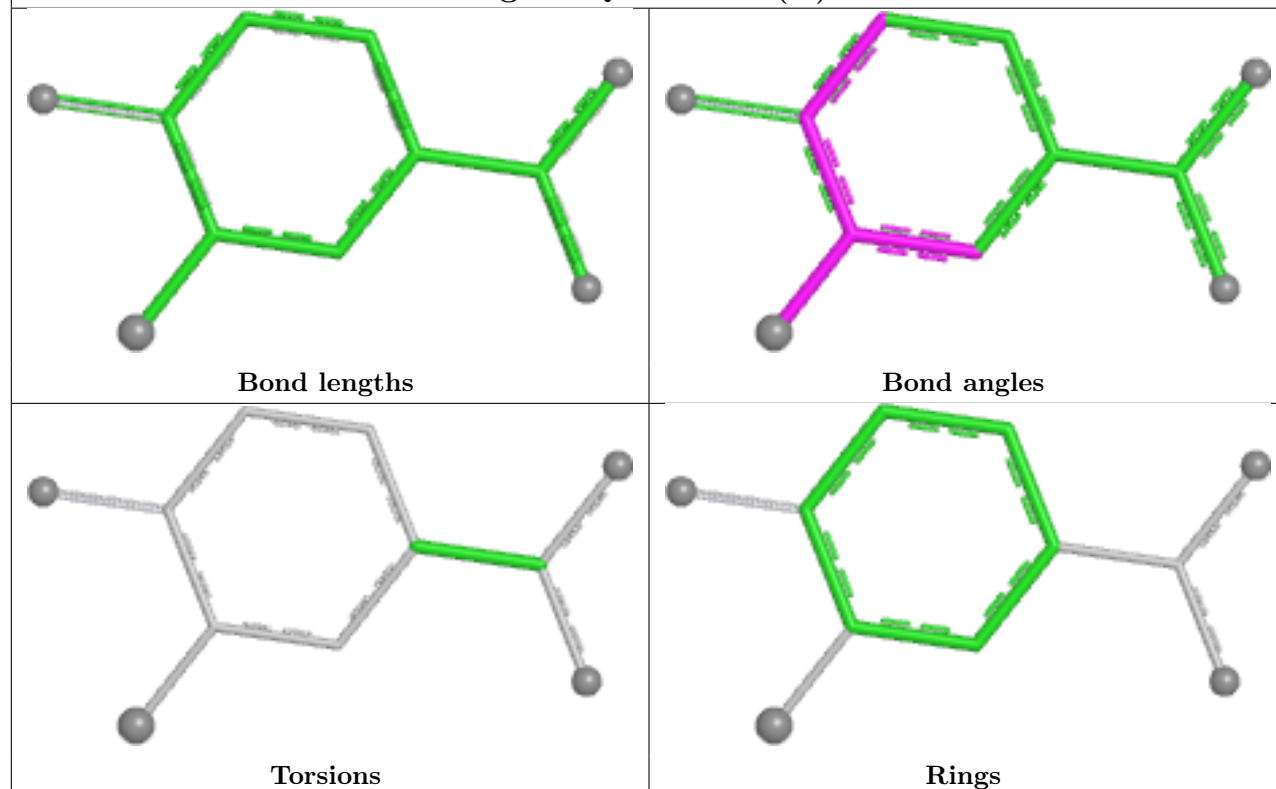


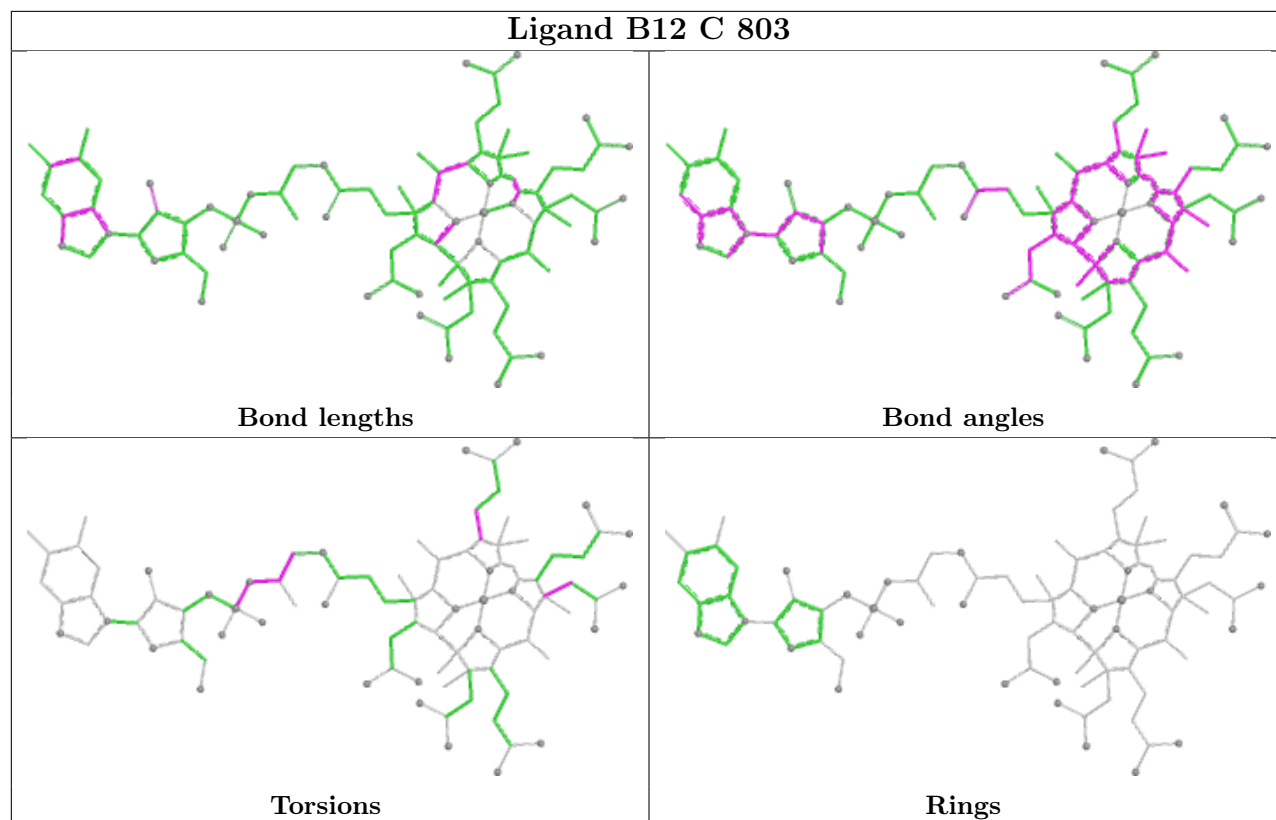
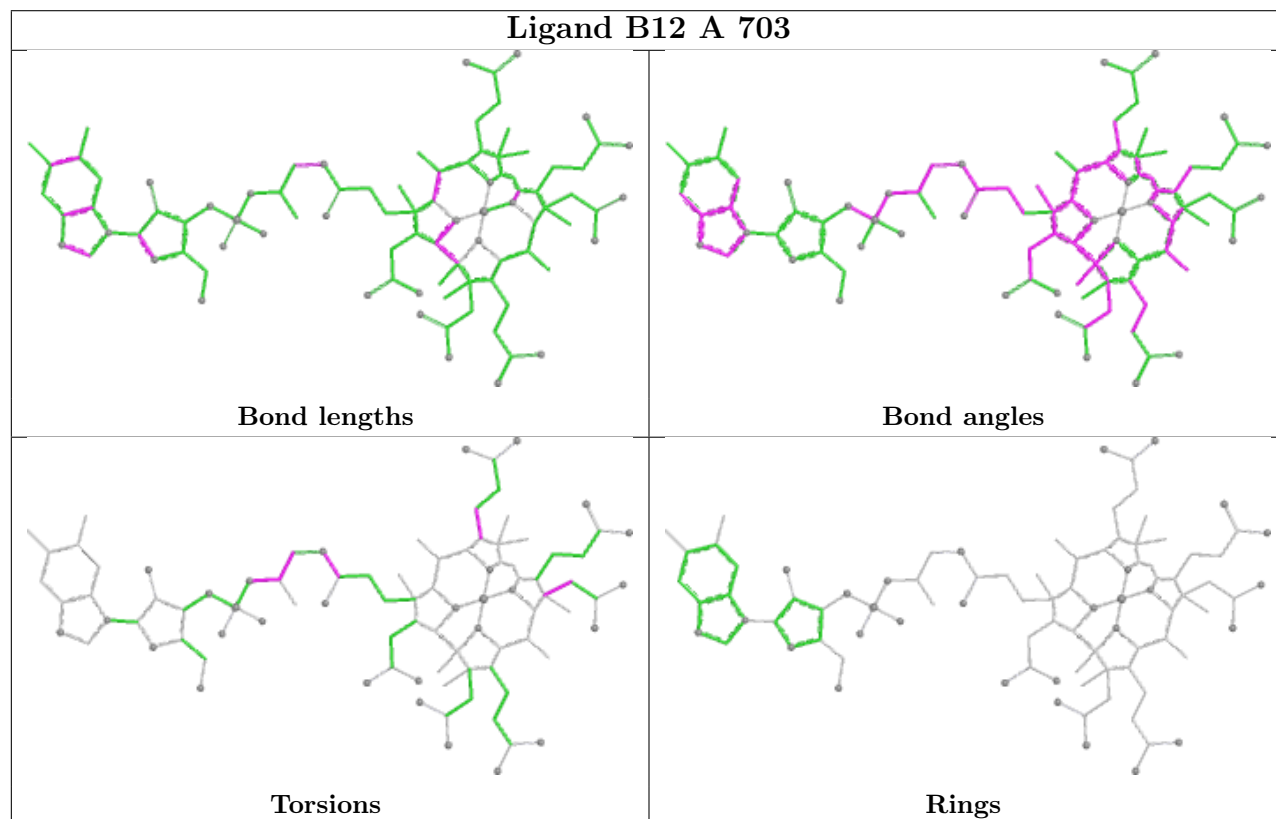


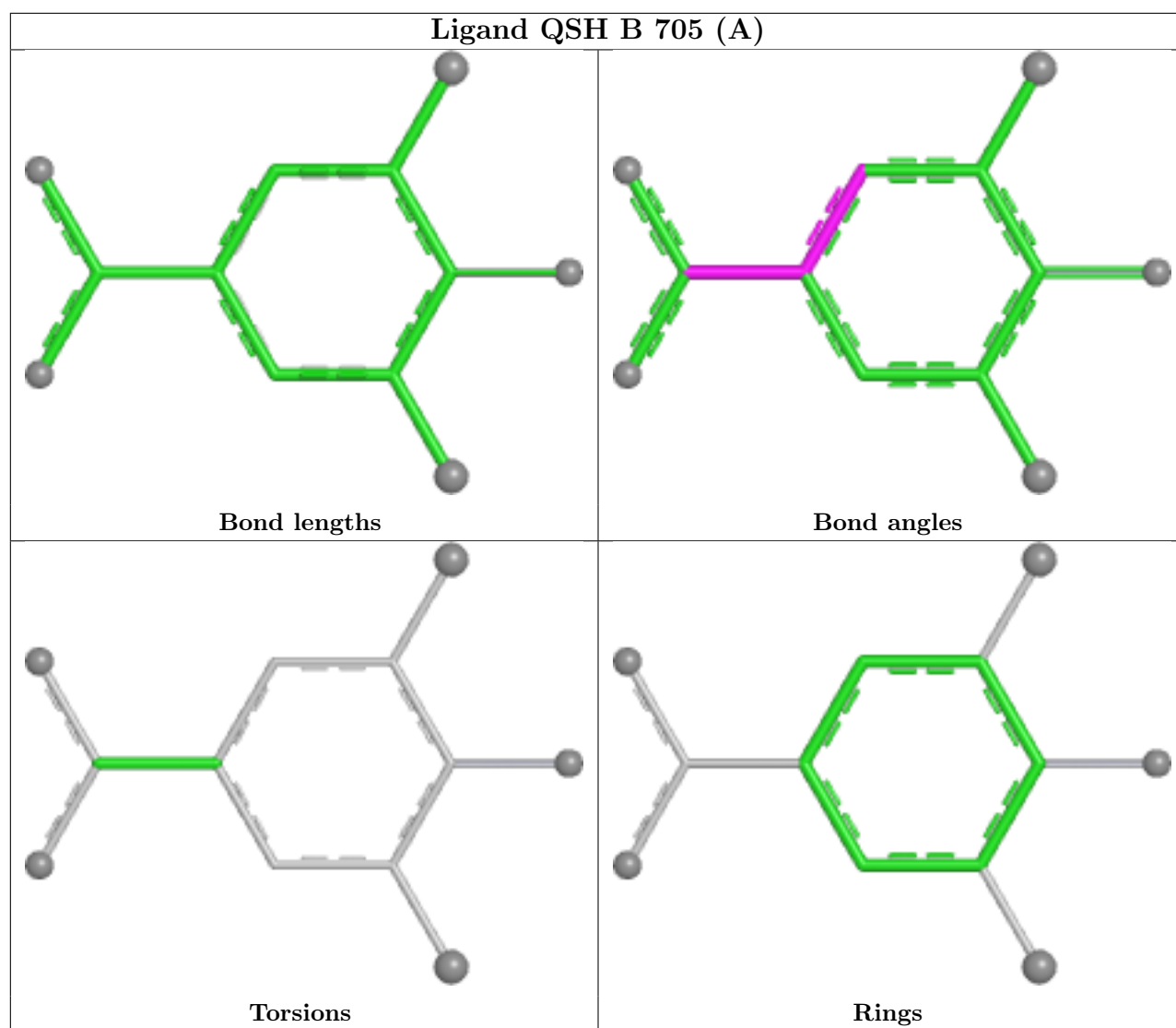
Ligand QSB A 706 (A)



Ligand QSB C 806 (A)



Ligand B12 C 803**Ligand B12 A 703**



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	700/725 (96%)	-0.22	7 (1%) 79 79	9, 23, 42, 70	1 (0%)
1	B	695/725 (95%)	-0.16	10 (1%) 73 73	10, 25, 44, 78	3 (0%)
1	C	696/725 (96%)	0.91	107 (15%) 5 4	15, 42, 66, 100	1 (0%)
All	All	2091/2175 (96%)	0.17	124 (5%) 28 27	9, 28, 58, 100	5 (0%)

All (124) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	-3	ALA	6.1
1	C	108	ARG	5.4
1	C	347	GLY	5.4
1	B	646	ALA	5.4
1	C	105	PRO	4.9
1	A	44	ASP	4.6
1	C	112	ASP	4.4
1	C	2	ILE	4.2
1	C	624	ILE	4.1
1	C	47	ASP	4.1
1	C	27	VAL	4.1
1	C	42	PHE	4.0
1	C	77	ASP	4.0
1	C	206	ARG	3.9
1	C	71	LEU	3.8
1	C	102	ARG	3.8
1	C	181	VAL	3.7
1	B	639	ASP	3.6
1	C	346	LYS	3.6
1	C	132	GLU	3.5
1	C	699	SER	3.4
1	C	103	LEU	3.4
1	C	118	THR	3.4

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Mol	Chain	Res	Type	RSRZ
1	C	49	LEU	3.3
1	C	186	LEU	3.3
1	B	-2	GLN	3.2
1	C	646	ASP	3.2
1	C	498	THR	3.2
1	A	39	PHE	3.1
1	C	34	PRO	3.1
1	B	44	ASP	3.0
1	C	79	PRO	3.0
1	C	170	PRO	3.0
1	C	197	ASP	3.0
1	C	196	VAL	3.0
1	B	638	PRO	3.0
1	A	106	ALA	2.9
1	C	1	GLN	2.9
1	C	673	LEU	2.9
1	C	560	MET	2.9
1	C	31	VAL	2.9
1	C	147	ALA	2.9
1	C	665	PRO	2.8
1	C	220	LEU	2.8
1	C	348	GLY	2.8
1	C	44	ALA	2.8
1	C	113	CYS	2.8
1	C	164	VAL	2.8
1	C	64	LEU	2.7
1	C	133	ALA	2.7
1	C	671	ALA	2.7
1	B	39	PHE	2.7
1	C	643	ASP	2.7
1	C	192	LEU	2.6
1	C	456[A]	ASN	2.6
1	C	53	VAL	2.6
1	C	388	VAL	2.6
1	C	139	GLU	2.6
1	C	32	ALA	2.6
1	C	104	ASP	2.5
1	B	-1	ILE	2.5
1	C	41	GLY	2.5
1	C	211	LEU	2.5
1	C	500	LEU	2.5
1	A	641	GLY	2.5

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Mol	Chain	Res	Type	RSRZ
1	C	253	ALA	2.5
1	C	30	VAL	2.5
1	C	46	GLU	2.5
1	C	627	VAL	2.5
1	C	106	ASP	2.5
1	C	207	ARG	2.5
1	C	180	GLN	2.5
1	C	29	ASP	2.5
1	B	107	GLY	2.4
1	C	43	ALA	2.4
1	C	61	THR	2.4
1	C	171	ALA	2.4
1	C	344	THR	2.4
1	C	183	LEU	2.4
1	A	642	ASP	2.4
1	C	168	GLY	2.4
1	C	230	GLY	2.4
1	C	698	LYS	2.4
1	C	36	ARG	2.3
1	C	446	ARG	2.3
1	B	43	GLU	2.3
1	C	28	ASP	2.3
1	C	199	VAL	2.3
1	C	441	ALA	2.3
1	C	229	GLU	2.3
1	C	216	THR	2.3
1	C	697	LEU	2.3
1	C	74	ALA	2.2
1	C	225	PRO	2.2
1	C	354	GLY	2.2
1	C	666	GLY	2.2
1	C	218	TYR	2.2
1	C	614	ILE	2.2
1	C	306	LYS	2.2
1	C	177	GLY	2.2
1	C	184	ALA	2.2
1	C	219	ALA	2.2
1	C	121	LEU	2.2
1	C	448	GLY	2.2
1	C	228	PRO	2.2
1	C	342	ALA	2.2
1	C	66	GLY	2.1

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Mol	Chain	Res	Type	RSRZ
1	C	345	GLY	2.1
1	C	205	LEU	2.1
1	A	452[A]	ASN	2.1
1	C	173	GLY	2.1
1	C	101	CYS	2.1
1	A	639	ASP	2.1
1	C	75	ILE	2.1
1	C	504	VAL	2.1
1	C	200	LEU	2.1
1	C	341	LEU	2.1
1	C	120	ALA	2.1
1	C	645	GLY	2.0
1	C	115	PRO	2.0
1	C	434	ALA	2.0
1	C	670	ASP	2.0
1	C	134	GLY	2.0
1	C	68	VAL	2.0

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 [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, 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	NA	C	804	1/1	0.90	0.12	55,55,55,55	0
4	NA	B	704	1/1	0.95	0.09	44,44,44,44	0
3	B12	C	803	91/91	0.97	0.07	19,27,30,31	0
4	NA	A	704	1/1	0.97	0.11	35,35,35,35	0
3	B12	A	703	91/91	0.98	0.06	12,15,20,21	0
3	B12	B	703	91/91	0.98	0.05	15,18,22,25	0

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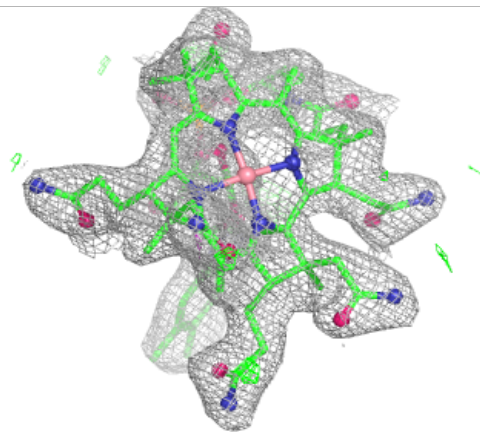
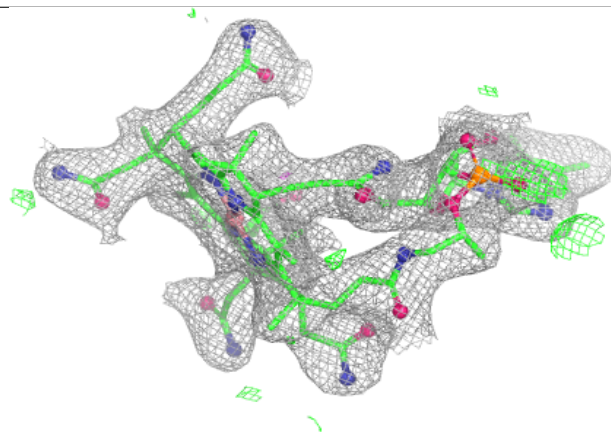
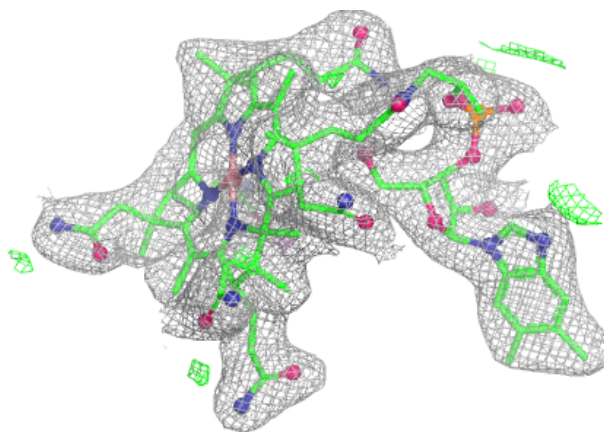
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	SF4	C	802	8/8	0.98	0.03	24,25,28,30	0
5	QSH	B	705[A]	12/12	0.98	0.09	20,22,24,26	12
5	QSH	C	805[A]	12/12	0.98	0.09	24,27,29,30	12
6	QSB	B	706[A]	11/11	0.98	0.08	23,25,28,29	11
6	QSB	C	806[A]	11/11	0.98	0.10	28,31,34,36	11
2	SF4	A	702	8/8	0.99	0.02	15,16,17,18	0
5	QSH	A	705[A]	12/12	0.99	0.06	20,20,23,23	12
2	SF4	B	701	8/8	0.99	0.03	19,20,22,22	0
2	SF4	B	702	8/8	0.99	0.03	21,24,26,26	0
6	QSB	A	706[A]	11/11	0.99	0.07	19,20,22,24	11
2	SF4	C	801	8/8	0.99	0.03	21,24,24,27	0
2	SF4	A	701	8/8	0.99	0.02	15,16,17,17	0
7	BR	A	707[A]	1/1	0.99	0.09	21,21,21,21	1
7	BR	B	707[A]	1/1	0.99	0.07	23,23,23,23	1
7	BR	C	807[A]	1/1	1.00	0.04	28,28,28,28	1

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.

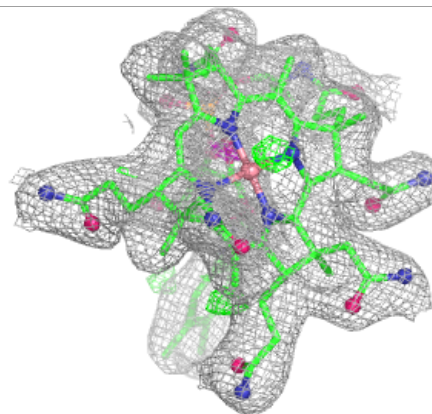
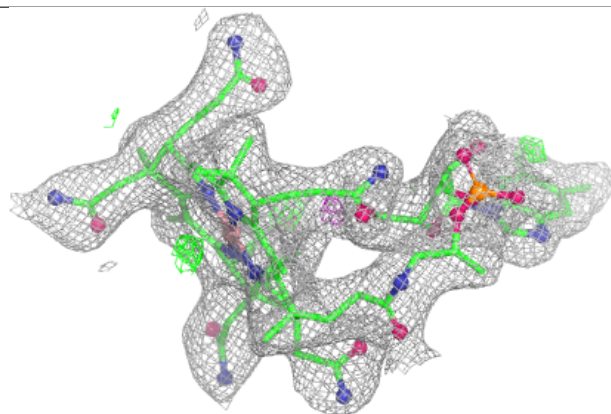
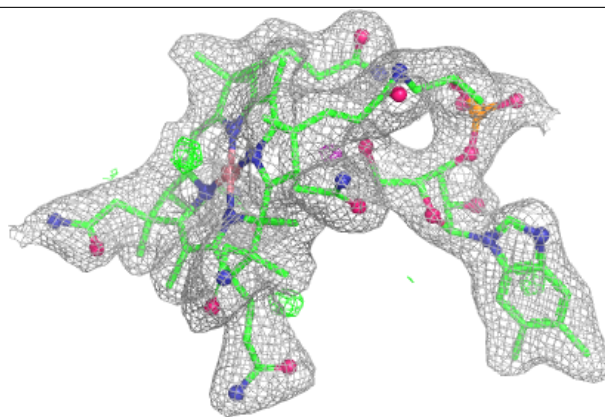
Electron density around B12 C 803:

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



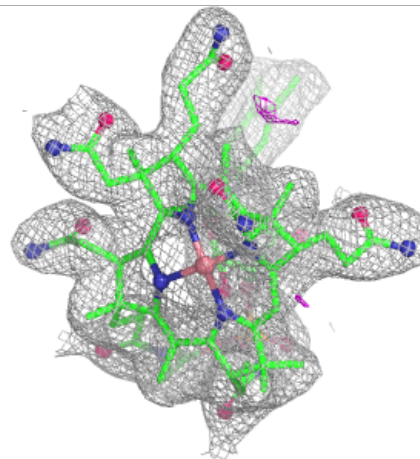
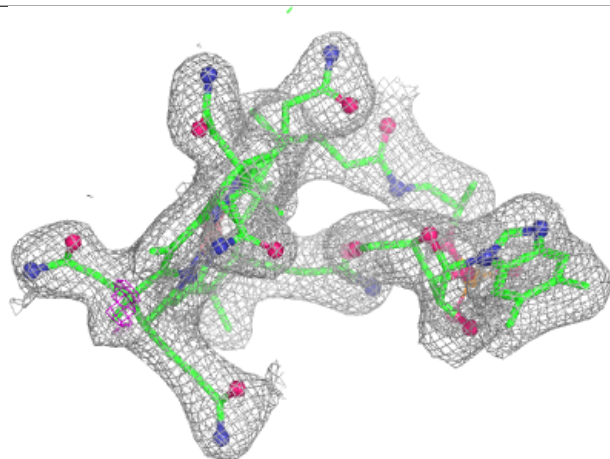
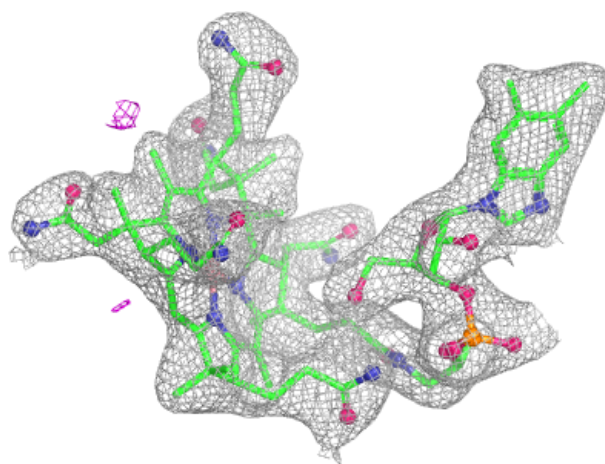
Electron density around B12 A 703:

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



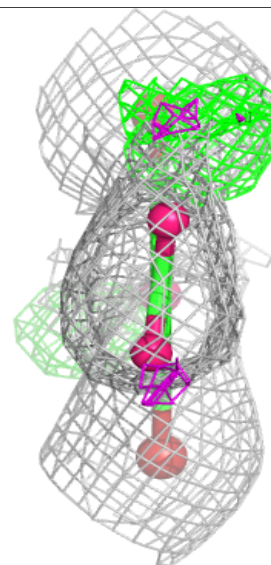
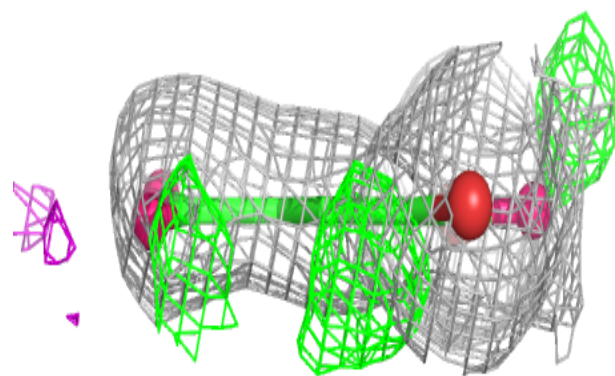
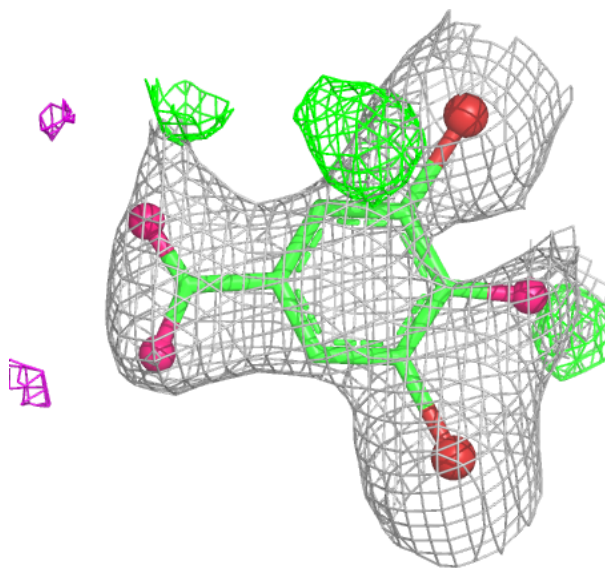
Electron density around B12 B 703:

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



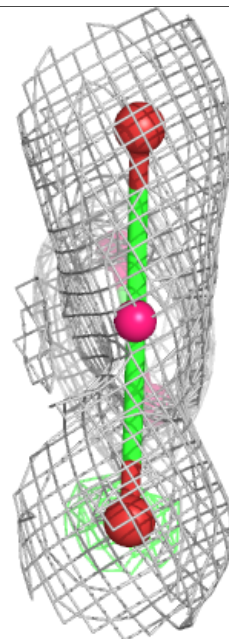
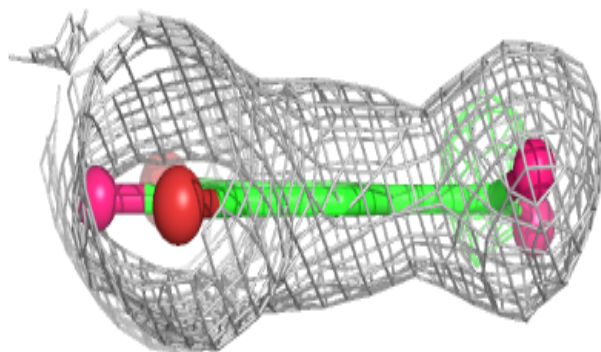
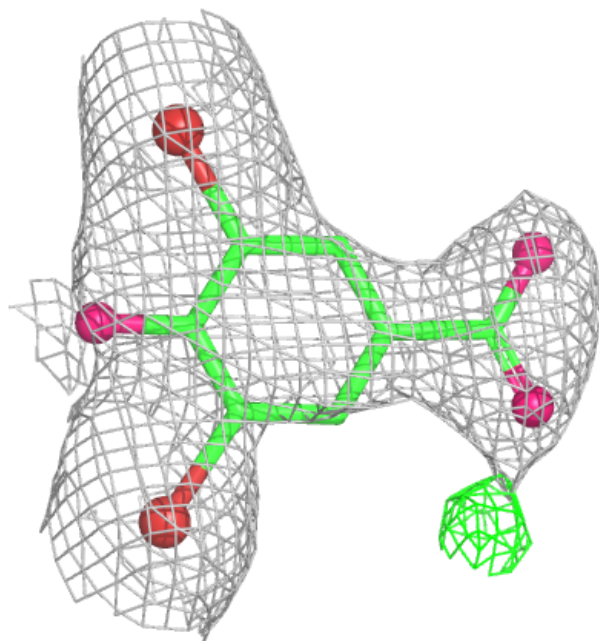
Electron density around QSH B 705 (A):

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



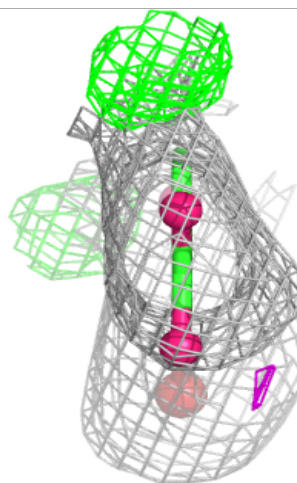
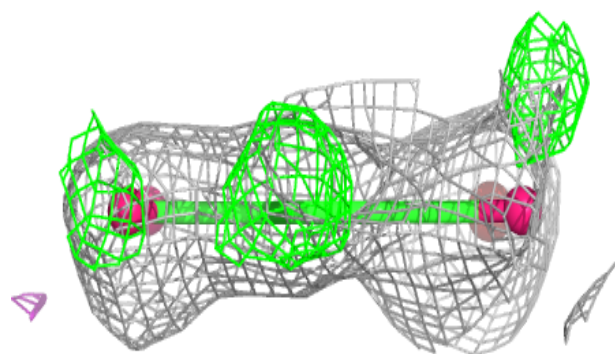
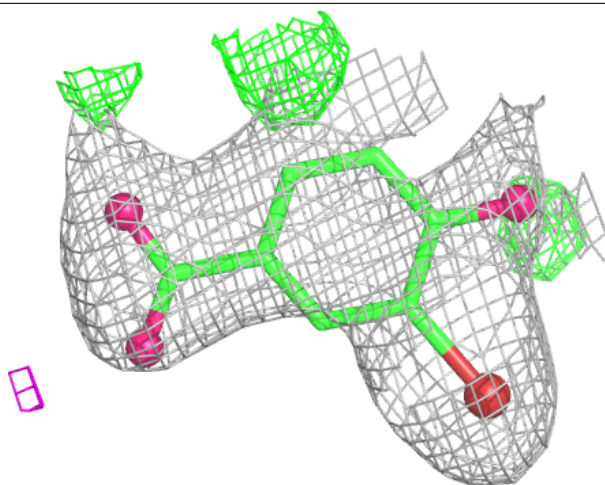
Electron density around QSH C 805 (A):

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



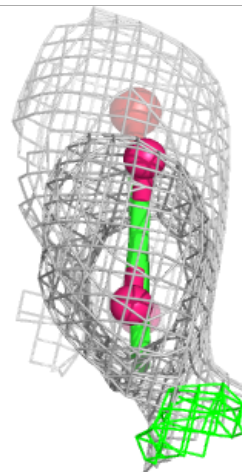
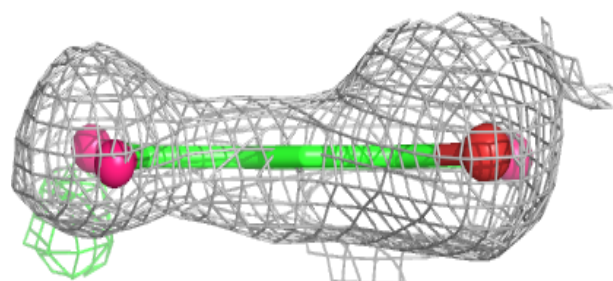
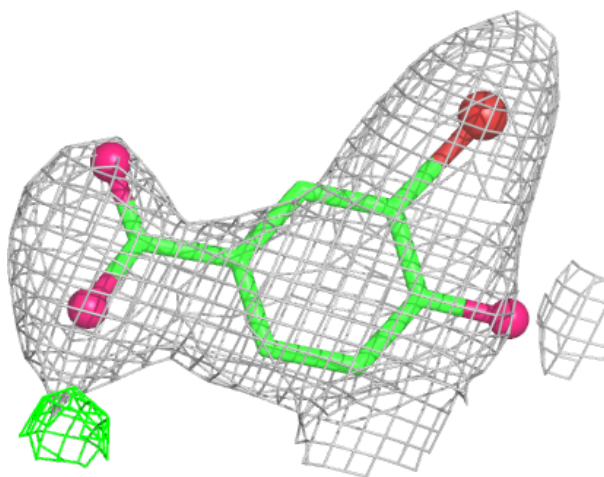
Electron density around QSB B 706 (A):

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



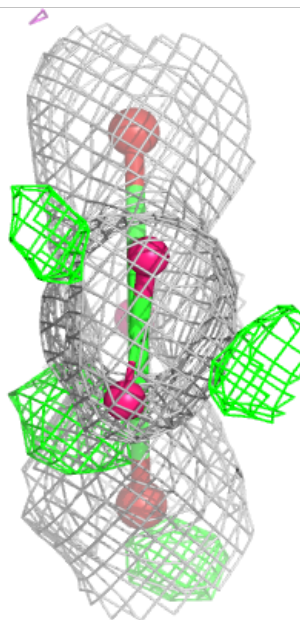
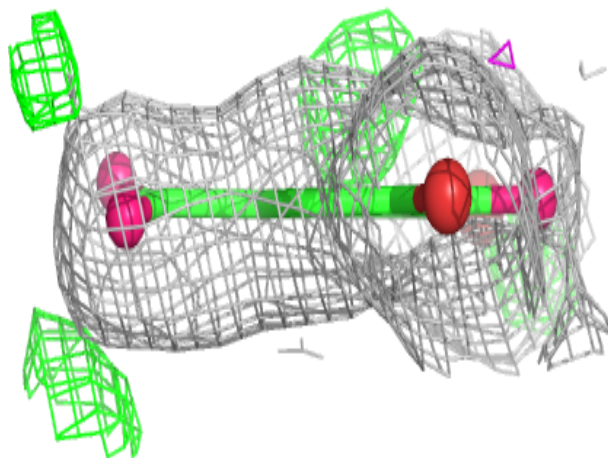
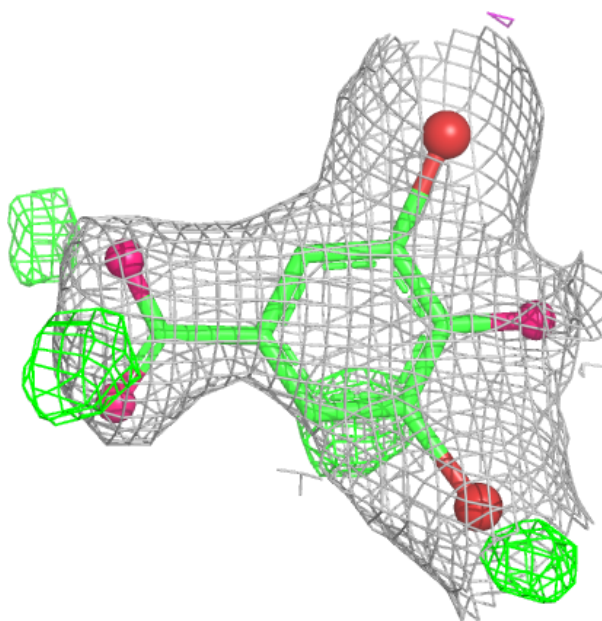
Electron density around QSB C 806 (A):

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and green (positive)



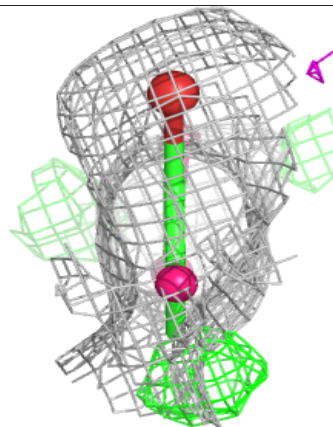
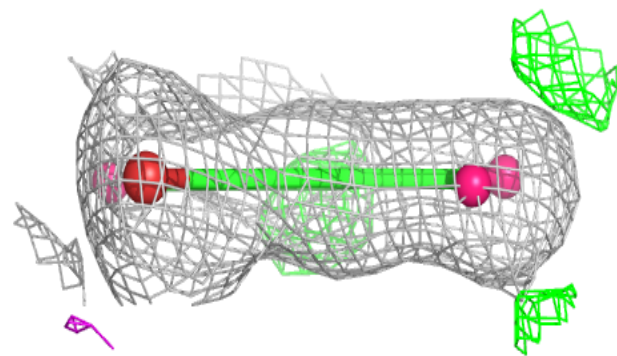
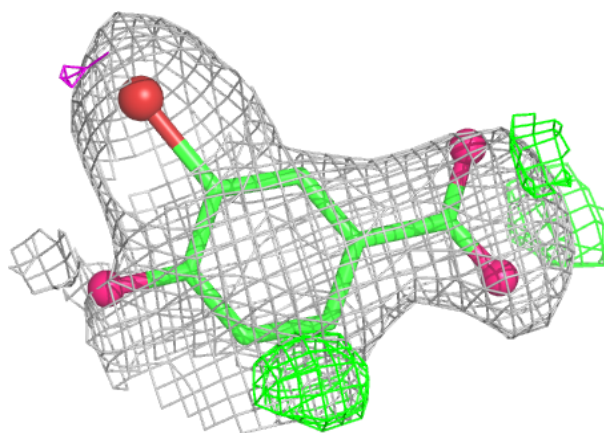
Electron density around QSH A 705 (A):

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



Electron density around QSB A 706 (A):

$2mF_o - DF_c$ (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.