



Full wwPDB X-ray Structure Validation Report ⓘ

Jan 7, 2024 – 03:44 am GMT

PDB ID : 5NQD
Title : Arsenite oxidase AioAB from Rhizobium sp. str. NT-26 mutant AioBF108A
Authors : Santos-Silva, T.; Romao, M.; Vieira, M.; Marques, A.T.
Deposited on : 2017-04-20
Resolution : 2.20 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 : 4.02b-467
Mogul : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

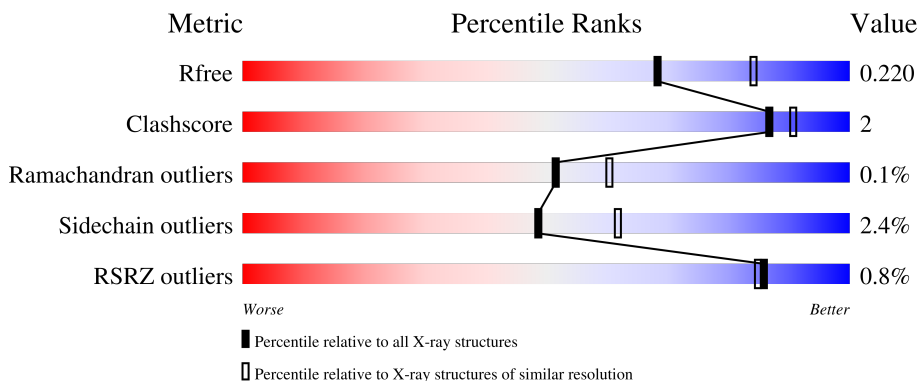
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	843	 91% 8%
1	C	843	 93% 6%
1	E	843	 92% 7%
1	G	843	 93% 6%
2	B	132	 96%

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Mol	Chain	Length	Quality of chain
2	D	132	<p>5% 97% 8%</p>
2	F	132	<p>10% 91% 8%</p>
2	H	132	<p>% 93% 7%</p>

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
11	EDO	G	2012	-	-	-	X
9	GOL	G	2010	-	X	-	-

2 Entry composition

There are 14 unique types of molecules in this entry. The entry contains 32195 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 AroA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	843	6545	4088	1167	1253	37	0	0	0
1	C	843	6545	4088	1167	1253	37	0	0	0
1	E	843	6545	4088	1167	1253	37	0	0	0
1	G	843	6545	4088	1167	1253	37	0	0	0

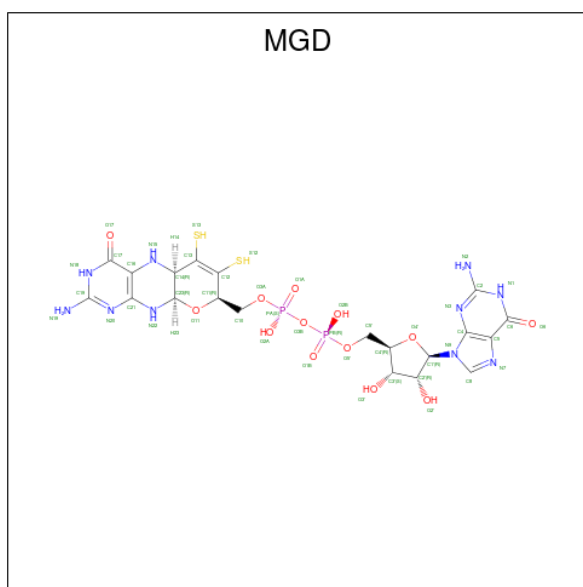
- Molecule 2 is a protein called Arsenite oxidase small subunit AioB Rieske [2Fe-2S] cluster.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	132	989	623	166	198	2	0	0	0
2	D	132	989	623	166	198	2	0	0	0
2	F	132	989	623	166	198	2	0	0	0
2	H	132	989	623	166	198	2	0	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	108	ALA	PHE	conflict	UNP L0NMC5
D	108	ALA	PHE	conflict	UNP L0NMC5
F	108	ALA	PHE	conflict	UNP L0NMC5
H	108	ALA	PHE	conflict	UNP L0NMC5

- Molecule 3 is 2-AMINO-5,6-DIMERCAPTO-7-METHYL-3,7,8A,9-TETRAHYDRO-8-OXA-1,3,9,10-TETRAAZA-ANTHRACEN-4-ONE GUANOSINE DINUCLEOTIDE (three-letter code: MGD) (formula: C₂₀H₂₆N₁₀O₁₃P₂S₂).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
			Total	C	N	O	P	S		
3	A	1	Total 47	C 20	N 10	O 13	P 2	S 2	0	0
3	A	1	Total 47	C 20	N 10	O 13	P 2	S 2	0	0
3	C	1	Total 47	C 20	N 10	O 13	P 2	S 2	0	0
3	C	1	Total 47	C 20	N 10	O 13	P 2	S 2	0	0
3	E	1	Total 47	C 20	N 10	O 13	P 2	S 2	0	0
3	E	1	Total 47	C 20	N 10	O 13	P 2	S 2	0	0
3	G	1	Total 47	C 20	N 10	O 13	P 2	S 2	0	0
3	G	1	Total 47	C 20	N 10	O 13	P 2	S 2	0	0

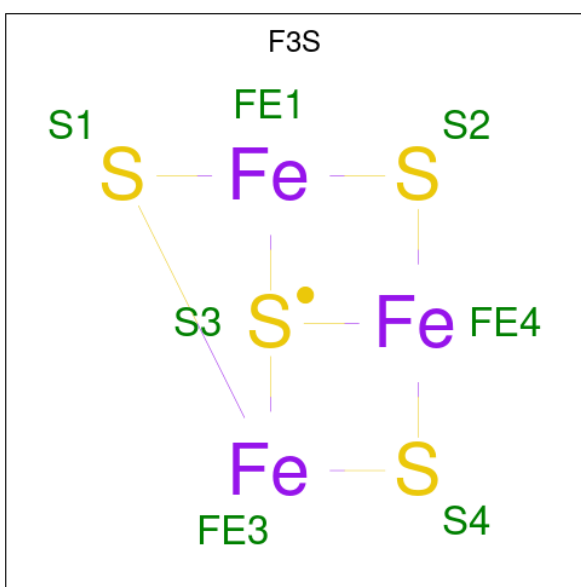
- Molecule 4 is OXYGEN ATOM (three-letter code: O) (formula: O).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total 1 O 1	0	0
4	C	1	Total 1 O 1	0	0
4	E	1	Total 1 O 1	0	0
4	G	1	Total 1 O 1	0	0

- Molecule 5 is MOLYBDENUM(IV) ION (three-letter code: 4MO) (formula: Mo).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total Mo 1 1	0	0
5	C	1	Total Mo 1 1	0	0
5	E	1	Total Mo 1 1	0	0
5	G	1	Total Mo 1 1	0	0

- Molecule 6 is FE3-S4 CLUSTER (three-letter code: F3S) (formula: Fe₃S₄).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total Fe S 7 3 4	0	0
6	C	1	Total Fe S 7 3 4	0	0
6	E	1	Total Fe S 7 3 4	0	0
6	G	1	Total Fe S 7 3 4	0	0

- Molecule 7 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



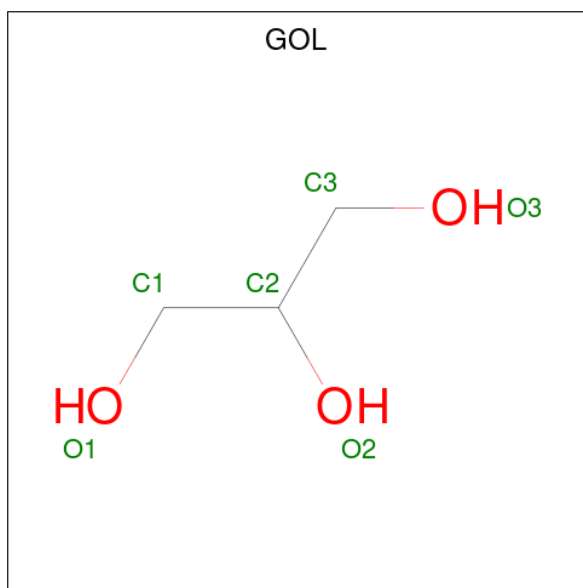
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total	O	S	0	0
			5	4	1		
7	A	1	Total	O	S	0	0
			5	4	1		
7	A	1	Total	O	S	0	0
			5	4	1		
7	A	1	Total	O	S	0	0
			5	4	1		
7	C	1	Total	O	S	0	0
			5	4	1		
7	C	1	Total	O	S	0	0
			5	4	1		
7	C	1	Total	O	S	0	0
			5	4	1		
7	C	1	Total	O	S	0	0
			5	4	1		
7	E	1	Total	O	S	0	0
			5	4	1		
7	E	1	Total	O	S	0	0
			5	4	1		
7	G	1	Total	O	S	0	0
			5	4	1		
7	G	1	Total	O	S	0	0
			5	4	1		

- Molecule 8 is TRIETHYLENE GLYCOL (three-letter code: PGE) (formula: C₆H₁₄O₄).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	A	1	Total	C	O	0	0
			10	6	4		

- Molecule 9 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



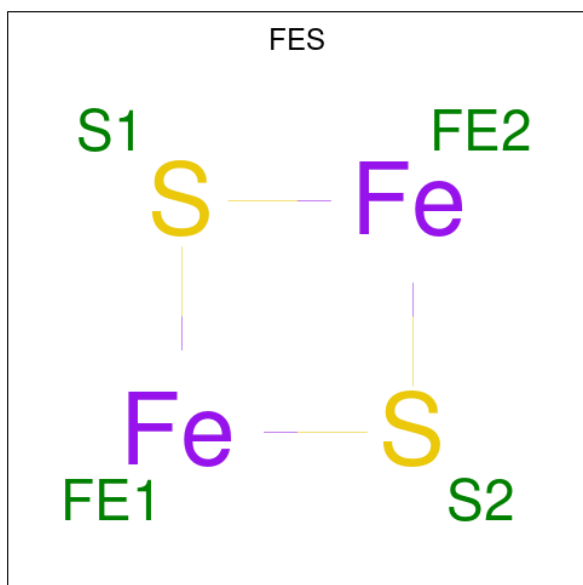
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
9	A	1	Total	C	O	0	0
			6	3	3		
9	C	1	Total	C	O	0	0
			6	3	3		
9	E	1	Total	C	O	0	0
			6	3	3		

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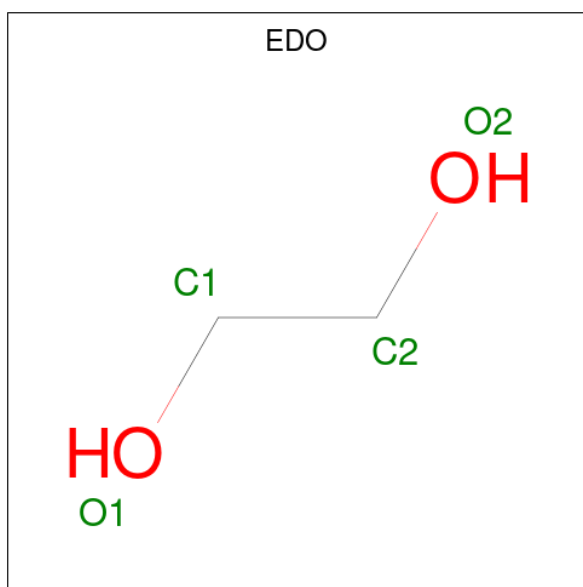
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	G	1	Total C O 6 3 3	0	0
9	G	1	Total C O 6 3 3	0	0

- Molecule 10 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe₂S₂).



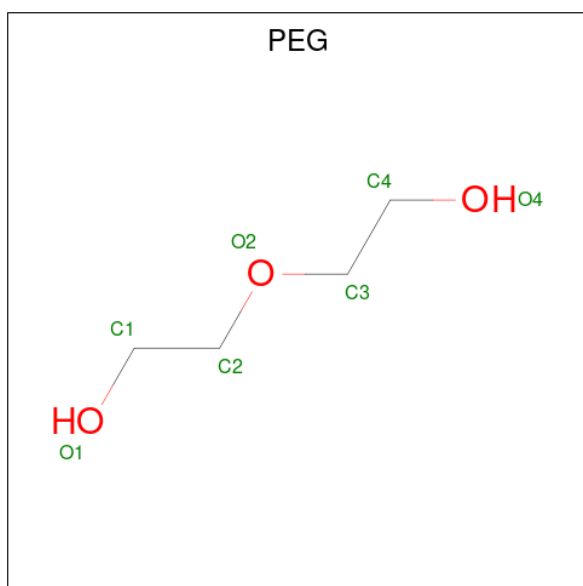
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	B	1	Total Fe S 4 2 2	0	0
10	D	1	Total Fe S 4 2 2	0	0
10	F	1	Total Fe S 4 2 2	0	0
10	H	1	Total Fe S 4 2 2	0	0

- Molecule 11 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C₂H₆O₂).



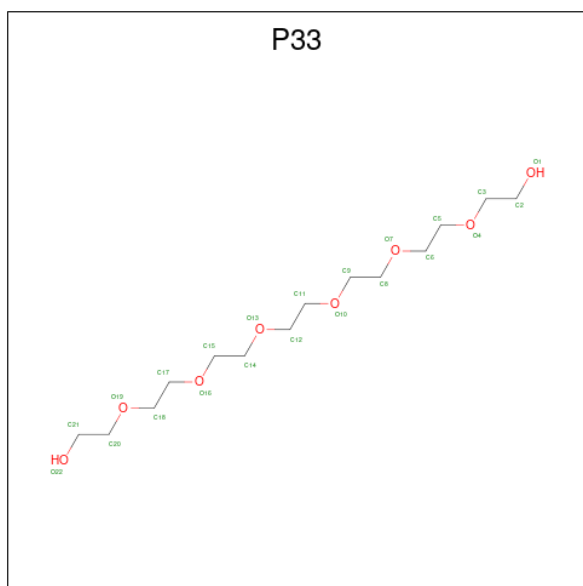
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
11	B	1	Total	C O	0	0
			4	2 2		
11	C	1	Total	C O	0	0
			4	2 2		
11	G	1	Total	C O	0	0
			4	2 2		

- Molecule 12 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: $C_4H_{10}O_3$).



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

- Molecule 13 is 3,6,9,12,15,18-HEXAOXAIICOSANE-1,20-DIOL (three-letter code: P33) (formula: $C_{14}H_{30}O_8$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
13	G	1	Total C O 22 14 8	0	0
13	G	1	Total C O 22 14 8	0	0

- Molecule 14 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
14	A	383	Total O 383 383	0	0
14	B	25	Total O 25 25	0	0
14	C	308	Total O 308 308	0	0
14	D	33	Total O 33 33	0	0
14	E	284	Total O 284 284	0	0
14	F	25	Total O 25 25	0	0

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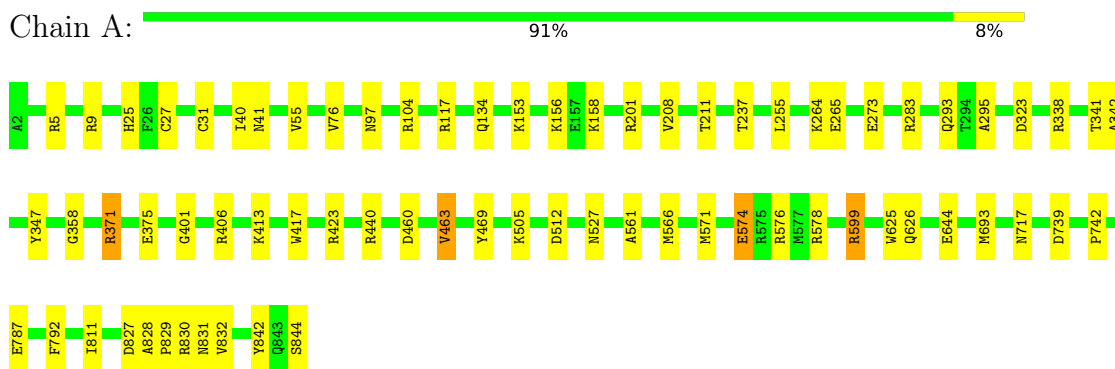
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
14	G	374	Total 374	O 374	0	0
14	H	36	Total 36	O 36	0	0

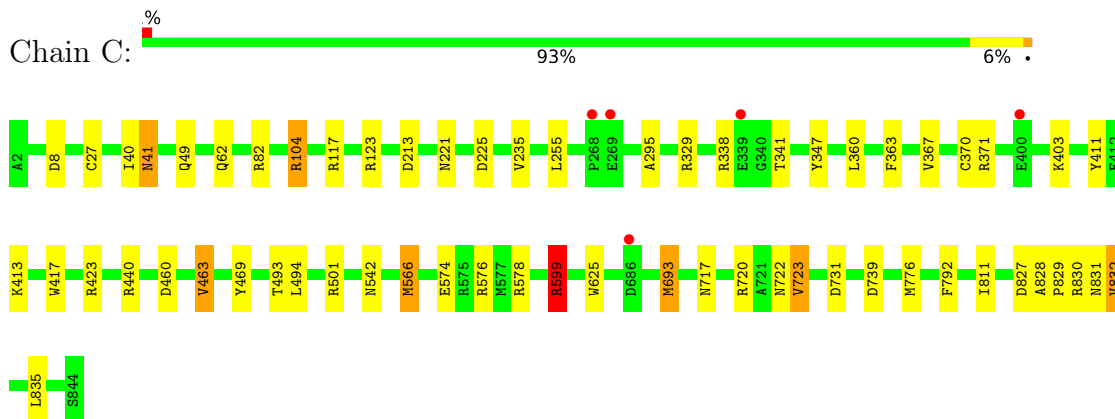
3 Residue-property plots [i](#)

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.

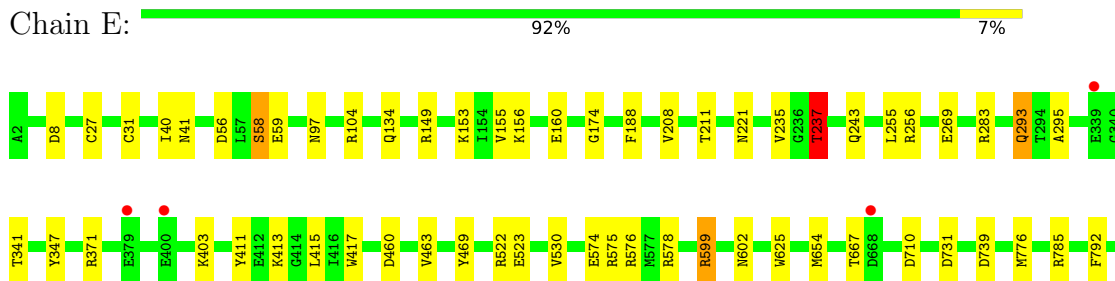
- Molecule 1: AroA



- Molecule 1: AroA



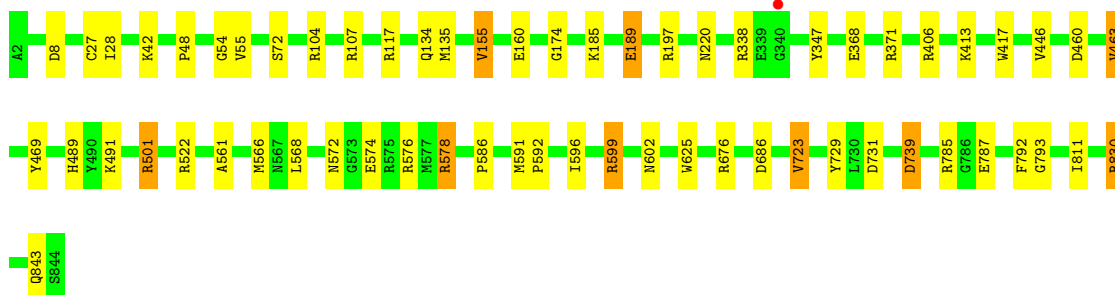
- Molecule 1: AroA





- Molecule 1: AroA

Chain G: 93% 6%



- Molecule 2: Arsenite oxidase small subunit AioB Rieske [2Fe-2S] cluster

Chain B: 96% 2%



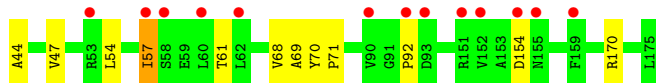
- Molecule 2: Arsenite oxidase small subunit AioB Rieske [2Fe-2S] cluster

Chain D: 97% 5%



- Molecule 2: Arsenite oxidase small subunit AioB Rieske [2Fe-2S] cluster

Chain F: 91% 10% 8%



- Molecule 2: Arsenite oxidase small subunit AioB Rieske [2Fe-2S] cluster

Chain H: 93% 7% 1%



4 Data and refinement statistics

Property	Value	Source
Space group	P 2 21 21	Depositor
Cell constants a, b, c, α , β , γ	141.41Å 148.66Å 232.01Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.55 – 2.20 49.24 – 2.20	Depositor EDS
% Data completeness (in resolution range)	100.0 (49.55-2.20) 100.0 (49.24-2.20)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.80 (at 2.20Å)	Xtrriage
Refinement program	REFMAC 5.8.0135	Depositor
R, R_{free}	0.172 , 0.217 0.179 , 0.220	Depositor DCC
R_{free} test set	12218 reflections (4.95%)	wwPDB-VP
Wilson B-factor (Å ²)	22.6	Xtrriage
Anisotropy	0.040	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 30.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	0.018 for k,h,-l	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	32195	wwPDB-VP
Average B, all atoms (Å ²)	26.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.32% 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: SO4, 4MO, PEG, F3S, MGD, PGE, EDO, GOL, FES, O, P33

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	0.83	1/6693 (0.0%)	0.92	18/9068 (0.2%)
1	C	0.81	0/6693	0.95	22/9068 (0.2%)
1	E	0.82	1/6693 (0.0%)	0.93	16/9068 (0.2%)
1	G	0.81	1/6693 (0.0%)	0.91	15/9068 (0.2%)
2	B	0.71	0/1011	0.82	1/1378 (0.1%)
2	D	0.74	0/1011	0.83	0/1378
2	F	0.73	0/1011	0.83	1/1378 (0.1%)
2	H	0.74	0/1011	0.85	1/1378 (0.1%)
All	All	0.80	3/30816 (0.0%)	0.92	74/41784 (0.2%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	375	GLU	CG-CD	5.37	1.60	1.51
1	E	523	GLU	CG-CD	5.34	1.59	1.51
1	G	787	GLU	CD-OE1	5.11	1.31	1.25

All (74) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	599	ARG	NE-CZ-NH2	-14.57	113.02	120.30
1	A	104	ARG	NE-CZ-NH2	-13.43	113.59	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	599	ARG	NE-CZ-NH1	13.06	126.83	120.30
1	G	104	ARG	NE-CZ-NH2	-12.18	114.21	120.30
1	A	599	ARG	NE-CZ-NH2	-10.54	115.03	120.30
1	C	104	ARG	NE-CZ-NH2	-10.31	115.14	120.30
1	E	599	ARG	NE-CZ-NH2	-10.24	115.18	120.30
1	C	82	ARG	NE-CZ-NH1	9.46	125.03	120.30
1	A	104	ARG	NE-CZ-NH1	9.00	124.80	120.30
1	E	599	ARG	NE-CZ-NH1	8.83	124.72	120.30
1	E	104	ARG	NE-CZ-NH2	-8.64	115.98	120.30
1	G	104	ARG	NE-CZ-NH1	8.64	124.62	120.30
1	C	104	ARG	NE-CZ-NH1	7.95	124.27	120.30
1	E	371	ARG	NE-CZ-NH1	7.73	124.16	120.30
1	E	104	ARG	NE-CZ-NH1	7.64	124.12	120.30
1	C	731	ASP	CB-CG-OD2	-7.24	111.78	118.30
1	A	739	ASP	CB-CG-OD1	-7.17	111.85	118.30
1	A	599	ARG	NE-CZ-NH1	6.92	123.76	120.30
1	E	731	ASP	CB-CG-OD1	6.91	124.52	118.30
1	A	201	ARG	NE-CZ-NH1	6.82	123.71	120.30
1	G	501	ARG	NE-CZ-NH2	-6.76	116.92	120.30
1	C	501	ARG	NE-CZ-NH2	-6.70	116.95	120.30
1	G	135	MET	CG-SD-CE	-6.58	89.67	100.20
1	C	720	ARG	NE-CZ-NH2	-6.54	117.03	120.30
1	E	522	ARG	NE-CZ-NH2	-6.42	117.09	120.30
1	E	237	THR	CB-CA-C	-6.40	94.33	111.60
1	C	739	ASP	CB-CG-OD1	-6.35	112.58	118.30
1	G	739	ASP	CB-CG-OD1	-6.30	112.63	118.30
1	A	201	ARG	NE-CZ-NH2	-6.29	117.16	120.30
1	C	723	VAL	CB-CA-C	-6.28	99.47	111.40
1	C	501	ARG	NE-CZ-NH1	6.27	123.44	120.30
1	C	566	MET	CG-SD-CE	-6.25	90.20	100.20
1	A	406	ARG	NE-CZ-NH1	6.24	123.42	120.30
1	C	117	ARG	NE-CZ-NH2	-6.23	117.19	120.30
1	E	371	ARG	NE-CZ-NH2	-6.05	117.27	120.30
2	B	85	ARG	NE-CZ-NH1	5.93	123.27	120.30
1	G	723	VAL	CB-CA-C	-5.93	100.13	111.40
1	C	440	ARG	NE-CZ-NH2	-5.93	117.34	120.30
1	E	731	ASP	CB-CG-OD2	-5.92	112.97	118.30
1	A	440	ARG	NE-CZ-NH2	-5.80	117.40	120.30
1	E	739	ASP	CB-CG-OD1	-5.80	113.08	118.30
1	C	731	ASP	CB-CG-OD1	5.79	123.51	118.30
1	G	501	ARG	NE-CZ-NH1	5.73	123.17	120.30
1	E	710	ASP	CB-CG-OD1	5.72	123.45	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	G	338	ARG	NE-CZ-NH1	5.68	123.14	120.30
1	G	117	ARG	NE-CZ-NH2	-5.67	117.47	120.30
1	E	283	ARG	NE-CZ-NH2	-5.56	117.52	120.30
1	A	512	ASP	CB-CG-OD1	5.55	123.29	118.30
1	A	599	ARG	CG-CD-NE	-5.54	100.16	111.80
1	A	338	ARG	NE-CZ-NH1	5.53	123.07	120.30
1	E	149	ARG	NE-CZ-NH2	-5.50	117.55	120.30
1	C	8	ASP	CB-CA-C	-5.49	99.42	110.40
1	A	5	ARG	NE-CZ-NH1	5.48	123.04	120.30
1	G	578	ARG	NE-CZ-NH2	-5.47	117.56	120.30
1	C	440	ARG	NE-CZ-NH1	5.46	123.03	120.30
1	C	123	ARG	NE-CZ-NH2	-5.45	117.58	120.30
1	A	371	ARG	NE-CZ-NH1	5.40	123.00	120.30
1	G	731	ASP	CB-CG-OD1	5.40	123.16	118.30
1	E	283	ARG	NE-CZ-NH1	5.40	123.00	120.30
1	A	574	GLU	N-CA-CB	-5.39	100.89	110.60
1	C	338	ARG	NE-CZ-NH1	5.39	123.00	120.30
1	A	283	ARG	NE-CZ-NH1	5.37	122.98	120.30
2	F	170	ARG	NE-CZ-NH1	5.30	122.95	120.30
1	C	329	ARG	NE-CZ-NH2	-5.30	117.65	120.30
1	C	693	MET	CG-SD-CE	-5.18	91.91	100.20
1	G	406	ARG	NE-CZ-NH1	5.14	122.87	120.30
1	A	9	ARG	NE-CZ-NH2	-5.13	117.74	120.30
1	G	676	ARG	NE-CZ-NH2	-5.11	117.75	120.30
1	G	104	ARG	CD-NE-CZ	5.09	130.72	123.60
1	C	599	ARG	CD-NE-CZ	5.08	130.71	123.60
2	H	151	ARG	NE-CZ-NH1	5.07	122.83	120.30
1	G	830	ARG	NE-CZ-NH1	5.06	122.83	120.30
1	A	5	ARG	NE-CZ-NH2	-5.05	117.78	120.30
1	E	188	PHE	CB-CG-CD1	5.00	124.30	120.80

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	401	GLY	Peptide

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	6545	0	6296	34	0
1	C	6545	0	6296	27	0
1	E	6545	0	6296	23	0
1	G	6545	0	6296	29	1
2	B	989	0	943	1	0
2	D	989	0	943	2	0
2	F	989	0	943	6	0
2	H	989	0	943	4	0
3	A	94	0	44	1	0
3	C	94	0	44	1	0
3	E	94	0	44	1	0
3	G	94	0	44	2	0
4	A	1	0	0	1	0
4	C	1	0	0	1	0
4	E	1	0	0	0	0
4	G	1	0	0	1	0
5	A	1	0	0	1	0
5	C	1	0	0	1	0
5	E	1	0	0	0	0
5	G	1	0	0	1	0
6	A	7	0	0	0	0
6	C	7	0	0	0	0
6	E	7	0	0	0	0
6	G	7	0	0	0	0
7	A	20	0	0	1	0
7	C	20	0	0	0	0
7	E	10	0	0	0	0
7	G	10	0	0	0	0
8	A	10	0	14	0	0
9	A	6	0	8	0	0
9	C	6	0	8	0	0
9	E	6	0	8	0	0
9	G	12	0	16	0	0
10	B	4	0	0	0	0
10	D	4	0	0	0	0
10	F	4	0	0	0	0
10	H	4	0	0	0	0
11	B	4	0	6	0	0
11	C	4	0	6	0	0
11	G	4	0	6	0	0
12	C	7	0	10	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
13	G	44	0	60	2	0
14	A	383	0	0	7	0
14	B	25	0	0	0	0
14	C	308	0	0	3	0
14	D	33	0	0	1	0
14	E	284	0	0	0	0
14	F	25	0	0	1	0
14	G	374	0	0	7	1
14	H	36	0	0	0	0
All	All	32195	0	29274	128	2

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 2.

All (128) 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:E:574:GLU:OE1	1:E:576:ARG:NH1	1.95	1.00
4:G:2003:O:O	5:G:2004:4MO:MO	1.35	0.97
1:G:574:GLU:OE1	1:G:576:ARG:NH1	2.08	0.86
1:G:599:ARG:NH1	1:G:602:ASN:OD1	2.10	0.85
1:C:574:GLU:OE1	1:C:576:ARG:NH1	2.09	0.84
1:A:265:GLU:OE1	14:A:2101:HOH:O	1.96	0.82
1:G:522:ARG:NH1	14:G:2101:HOH:O	2.11	0.81
1:A:574:GLU:OE1	1:A:576:ARG:NH1	2.19	0.75
1:C:832:VAL:HG22	1:C:835:LEU:HD22	1.68	0.74
1:A:413:LYS:HD2	1:A:417:TRP:NE1	2.04	0.73
4:C:2003:O:O	5:C:2004:4MO:MO	1.61	0.71
4:A:2003:O:O	5:A:2004:4MO:MO	1.63	0.70
1:C:413:LYS:HD2	1:C:417:TRP:NE1	2.07	0.69
1:A:787:GLU:OE1	14:A:2102:HOH:O	2.10	0.69
1:A:423:ARG:HA	1:A:693:MET:HE2	1.75	0.68
1:A:599:ARG:NH2	1:A:625:TRP:O	2.25	0.66
1:G:413:LYS:HD2	1:G:417:TRP:NE1	2.11	0.65
1:G:739:ASP:OD1	14:G:2102:HOH:O	2.14	0.65
1:G:599:ARG:NH2	1:G:625:TRP:O	2.32	0.63
1:G:566:MET:HE1	14:G:2118:HOH:O	1.98	0.62
1:C:423:ARG:HA	1:C:693:MET:CE	2.30	0.61
13:G:2008:P33:H91	14:G:2433:HOH:O	1.99	0.61
1:E:56:ASP:OD1	1:E:58:SER:OG	2.17	0.60
2:F:70:TYR:CD1	2:F:71:PRO:HA	2.36	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:40:ILE:O	1:A:41:ASN:HB2	2.02	0.60
1:C:776:MET:SD	1:C:832:VAL:HG21	2.42	0.59
1:C:829:PRO:HB2	1:C:831:ASN:OD1	2.04	0.58
1:G:561:ALA:O	1:G:566:MET:HE3	2.03	0.58
1:A:413:LYS:HD2	1:A:417:TRP:CE2	2.39	0.57
1:E:40:ILE:O	1:E:41:ASN:HB2	2.05	0.56
1:C:566:MET:HE1	14:C:2333:HOH:O	2.06	0.56
1:G:8:ASP:HB3	2:H:47:VAL:HG21	1.87	0.55
2:H:54:LEU:HD11	2:H:160:ALA:HB2	1.87	0.55
1:A:25:HIS:HD2	14:A:2108:HOH:O	1.88	0.55
1:A:323:ASP:OD2	1:A:371:ARG:NH2	2.39	0.54
1:C:413:LYS:HD2	1:C:417:TRP:CE2	2.42	0.54
1:A:566:MET:CE	14:A:2104:HOH:O	2.55	0.54
1:C:423:ARG:HA	1:C:693:MET:HE2	1.89	0.54
1:G:501:ARG:NH2	14:G:2107:HOH:O	2.41	0.53
1:E:832:VAL:HG22	1:E:835:LEU:HD22	1.90	0.53
1:A:574:GLU:OE2	14:A:2103:HOH:O	2.19	0.53
2:F:57:ILE:HD11	2:F:92:PRO:HD2	1.91	0.52
1:A:566:MET:HE1	14:A:2104:HOH:O	2.10	0.52
1:E:599:ARG:NH1	1:E:602:ASN:OD1	2.42	0.52
2:H:70:TYR:CD1	2:H:71:PRO:HA	2.44	0.52
1:G:561:ALA:O	1:G:566:MET:CE	2.58	0.51
1:G:155:VAL:HG22	1:G:160:GLU:HA	1.91	0.51
1:A:423:ARG:HA	1:A:693:MET:CE	2.38	0.51
1:A:40:ILE:O	1:A:41:ASN:CB	2.56	0.51
1:A:830:ARG:NH1	7:A:2008:SO4:O4	2.44	0.51
2:F:68:VAL:HG12	2:F:69:ALA:N	2.26	0.51
1:E:8:ASP:HB3	2:F:47:VAL:HG21	1.93	0.50
1:E:599:ARG:NH2	1:E:625:TRP:O	2.43	0.50
2:D:70:TYR:CD1	2:D:71:PRO:HA	2.47	0.50
1:G:174:GLY:HA2	3:G:2001:MGD:C6	2.42	0.50
1:C:566:MET:HE1	14:C:2103:HOH:O	2.11	0.50
1:E:153:LYS:HE3	1:E:530:VAL:HG21	1.93	0.50
1:G:413:LYS:HD2	1:G:417:TRP:CE2	2.47	0.50
1:C:40:ILE:O	1:C:41:ASN:CG	2.50	0.50
1:C:423:ARG:HA	1:C:693:MET:HE1	1.94	0.49
1:A:829:PRO:HB2	1:A:831:ASN:OD1	2.12	0.49
1:E:255:LEU:HB3	1:E:295:ALA:HB2	1.93	0.49
1:E:415:LEU:HD23	1:E:415:LEU:C	2.33	0.49
1:C:235:VAL:O	1:C:411:TYR:HA	2.12	0.48
1:C:460:ASP:O	1:C:463:VAL:HB	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:827:ASP:O	1:A:828:ALA:C	2.52	0.48
1:G:591:MET:HG3	1:G:596:ILE:HG13	1.95	0.48
1:A:561:ALA:O	1:A:566:MET:CE	2.62	0.48
1:E:31:CYS:SG	1:E:97:ASN:HB3	2.54	0.48
1:C:213:ASP:HB3	1:C:360:LEU:HD11	1.96	0.47
1:E:221:ASN:O	1:E:575:ARG:NH2	2.47	0.47
2:B:70:TYR:CD1	2:B:71:PRO:HA	2.50	0.47
1:A:341:THR:HG22	14:A:2112:HOH:O	2.15	0.46
1:A:358:GLY:HA3	1:A:693:MET:HE3	1.98	0.46
1:A:341:THR:OG1	1:A:342:ALA:N	2.49	0.46
1:A:255:LEU:HB3	1:A:295:ALA:HB2	1.97	0.45
1:C:255:LEU:HB3	1:C:295:ALA:HB2	1.98	0.45
1:E:293:GLN:HG2	1:E:842:TYR:HE2	1.82	0.45
1:G:197:ARG:CZ	1:G:489:HIS:CE1	3.00	0.45
1:C:104:ARG:NH2	1:C:722:ASN:OD1	2.50	0.45
2:F:54:LEU:HD13	2:F:68:VAL:HG11	1.98	0.45
1:E:413:LYS:HD2	1:E:417:TRP:NE1	2.32	0.44
13:G:2008:P33:C9	14:G:2433:HOH:O	2.62	0.44
1:C:370:CYS:O	1:C:371:ARG:C	2.56	0.44
1:A:717:ASN:OD1	3:A:2002:MGD:H8	2.18	0.44
1:C:363:PHE:O	1:C:367:VAL:HG23	2.18	0.44
1:E:460:ASP:O	1:E:463:VAL:HB	2.18	0.44
1:C:493:THR:HG23	1:C:494:LEU:O	2.18	0.43
2:F:44:ALA:N	14:F:303:HOH:O	2.50	0.43
1:G:72:SER:HB2	1:G:107:ARG:HA	1.99	0.43
1:E:208:VAL:HB	1:E:211:THR:HG22	2.00	0.43
1:G:561:ALA:HB2	1:G:586:PRO:HB3	2.00	0.43
1:E:293:GLN:HG2	1:E:842:TYR:CE2	2.53	0.43
1:G:491:LYS:O	1:G:793:GLY:HA2	2.18	0.43
1:E:174:GLY:HA2	3:E:2001:MGD:C6	2.48	0.43
1:A:208:VAL:HB	1:A:211:THR:HG22	2.01	0.43
1:A:571:MET:HA	1:A:576:ARG:O	2.19	0.43
1:C:40:ILE:O	1:C:41:ASN:CB	2.63	0.43
1:E:269:GLU:O	1:E:403:LYS:HD2	2.19	0.43
1:A:460:ASP:O	1:A:463:VAL:HB	2.18	0.43
1:C:221:ASN:HB2	1:C:225:ASP:OD2	2.19	0.43
1:G:28:ILE:O	1:G:572:ASN:HB2	2.18	0.43
1:E:237:THR:CG2	1:E:243:GLN:OE1	2.67	0.43
1:C:599:ARG:HD3	1:C:599:ARG:HA	1.75	0.42
1:E:40:ILE:O	1:E:41:ASN:CB	2.65	0.42
1:C:717:ASN:OD1	3:C:2002:MGD:H8	2.20	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:76:VAL:HG23	1:A:117:ARG:HD2	2.01	0.42
1:E:155:VAL:HG22	1:E:160:GLU:HA	2.02	0.42
1:G:843:GLN:OE1	2:H:116:ASN:HB2	2.20	0.42
2:D:44:ALA:HB3	14:D:320:HOH:O	2.18	0.41
1:E:235:VAL:O	1:E:411:TYR:HA	2.21	0.41
1:G:460:ASP:O	1:G:463:VAL:HB	2.19	0.41
1:G:566:MET:CE	14:G:2118:HOH:O	2.63	0.41
1:A:153:LYS:HE2	1:A:527:ASN:OD1	2.20	0.41
1:A:742:PRO:HG2	1:A:832:VAL:HG12	2.03	0.41
1:A:31:CYS:SG	1:A:97:ASN:HB3	2.61	0.41
1:A:599:ARG:HA	1:A:599:ARG:HD3	1.83	0.41
1:A:293:GLN:HG2	1:A:842:TYR:CE2	2.56	0.41
1:A:358:GLY:HA3	1:A:693:MET:CE	2.51	0.41
1:G:220:ASN:H	1:G:446:VAL:HG12	1.86	0.41
1:G:185:LYS:O	1:G:189:GLU:HB3	2.21	0.41
1:G:566:MET:HE1	1:G:592:PRO:HA	2.03	0.40
1:G:729:TYR:CD1	3:G:2001:MGD:H2'	2.56	0.40
1:C:566:MET:CE	14:C:2333:HOH:O	2.66	0.40
1:C:599:ARG:NH2	1:C:625:TRP:O	2.37	0.40
1:C:827:ASP:O	1:C:828:ALA:C	2.59	0.40
1:G:48:PRO:O	1:G:54:GLY:HA2	2.21	0.40
1:G:368:GLU:OE1	1:G:371:ARG:NH1	2.55	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
14:G:2463:HOH:O	14:G:2463:HOH:O[2_545]	1.27	0.93
1:G:686:ASP:O	1:G:686:ASP:O[2_545]	1.98	0.22

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	841/843 (100%)	808 (96%)	32 (4%)	1 (0%)	51	60
1	C	841/843 (100%)	805 (96%)	35 (4%)	1 (0%)	51	60
1	E	841/843 (100%)	807 (96%)	33 (4%)	1 (0%)	51	60
1	G	841/843 (100%)	804 (96%)	36 (4%)	1 (0%)	51	60
2	B	130/132 (98%)	124 (95%)	6 (5%)	0	100	100
2	D	130/132 (98%)	123 (95%)	7 (5%)	0	100	100
2	F	130/132 (98%)	122 (94%)	8 (6%)	0	100	100
2	H	130/132 (98%)	122 (94%)	8 (6%)	0	100	100
All	All	3884/3900 (100%)	3715 (96%)	165 (4%)	4 (0%)	51	60

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	G	811	ILE
1	C	811	ILE
1	E	811	ILE
1	A	811	ILE

5.3.2 Protein sidechains [i](#)

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

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	677/677 (100%)	660 (98%)	17 (2%)	47	60
1	C	677/677 (100%)	661 (98%)	16 (2%)	49	62
1	E	677/677 (100%)	658 (97%)	19 (3%)	43	56
1	G	677/677 (100%)	661 (98%)	16 (2%)	49	62
2	B	104/104 (100%)	102 (98%)	2 (2%)	57	71
2	D	104/104 (100%)	103 (99%)	1 (1%)	76	86
2	F	104/104 (100%)	101 (97%)	3 (3%)	42	54
2	H	104/104 (100%)	102 (98%)	2 (2%)	57	71
All	All	3124/3124 (100%)	3048 (98%)	76 (2%)	49	62

All (76) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	27	CYS
1	A	55	VAL
1	A	134	GLN
1	A	156	LYS
1	A	158	LYS
1	A	237	THR
1	A	264	LYS
1	A	273	GLU
1	A	347	TYR
1	A	463	VAL
1	A	469	TYR
1	A	505	LYS
1	A	578	ARG
1	A	626	GLN
1	A	644	GLU
1	A	792	PHE
1	A	844	SER
2	B	53	ARG
2	B	57	ILE
1	C	27	CYS
1	C	41	ASN
1	C	49	GLN
1	C	62	GLN
1	C	341	THR
1	C	347	TYR
1	C	403	LYS
1	C	463	VAL
1	C	469	TYR
1	C	542	ASN
1	C	578	ARG
1	C	599	ARG
1	C	723	VAL
1	C	792	PHE
1	C	830	ARG
1	C	832	VAL
2	D	115	ASP
1	E	27	CYS
1	E	58	SER
1	E	59	GLU
1	E	134	GLN
1	E	156	LYS
1	E	237	THR

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Mol	Chain	Res	Type
1	E	256	ARG
1	E	293	GLN
1	E	341	THR
1	E	347	TYR
1	E	469	TYR
1	E	578	ARG
1	E	654	MET
1	E	667	THR
1	E	776	MET
1	E	785	ARG
1	E	792	PHE
1	E	832	VAL
1	E	844	SER
2	F	57	ILE
2	F	61	THR
2	F	154	ASP
1	G	27	CYS
1	G	42	LYS
1	G	55	VAL
1	G	134	GLN
1	G	155	VAL
1	G	189	GLU
1	G	347	TYR
1	G	463	VAL
1	G	469	TYR
1	G	568	LEU
1	G	578	ARG
1	G	599	ARG
1	G	723	VAL
1	G	785	ARG
1	G	792	PHE
1	G	830	ARG
2	H	85	ARG
2	H	154	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	25	HIS
1	A	619	GLN
1	E	425	ASN
1	G	249	ASN

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Mol	Chain	Res	Type
1	G	637	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 48 ligands modelled in this entry, 8 are monoatomic - leaving 40 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z > 2$	Counts	RMSZ	# $ Z > 2$
9	GOL	G	2010	-	5,5,5	1.31	1 (20%)	5,5,5	1.76	2 (40%)
7	SO4	C	2006	-	4,4,4	0.60	0	6,6,6	0.71	0
3	MGD	C	2002	5	41,52,52	1.68	7 (17%)	40,81,81	1.48	6 (15%)
7	SO4	E	2007	-	4,4,4	0.48	0	6,6,6	0.53	0
7	SO4	E	2006	-	4,4,4	0.32	0	6,6,6	0.46	0
9	GOL	G	2011	-	5,5,5	1.11	0	5,5,5	1.85	1 (20%)
6	F3S	C	2005	1	0,9,9	-	-	-	-	-
3	MGD	A	2002	5	41,52,52	1.46	6 (14%)	40,81,81	1.62	8 (20%)
3	MGD	G	2001	5	41,52,52	1.30	4 (9%)	40,81,81	1.49	6 (15%)
7	SO4	C	2009	-	4,4,4	0.67	0	6,6,6	0.57	0
7	SO4	C	2008	-	4,4,4	0.45	0	6,6,6	0.23	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
9	GOL	A	2011	-	5,5,5	1.07	0	5,5,5	1.45	1 (20%)
11	EDO	C	2012	-	3,3,3	0.48	0	2,2,2	0.45	0
10	FES	H	201	2	0,4,4	-	-	-	-	-
7	SO4	C	2007	-	4,4,4	0.57	0	6,6,6	0.83	0
7	SO4	A	2009	-	4,4,4	0.46	0	6,6,6	1.00	0
6	F3S	A	2005	1	0,9,9	-	-	-	-	-
3	MGD	A	2001	5	41,52,52	1.41	4 (9%)	40,81,81	1.35	4 (10%)
10	FES	D	201	2	0,4,4	-	-	-	-	-
7	SO4	A	2008	-	4,4,4	0.79	0	6,6,6	1.06	0
10	FES	F	201	2	0,4,4	-	-	-	-	-
7	SO4	G	2007	-	4,4,4	0.55	0	6,6,6	0.54	0
11	EDO	G	2012	-	3,3,3	0.64	0	2,2,2	0.45	0
3	MGD	E	2001	5	41,52,52	1.55	5 (12%)	40,81,81	1.64	6 (15%)
7	SO4	A	2006	-	4,4,4	0.46	0	6,6,6	0.88	0
10	FES	B	201	2	0,4,4	-	-	-	-	-
8	PGE	A	2010	-	9,9,9	1.14	0	8,8,8	1.30	0
7	SO4	G	2006	-	4,4,4	0.42	0	6,6,6	0.75	0
6	F3S	G	2005	1	0,9,9	-	-	-	-	-
7	SO4	A	2007	-	4,4,4	0.41	0	6,6,6	0.89	0
3	MGD	G	2002	5	41,52,52	1.59	6 (14%)	40,81,81	1.52	7 (17%)
12	PEG	C	2010	-	6,6,6	0.65	0	5,5,5	0.63	0
9	GOL	E	2008	-	5,5,5	0.50	0	5,5,5	0.37	0
3	MGD	E	2002	5	41,52,52	1.37	5 (12%)	40,81,81	1.47	8 (20%)
13	P33	G	2009	-	21,21,21	0.69	0	20,20,20	0.82	1 (5%)
13	P33	G	2008	-	21,21,21	1.04	0	20,20,20	1.54	4 (20%)
9	GOL	C	2011	-	5,5,5	0.71	0	5,5,5	1.01	0
3	MGD	C	2001	5	41,52,52	1.43	5 (12%)	40,81,81	1.75	11 (27%)
11	EDO	B	202	-	3,3,3	0.39	0	2,2,2	0.83	0
6	F3S	E	2005	1	0,9,9	-	-	-	-	-

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
9	GOL	G	2010	-	-	3/4/4/4	-
3	MGD	C	2002	5	-	3/18/66/66	0/6/6/6
9	GOL	G	2011	-	-	2/4/4/4	-
6	F3S	C	2005	1	-	-	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	MGD	A	2002	5	-	3/18/66/66	0/6/6/6
3	MGD	G	2001	5	-	5/18/66/66	0/6/6/6
9	GOL	A	2011	-	-	4/4/4/4	-
11	EDO	C	2012	-	-	1/1/1/1	-
10	FES	H	201	2	-	-	0/1/1/1
6	F3S	A	2005	1	-	-	0/3/3/3
3	MGD	A	2001	5	-	4/18/66/66	0/6/6/6
10	FES	D	201	2	-	-	0/1/1/1
10	FES	F	201	2	-	-	0/1/1/1
11	EDO	G	2012	-	-	1/1/1/1	-
3	MGD	E	2001	5	-	5/18/66/66	0/6/6/6
10	FES	B	201	2	-	-	0/1/1/1
8	PGE	A	2010	-	-	4/7/7/7	-
6	F3S	G	2005	1	-	-	0/3/3/3
12	PEG	C	2010	-	-	3/4/4/4	-
3	MGD	G	2002	5	-	3/18/66/66	0/6/6/6
9	GOL	E	2008	-	-	4/4/4/4	-
3	MGD	E	2002	5	-	6/18/66/66	0/6/6/6
13	P33	G	2009	-	-	11/19/19/19	-
13	P33	G	2008	-	-	10/19/19/19	-
9	GOL	C	2011	-	-	3/4/4/4	-
3	MGD	C	2001	5	-	4/18/66/66	0/6/6/6
11	EDO	B	202	-	-	1/1/1/1	-
6	F3S	E	2005	1	-	-	0/3/3/3

All (43) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	E	2001	MGD	C16-C21	6.55	1.49	1.38
3	C	2002	MGD	C16-C21	5.58	1.48	1.38
3	C	2001	MGD	C16-C21	5.56	1.48	1.38
3	G	2002	MGD	C16-C21	5.46	1.48	1.38
3	A	2002	MGD	C16-C21	5.09	1.47	1.38
3	G	2001	MGD	C16-C21	5.06	1.47	1.38
3	E	2002	MGD	C16-C21	5.00	1.47	1.38
3	C	2002	MGD	C21-N22	-4.78	1.30	1.35
3	A	2001	MGD	C16-C21	4.57	1.46	1.38
3	G	2002	MGD	C14-N15	-4.01	1.41	1.46
3	G	2002	MGD	C21-N22	-3.74	1.31	1.35

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	2001	MGD	C17-N18	-3.60	1.32	1.38
3	C	2002	MGD	C17-N18	-3.52	1.32	1.38
3	C	2001	MGD	C6-N1	-3.27	1.33	1.37
3	C	2002	MGD	O11-C11	-3.08	1.39	1.43
3	C	2002	MGD	C6-N1	-2.83	1.33	1.37
3	A	2002	MGD	C21-N22	-2.76	1.32	1.35
3	E	2002	MGD	C2'-C1'	-2.73	1.49	1.53
3	A	2001	MGD	C6-N1	-2.72	1.33	1.37
3	E	2001	MGD	C21-N22	-2.66	1.32	1.35
3	C	2001	MGD	O11-C23	-2.57	1.40	1.43
3	E	2001	MGD	O11-C11	-2.56	1.40	1.43
3	C	2001	MGD	C16-C17	2.47	1.48	1.42
3	A	2002	MGD	O11-C23	-2.45	1.40	1.43
3	G	2001	MGD	C16-C17	2.44	1.48	1.42
3	A	2002	MGD	C2'-C1'	-2.40	1.50	1.53
3	E	2001	MGD	C6-N1	-2.34	1.34	1.37
3	C	2002	MGD	C21-N20	-2.33	1.32	1.36
3	G	2002	MGD	C17-N18	-2.32	1.34	1.38
3	G	2002	MGD	O11-C23	-2.30	1.40	1.43
3	E	2002	MGD	C16-C17	2.28	1.48	1.42
3	E	2002	MGD	O11-C11	-2.27	1.40	1.43
3	C	2001	MGD	C14-N15	-2.25	1.43	1.46
3	A	2002	MGD	C5-C4	2.22	1.48	1.43
9	G	2010	GOL	O1-C1	2.22	1.51	1.42
3	E	2001	MGD	C16-C17	2.19	1.48	1.42
3	A	2001	MGD	C23-C14	-2.18	1.51	1.53
3	G	2001	MGD	C17-N18	-2.16	1.34	1.38
3	G	2002	MGD	C6-N1	-2.13	1.34	1.37
3	A	2002	MGD	O6-C6	2.08	1.27	1.23
3	C	2002	MGD	C19-N20	2.03	1.38	1.33
3	G	2001	MGD	O4'-C1'	2.02	1.43	1.41
3	E	2002	MGD	C17-N18	-2.01	1.35	1.38

All (65) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	E	2001	MGD	C19-N20-C21	4.80	122.10	113.43
3	G	2001	MGD	C19-N20-C21	4.77	122.04	113.43
3	C	2001	MGD	C19-N20-C21	4.67	121.86	113.43
3	C	2002	MGD	O11-C23-N22	-4.24	104.20	108.57
3	C	2001	MGD	O17-C17-C16	-4.18	117.67	127.24
3	G	2002	MGD	C19-N20-C21	4.03	120.70	113.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	2002	MGD	O11-C23-N22	-3.97	104.48	108.57
3	A	2002	MGD	C19-N20-C21	3.83	120.35	113.43
3	E	2002	MGD	C19-N20-C21	3.69	120.09	113.43
3	A	2002	MGD	O17-C17-C16	-3.58	119.04	127.24
3	A	2001	MGD	C19-N20-C21	3.39	119.55	113.43
3	G	2002	MGD	O11-C23-N22	-3.17	105.31	108.57
3	C	2002	MGD	O2A-PA-O1A	3.09	127.54	112.24
13	G	2008	P33	O10-C9-C8	3.07	124.25	110.39
3	E	2001	MGD	O17-C17-C16	-3.03	120.29	127.24
3	A	2001	MGD	O6-C6-N1	3.01	124.21	120.65
3	E	2001	MGD	C17-C16-N15	2.97	124.72	116.76
3	G	2002	MGD	O17-C17-C16	-2.91	120.58	127.24
3	C	2002	MGD	C19-N20-C21	2.87	118.62	113.43
13	G	2008	P33	C15-O16-C17	2.85	125.65	113.29
3	C	2001	MGD	C23-C14-C13	2.81	116.82	110.53
3	C	2001	MGD	PA-O3B-PB	-2.80	123.23	132.83
3	E	2002	MGD	O11-C23-C14	-2.77	107.12	108.96
3	C	2001	MGD	C5-C6-N1	2.76	118.82	113.95
3	E	2002	MGD	C5-C6-N1	2.74	118.80	113.95
3	C	2002	MGD	O11-C23-C14	2.71	110.77	108.96
3	E	2001	MGD	N19-C19-N18	2.68	122.41	116.71
3	E	2002	MGD	O17-C17-C16	-2.66	121.13	127.24
3	G	2002	MGD	O6-C6-C5	-2.63	119.23	124.37
9	G	2011	GOL	O2-C2-C1	2.60	120.57	109.12
3	G	2002	MGD	O2A-PA-O1A	2.59	125.02	112.24
3	A	2002	MGD	O11-C23-C14	2.57	110.68	108.96
3	C	2002	MGD	O17-C17-C16	-2.53	121.44	127.24
3	A	2002	MGD	O6-C6-N1	2.52	123.62	120.65
13	G	2008	P33	C6-O7-C8	2.50	124.10	113.29
3	E	2001	MGD	PA-O3B-PB	-2.45	124.41	132.83
3	A	2001	MGD	C17-C16-N15	2.43	123.29	116.76
3	C	2001	MGD	C19-N18-C17	-2.39	120.74	125.10
3	A	2001	MGD	O17-C17-C16	-2.39	121.76	127.24
3	C	2001	MGD	O11-C23-C14	2.37	110.55	108.96
3	G	2001	MGD	O17-C17-C16	-2.37	121.81	127.24
3	E	2001	MGD	O11-C23-C14	2.36	110.54	108.96
3	A	2002	MGD	N2-C2-N3	-2.36	115.15	119.74
9	G	2010	GOL	O1-C1-C2	2.32	121.34	110.20
3	G	2002	MGD	O6-C6-N1	2.32	123.39	120.65
3	A	2002	MGD	O6-C6-C5	-2.31	119.86	124.37
3	C	2001	MGD	C16-C17-N18	2.30	119.16	112.31
3	E	2002	MGD	O2A-PA-O1A	2.29	123.55	112.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	E	2002	MGD	C8-N7-C5	2.29	107.34	102.99
13	G	2008	P33	O19-C20-C21	2.23	119.87	110.07
3	C	2001	MGD	C17-C16-N15	2.23	122.74	116.76
3	G	2001	MGD	C17-C16-N15	2.21	122.70	116.76
3	G	2002	MGD	O11-C23-C14	-2.18	107.51	108.96
9	A	2011	GOL	O3-C3-C2	2.17	120.61	110.20
3	C	2002	MGD	O4'-C1'-C2'	-2.12	103.83	106.93
3	C	2001	MGD	C8-N7-C5	2.12	107.03	102.99
13	G	2009	P33	C18-O19-C20	2.07	122.27	113.29
9	G	2010	GOL	O2-C2-C3	-2.07	100.00	109.12
3	A	2002	MGD	C16-C17-N18	2.07	118.47	112.31
3	G	2001	MGD	O2B-PB-O1B	2.07	122.47	112.24
3	G	2001	MGD	O11-C23-N22	2.05	110.68	108.57
3	G	2001	MGD	PA-O3B-PB	-2.03	125.85	132.83
3	C	2001	MGD	O4'-C4'-C3'	2.02	109.11	105.11
3	E	2002	MGD	O2A-PA-O3A	-2.01	98.40	107.75
3	E	2002	MGD	O6-C6-C5	-2.01	120.45	124.37

There are no chirality outliers.

All (80) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	2001	MGD	PA-O3B-PB-O5'
3	A	2001	MGD	C5'-O5'-PB-O3B
3	A	2002	MGD	C5'-O5'-PB-O1B
3	C	2001	MGD	C5'-O5'-PB-O3B
3	E	2001	MGD	PA-O3B-PB-O5'
3	E	2001	MGD	C5'-O5'-PB-O3B
3	E	2002	MGD	C5'-O5'-PB-O1B
3	E	2002	MGD	C5'-O5'-PB-O3B
3	G	2001	MGD	PA-O3B-PB-O5'
3	G	2001	MGD	C5'-O5'-PB-O1B
3	G	2002	MGD	C5'-O5'-PB-O1B
3	G	2002	MGD	C5'-O5'-PB-O3B
9	A	2011	GOL	O1-C1-C2-C3
9	A	2011	GOL	C1-C2-C3-O3
9	E	2008	GOL	O1-C1-C2-C3
9	E	2008	GOL	O2-C2-C3-O3
13	G	2008	P33	C18-C17-O16-C15
13	G	2009	P33	C8-C9-O10-C11
13	G	2009	P33	O4-C5-C6-O7
8	A	2010	PGE	O2-C3-C4-O3

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Mol	Chain	Res	Type	Atoms
13	G	2009	P33	O7-C8-C9-O10
13	G	2009	P33	O1-C2-C3-O4
13	G	2008	P33	O19-C20-C21-O22
13	G	2008	P33	O1-C2-C3-O4
13	G	2008	P33	O10-C11-C12-O13
9	C	2011	GOL	C1-C2-C3-O3
9	E	2008	GOL	C1-C2-C3-O3
9	G	2010	GOL	O1-C1-C2-C3
9	G	2010	GOL	C1-C2-C3-O3
9	G	2011	GOL	C1-C2-C3-O3
9	A	2011	GOL	O1-C1-C2-O2
9	C	2011	GOL	O2-C2-C3-O3
13	G	2009	P33	O19-C20-C21-O22
8	A	2010	PGE	O1-C1-C2-O2
13	G	2009	P33	O16-C17-C18-O19
9	A	2011	GOL	O2-C2-C3-O3
9	E	2008	GOL	O1-C1-C2-O2
13	G	2008	P33	O7-C8-C9-O10
3	G	2001	MGD	O4'-C4'-C5'-O5'
13	G	2008	P33	O4-C5-C6-O7
11	C	2012	EDO	O1-C1-C2-O2
3	A	2002	MGD	PA-O3B-PB-O5'
3	C	2001	MGD	PA-O3B-PB-O5'
3	C	2002	MGD	PA-O3B-PB-O5'
3	E	2002	MGD	PA-O3B-PB-O5'
3	G	2002	MGD	PA-O3B-PB-O5'
13	G	2009	P33	C15-C14-O13-C12
13	G	2008	P33	O16-C17-C18-O19
12	C	2010	PEG	C4-C3-O2-C2
13	G	2008	P33	C5-C6-O7-C8
3	A	2002	MGD	C5'-O5'-PB-O3B
3	C	2002	MGD	C5'-O5'-PB-O3B
12	C	2010	PEG	O2-C3-C4-O4
8	A	2010	PGE	C1-C2-O2-C3
3	C	2001	MGD	O4'-C4'-C5'-O5'
3	E	2002	MGD	PB-O3B-PA-O1A
3	A	2001	MGD	C5'-O5'-PB-O1B
3	C	2001	MGD	C5'-O5'-PB-O1B
3	E	2001	MGD	C5'-O5'-PB-O1B
3	E	2002	MGD	C5'-O5'-PB-O2B
13	G	2009	P33	C6-C5-O4-C3
11	B	202	EDO	O1-C1-C2-O2

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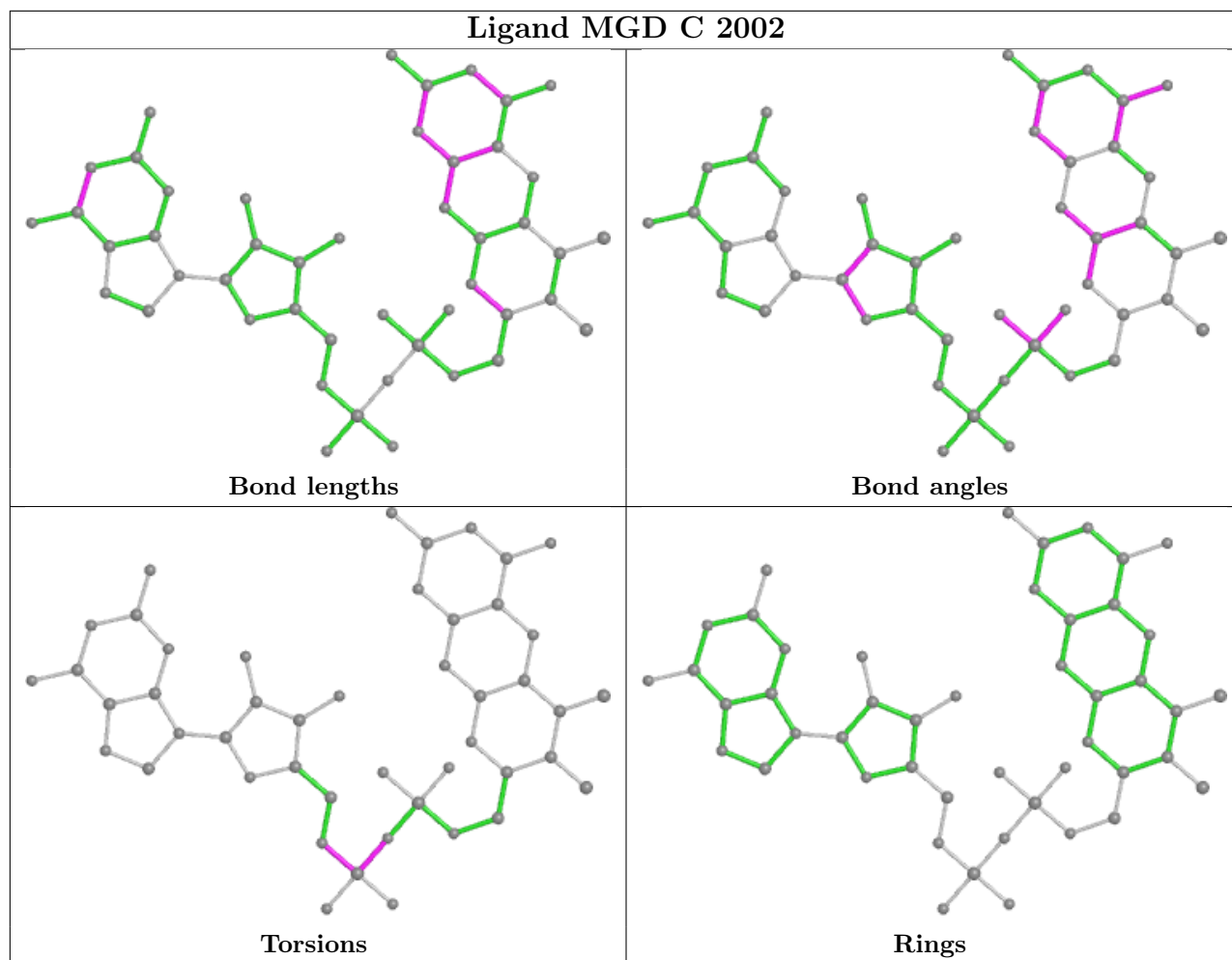
Mol	Chain	Res	Type	Atoms
11	G	2012	EDO	O1-C1-C2-O2
9	C	2011	GOL	O1-C1-C2-O2
3	A	2001	MGD	O4'-C4'-C5'-O5'
3	G	2001	MGD	C3'-C4'-C5'-O5'
13	G	2009	P33	C11-C12-O13-C14
13	G	2008	P33	C2-C3-O4-C5
8	A	2010	PGE	C4-C3-O2-C2
12	C	2010	PEG	O1-C1-C2-O2
3	G	2001	MGD	C5'-O5'-PB-O3B
9	G	2011	GOL	O1-C1-C2-O2
3	E	2002	MGD	PB-O3B-PA-O2A
3	C	2002	MGD	C5'-O5'-PB-O1B
3	E	2001	MGD	C10-O3A-PA-O1A
3	E	2001	MGD	O4'-C4'-C5'-O5'
9	G	2010	GOL	O2-C2-C3-O3
13	G	2009	P33	O10-C11-C12-O13
13	G	2008	P33	O13-C14-C15-O16
13	G	2009	P33	O13-C14-C15-O16

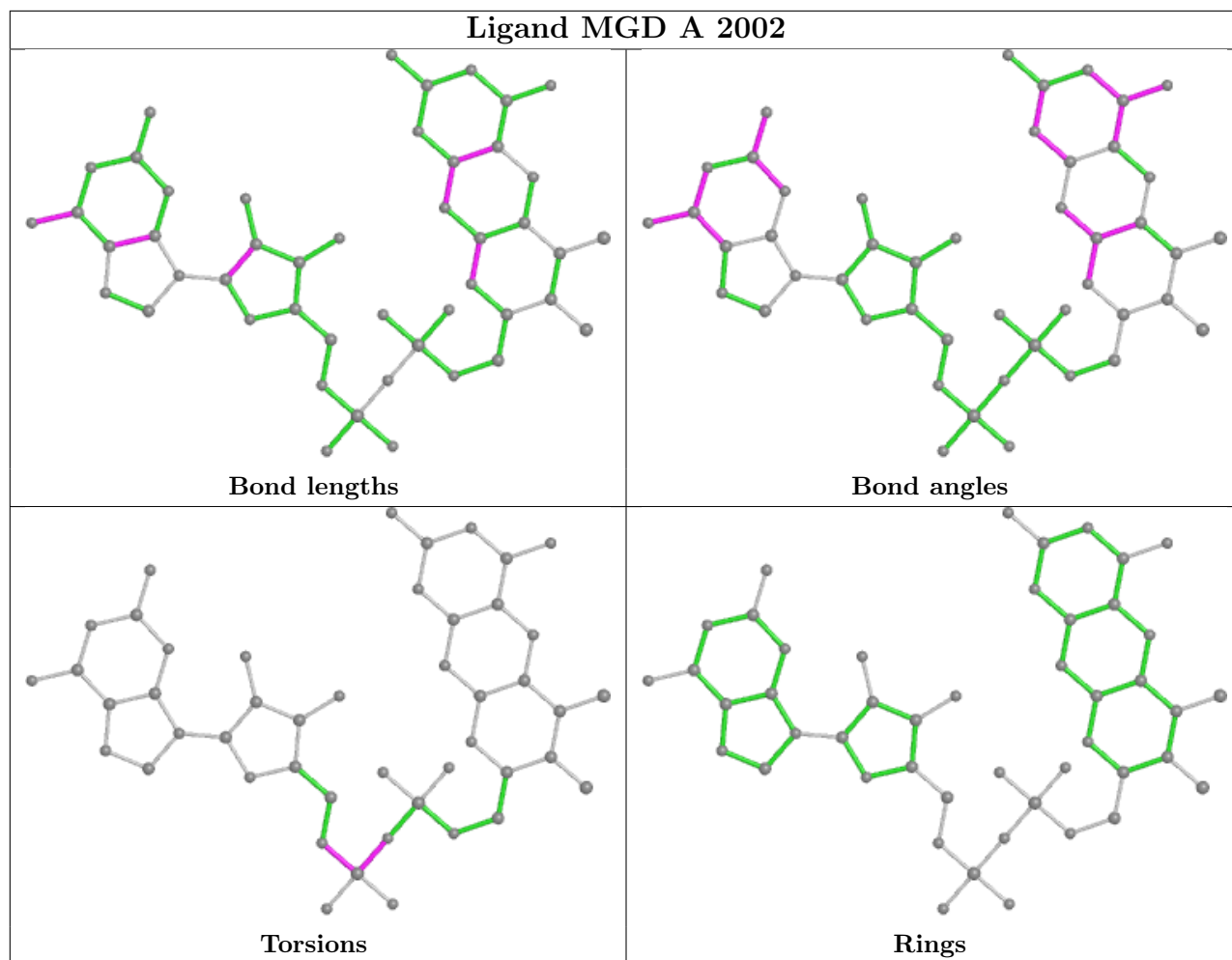
There are no ring outliers.

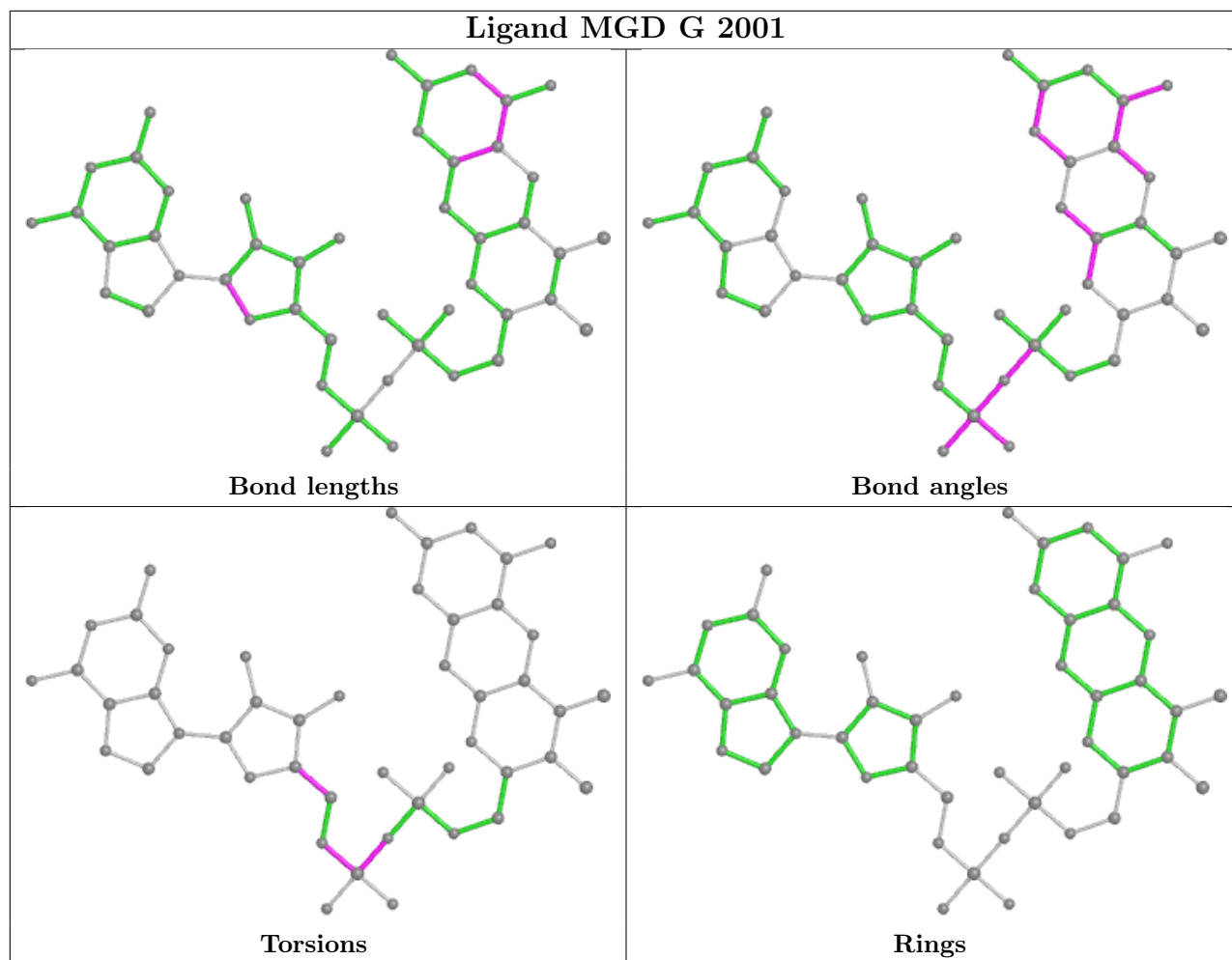
6 monomers are involved in 8 short contacts:

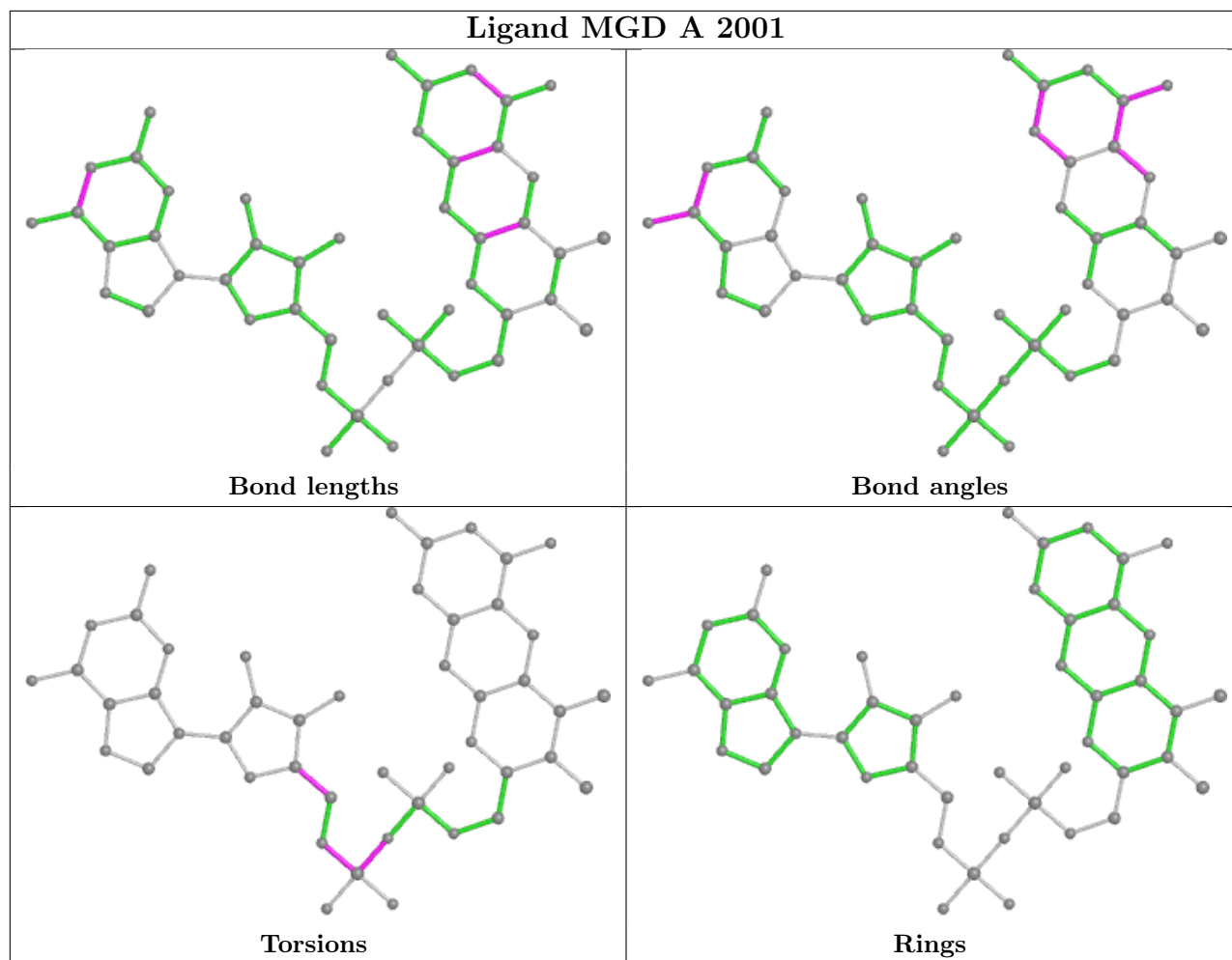
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	2002	MGD	1	0
3	A	2002	MGD	1	0
3	G	2001	MGD	2	0
7	A	2008	SO4	1	0
3	E	2001	MGD	1	0
13	G	2008	P33	2	0

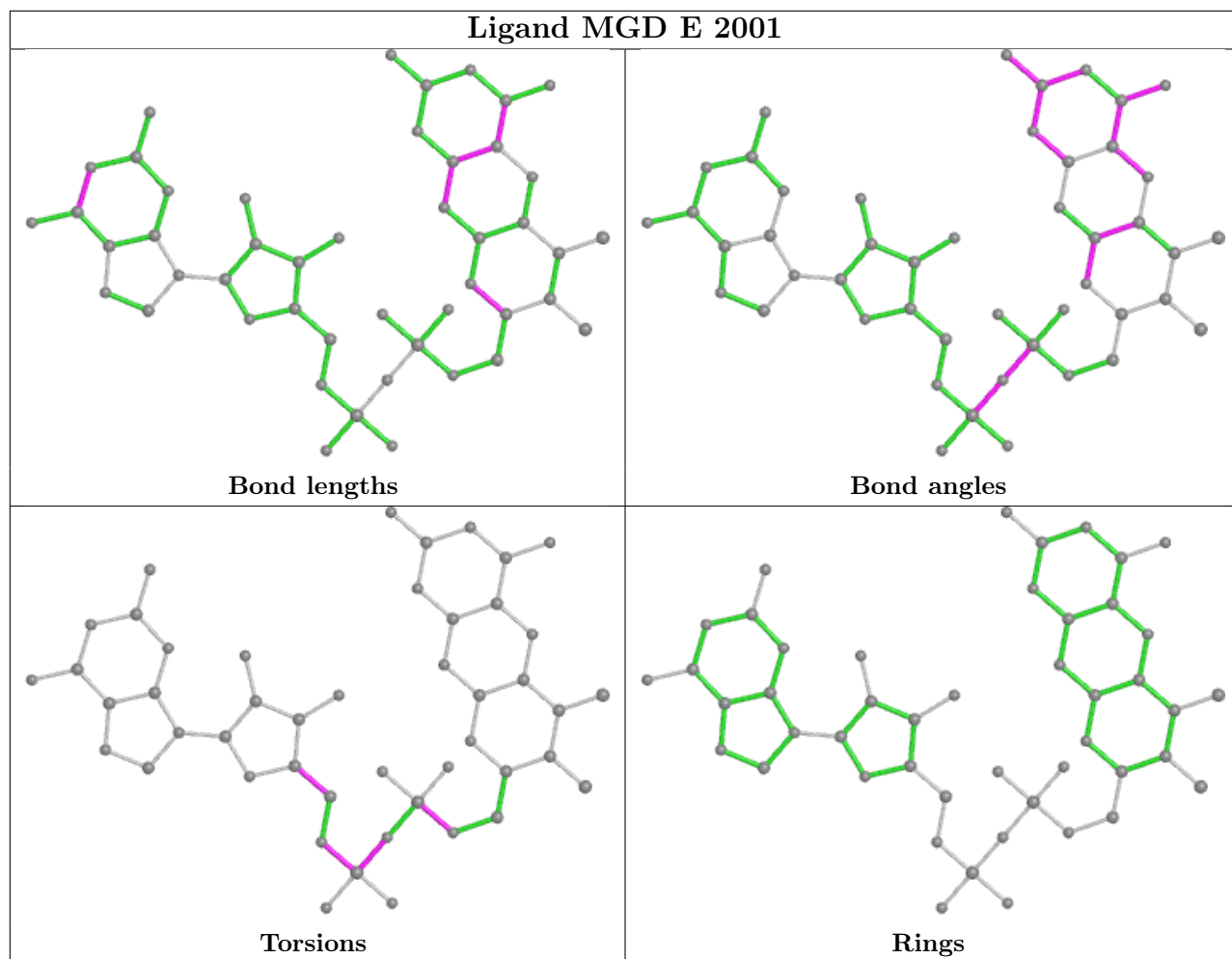
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

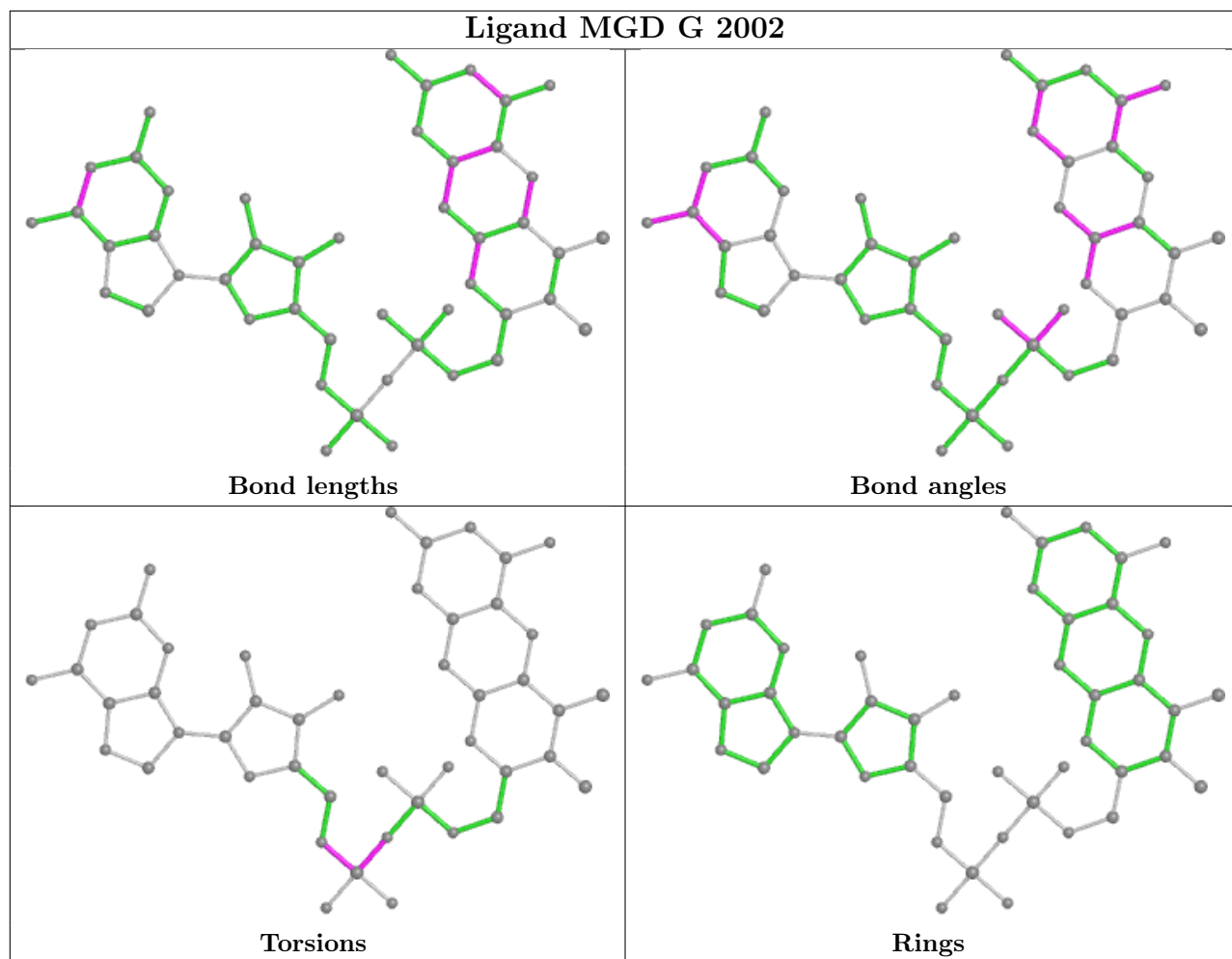


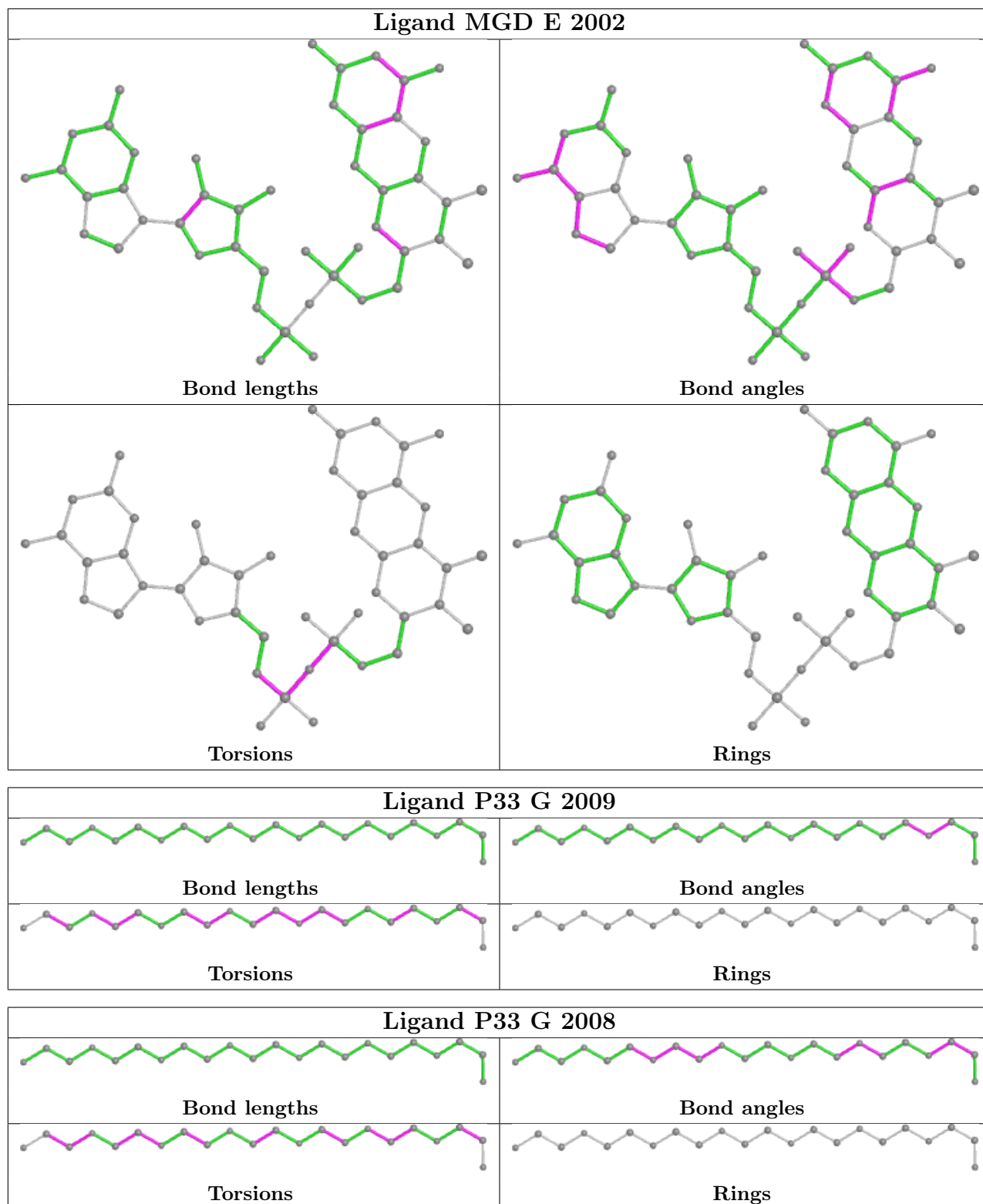


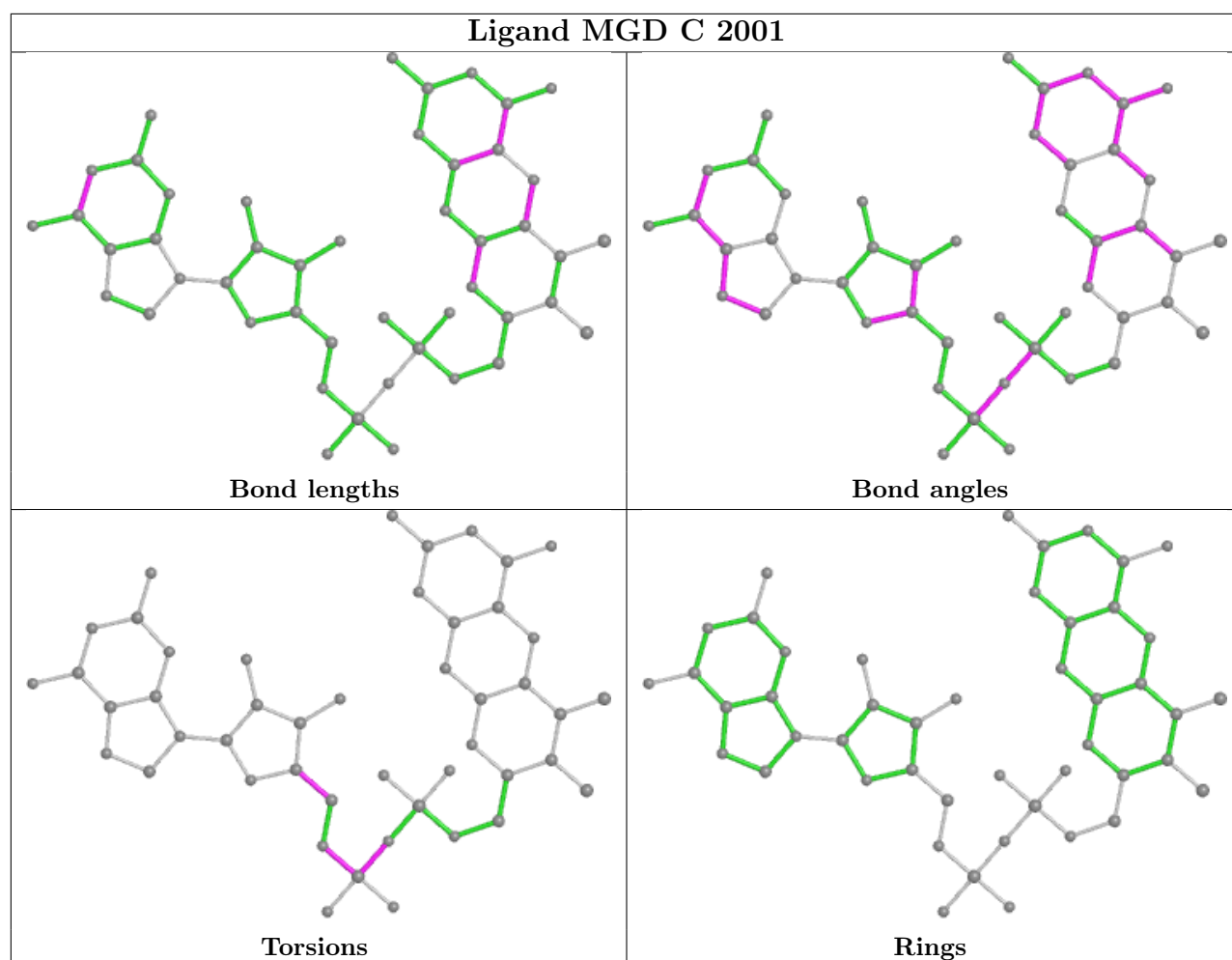












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

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	843/843 (100%)	-0.60	0 100 100	11, 21, 39, 65	0
1	C	843/843 (100%)	-0.52	5 (0%) 89 88	14, 24, 43, 73	0
1	E	843/843 (100%)	-0.59	4 (0%) 91 90	13, 24, 44, 72	0
1	G	843/843 (100%)	-0.60	1 (0%) 95 95	12, 22, 40, 72	0
2	B	132/132 (100%)	-0.18	3 (2%) 60 58	19, 32, 51, 67	0
2	D	132/132 (100%)	-0.08	6 (4%) 33 32	20, 31, 50, 68	0
2	F	132/132 (100%)	0.28	13 (9%) 7 6	22, 36, 57, 65	0
2	H	132/132 (100%)	-0.30	1 (0%) 86 85	19, 29, 46, 60	0
All	All	3900/3900 (100%)	-0.51	33 (0%) 86 85	11, 24, 45, 73	0

All (33) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	F	57	ILE	4.4
1	G	340	GLY	4.2
2	F	58	SER	4.0
2	D	57	ILE	3.2
2	F	92	PRO	3.2
2	F	152	VAL	3.2
2	B	154	ASP	3.1
2	D	154	ASP	3.0
1	C	339	GLU	3.0
2	D	152	VAL	2.9
2	F	154	ASP	2.8
1	C	269	GLU	2.7
2	F	93	ASP	2.6
1	C	268	PRO	2.5
1	C	686	ASP	2.5
1	E	400	GLU	2.5

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Mol	Chain	Res	Type	RSRZ
2	D	92	PRO	2.5
2	F	53	ARG	2.4
2	D	156	GLY	2.4
2	D	153	ALA	2.3
2	F	155	ASN	2.3
2	H	154	ASP	2.3
1	E	668	ASP	2.2
2	F	62	LEU	2.2
2	F	151	ARG	2.2
2	B	155	ASN	2.2
1	E	339	GLU	2.1
2	B	152	VAL	2.1
2	F	90	VAL	2.1
1	C	400	GLU	2.1
2	F	60	LEU	2.1
1	E	379	GLU	2.0
2	F	159	PHE	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 monosaccharides 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.

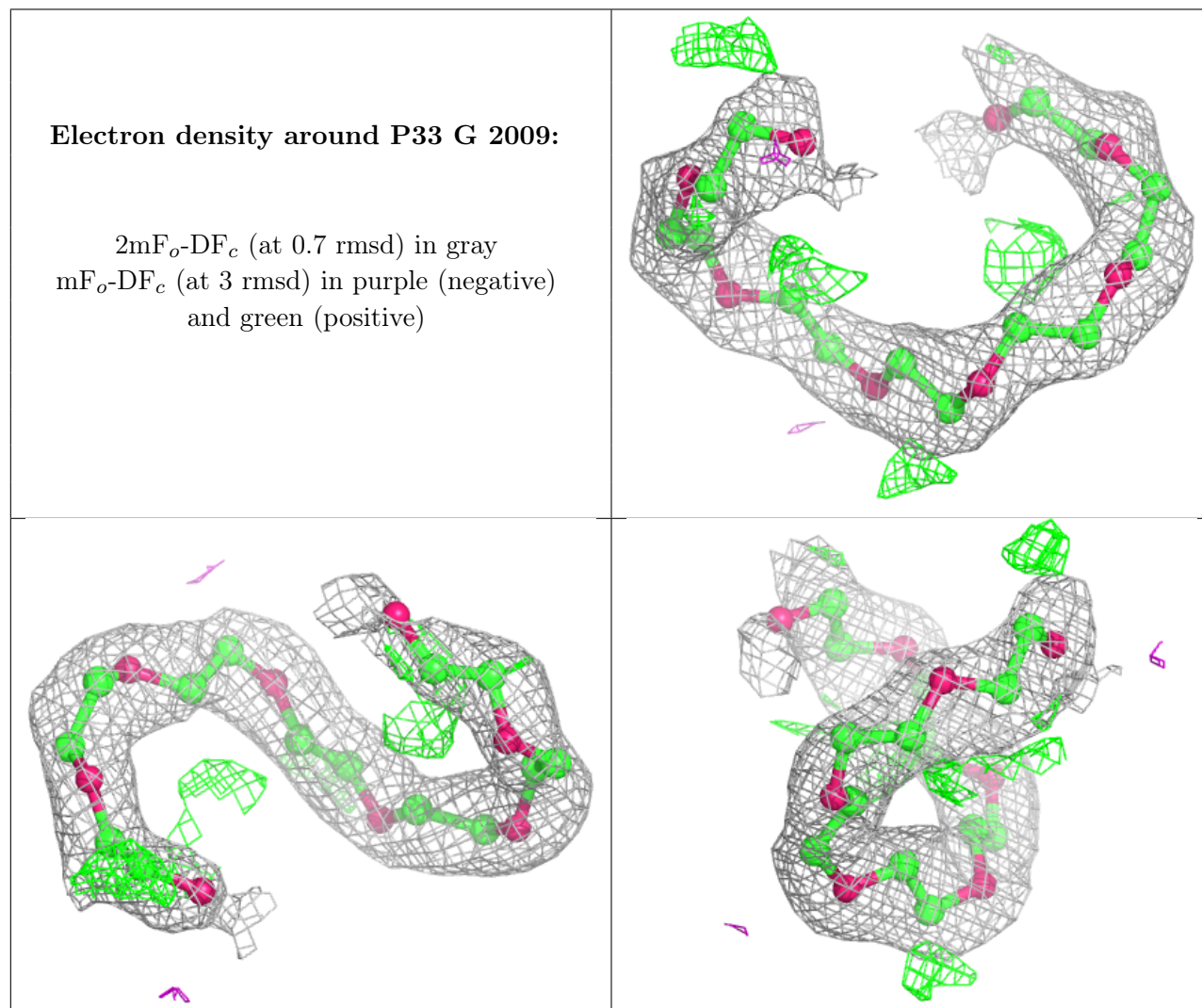
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
11	EDO	G	2012	4/4	0.24	0.98	99,99,100,100	0
9	GOL	A	2011	6/6	0.62	0.27	49,58,60,63	0
9	GOL	G	2011	6/6	0.75	0.18	35,43,47,48	0
7	SO4	C	2009	5/5	0.75	0.35	64,72,76,87	0
12	PEG	C	2010	7/7	0.76	0.22	49,53,60,65	0
9	GOL	C	2011	6/6	0.78	0.23	49,55,57,60	0

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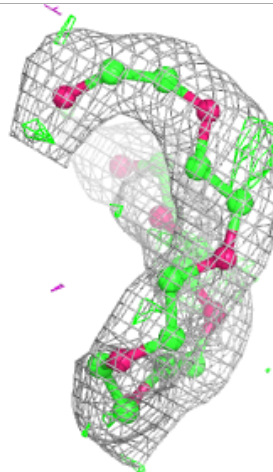
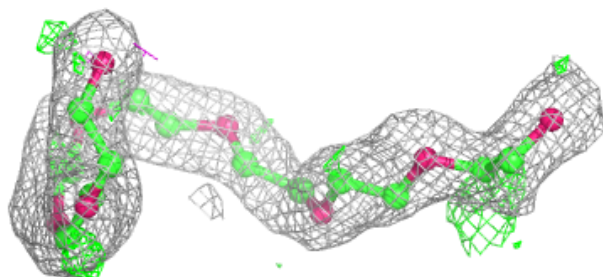
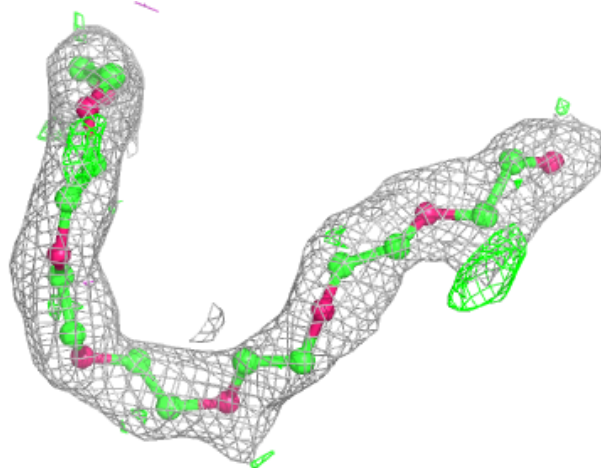
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
9	GOL	G	2010	6/6	0.83	0.30	29,39,40,43	0
9	GOL	E	2008	6/6	0.85	0.16	47,55,61,62	0
13	P33	G	2009	22/22	0.86	0.18	37,47,51,54	0
13	P33	G	2008	22/22	0.89	0.19	26,37,43,44	0
8	PGE	A	2010	10/10	0.89	0.18	29,35,36,38	0
7	SO4	E	2007	5/5	0.91	0.25	66,69,74,81	0
11	EDO	B	202	4/4	0.92	0.15	45,47,49,49	0
7	SO4	G	2007	5/5	0.93	0.26	54,64,68,72	0
7	SO4	C	2008	5/5	0.93	0.25	66,72,76,76	0
11	EDO	C	2012	4/4	0.94	0.13	31,34,36,36	0
7	SO4	C	2007	5/5	0.95	0.19	57,57,64,67	0
7	SO4	A	2007	5/5	0.96	0.18	56,57,61,69	0
7	SO4	A	2006	5/5	0.96	0.17	50,57,66,66	0
7	SO4	E	2006	5/5	0.97	0.18	61,65,68,73	0
3	MGD	C	2002	47/47	0.98	0.12	18,20,22,24	0
3	MGD	E	2001	47/47	0.98	0.10	14,17,20,22	0
3	MGD	E	2002	47/47	0.98	0.09	18,20,22,24	0
3	MGD	G	2002	47/47	0.98	0.10	14,17,19,20	0
3	MGD	A	2002	47/47	0.98	0.11	11,14,17,19	0
3	MGD	C	2001	47/47	0.98	0.11	15,18,20,21	0
7	SO4	A	2008	5/5	0.98	0.08	26,32,36,36	0
7	SO4	A	2009	5/5	0.98	0.08	29,32,34,35	0
7	SO4	C	2006	5/5	0.98	0.06	26,28,33,34	0
3	MGD	A	2001	47/47	0.99	0.12	13,16,17,18	0
4	O	E	2003	1/1	0.99	0.10	32,32,32,32	0
10	FES	B	201	4/4	0.99	0.04	22,24,25,27	0
10	FES	D	201	4/4	0.99	0.05	27,28,29,31	0
10	FES	F	201	4/4	0.99	0.04	29,30,31,31	0
10	FES	H	201	4/4	0.99	0.06	25,25,27,28	0
7	SO4	G	2006	5/5	0.99	0.07	29,30,31,33	0
6	F3S	A	2005	7/7	0.99	0.07	19,20,22,24	0
6	F3S	C	2005	7/7	0.99	0.08	21,22,24,24	0
6	F3S	E	2005	7/7	0.99	0.07	23,24,26,31	0
6	F3S	G	2005	7/7	0.99	0.08	20,22,25,25	0
3	MGD	G	2001	47/47	0.99	0.10	14,18,19,21	0
5	4MO	C	2004	1/1	1.00	0.07	23,23,23,23	0
5	4MO	E	2004	1/1	1.00	0.07	23,23,23,23	0
5	4MO	G	2004	1/1	1.00	0.07	22,22,22,22	0
4	O	C	2003	1/1	1.00	0.07	22,22,22,22	0
4	O	A	2003	1/1	1.00	0.09	17,17,17,17	0
4	O	G	2003	1/1	1.00	0.08	23,23,23,23	0
5	4MO	A	2004	1/1	1.00	0.07	18,18,18,18	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.



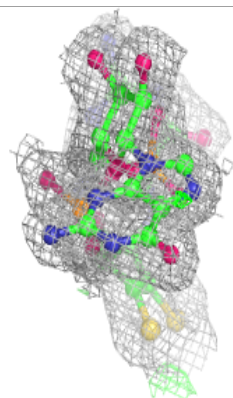
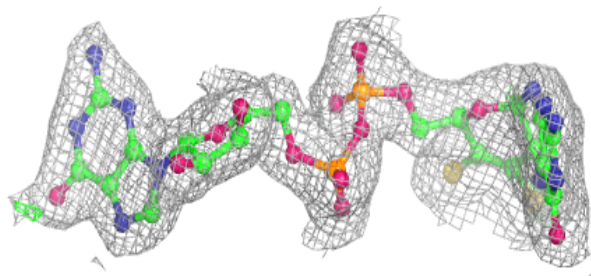
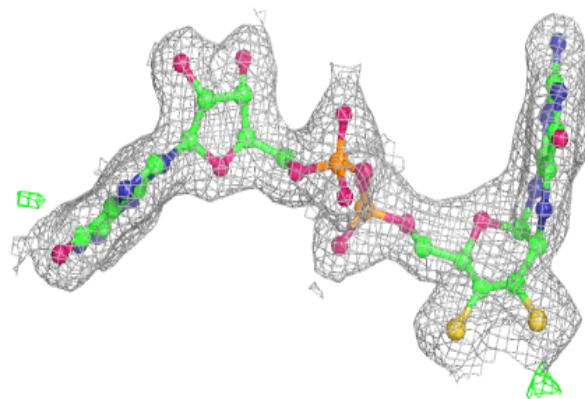
Electron density around P33 G 2008:

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

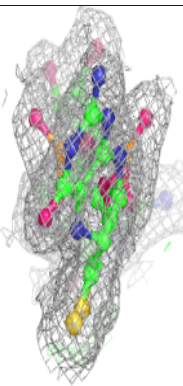
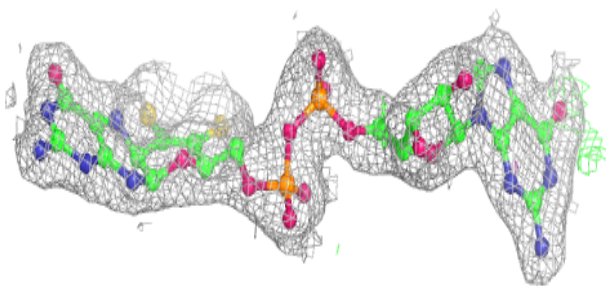
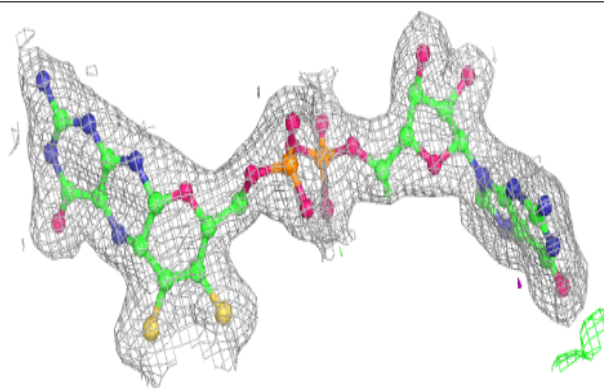


Electron density around MGD C 2002:

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

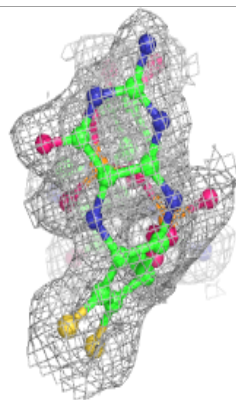
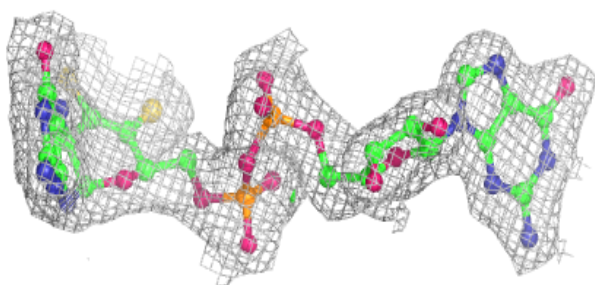
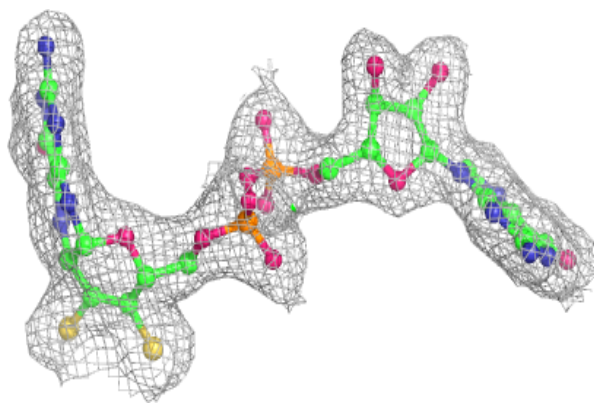
**Electron density around MGD E 2001:**

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

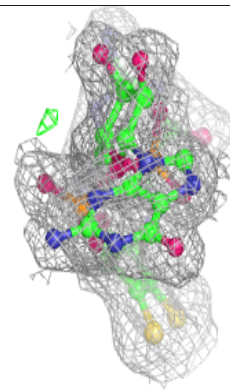
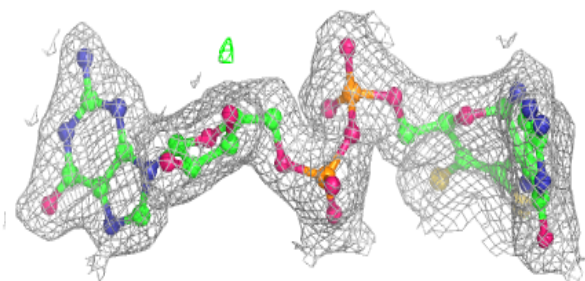
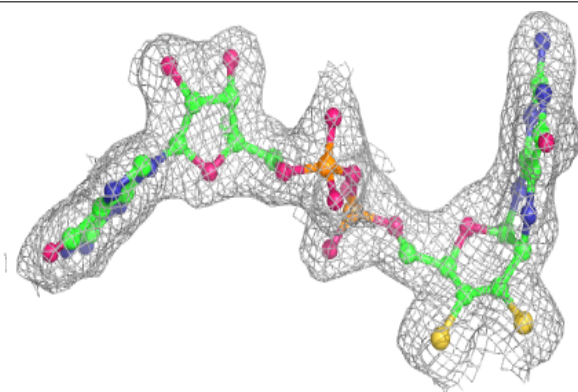


Electron density around MGD E 2002:

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

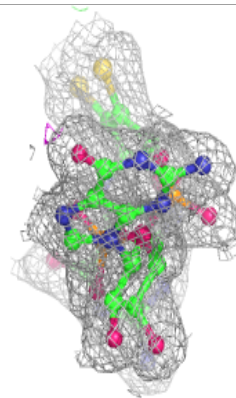
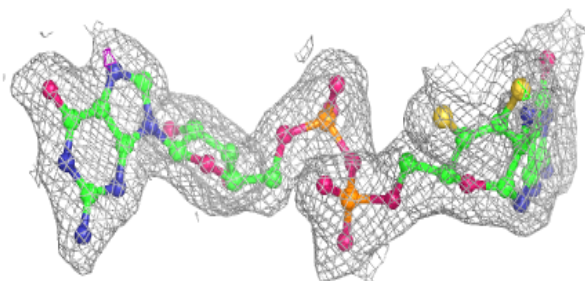
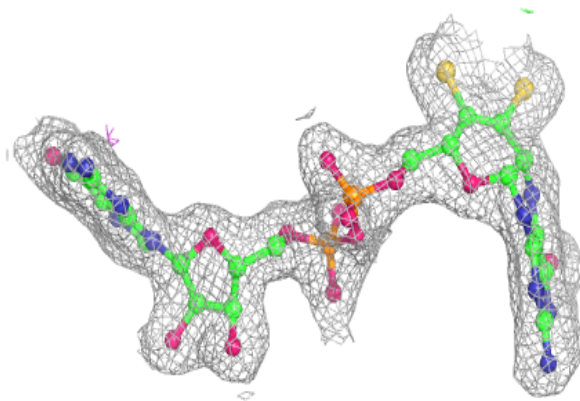
**Electron density around MGD G 2002:**

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

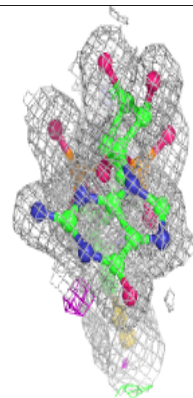
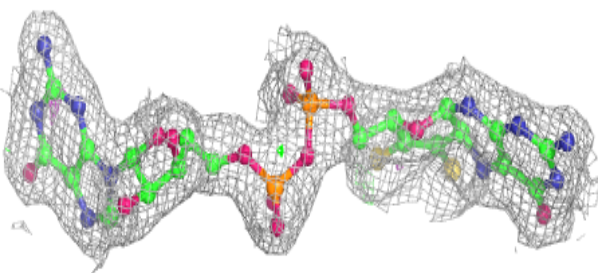
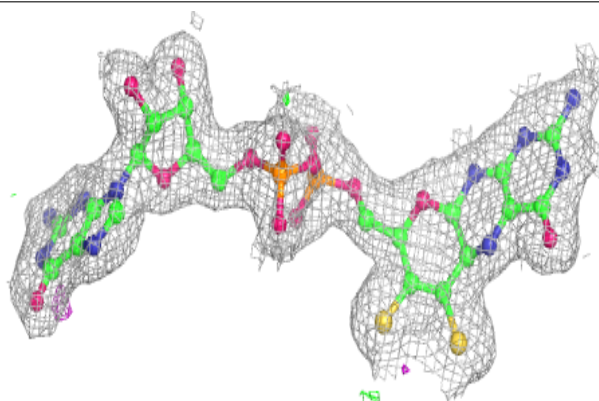


Electron density around MGD A 2002:

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

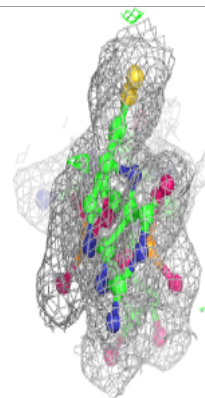
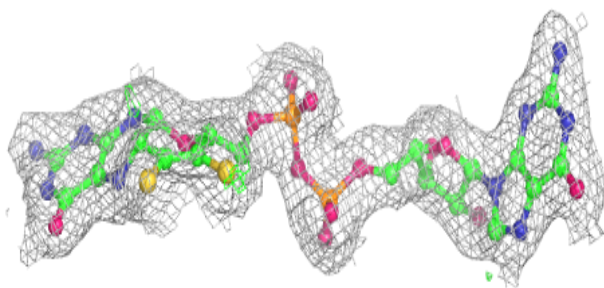
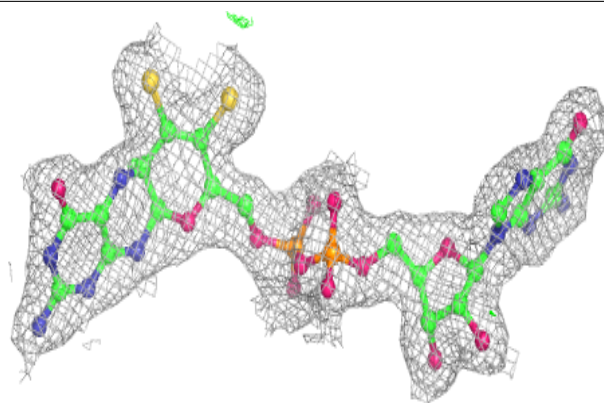
**Electron density around MGD C 2001:**

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

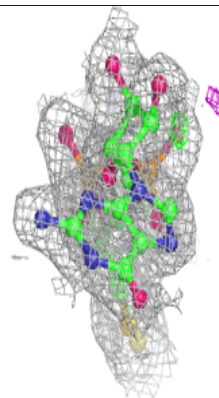
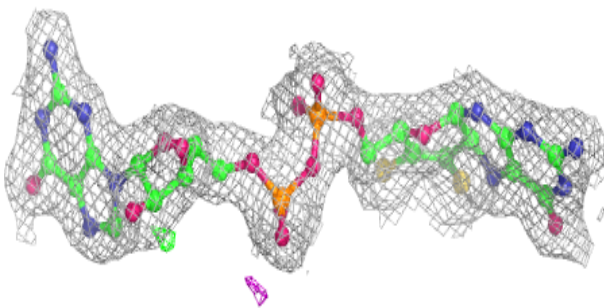
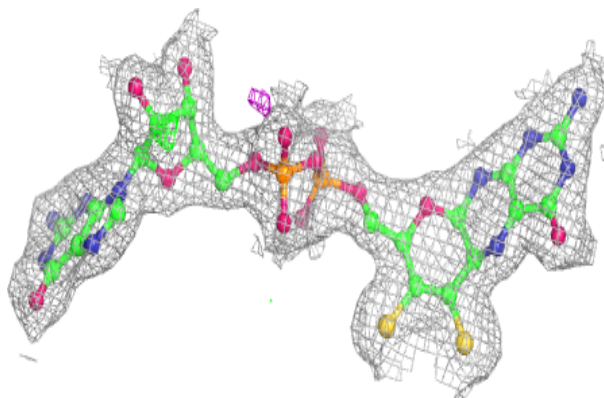


Electron density around MGD A 2001:

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

**Electron density around MGD G 2001:**

$2mF_o-DF_c$ (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.