



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 29, 2023 – 04:23 pm BST

PDB ID : 6RKY
Title : STRUCTURE OF ESTER-HYDROLASE EH1AB1 FROM THE METAGENOME OF LAKE ARREO COMPLEXED WITH A DERIVATIVE OF BIPYRIDINE PHOSPHONATE
Authors : Cea-Rama, I.; Sanz-Aparicio, J.
Deposited on : 2019-04-30
Resolution : 2.79 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 : 2.33
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) : 2.33

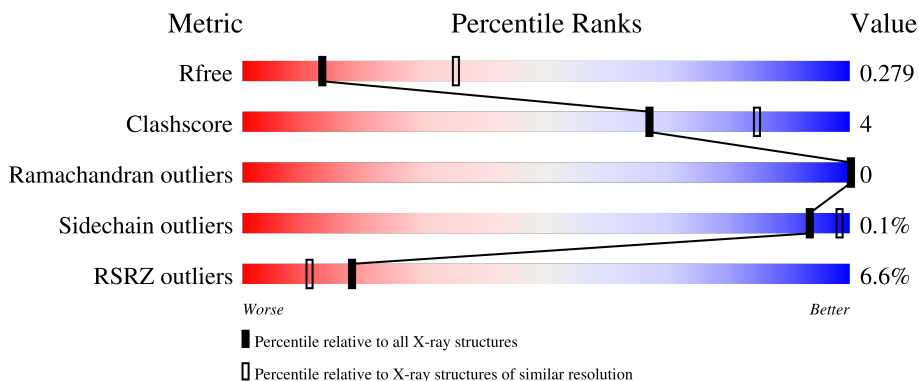
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.79 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	3140 (2.80-2.80)
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)
RSRZ outliers	127900	3078 (2.80-2.80)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments 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	329	 4% (poor fit), 88% (0-1 outliers), 7% (2-3 outliers), 0% (4+ outliers), 0% (not modelled)
1	B	329	 3% (poor fit), 88% (0-1 outliers), 7% (2-3 outliers), 0% (4+ outliers), 0% (not modelled)
1	C	329	 12% (poor fit), 87% (0-1 outliers), 9% (2-3 outliers), 0% (4+ outliers), 0% (not modelled)
1	D	329	 7% (poor fit), 88% (0-1 outliers), 7% (2-3 outliers), 0% (4+ outliers), 0% (not modelled)

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	ZK8	C	406	-	-	-	X
3	ZK8	D	404	-	-	-	X

2 Entry composition [i](#)

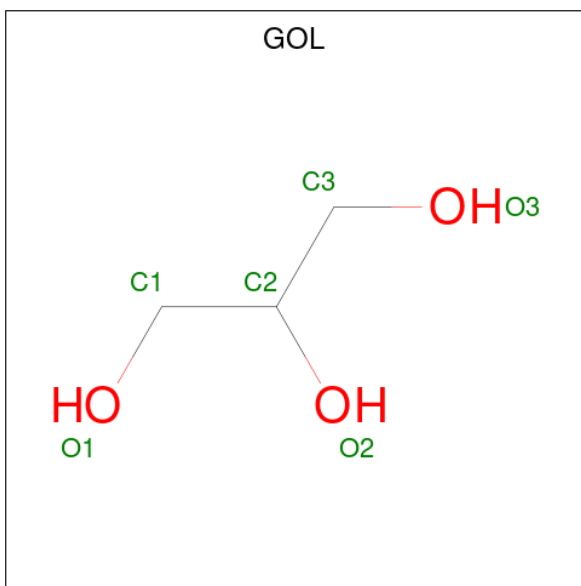
There are 5 unique types of molecules in this entry. The entry contains 9764 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 EH1AB1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	315	Total 2385	C 1500	N 419	O 455	S 11	0	0	0
1	B	315	Total 2385	C 1500	N 419	O 455	S 11	0	0	0
1	C	315	Total 2385	C 1500	N 419	O 455	S 11	0	0	0
1	D	315	Total 2385	C 1500	N 419	O 455	S 11	0	0	0

- Molecule 2 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



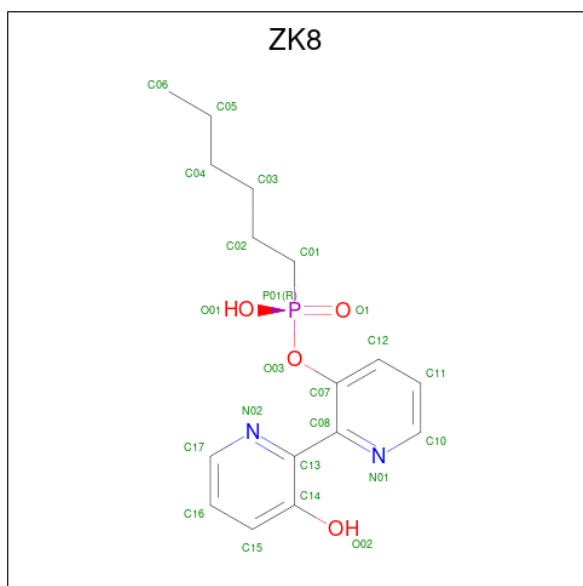
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
2	A	1	Total 6	C 3	O 3	0	0
2	B	1	Total 6	C 3	O 3	0	0

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	C	1	Total	C	O	0	0
			6	3	3		
2	C	1	Total	C	O	0	0
			6	3	3		
2	D	1	Total	C	O	0	0
			6	3	3		
2	D	1	Total	C	O	0	0
			6	3	3		

- Molecule 3 is hexyl-[2-(3-oxidanylpiperidin-2-yl)piperidin-3-yl]oxy-phosphinic acid (three-letter code: ZK8) (formula: C₁₆H₂₁N₂O₄P) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	P	0	0
			22	16	2	3	1		
3	B	1	Total	C	N	O	P	0	0
			22	16	2	3	1		
3	C	1	Total	C	N	O	P	0	0
			22	16	2	3	1		
3	D	1	Total	C	N	O	P	0	0
			22	16	2	3	1		

- Molecule 4 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: C₄H₁₀O₃).



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

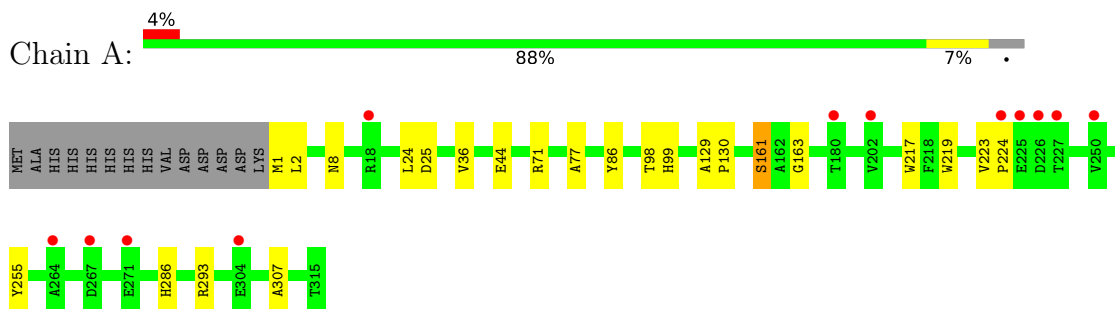
- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	16	Total O 16 16	0	0
5	B	14	Total O 14 14	0	0
5	C	19	Total O 19 19	0	0
5	D	23	Total O 23 23	0	0

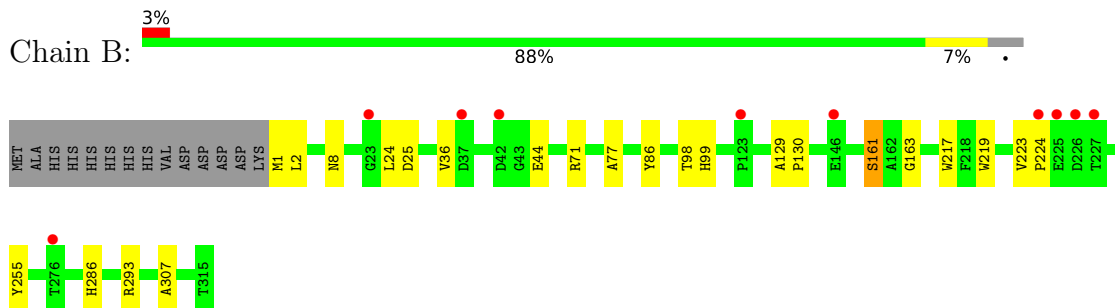
3 Residue-property plots [i](#)

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.

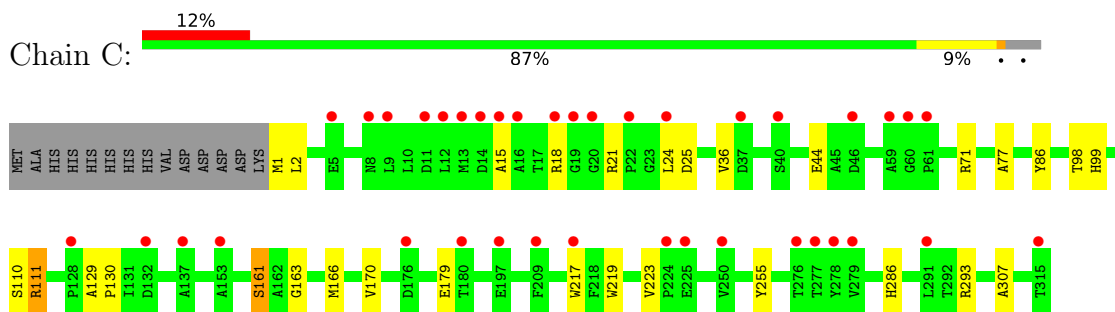
- Molecule 1: EH1AB1



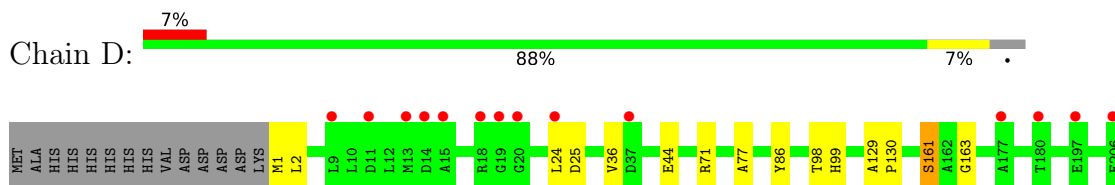
- Molecule 1: EH1AB1

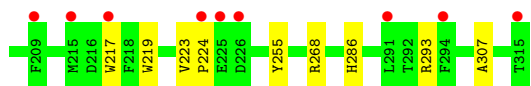


- Molecule 1: EH1AB1



- Molecule 1: EH1AB1





4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	90.77Å 201.92Å 90.64Å 90.00° 112.19° 90.00°	Depositor
Resolution (Å)	49.08 – 2.79 49.08 – 2.79	Depositor EDS
% Data completeness (in resolution range)	99.1 (49.08-2.79) 99.1 (49.08-2.79)	Depositor EDS
R_{merge}	0.28	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.81 (at 2.77Å)	Xtrriage
Refinement program	REFMAC 5.8.0238	Depositor
R, R_{free}	0.239 , 0.276 0.241 , 0.279	Depositor DCC
R_{free} test set	1823 reflections (4.91%)	wwPDB-VP
Wilson B-factor (Å ²)	54.4	Xtrriage
Anisotropy	0.304	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 37.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.35$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	9764	wwPDB-VP
Average B, all atoms (Å ²)	52.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 27.01 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 2.3736e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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: PEG, ZK8, GOL

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	0.68	0/2443	0.79	1/3318 (0.0%)
1	B	0.68	0/2443	0.79	1/3318 (0.0%)
1	C	0.69	0/2443	0.79	1/3318 (0.0%)
1	D	0.69	0/2443	0.79	1/3318 (0.0%)
All	All	0.69	0/9772	0.79	4/13272 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	161	SER	N-CA-CB	5.90	119.35	110.50
1	A	161	SER	N-CA-CB	5.80	119.21	110.50
1	D	161	SER	N-CA-CB	5.76	119.14	110.50
1	C	161	SER	N-CA-CB	5.74	119.11	110.50

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2385	0	2297	19	0
1	B	2385	0	2297	19	0
1	C	2385	0	2297	20	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	2385	0	2297	17	0
2	A	6	0	8	0	0
2	B	6	0	8	0	0
2	C	12	0	16	0	0
2	D	12	0	16	0	0
3	A	22	0	0	1	0
3	B	22	0	0	1	0
3	C	22	0	0	1	0
3	D	22	0	0	1	0
4	C	21	0	30	1	0
4	D	7	0	10	0	0
5	A	16	0	0	0	0
5	B	14	0	0	0	0
5	C	19	0	0	1	0
5	D	23	0	0	1	0
All	All	9764	0	9276	74	0

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

All (74) 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:307:ALA:HB1	1:D:307:ALA:HB1	1.38	1.02
1:A:307:ALA:HB1	1:C:307:ALA:HB1	1.45	0.99
1:B:161:SER:HB3	1:B:286:HIS:CE1	2.26	0.71
1:C:161:SER:HB3	1:C:286:HIS:CE1	2.26	0.71
1:A:161:SER:HB3	1:A:286:HIS:CE1	2.26	0.69
1:D:161:SER:HB3	1:D:286:HIS:CE1	2.27	0.69
3:C:406:ZK8:O03	3:C:406:ZK8:O02	2.16	0.64
3:B:402:ZK8:O03	3:B:402:ZK8:O02	2.16	0.63
3:A:402:ZK8:O03	3:A:402:ZK8:O02	2.16	0.63
3:D:404:ZK8:O03	3:D:404:ZK8:O02	2.16	0.63
1:D:268:ARG:HG2	5:D:507:HOH:O	2.01	0.58
1:B:161:SER:HB3	1:B:286:HIS:HE1	1.69	0.58
1:A:98:THR:OG1	1:A:99:HIS:HD2	1.87	0.58
1:D:44:GLU:O	1:D:293:ARG:NH1	2.37	0.57
1:B:24:LEU:HD13	1:B:36:VAL:HG21	1.86	0.57
1:B:98:THR:OG1	1:B:99:HIS:HD2	1.87	0.57
1:D:98:THR:OG1	1:D:99:HIS:HD2	1.87	0.57
1:A:24:LEU:HD13	1:A:36:VAL:HG21	1.86	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:1:MET:HB2	1:A:255:TYR:OH	2.05	0.56
1:C:44:GLU:O	1:C:293:ARG:NH1	2.38	0.56
1:A:44:GLU:O	1:A:293:ARG:NH1	2.39	0.56
1:C:98:THR:OG1	1:C:99:HIS:HD2	1.87	0.56
1:B:44:GLU:O	1:B:293:ARG:NH1	2.39	0.56
1:D:161:SER:HB3	1:D:286:HIS:HE1	1.71	0.55
1:A:161:SER:HB3	1:A:286:HIS:HE1	1.68	0.55
1:A:8:ASN:HD22	1:B:8:ASN:ND2	2.05	0.55
1:A:219:TRP:CZ2	1:A:223:VAL:HG21	2.42	0.55
1:C:161:SER:HB3	1:C:286:HIS:HE1	1.70	0.55
1:C:219:TRP:CZ2	1:C:223:VAL:HG21	2.43	0.54
1:C:1:MET:HB2	1:C:255:TYR:OH	2.07	0.54
1:D:219:TRP:CZ2	1:D:223:VAL:HG21	2.42	0.54
1:D:1:MET:HB2	1:D:255:TYR:OH	2.09	0.53
1:A:8:ASN:ND2	1:B:8:ASN:HD22	2.07	0.53
1:B:219:TRP:CZ2	1:B:223:VAL:HG21	2.44	0.53
1:B:1:MET:HB2	1:B:255:TYR:OH	2.09	0.52
1:C:110:SER:O	1:C:111:ARG:HB2	2.08	0.52
1:A:24:LEU:HD13	1:A:36:VAL:CG2	2.40	0.51
1:A:71:ARG:NH2	1:A:77:ALA:O	2.44	0.51
1:C:25:ASP:HA	1:C:217:TRP:CD1	2.46	0.50
1:B:71:ARG:NH2	1:B:77:ALA:O	2.43	0.50
1:D:25:ASP:HA	1:D:217:TRP:CD1	2.47	0.49
1:A:25:ASP:HA	1:A:217:TRP:CD1	2.47	0.49
1:B:24:LEU:HD13	1:B:36:VAL:CG2	2.42	0.49
1:B:25:ASP:HA	1:B:217:TRP:CD1	2.48	0.49
1:C:24:LEU:HD13	1:C:36:VAL:HG21	1.95	0.49
1:A:8:ASN:HD22	1:B:8:ASN:HD22	1.59	0.48
1:D:86:TYR:O	1:D:163:GLY:HA3	2.14	0.48
1:D:71:ARG:NH2	1:D:77:ALA:O	2.44	0.48
1:A:86:TYR:O	1:A:163:GLY:HA3	2.13	0.48
1:B:86:TYR:O	1:B:163:GLY:HA3	2.14	0.47
1:C:1:MET:HG3	1:C:2:LEU:H	1.79	0.47
1:A:219:TRP:CE2	1:A:223:VAL:HG21	2.50	0.47
1:C:86:TYR:O	1:C:163:GLY:HA3	2.14	0.47
1:D:219:TRP:CE2	1:D:223:VAL:HG21	2.50	0.47
1:C:71:ARG:NH2	1:C:77:ALA:O	2.47	0.47
1:C:179:GLU:OE2	4:C:405:PEG:C2	2.63	0.47
1:A:1:MET:HG3	1:A:2:LEU:H	1.80	0.46
1:D:24:LEU:HD13	1:D:36:VAL:HG21	1.96	0.46
1:B:219:TRP:CE2	1:B:223:VAL:HG21	2.51	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:219:TRP:CE2	1:C:223:VAL:HG21	2.50	0.46
1:D:24:LEU:HD13	1:D:36:VAL:CG2	2.46	0.46
1:C:129:ALA:HB3	1:C:130:PRO:HD3	1.98	0.46
1:A:129:ALA:HB3	1:A:130:PRO:HD3	1.98	0.46
1:D:129:ALA:HB3	1:D:130:PRO:HD3	1.97	0.46
1:B:1:MET:HG3	1:B:2:LEU:H	1.82	0.45
1:B:129:ALA:HB3	1:B:130:PRO:HD3	1.98	0.45
1:C:24:LEU:HD13	1:C:36:VAL:CG2	2.46	0.45
1:C:21:ARG:HD3	5:C:508:HOH:O	2.16	0.45
1:D:1:MET:HG3	1:D:2:LEU:H	1.83	0.43
1:D:223:VAL:HA	1:D:224:PRO:HD2	1.91	0.43
1:A:223:VAL:HA	1:A:224:PRO:HD2	1.92	0.43
1:C:15:ALA:HA	1:C:18:ARG:NH1	2.33	0.43
1:B:223:VAL:HA	1:B:224:PRO:HD2	1.92	0.41
1:C:166:MET:O	1:C:170:VAL:HG23	2.20	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	313/329 (95%)	296 (95%)	17 (5%)	0	100	100
1	B	313/329 (95%)	299 (96%)	14 (4%)	0	100	100
1	C	313/329 (95%)	298 (95%)	15 (5%)	0	100	100
1	D	313/329 (95%)	299 (96%)	14 (4%)	0	100	100
All	All	1252/1316 (95%)	1192 (95%)	60 (5%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	238/251 (95%)	238 (100%)	0	100	100
1	B	238/251 (95%)	238 (100%)	0	100	100
1	C	238/251 (95%)	237 (100%)	1 (0%)	91	97
1	D	238/251 (95%)	238 (100%)	0	100	100
All	All	952/1004 (95%)	951 (100%)	1 (0%)	93	98

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	111	ARG

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	99	HIS
1	B	8	ASN
1	B	99	HIS
1	C	99	HIS
1	D	99	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

14 ligands are modelled in this entry.

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
4	PEG	C	405	-	6,6,6	0.32	0	5,5,5	0.23	0
2	GOL	A	401	-	5,5,5	0.15	0	5,5,5	0.41	0
4	PEG	C	404	-	6,6,6	0.34	0	5,5,5	0.29	0
2	GOL	B	401	-	5,5,5	0.11	0	5,5,5	0.23	0
2	GOL	C	401	-	5,5,5	0.11	0	5,5,5	0.36	0
4	PEG	D	403	-	6,6,6	0.31	0	5,5,5	0.21	0
2	GOL	D	402	-	5,5,5	0.18	0	5,5,5	0.51	0
3	ZK8	B	402	1	19,23,24	2.29	4 (21%)	21,29,32	4.77	10 (47%)
3	ZK8	C	406	1	19,23,24	2.39	4 (21%)	21,29,32	4.78	10 (47%)
4	PEG	C	403	-	6,6,6	0.20	0	5,5,5	0.11	0
2	GOL	C	402	-	5,5,5	0.15	0	5,5,5	0.31	0
3	ZK8	D	404	1	19,23,24	2.34	4 (21%)	21,29,32	4.79	10 (47%)
3	ZK8	A	402	1	19,23,24	2.30	4 (21%)	21,29,32	4.76	10 (47%)
2	GOL	D	401	-	5,5,5	0.13	0	5,5,5	0.34	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	PEG	C	405	-	-	1/4/4/4	-
2	GOL	A	401	-	-	2/4/4/4	-
4	PEG	C	404	-	-	2/4/4/4	-
2	GOL	B	401	-	-	2/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GOL	C	401	-	-	2/4/4/4	-
4	PEG	D	403	-	-	2/4/4/4	-
2	GOL	D	402	-	-	3/4/4/4	-
3	ZK8	B	402	1	-	8/10/14/16	0/2/2/2
3	ZK8	C	406	1	-	8/10/14/16	0/2/2/2
4	PEG	C	403	-	-	3/4/4/4	-
2	GOL	C	402	-	-	4/4/4/4	-
3	ZK8	D	404	1	-	9/10/14/16	0/2/2/2
3	ZK8	A	402	1	-	8/10/14/16	0/2/2/2
2	GOL	D	401	-	-	1/4/4/4	-

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	406	ZK8	C08-C13	-8.17	1.36	1.49
3	A	402	ZK8	C08-C13	-8.09	1.36	1.49
3	D	404	ZK8	C08-C13	-8.09	1.36	1.49
3	B	402	ZK8	C08-C13	-8.09	1.36	1.49
3	D	404	ZK8	O03-C07	3.63	1.46	1.40
3	C	406	ZK8	O02-C14	3.63	1.43	1.36
3	C	406	ZK8	O03-C07	3.58	1.46	1.40
3	A	402	ZK8	O03-C07	3.44	1.46	1.40
3	D	404	ZK8	O02-C14	3.34	1.43	1.36
3	B	402	ZK8	O03-C07	3.28	1.45	1.40
3	B	402	ZK8	O02-C14	3.11	1.42	1.36
3	A	402	ZK8	O02-C14	3.01	1.42	1.36
3	C	406	ZK8	C07-C08	2.75	1.44	1.40
3	A	402	ZK8	C07-C08	2.68	1.44	1.40
3	B	402	ZK8	C07-C08	2.60	1.44	1.40
3	D	404	ZK8	C07-C08	2.54	1.44	1.40

All (40) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	406	ZK8	C07-C08-N01	-11.40	112.63	121.68
3	D	404	ZK8	C07-C08-N01	-11.26	112.74	121.68
3	B	402	ZK8	C07-C08-N01	-11.22	112.77	121.68
3	A	402	ZK8	C07-C08-N01	-11.22	112.78	121.68
3	D	404	ZK8	C10-N01-C08	9.17	134.76	116.81
3	B	402	ZK8	C10-N01-C08	9.15	134.72	116.81

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	406	ZK8	C10-N01-C08	9.15	134.72	116.81
3	D	404	ZK8	C17-N02-C13	9.14	134.71	116.81
3	A	402	ZK8	C10-N01-C08	9.12	134.67	116.81
3	C	406	ZK8	C17-N02-C13	9.09	134.61	116.81
3	B	402	ZK8	C17-N02-C13	9.06	134.55	116.81
3	A	402	ZK8	C17-N02-C13	9.01	134.44	116.81
3	D	404	ZK8	C14-C13-N02	-7.18	111.34	121.20
3	B	402	ZK8	C14-C13-N02	-7.18	111.35	121.20
3	A	402	ZK8	C14-C13-N02	-7.13	111.41	121.20
3	C	406	ZK8	C14-C13-N02	-7.11	111.44	121.20
3	B	402	ZK8	C11-C10-N01	-6.58	112.68	123.43
3	D	404	ZK8	C11-C10-N01	-6.57	112.69	123.43
3	A	402	ZK8	C11-C10-N01	-6.49	112.83	123.43
3	C	406	ZK8	C11-C10-N01	-6.49	112.83	123.43
3	D	404	ZK8	C16-C17-N02	-6.27	113.19	123.43
3	C	406	ZK8	C16-C17-N02	-6.16	113.37	123.43
3	A	402	ZK8	C16-C17-N02	-6.15	113.39	123.43
3	B	402	ZK8	C16-C17-N02	-6.05	113.54	123.43
3	A	402	ZK8	C14-C13-C08	5.19	127.61	121.53
3	B	402	ZK8	C14-C13-C08	5.14	127.56	121.53
3	C	406	ZK8	C14-C13-C08	5.09	127.50	121.53
3	D	404	ZK8	C14-C13-C08	5.05	127.45	121.53
3	D	404	ZK8	C08-C13-N02	3.23	121.20	114.84
3	B	402	ZK8	C08-C13-N02	3.16	121.08	114.84
3	C	406	ZK8	C08-C13-N02	3.14	121.04	114.84
3	A	402	ZK8	C08-C13-N02	3.11	120.97	114.84
3	A	402	ZK8	C15-C14-C13	2.70	120.54	118.30
3	D	404	ZK8	C15-C14-C13	2.61	120.47	118.30
3	B	402	ZK8	C15-C14-C13	2.54	120.41	118.30
3	A	402	ZK8	C13-C08-N01	2.37	119.50	114.84
3	C	406	ZK8	C15-C14-C13	2.36	120.25	118.30
3	B	402	ZK8	C13-C08-N01	2.35	119.47	114.84
3	C	406	ZK8	C13-C08-N01	2.30	119.38	114.84
3	D	404	ZK8	C13-C08-N01	2.25	119.28	114.84

There are no chirality outliers.

All (55) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	401	GOL	O1-C1-C2-C3
2	B	401	GOL	O1-C1-C2-C3
2	C	401	GOL	C1-C2-C3-O3

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Mol	Chain	Res	Type	Atoms
2	D	402	GOL	C1-C2-C3-O3
3	A	402	ZK8	C07-C08-C13-C14
3	A	402	ZK8	N01-C08-C13-N02
3	A	402	ZK8	P01-C01-C02-C03
3	B	402	ZK8	C07-C08-C13-C14
3	B	402	ZK8	N01-C08-C13-N02
3	B	402	ZK8	P01-C01-C02-C03
3	C	406	ZK8	C07-C08-C13-C14
3	C	406	ZK8	N01-C08-C13-N02
3	C	406	ZK8	P01-C01-C02-C03
3	D	404	ZK8	C07-C08-C13-C14
3	D	404	ZK8	N01-C08-C13-N02
3	D	404	ZK8	P01-C01-C02-C03
2	B	401	GOL	O1-C1-C2-O2
4	C	403	PEG	O2-C3-C4-O4
4	C	405	PEG	O1-C1-C2-O2
4	D	403	PEG	O2-C3-C4-O4
2	C	402	GOL	C1-C2-C3-O3
3	D	404	ZK8	C02-C03-C04-C05
3	B	402	ZK8	C02-C03-C04-C05
3	C	406	ZK8	C02-C03-C04-C05
2	C	401	GOL	O2-C2-C3-O3
3	A	402	ZK8	C02-C03-C04-C05
4	D	403	PEG	O1-C1-C2-O2
2	A	401	GOL	O1-C1-C2-O2
4	C	403	PEG	O1-C1-C2-O2
2	D	402	GOL	O1-C1-C2-C3
3	C	406	ZK8	C03-C04-C05-C06
3	B	402	ZK8	C03-C04-C05-C06
4	C	404	PEG	O1-C1-C2-O2
3	D	404	ZK8	C03-C04-C05-C06
3	A	402	ZK8	N01-C08-C13-C14
3	A	402	ZK8	C07-C08-C13-N02
3	B	402	ZK8	N01-C08-C13-C14
3	B	402	ZK8	C07-C08-C13-N02
3	C	406	ZK8	N01-C08-C13-C14
3	C	406	ZK8	C07-C08-C13-N02
3	D	404	ZK8	N01-C08-C13-C14
3	D	404	ZK8	C07-C08-C13-N02
3	A	402	ZK8	C03-C04-C05-C06
3	A	402	ZK8	C12-C07-O03-P01
3	B	402	ZK8	C12-C07-O03-P01

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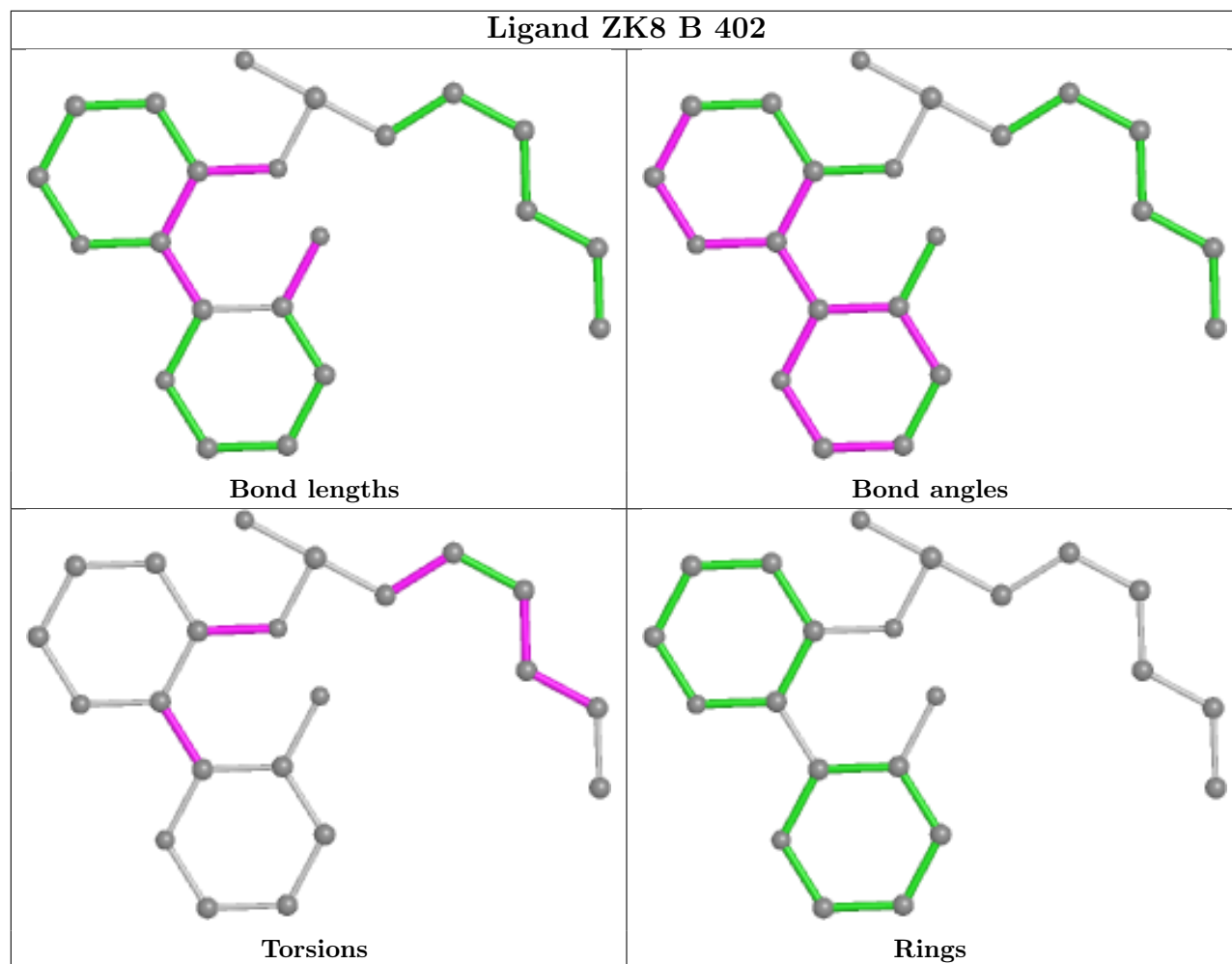
Mol	Chain	Res	Type	Atoms
3	C	406	ZK8	C12-C07-O03-P01
3	D	404	ZK8	C12-C07-O03-P01
4	C	403	PEG	C4-C3-O2-C2
2	C	402	GOL	O1-C1-C2-C3
2	C	402	GOL	O2-C2-C3-O3
4	C	404	PEG	C4-C3-O2-C2
2	D	402	GOL	O2-C2-C3-O3
3	D	404	ZK8	C08-C07-O03-P01
2	C	402	GOL	O1-C1-C2-O2
2	D	401	GOL	O2-C2-C3-O3

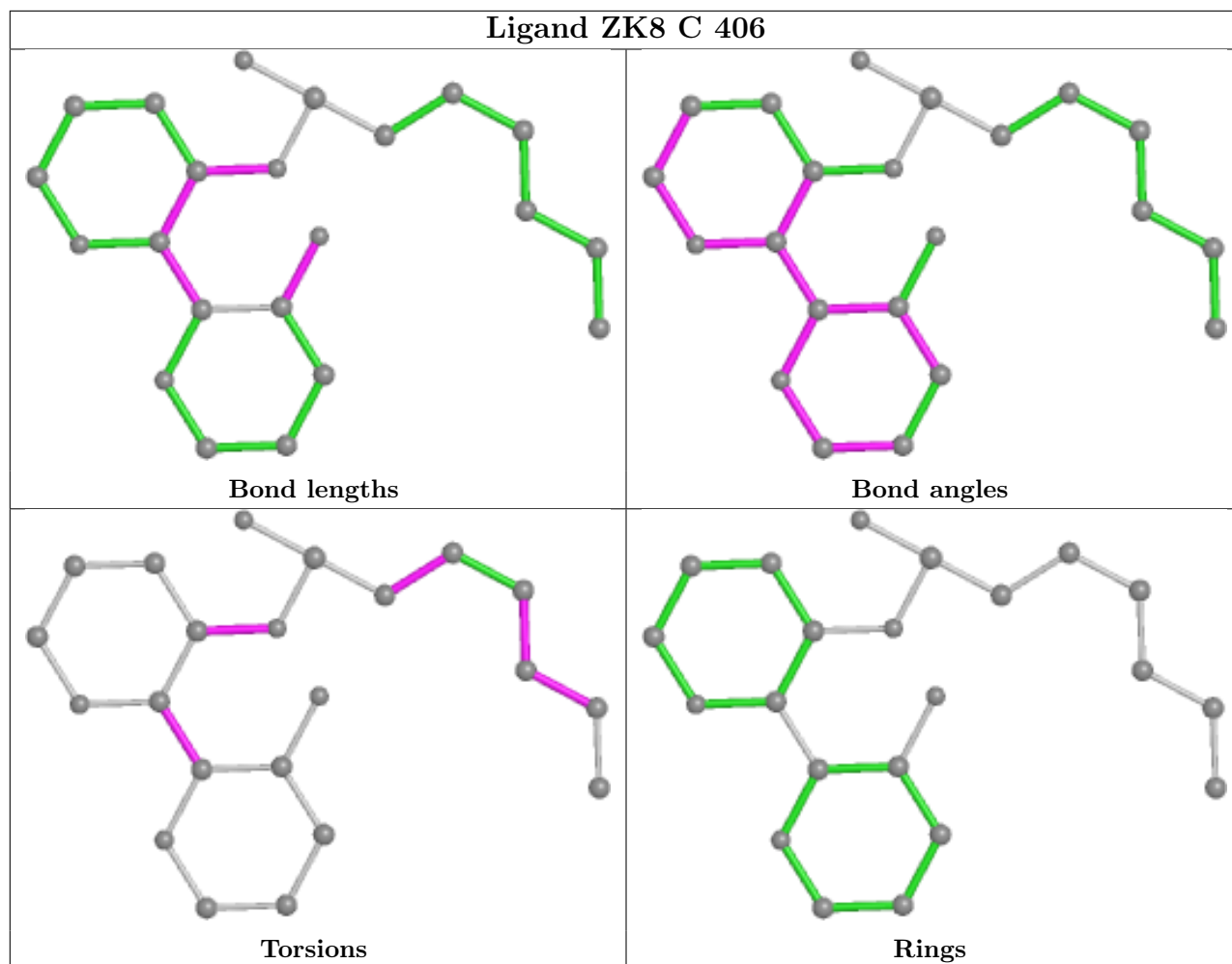
There are no ring outliers.

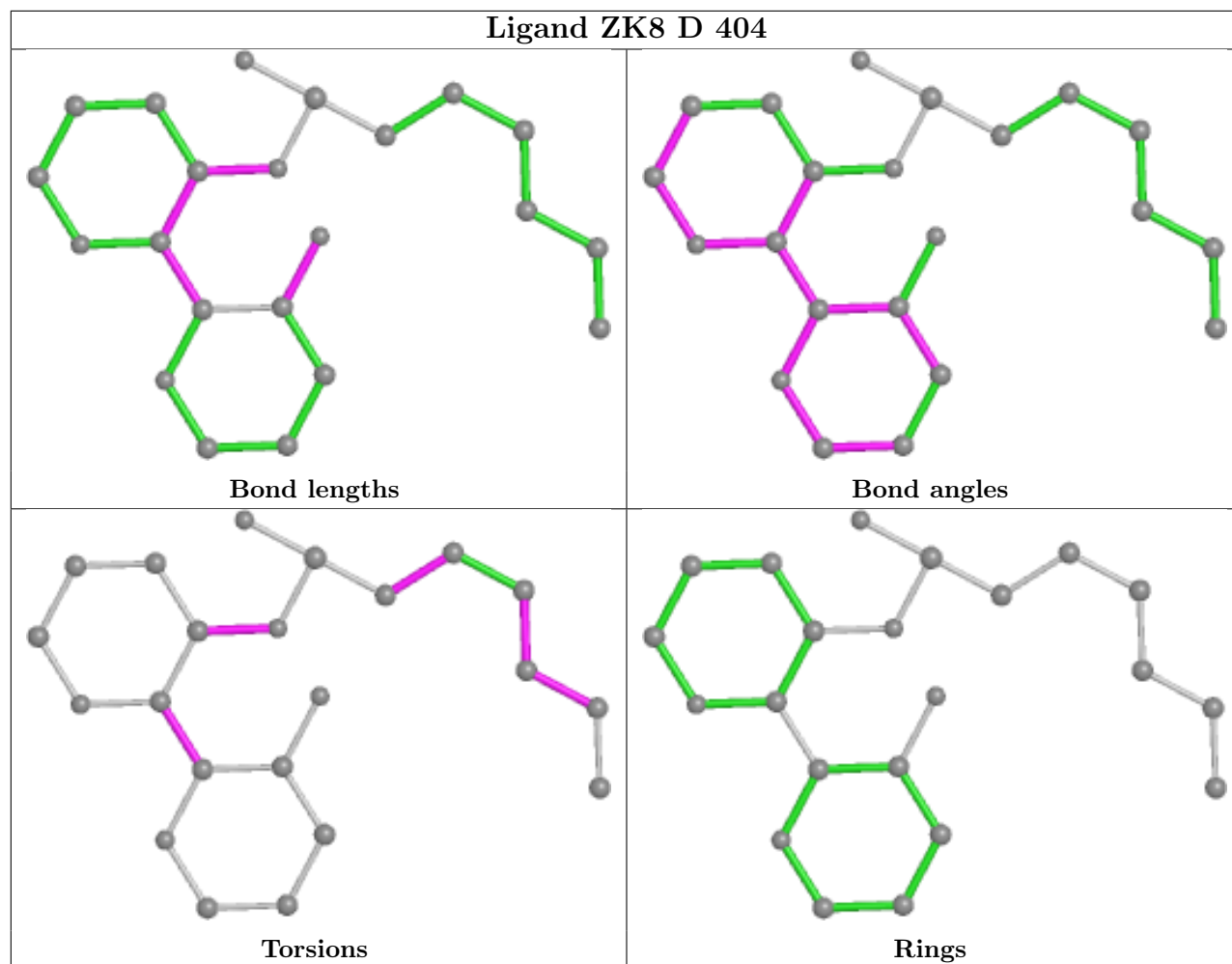
5 monomers are involved in 5 short contacts:

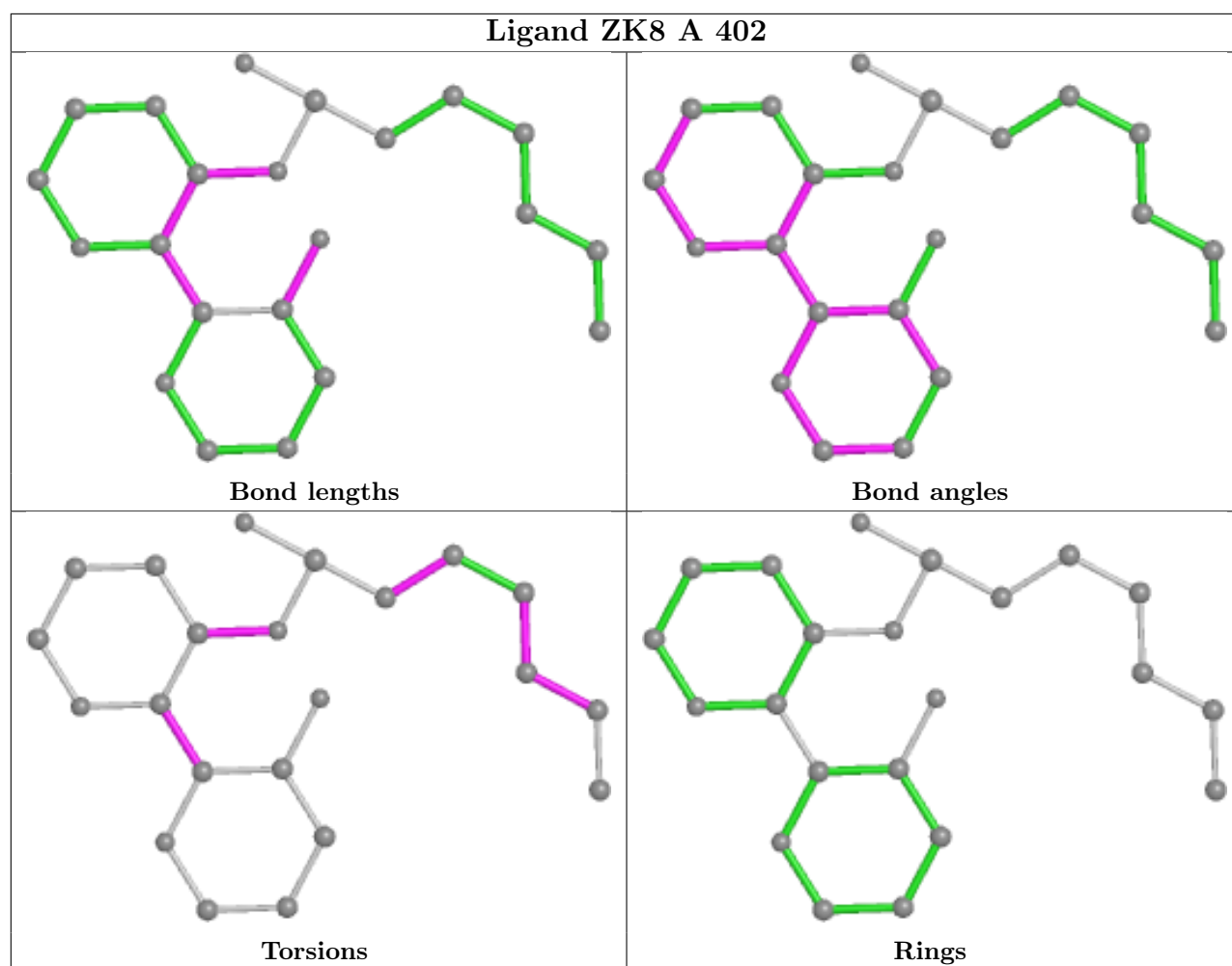
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	405	PEG	1	0
3	B	402	ZK8	1	0
3	C	406	ZK8	1	0
3	D	404	ZK8	1	0
3	A	402	ZK8	1	0

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









5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

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	315/329 (95%)	0.37	12 (3%) 40 30	25, 46, 74, 103	0
1	B	315/329 (95%)	0.32	10 (3%) 47 37	25, 47, 77, 111	0
1	C	315/329 (95%)	0.75	38 (12%) 4 2	32, 52, 90, 110	0
1	D	315/329 (95%)	0.54	23 (7%) 15 8	25, 48, 77, 116	0
All	All	1260/1316 (95%)	0.50	83 (6%) 18 11	25, 48, 80, 116	0

All (83) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	19	GLY	5.7
1	C	20	GLY	5.1
1	D	226	ASP	4.8
1	D	11	ASP	4.7
1	C	224	PRO	4.6
1	D	209	PHE	4.4
1	C	209	PHE	4.3
1	C	18	ARG	4.2
1	C	9	LEU	4.1
1	D	18	ARG	4.1
1	C	8	ASN	3.8
1	D	177	ALA	3.8
1	B	224	PRO	3.6
1	C	14	ASP	3.6
1	A	18	ARG	3.4
1	A	224	PRO	3.4
1	D	206	GLU	3.4
1	B	225	GLU	3.3
1	C	15	ALA	3.3
1	C	24	LEU	3.3
1	C	137	ALA	3.2

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Mol	Chain	Res	Type	RSRZ
1	D	14	ASP	3.1
1	C	37	ASP	3.0
1	B	227	THR	3.0
1	D	225	GLU	3.0
1	C	59	ALA	3.0
1	D	224	PRO	3.0
1	D	294	PHE	3.0
1	D	19	GLY	2.9
1	C	277	THR	2.9
1	C	276	THR	2.9
1	C	176	ASP	2.9
1	C	225	GLU	2.9
1	C	291	LEU	2.9
1	A	225	GLU	2.8
1	D	37	ASP	2.8
1	D	24	LEU	2.8
1	C	11	ASP	2.7
1	C	278	TYR	2.7
1	C	180	THR	2.7
1	C	128	PRO	2.6
1	A	271	GLU	2.6
1	C	16	ALA	2.6
1	A	250	VAL	2.6
1	C	46	ASP	2.5
1	D	197	GLU	2.5
1	C	279	VAL	2.5
1	D	315	THR	2.5
1	B	37	ASP	2.5
1	D	180	THR	2.5
1	A	267	ASP	2.5
1	C	153	ALA	2.4
1	D	217	TRP	2.4
1	C	315	THR	2.4
1	D	13	MET	2.4
1	A	180	THR	2.4
1	A	304	GLU	2.4
1	C	13	MET	2.4
1	A	226	ASP	2.4
1	A	227	THR	2.4
1	A	264	ALA	2.4
1	C	12	LEU	2.3
1	C	250	VAL	2.3

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Mol	Chain	Res	Type	RSRZ
1	C	22	PRO	2.3
1	B	23	GLY	2.3
1	C	61	PRO	2.3
1	D	215	MET	2.3
1	D	291	LEU	2.2
1	B	226	ASP	2.2
1	C	40	SER	2.2
1	B	146	GLU	2.2
1	C	60	GLY	2.2
1	C	5	GLU	2.1
1	C	132	ASP	2.1
1	C	217	TRP	2.1
1	B	42	ASP	2.1
1	B	123	PRO	2.1
1	D	20	GLY	2.1
1	D	15	ALA	2.1
1	B	276	THR	2.1
1	C	197	GLU	2.1
1	D	9	LEU	2.0
1	A	202	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 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.

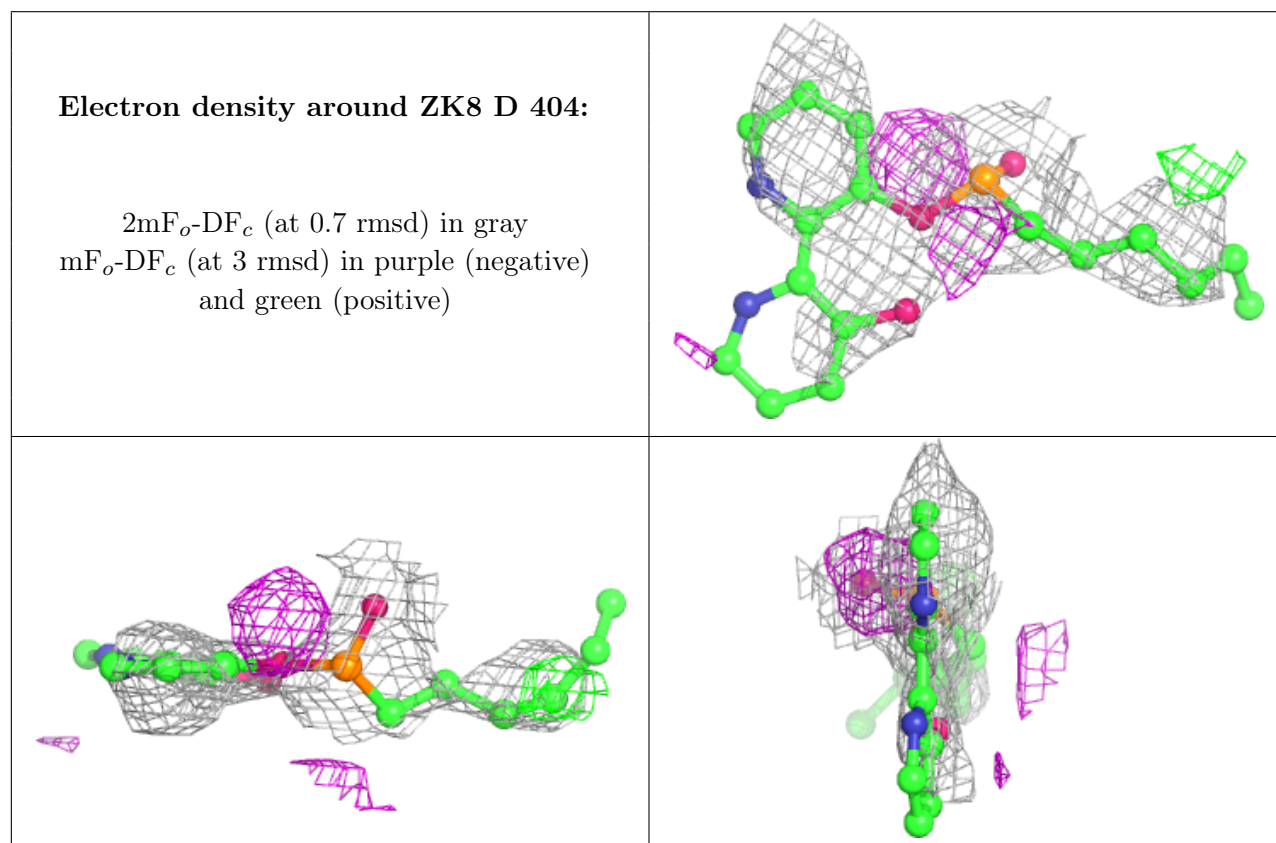
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	GOL	D	402	6/6	0.69	0.28	56,61,66,67	0
2	GOL	C	401	6/6	0.71	0.26	82,86,90,92	0
4	PEG	C	404	7/7	0.71	0.25	65,75,81,82	0

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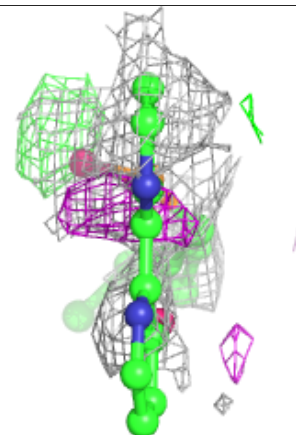
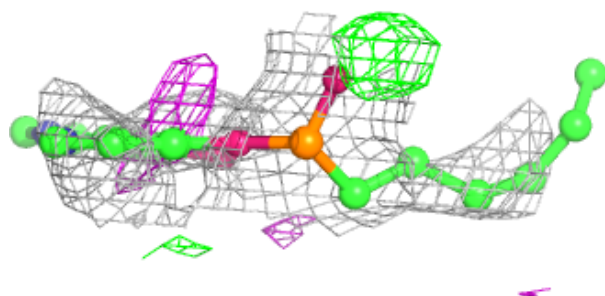
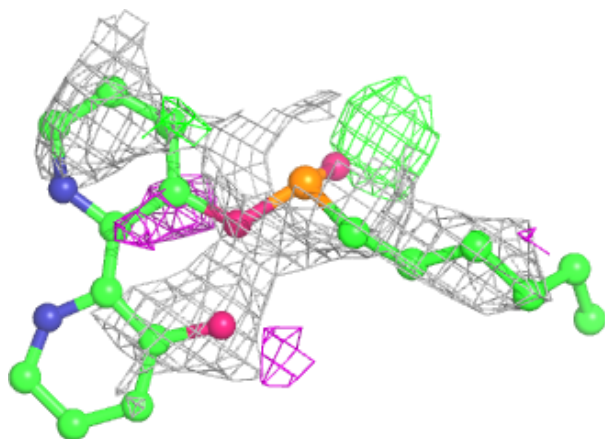
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	ZK8	D	404	22/23	0.72	0.45	68,101,129,134	0
3	ZK8	C	406	22/23	0.72	0.46	66,113,135,139	0
4	PEG	C	403	7/7	0.78	0.26	69,76,81,83	0
3	ZK8	A	402	22/23	0.79	0.40	70,120,150,157	0
4	PEG	C	405	7/7	0.81	0.24	47,52,58,59	0
3	ZK8	B	402	22/23	0.82	0.39	63,112,129,140	0
2	GOL	A	401	6/6	0.87	0.37	64,80,83,83	0
4	PEG	D	403	7/7	0.87	0.25	56,63,67,69	0
2	GOL	C	402	6/6	0.88	0.21	51,61,65,65	0
2	GOL	B	401	6/6	0.89	0.29	72,73,77,86	0
2	GOL	D	401	6/6	0.92	0.12	68,74,75,78	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.



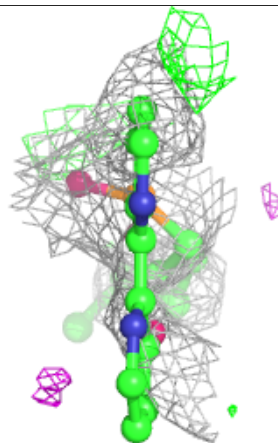
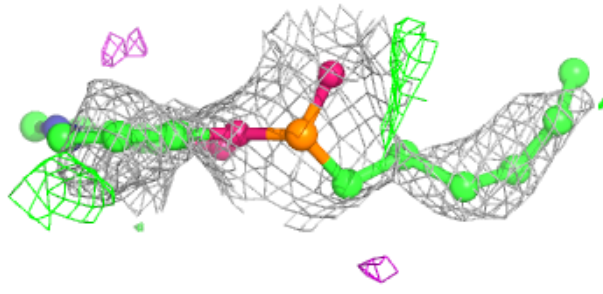
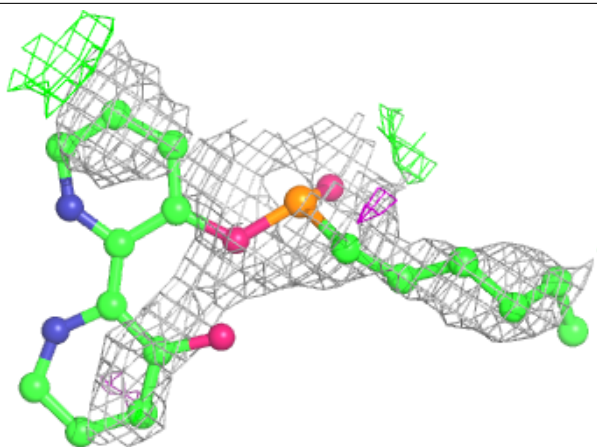
Electron density around ZK8 C 406:

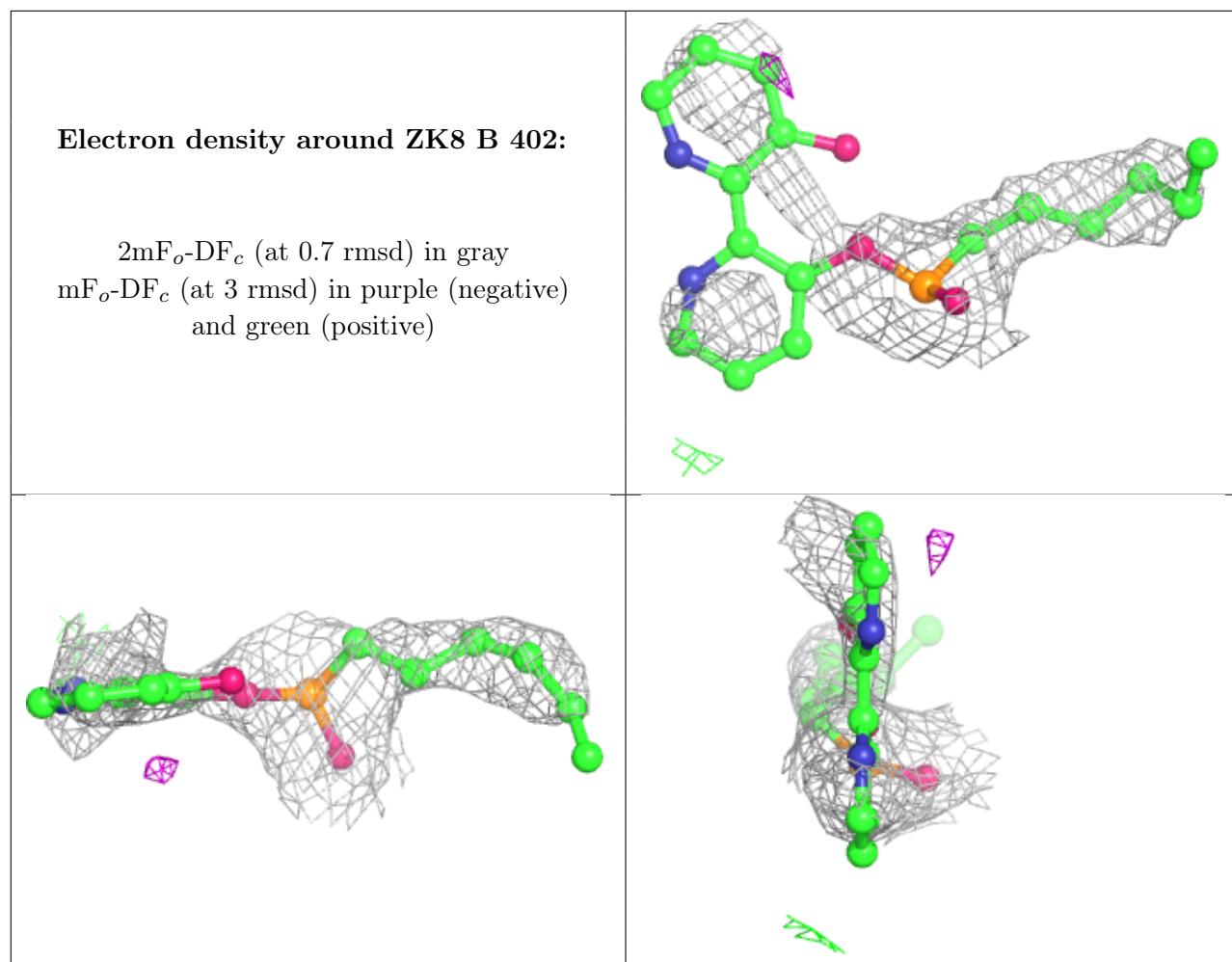
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around ZK8 A 402:

$2mF_o-DF_c$ (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.