



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 08:06 AM UTC

PDB ID : 5H8E / pdb_00005h8e
Title : Crystal structure of CK2 with compound 7h
Authors : Ferguson, A.D.
Deposited on : 2015-12-23
Resolution : 2.15 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

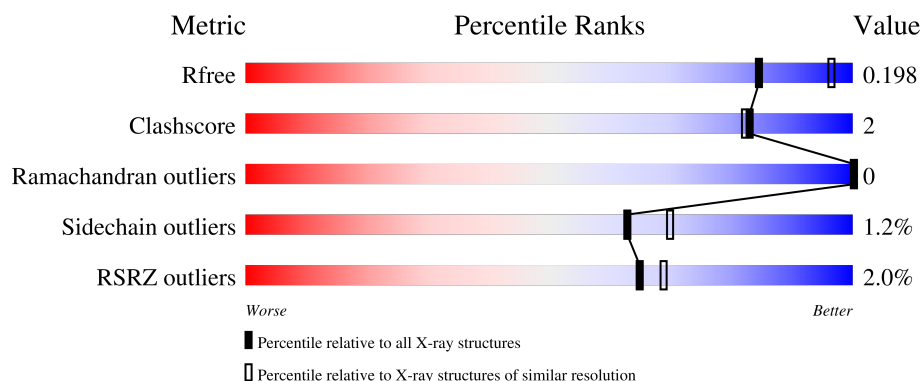
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

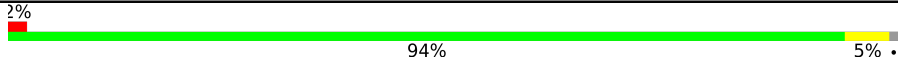
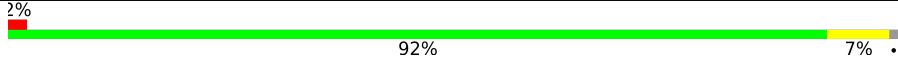
The reported resolution of this entry is 2.15 Å.

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	2057 (2.16-2.16)
Clashscore	190562	2159 (2.16-2.16)
Ramachandran outliers	187476	2134 (2.16-2.16)
Sidechain outliers	187428	2133 (2.16-2.16)
RSRZ outliers	180081	2059 (2.16-2.16)

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	333	
1	B	333	

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	EDO	B	415	-	-	X	-

2 Entry composition [i](#)

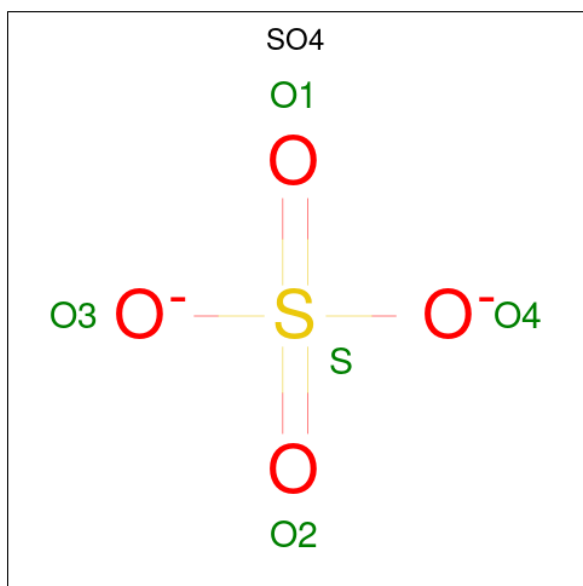
There are 6 unique types of molecules in this entry. The entry contains 6287 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Casein kinase II subunit alpha.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	331	Total	C	N	O	S	0	0	0
			2793	1789	491	502	11			
1	B	331	Total	C	N	O	S	0	0	0
			2793	1789	491	502	11			

- Molecule 2 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



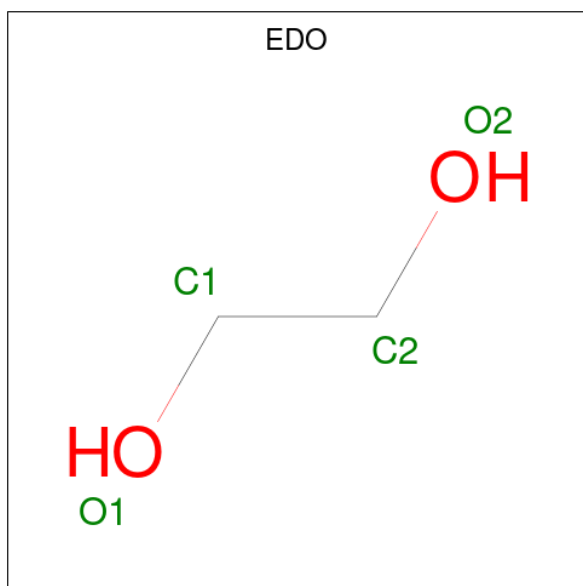
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		

- Molecule 3 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		

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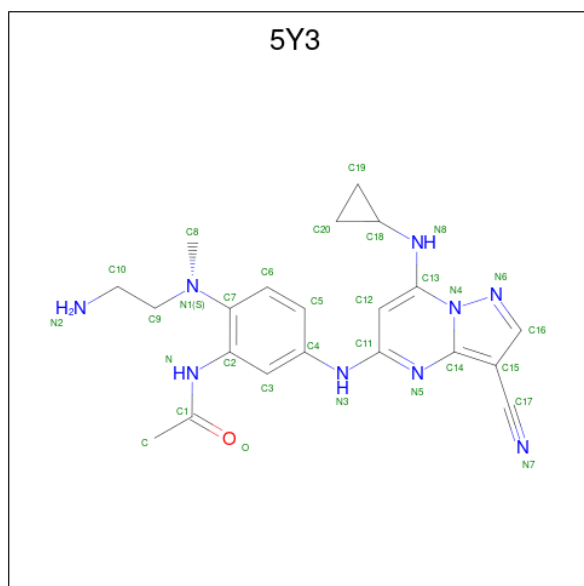
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total 4	C 2	O 2	0	0
3	A	1	Total 4	C 2	O 2	0	0
3	A	1	Total 4	C 2	O 2	0	0
3	A	1	Total 4	C 2	O 2	0	0
3	A	1	Total 4	C 2	O 2	0	0
3	A	1	Total 4	C 2	O 2	0	0
3	A	1	Total 4	C 2	O 2	0	0
3	A	1	Total 4	C 2	O 2	0	0
3	A	1	Total 4	C 2	O 2	0	0
3	A	1	Total 4	C 2	O 2	0	0
3	A	1	Total 4	C 2	O 2	0	0
3	A	1	Total 4	C 2	O 2	0	0
3	B	1	Total 4	C 2	O 2	0	0
3	B	1	Total 4	C 2	O 2	0	0
3	B	1	Total 4	C 2	O 2	0	0
3	B	1	Total 4	C 2	O 2	0	0
3	B	1	Total 4	C 2	O 2	0	0
3	B	1	Total 4	C 2	O 2	0	0
3	B	1	Total 4	C 2	O 2	0	0
3	B	1	Total 4	C 2	O 2	0	0
3	B	1	Total 4	C 2	O 2	0	0
3	B	1	Total 4	C 2	O 2	0	0

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

- Molecule 4 is {N}-[2-[2-azanylethyl(methyl)amino]-5-[[3-cyano-7-(cyclopropylamino)pyrazolo[1,5-a]pyrimidin-5-yl]amino]phenyl]ethanamide (CCD ID: 5Y3) (formula: C₂₁H₂₅N₉O).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			31	21	9	1		
4	B	1	Total	C	N	O	0	0
			31	21	9	1		

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

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	B	1	Total	Cl	0	0
			1	1		

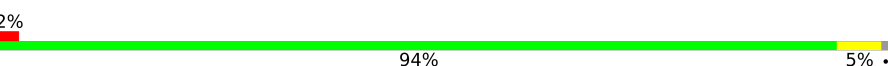
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	230	Total 230	O 230	0	0
6	B	232	Total 232	O 232	0	0

3 Residue-property plots [i](#)

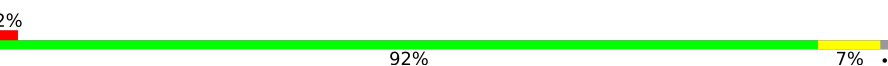
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density.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

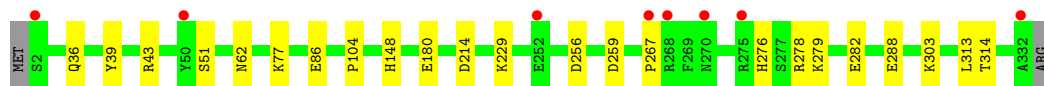
- Molecule 1: Casein kinase II subunit alpha

Chain A: 



- Molecule 1: Casein kinase II subunit alpha

Chain B: 



4 Data and refinement statistics

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, α , β , γ	126.92Å 126.92Å 124.57Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	24.60 – 2.15 24.60 – 2.15	Depositor EDS
% Data completeness (in resolution range)	99.9 (24.60-2.15) 99.8 (24.60-2.15)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.38 (at 2.15Å)	Xtriage
Refinement program	BUSTER 2.11.6	Depositor
R, R_{free}	0.165 , 0.196 0.165 , 0.198	Depositor DCC
R_{free} test set	2816 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å ²)	25.9	Xtriage
Anisotropy	0.382	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 45.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.015 for -h,-l,-k 0.007 for l,-k,h	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	6287	wwPDB-VP
Average B, all atoms (Å ²)	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 24.63 % 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 3.6991e-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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: CL, EDO, 5Y3, SO4

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	0.86	0/2868	1.15	5/3879 (0.1%)
1	B	0.85	0/2868	1.17	9/3879 (0.2%)
All	All	0.85	0/5736	1.16	14/7758 (0.2%)

There are no bond length outliers.

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	21	ARG	CA-C-N	5.82	128.88	120.38
1	A	21	ARG	C-N-CA	5.82	128.88	120.38
1	A	51	SER	N-CA-C	5.80	117.07	108.60
1	A	121	PHE	CA-CB-CG	5.71	119.51	113.80
1	B	314	THR	N-CA-C	-5.65	103.24	110.53
1	B	180	GLU	CB-CG-CD	5.58	122.09	112.60
1	B	282	GLU	CA-C-N	5.58	128.31	120.28
1	B	282	GLU	C-N-CA	5.58	128.31	120.28
1	B	51	SER	N-CA-C	5.54	116.69	108.60
1	B	267	PRO	CA-C-N	5.36	127.77	120.54
1	B	267	PRO	C-N-CA	5.36	127.77	120.54
1	A	132	ASP	CA-CB-CG	5.34	117.94	112.60
1	B	256	ASP	CA-C-N	5.06	127.02	120.44
1	B	256	ASP	C-N-CA	5.06	127.02	120.44

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	2793	0	2735	7	0
1	B	2793	0	2735	15	0
2	A	30	0	0	0	0
2	B	30	0	0	0	0
3	A	56	0	84	3	0
3	B	60	0	90	12	0
4	A	31	0	25	2	0
4	B	31	0	25	3	0
5	B	1	0	0	0	0
6	A	230	0	0	1	0
6	B	232	0	0	0	0
All	All	6287	0	5694	28	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 2.

All (28) 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:276:HIS:HD2	3:B:415:EDO:H22	1.36	0.91
1:B:276:HIS:CD2	3:B:415:EDO:H22	2.13	0.82
1:B:278:ARG:H	3:B:411:EDO:H22	1.49	0.77
1:B:279:LYS:HZ3	3:B:415:EDO:H21	1.61	0.65
1:B:279:LYS:NZ	3:B:415:EDO:H21	2.14	0.62
1:B:278:ARG:N	3:B:411:EDO:H22	2.15	0.60
1:B:39:TYR:HB2	3:B:409:EDO:H21	1.85	0.59
1:B:43:ARG:HB2	3:B:414:EDO:H12	1.85	0.58
4:B:423:5Y3:H1	4:B:423:5Y3:H26	1.86	0.57
1:B:148:HIS:HE1	1:B:214:ASP:OD2	1.88	0.57
1:A:134:ARG:HG2	1:A:323:TYR:CZ	2.43	0.53
4:B:423:5Y3:H1	4:B:423:5Y3:N5	2.25	0.51
4:A:421:5Y3:N5	4:A:421:5Y3:H1	2.26	0.50
1:B:148:HIS:HD2	3:B:419:EDO:O2	1.94	0.50
3:A:417:EDO:H22	6:A:604:HOH:O	2.14	0.48
1:A:165:ASP:HB3	1:A:170:LYS:HB3	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:286:HIS:CE1	1:A:288:GLU:HG2	2.50	0.47
1:A:19:ARG:HD2	1:A:23:TYR:CG	2.50	0.46
1:A:7:SER:OG	1:A:309:HIS:HE1	1.99	0.45
4:A:421:5Y3:H1	4:A:421:5Y3:H26	1.99	0.45
1:A:291:HIS:HB2	3:A:412:EDO:H22	2.00	0.43
1:B:303:LYS:HB3	1:B:313:LEU:HG	2.00	0.43
1:B:36:GLN:HG3	1:B:104:PRO:HD3	2.01	0.43
1:B:229:LYS:HE3	3:B:417:EDO:H22	2.01	0.42
1:B:36:GLN:HG2	3:B:409:EDO:H22	2.01	0.42
4:B:423:5Y3:H26	4:B:423:5Y3:C3	2.49	0.41
1:B:278:ARG:H	3:B:411:EDO:C2	2.27	0.40
1:A:249:LEU:HD23	3:A:416:EDO:H12	2.03	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	329/333 (99%)	321 (98%)	8 (2%)	0	100	100
1	B	329/333 (99%)	321 (98%)	8 (2%)	0	100	100
All	All	658/666 (99%)	642 (98%)	16 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	304/306 (99%)	302 (99%)	2 (1%)	76	82
1	B	304/306 (99%)	299 (98%)	5 (2%)	55	61
All	All	608/612 (99%)	601 (99%)	7 (1%)	63	70

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	114	GLU
1	A	288	GLU
1	B	62	ASN
1	B	77	LYS
1	B	86	GLU
1	B	259	ASP
1	B	288	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	123	GLN
1	A	234	HIS
1	A	309	HIS
1	A	310	GLN
1	B	16	ASN
1	B	126	GLN
1	B	148	HIS
1	B	186	GLN
1	B	207	GLN
1	B	276	HIS

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 [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 44 ligands modelled in this entry, 1 is monoatomic - leaving 43 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	$\# Z > 2$
3	EDO	A	418	-	3,3,3	0.42	0	2,2,2	0.32	0
3	EDO	B	409	-	3,3,3	0.44	0	2,2,2	0.51	0
3	EDO	A	414	-	3,3,3	0.50	0	2,2,2	0.72	0
3	EDO	A	420	-	3,3,3	0.47	0	2,2,2	0.45	0
2	SO4	A	406	-	4,4,4	0.23	0	6,6,6	0.14	0
3	EDO	A	410	-	3,3,3	0.47	0	2,2,2	0.31	0
4	5Y3	B	423	-	32,34,34	1.10	3 (9%)	46,48,48	0.95	3 (6%)
3	EDO	B	417	-	3,3,3	0.54	0	2,2,2	0.33	0
2	SO4	B	404	-	4,4,4	0.27	0	6,6,6	0.17	0
3	EDO	B	412	-	3,3,3	0.36	0	2,2,2	0.55	0
2	SO4	B	402	-	4,4,4	0.28	0	6,6,6	0.31	0
2	SO4	A	405	-	4,4,4	0.36	0	6,6,6	0.16	0
3	EDO	A	419	-	3,3,3	0.63	0	2,2,2	0.58	0
2	SO4	A	404	-	4,4,4	0.26	0	6,6,6	0.26	0
4	5Y3	A	421	-	32,34,34	1.01	4 (12%)	46,48,48	0.98	3 (6%)
3	EDO	B	415	-	3,3,3	0.56	0	2,2,2	0.34	0
3	EDO	B	418	-	3,3,3	0.80	0	2,2,2	0.15	0
2	SO4	B	406	-	4,4,4	0.26	0	6,6,6	0.33	0
3	EDO	B	414	-	3,3,3	0.47	0	2,2,2	0.25	0
3	EDO	A	416	-	3,3,3	0.53	0	2,2,2	0.13	0
3	EDO	A	417	-	3,3,3	0.45	0	2,2,2	0.38	0
3	EDO	B	411	-	3,3,3	0.70	0	2,2,2	0.40	0
3	EDO	B	416	-	3,3,3	0.44	0	2,2,2	0.33	0
3	EDO	B	421	-	3,3,3	0.49	0	2,2,2	0.20	0
3	EDO	B	420	-	3,3,3	0.49	0	2,2,2	0.48	0
3	EDO	A	411	-	3,3,3	0.56	0	2,2,2	0.25	0
3	EDO	A	412	-	3,3,3	0.50	0	2,2,2	0.49	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	SO4	A	401	-	4,4,4	0.25	0	6,6,6	0.20	0
3	EDO	A	413	-	3,3,3	0.60	0	2,2,2	0.37	0
2	SO4	B	403	-	4,4,4	0.28	0	6,6,6	0.18	0
2	SO4	B	405	-	4,4,4	0.28	0	6,6,6	0.19	0
3	EDO	A	407	-	3,3,3	0.32	0	2,2,2	0.30	0
3	EDO	A	408	-	3,3,3	0.51	0	2,2,2	0.12	0
3	EDO	B	408	-	3,3,3	0.42	0	2,2,2	0.62	0
2	SO4	B	401	-	4,4,4	0.44	0	6,6,6	0.31	0
3	EDO	B	410	-	3,3,3	0.39	0	2,2,2	0.50	0
3	EDO	B	419	-	3,3,3	0.50	0	2,2,2	0.64	0
3	EDO	B	422	-	3,3,3	0.51	0	2,2,2	0.31	0
3	EDO	A	409	-	3,3,3	0.47	0	2,2,2	0.34	0
3	EDO	B	413	-	3,3,3	0.45	0	2,2,2	0.47	0
2	SO4	A	403	-	4,4,4	0.40	0	6,6,6	0.12	0
2	SO4	A	402	-	4,4,4	0.19	0	6,6,6	0.16	0
3	EDO	A	415	-	3,3,3	0.61	0	2,2,2	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
3	EDO	A	418	-	-	1/1/1/1	-
3	EDO	B	409	-	-	0/1/1/1	-
3	EDO	A	414	-	-	0/1/1/1	-
3	EDO	A	420	-	-	0/1/1/1	-
3	EDO	A	410	-	-	0/1/1/1	-
4	5Y3	B	423	-	-	6/18/23/23	0/4/4/4
3	EDO	B	417	-	-	0/1/1/1	-
3	EDO	B	412	-	-	0/1/1/1	-
3	EDO	A	419	-	-	1/1/1/1	-
4	5Y3	A	421	-	-	6/18/23/23	0/4/4/4
3	EDO	B	415	-	-	0/1/1/1	-
3	EDO	B	418	-	-	1/1/1/1	-
3	EDO	B	414	-	-	1/1/1/1	-
3	EDO	A	416	-	-	0/1/1/1	-
3	EDO	A	417	-	-	1/1/1/1	-
3	EDO	B	411	-	-	1/1/1/1	-
3	EDO	B	416	-	-	0/1/1/1	-
3	EDO	B	421	-	-	0/1/1/1	-
3	EDO	B	420	-	-	0/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	EDO	A	411	-	-	1/1/1/1	-
3	EDO	A	412	-	-	1/1/1/1	-
3	EDO	A	413	-	-	0/1/1/1	-
3	EDO	A	407	-	-	0/1/1/1	-
3	EDO	A	408	-	-	0/1/1/1	-
3	EDO	B	408	-	-	0/1/1/1	-
3	EDO	B	419	-	-	0/1/1/1	-
3	EDO	B	410	-	-	0/1/1/1	-
3	EDO	B	422	-	-	0/1/1/1	-
3	EDO	A	409	-	-	0/1/1/1	-
3	EDO	B	413	-	-	0/1/1/1	-
3	EDO	A	415	-	-	1/1/1/1	-

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	423	5Y3	C7-N1	3.69	1.49	1.41
4	A	421	5Y3	C7-N1	3.05	1.48	1.41
4	B	423	5Y3	C13-N4	3.04	1.40	1.37
4	A	421	5Y3	C13-N4	2.40	1.40	1.37
4	B	423	5Y3	C9-N1	2.22	1.53	1.46
4	A	421	5Y3	C9-N1	2.19	1.53	1.46
4	A	421	5Y3	C16-N6	2.17	1.36	1.32

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	421	5Y3	N3-C11-N5	2.59	120.60	114.41
4	B	423	5Y3	N3-C11-N5	2.45	120.27	114.41
4	B	423	5Y3	C4-N3-C11	2.30	132.63	128.08
4	A	421	5Y3	C2-N-C1	2.29	133.03	127.50
4	B	423	5Y3	C13-N4-N6	2.08	128.02	125.79
4	A	421	5Y3	C4-N3-C11	2.05	132.13	128.08

There are no chirality outliers.

All (21) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	421	5Y3	C-C1-N-C2
4	A	421	5Y3	C10-C9-N1-C8
4	B	423	5Y3	C10-C9-N1-C8

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Mol	Chain	Res	Type	Atoms
4	A	421	5Y3	O-C1-N-C2
4	B	423	5Y3	O-C1-N-C2
4	B	423	5Y3	C-C1-N-C2
3	B	411	EDO	O1-C1-C2-O2
3	B	414	EDO	O1-C1-C2-O2
3	A	412	EDO	O1-C1-C2-O2
4	A	421	5Y3	C2-C7-N1-C9
4	B	423	5Y3	C2-C7-N1-C9
4	B	423	5Y3	C2-C7-N1-C8
4	A	421	5Y3	C2-C7-N1-C8
3	A	418	EDO	O1-C1-C2-O2
3	A	411	EDO	O1-C1-C2-O2
3	A	415	EDO	O1-C1-C2-O2
3	A	417	EDO	O1-C1-C2-O2
4	B	423	5Y3	C6-C7-N1-C8
3	A	419	EDO	O1-C1-C2-O2
4	A	421	5Y3	C6-C7-N1-C9
3	B	418	EDO	O1-C1-C2-O2

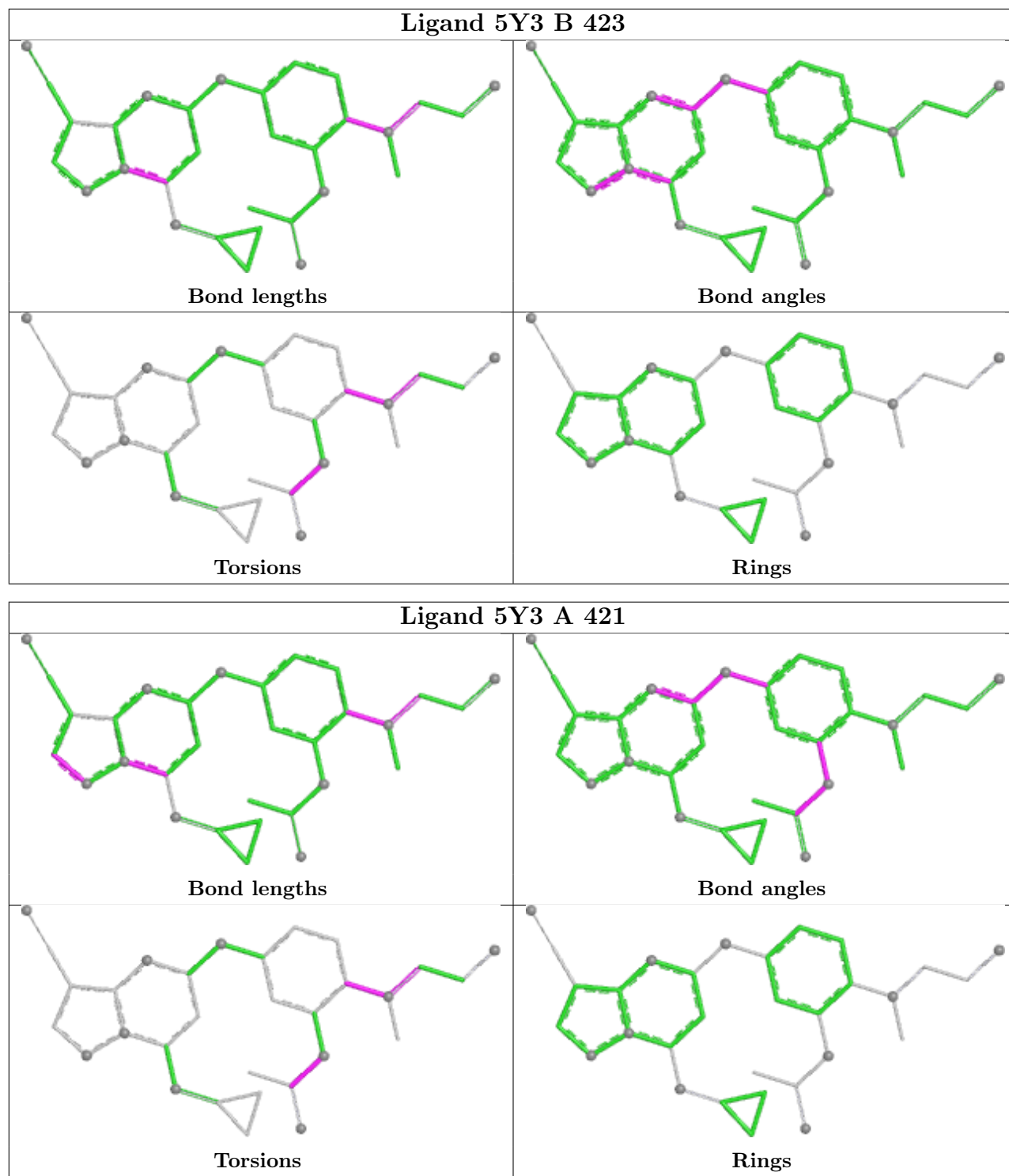
There are no ring outliers.

11 monomers are involved in 20 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	409	EDO	2	0
4	B	423	5Y3	3	0
3	B	417	EDO	1	0
4	A	421	5Y3	2	0
3	B	415	EDO	4	0
3	B	414	EDO	1	0
3	A	416	EDO	1	0
3	A	417	EDO	1	0
3	B	411	EDO	3	0
3	A	412	EDO	1	0
3	B	419	EDO	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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	331/333 (99%)	-0.44	5 (1%) 72 76	17, 27, 55, 80	1 (0%)
1	B	331/333 (99%)	-0.38	8 (2%) 59 63	16, 27, 55, 81	1 (0%)
All	All	662/666 (99%)	-0.41	13 (1%) 65 69	16, 27, 55, 81	2 (0%)

All (13) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	332	ALA	6.8
1	B	332	ALA	4.5
1	B	50	TYR	4.3
1	B	252	GLU	3.5
1	A	50	TYR	3.0
1	B	275	ARG	2.9
1	B	268	ARG	2.6
1	A	49	LYS	2.4
1	B	270	ASN	2.3
1	B	267	PRO	2.2
1	A	264	GLU	2.1
1	B	2	SER	2.1
1	A	121	PHE	2.1

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

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	EDO	A	415	4/4	0.67	0.21	53,55,56,57	0
3	EDO	A	419	4/4	0.70	0.24	49,50,50,52	0
2	SO4	B	402	5/5	0.74	0.19	73,73,74,74	0
3	EDO	B	420	4/4	0.74	0.21	65,65,65,66	0
3	EDO	B	415	4/4	0.75	0.21	44,44,45,47	0
3	EDO	B	411	4/4	0.75	0.23	41,42,43,46	0
3	EDO	B	421	4/4	0.76	0.21	61,63,66,69	0
3	EDO	B	413	4/4	0.77	0.17	50,51,51,52	0
3	EDO	A	420	4/4	0.79	0.20	69,70,71,72	0
3	EDO	A	409	4/4	0.79	0.23	60,61,61,61	0
2	SO4	B	406	5/5	0.80	0.24	112,112,112,113	0
2	SO4	B	405	5/5	0.80	0.13	99,100,100,100	0
3	EDO	B	410	4/4	0.82	0.21	55,56,56,56	0
3	EDO	B	418	4/4	0.82	0.18	36,42,46,46	0
2	SO4	B	404	5/5	0.82	0.13	83,84,84,85	0
3	EDO	A	408	4/4	0.82	0.17	52,53,54,55	0
2	SO4	B	403	5/5	0.83	0.14	97,98,99,99	0
5	CL	B	407	1/1	0.83	0.24	76,76,76,76	0
3	EDO	B	414	4/4	0.84	0.25	35,40,41,44	0
3	EDO	A	416	4/4	0.84	0.26	52,54,55,55	0
3	EDO	A	411	4/4	0.84	0.26	48,49,51,52	0
3	EDO	B	412	4/4	0.86	0.14	48,49,49,50	0
3	EDO	A	412	4/4	0.87	0.20	42,44,46,46	0
3	EDO	B	416	4/4	0.87	0.14	52,53,53,56	0
3	EDO	A	410	4/4	0.87	0.14	65,66,68,69	0
2	SO4	A	406	5/5	0.88	0.11	76,76,78,78	0
3	EDO	A	413	4/4	0.89	0.12	37,40,41,42	0
3	EDO	B	422	4/4	0.91	0.10	50,52,54,54	0
3	EDO	A	417	4/4	0.91	0.16	60,61,61,63	0
3	EDO	A	407	4/4	0.92	0.11	28,30,37,40	0
3	EDO	A	418	4/4	0.93	0.14	30,34,34,36	0
3	EDO	B	409	4/4	0.94	0.13	48,50,54,57	0
2	SO4	A	402	5/5	0.94	0.11	52,53,54,55	0
3	EDO	B	417	4/4	0.94	0.07	35,37,40,41	0
2	SO4	B	401	5/5	0.94	0.11	49,52,54,54	0
2	SO4	A	405	5/5	0.96	0.06	54,56,56,57	0
3	EDO	B	408	4/4	0.96	0.07	26,27,30,35	0

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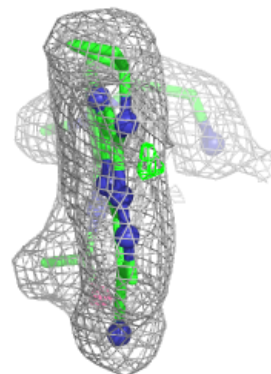
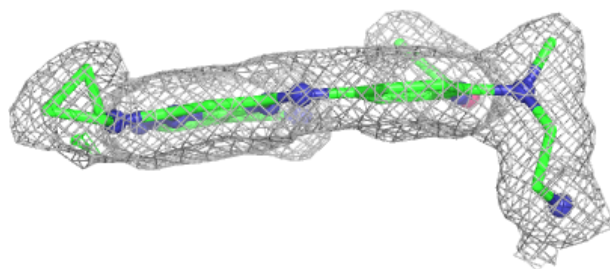
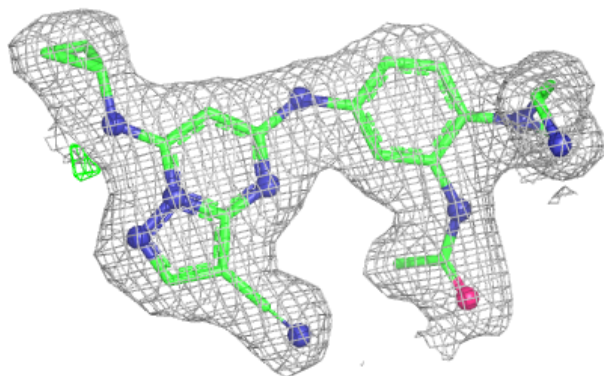
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	5Y3	A	421	31/31	0.97	0.05	15,20,27,28	0
4	5Y3	B	423	31/31	0.97	0.05	16,20,23,24	0
3	EDO	A	414	4/4	0.97	0.09	20,21,23,25	0
2	SO4	A	404	5/5	0.98	0.09	45,46,47,48	0
3	EDO	B	419	4/4	0.98	0.07	17,20,21,21	0
2	SO4	A	401	5/5	0.98	0.06	39,41,41,42	0
2	SO4	A	403	5/5	0.98	0.10	32,36,37,41	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.

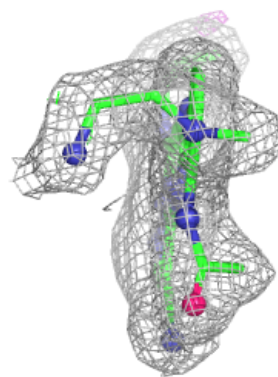
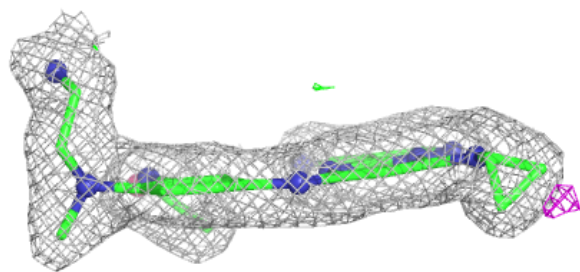
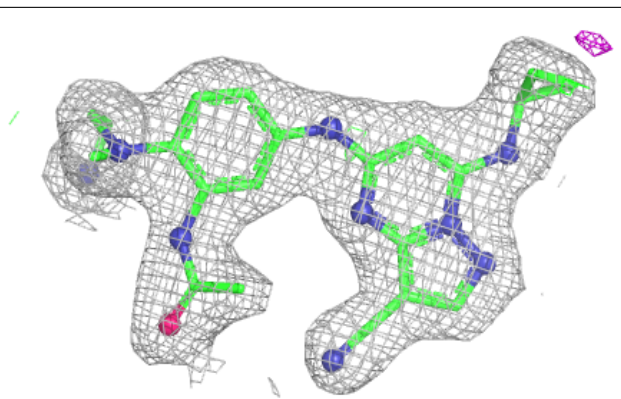
Electron density around 5Y3 A 421:

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 5Y3 B 423:

$2mF_o-DF_c$ (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.