Full wwPDB X-ray Structure Validation Report (i)

May 22, 2020 – 06:01 am BST

PDB ID	:	2YKV
Title	:	Structural Determinants of the Beta-Selectivity of a Bacterial Aminotransferase
Authors	:	Wybenga, G.G.; Crismaru, C.G.; Janssen, D.B.; Dijkstra, B.W.
Deposited on	:	2011-05-30
Resolution	:	1.90 Å(reported)

The following versions of software and data (see references (i)) were used in the production of this report:

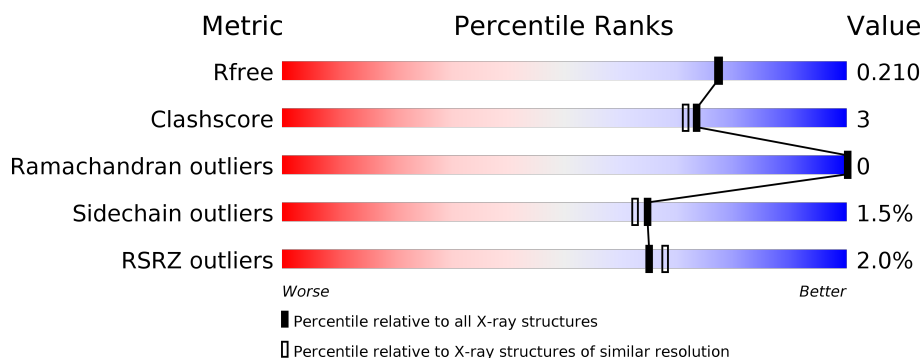|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.11
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

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 1.90 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	Percentile Ranks	Value
Rfree		0.210
Clashscore		3
Ramachandran outliers		0
Sidechain outliers		1.5%
RSRZ outliers		2.0%

Worse → *Better*

▪ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	130704	6207 (1.90-1.90)
Clashscore	141614	6847 (1.90-1.90)
Ramachandran outliers	138981	6760 (1.90-1.90)
Sidechain outliers	138945	6760 (1.90-1.90)
RSRZ outliers	127900	6082 (1.90-1.90)

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 on 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 <=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	465	2% — 88% ... 7%
1	B	465	2% — 87% .. 8%
1	C	465	2% — 86% 6% 8%

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 10545 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 BETA-TRANSAMINASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	432	Total 3268	C 2041	N 603	O 609	S 15	0	5	0
1	B	430	Total 3255	C 2034	N 599	O 605	S 17	0	5	0
1	C	430	Total 3255	C 2033	N 599	O 607	S 16	0	5	0

There are 60 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	expression tag	UNP A3EYF7
A	-18	GLY	-	expression tag	UNP A3EYF7
A	-17	SER	-	expression tag	UNP A3EYF7
A	-16	SER	-	expression tag	UNP A3EYF7
A	-15	HIS	-	expression tag	UNP A3EYF7
A	-14	HIS	-	expression tag	UNP A3EYF7
A	-13	HIS	-	expression tag	UNP A3EYF7
A	-12	HIS	-	expression tag	UNP A3EYF7
A	-11	HIS	-	expression tag	UNP A3EYF7
A	-10	HIS	-	expression tag	UNP A3EYF7
A	-9	SER	-	expression tag	UNP A3EYF7
A	-8	SER	-	expression tag	UNP A3EYF7
A	-7	GLY	-	expression tag	UNP A3EYF7
A	-6	LEU	-	expression tag	UNP A3EYF7
A	-5	VAL	-	expression tag	UNP A3EYF7
A	-4	PRO	-	expression tag	UNP A3EYF7
A	-3	ARG	-	expression tag	UNP A3EYF7
A	-2	GLY	-	expression tag	UNP A3EYF7
A	-1	SER	-	expression tag	UNP A3EYF7
A	0	HIS	-	expression tag	UNP A3EYF7
B	-19	MET	-	expression tag	UNP A3EYF7
B	-18	GLY	-	expression tag	UNP A3EYF7
B	-17	SER	-	expression tag	UNP A3EYF7

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-16	SER	-	expression tag	UNP A3EYF7
B	-15	HIS	-	expression tag	UNP A3EYF7
B	-14	HIS	-	expression tag	UNP A3EYF7
B	-13	HIS	-	expression tag	UNP A3EYF7
B	-12	HIS	-	expression tag	UNP A3EYF7
B	-11	HIS	-	expression tag	UNP A3EYF7
B	-10	HIS	-	expression tag	UNP A3EYF7
B	-9	SER	-	expression tag	UNP A3EYF7
B	-8	SER	-	expression tag	UNP A3EYF7
B	-7	GLY	-	expression tag	UNP A3EYF7
B	-6	LEU	-	expression tag	UNP A3EYF7
B	-5	VAL	-	expression tag	UNP A3EYF7
B	-4	PRO	-	expression tag	UNP A3EYF7
B	-3	ARG	-	expression tag	UNP A3EYF7
B	-2	GLY	-	expression tag	UNP A3EYF7
B	-1	SER	-	expression tag	UNP A3EYF7
B	0	HIS	-	expression tag	UNP A3EYF7
C	-19	MET	-	expression tag	UNP A3EYF7
C	-18	GLY	-	expression tag	UNP A3EYF7
C	-17	SER	-	expression tag	UNP A3EYF7
C	-16	SER	-	expression tag	UNP A3EYF7
C	-15	HIS	-	expression tag	UNP A3EYF7
C	-14	HIS	-	expression tag	UNP A3EYF7
C	-13	HIS	-	expression tag	UNP A3EYF7
C	-12	HIS	-	expression tag	UNP A3EYF7
C	-11	HIS	-	expression tag	UNP A3EYF7
C	-10	HIS	-	expression tag	UNP A3EYF7
C	-9	SER	-	expression tag	UNP A3EYF7
C	-8	SER	-	expression tag	UNP A3EYF7
C	-7	GLY	-	expression tag	UNP A3EYF7
C	-6	LEU	-	expression tag	UNP A3EYF7
C	-5	VAL	-	expression tag	UNP A3EYF7
C	-4	PRO	-	expression tag	UNP A3EYF7
C	-3	ARG	-	expression tag	UNP A3EYF7
C	-2	GLY	-	expression tag	UNP A3EYF7
C	-1	SER	-	expression tag	UNP A3EYF7
C	0	HIS	-	expression tag	UNP A3EYF7

- Molecule 2 is 4'-DEOXY-4'-ACETYLYAMINO-PYRIDOXAL-5'-PHOSPHATE (three-letter code: IK2) (formula: $C_{10}H_{15}N_2O_8P$).

IK2
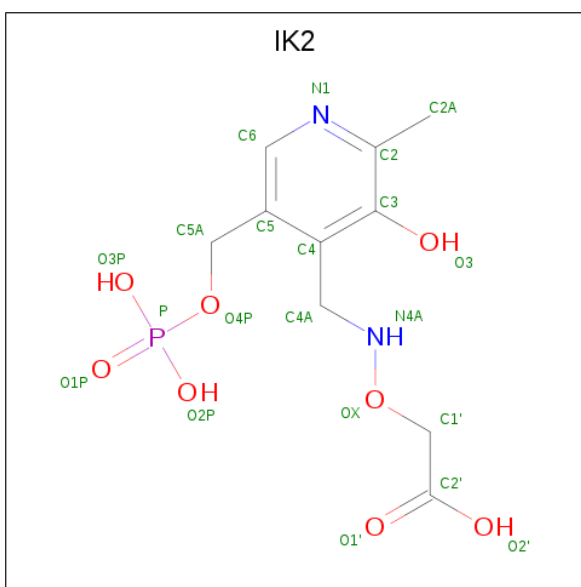
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			21	10	2	8	1		
2	B	1	Total	C	N	O	P	0	0
			21	10	2	8	1		
2	C	1	Total	C	N	O	P	0	0
			21	10	2	8	1		

- Molecule 3 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$).

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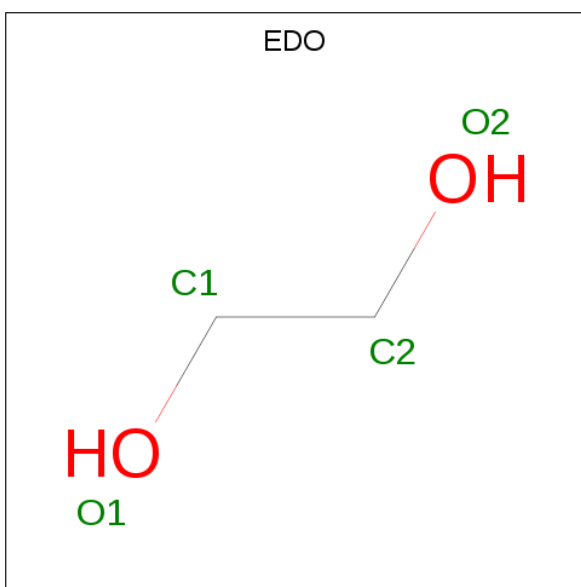
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			4	2	2		

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Full wwPDB X-ray Structure Validation Report

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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	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	C	1	Total 4	C 2	O 2	0	0
3	C	1	Total 4	C 2	O 2	0	0
3	C	1	Total 4	C 2	O 2	0	0
3	C	1	Total 4	C 2	O 2	0	0
3	C	1	Total 4	C 2	O 2	0	0
3	C	1	Total 4	C 2	O 2	0	0
3	C	1	Total 4	C 2	O 2	0	0
3	C	1	Total 4	C 2	O 2	0	0

- Molecule 4 is water.

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	238	Total 238	O 238	0	0
4	B	161	Total 161	O 161	0	0
4	C	225	Total 225	O 225	0	0

3 Residue-property plots (i)

These plots are drawn for all protein, RNA and DNA 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.
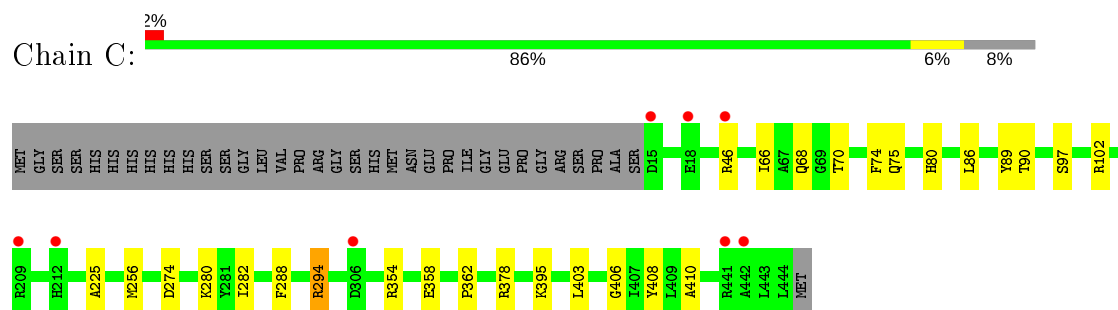
- Molecule 1: BETA-TRANSAMINASE

Chain A:

- Molecule 1: BETA-TRANSAMINASE

Chain B:

- Molecule 1: BETA-TRANSAMINASE

Chain C:
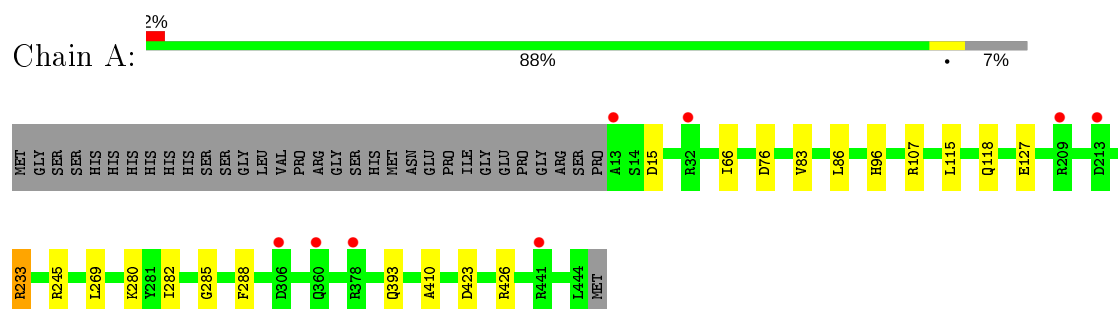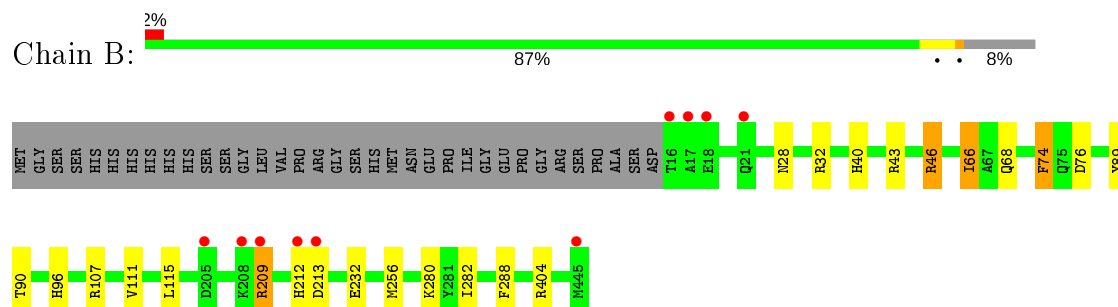
4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	183.58Å 94.32Å 102.31Å 90.00° 113.99° 90.00°	Depositor
Resolution (Å)	48.09 – 1.90 48.09 – 1.90	Depositor EDS
% Data completeness (in resolution range)	99.9 (48.09-1.90) 99.9 (48.09-1.90)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$<I/\sigma(I)>$ [1]	2.43 (at 1.90Å)	Xtriage
Refinement program	REFMAC 5.5.0102	Depositor
R, R_{free}	0.176 , 0.206 0.180 , 0.210	Depositor DCC
R_{free} test set	6257 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å^2)	19.2	Xtriage
Anisotropy	0.015	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.39 , 47.1	EDS
L-test for twinning[2]	$<|L|> = 0.49$, $<L^2> = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	10545	wwPDB-VP
Average B, all atoms (Å^2)	21.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.50% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.

[2]Theoretical values of $<|L|>$, $<L^2>$ 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: IK2, EDO

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	0.58	0/3337	0.62	0/4512
1	B	0.59	0/3321	0.63	0/4490
1	C	0.64	0/3321	0.63	0/4491
All	All	0.61	0/9979	0.63	0/13493

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2   Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3268	0	3198	20	0
1	B	3255	0	3184	27	0
1	C	3255	0	3179	21	0
2	A	21	0	11	3	0
2	B	21	0	11	2	0
2	C	21	0	12	2	0
3	A	20	0	30	1	0
3	B	28	0	42	4	0
3	C	32	0	48	5	0
4	A	238	0	0	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	161	0	0	3	0
4	C	225	0	0	1	0
All	All	10545	0	9715	64	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 3.

All (64) 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:209:ARG:HH11	1:B:209:ARG:HG2	1.11	1.15
1:A:66:ILE:HD11	1:B:115:LEU:HD22	1.49	0.93
1:C:294:ARG:HH11	1:C:294:ARG:HG2	1.46	0.79
1:A:233:ARG:NH2	1:A:269:LEU:O	2.23	0.71
1:C:280:LYS:HE2	2:C:1445:IK2:H4A2	1.73	0.70
1:A:115:LEU:HB3	1:B:66:ILE:HD11	1.73	0.70
1:B:212:HIS:NE2	1:B:213:ASP:OD2	2.27	0.68
1:B:209:ARG:HG2	1:B:209:ARG:NH1	1.91	0.66
1:A:423:ASP:OD1	1:A:426:ARG:NH2	2.30	0.65
1:A:115:LEU:HD22	1:B:66:ILE:HD11	1.79	0.65
1:B:209:ARG:HH11	1:B:209:ARG:CG	1.99	0.64
1:B:212:HIS:CD2	1:B:213:ASP:OD2	2.51	0.64
1:A:280:LYS:HE2	2:A:1445:IK2:H4A1	1.80	0.62
1:A:127:GLU:HG2	3:B:1451:EDO:H12	1.81	0.62
1:B:28[B]:ASN:OD1	1:B:32:ARG:NH1	2.32	0.61
1:B:43:ARG:O	1:B:46:ARG:HD3	2.01	0.61
1:A:66:ILE:HA	1:A:76:ASP:HA	1.83	0.60
3:B:1446:EDO:H21	3:B:1448:EDO:H22	1.82	0.60
1:B:280:LYS:HE2	2:B:1447:IK2:H4A1	1.83	0.60
4:A:2193:HOH:O	3:C:1450:EDO:H21	2.03	0.59
1:B:232:GLU:HG3	3:B:1449:EDO:H11	1.84	0.58
1:B:212:HIS:CD2	1:B:213:ASP:CG	2.76	0.58
1:A:66:ILE:CD1	1:B:115:LEU:HD22	2.30	0.57
1:A:285:GLY:O	3:B:1450:EDO:H22	2.07	0.55
1:C:225:ALA:HB2	3:C:1449:EDO:C2	2.36	0.55
1:B:66:ILE:HD12	1:B:74:PHE:HB2	1.88	0.55
1:C:294:ARG:HG2	1:C:294:ARG:NH1	2.20	0.55
1:C:46:ARG:CZ	1:C:46:ARG:HB2	2.39	0.52
1:C:362:PRO:HA	1:C:378:ARG:HD2	1.92	0.52
1:A:280:LYS:CE	2:A:1445:IK2:H4A1	2.41	0.51
1:A:245:ARG:NH2	4:A:2153:HOH:O	2.43	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:90:THR:HG21	1:C:256:MET:HG3	1.94	0.50
1:C:225:ALA:HB2	3:C:1449:EDO:H22	1.94	0.50
1:B:111:VAL:HG12	1:B:115:LEU:HD11	1.93	0.50
1:A:115:LEU:HD23	1:B:96:HIS:CD2	2.48	0.48
1:A:86:LEU:HD13	1:A:410:ALA:HB2	1.95	0.48
1:B:90:THR:HG21	1:B:256:MET:HG3	1.96	0.48
1:A:96:HIS:CD2	3:A:1449:EDO:H11	2.50	0.47
1:C:282:ILE:HB	1:C:288:PHE:CE2	2.50	0.47
1:C:46:ARG:CB	1:C:46:ARG:CZ	2.93	0.46
1:B:280:LYS:CE	2:B:1447:IK2:H4A1	2.44	0.46
1:C:89:TYR:HB3	3:C:1449:EDO:H11	1.98	0.46
1:A:118:GLN:NE2	4:A:2087:HOH:O	2.48	0.45
1:A:115:LEU:HB3	1:B:66:ILE:CD1	2.46	0.45
1:C:280:LYS:CE	2:C:1445:IK2:H4A2	2.44	0.45
1:B:107:ARG:NH1	4:B:2042:HOH:O	2.49	0.44
1:C:274:ASP:HA	1:C:294:ARG:HD3	1.99	0.44
1:B:66:ILE:HA	1:B:76:ASP:HA	1.99	0.44
1:A:66:ILE:HD11	1:B:115:LEU:CD2	2.35	0.43
1:B:40:HIS:HE1	4:B:2013:HOH:O	2.00	0.43
1:B:404:ARG:HD3	4:B:2007:HOH:O	2.18	0.43
1:C:406:GLY:HA2	3:C:1446:EDO:H11	2.01	0.43
1:C:97:SER:O	1:C:102:ARG:NH2	2.52	0.43
1:A:282:ILE:HB	1:A:288:PHE:CE2	2.54	0.42
2:A:1445:IK2:HNA	2:A:1445:IK2:H5A1	1.83	0.42
1:C:294:ARG:CG	1:C:294:ARG:NH1	2.82	0.42
1:C:403:LEU:HD21	1:C:408:TYR:CD2	2.55	0.42
1:C:294:ARG:HD2	4:C:2155:HOH:O	2.20	0.41
1:C:354:ARG:NH1	1:C:358:GLU:OE1	2.53	0.41
1:B:89:TYR:C	1:B:90:THR:HG23	2.40	0.41
1:B:282:ILE:HB	1:B:288:PHE:CE2	2.55	0.41
1:A:15:ASP:HA	1:A:393:GLN:OE1	2.21	0.41
1:C:75:GLN:HA	1:C:80:HIS:O	2.20	0.40
1:C:86:LEU:HD13	1:C:410:ALA:HB2	2.03	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	435/465 (94%)	422 (97%)	13 (3%)	0	100	100
1	B	433/465 (93%)	420 (97%)	13 (3%)	0	100	100
1	C	433/465 (93%)	421 (97%)	12 (3%)	0	100	100
All	All	1301/1395 (93%)	1263 (97%)	38 (3%)	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	323/346 (93%)	320 (99%)	3 (1%)	78	79
1	B	322/346 (93%)	317 (98%)	5 (2%)	62	60
1	C	322/346 (93%)	316 (98%)	6 (2%)	57	53
All	All	967/1038 (93%)	953 (99%)	14 (1%)	65	65

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	83	VAL
1	A	107	ARG
1	A	233	ARG
1	B	46	ARG
1	B	66	ILE

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Mol	Chain	Res	Type
1	B	68	GLN
1	B	74	PHE
1	B	209	ARG
1	C	66	ILE
1	C	68	GLN
1	C	70	THR
1	C	74	PHE
1	C	294	ARG
1	C	395	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	40	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 ⓘ

There are no carbohydrates in this entry.

5.6　Ligand geometry ⓘ

23 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
3	EDO	C	1449	-	3,3,3	0.43	0	2,2,2	0.31	0
3	EDO	C	1450	-	3,3,3	0.45	0	2,2,2	0.13	0
3	EDO	B	1452	-	3,3,3	0.49	0	2,2,2	0.51	0
3	EDO	B	1448	-	3,3,3	0.42	0	2,2,2	0.20	0
3	EDO	C	1453	-	3,3,3	0.52	0	2,2,2	0.38	0
3	EDO	B	1453	-	3,3,3	0.44	0	2,2,2	0.28	0
3	EDO	B	1450	-	3,3,3	0.40	0	2,2,2	0.46	0
3	EDO	B	1449	-	3,3,3	0.40	0	2,2,2	0.37	0
3	EDO	C	1451	-	3,3,3	0.38	0	2,2,2	0.62	0
3	EDO	A	1446	-	3,3,3	0.44	0	2,2,2	0.35	0
3	EDO	C	1446	-	3,3,3	0.38	0	2,2,2	0.41	0
3	EDO	C	1447	-	3,3,3	0.42	0	2,2,2	0.79	0
3	EDO	A	1450	-	3,3,3	0.51	0	2,2,2	0.33	0
3	EDO	A	1447	-	3,3,3	0.54	0	2,2,2	0.27	0
3	EDO	C	1448	-	3,3,3	0.38	0	2,2,2	0.53	0
3	EDO	A	1448	-	3,3,3	0.47	0	2,2,2	0.51	0
2	IK2	B	1447	-	18,21,21	1.66	3 (16%)	21,29,29	3.12	6 (28%)
3	EDO	B	1451	-	3,3,3	0.35	0	2,2,2	0.52	0
3	EDO	B	1446	-	3,3,3	0.61	0	2,2,2	0.23	0
2	IK2	C	1445	-	18,21,21	1.33	4 (22%)	21,29,29	2.16	6 (28%)
2	IK2	A	1445	-	18,21,21	1.44	4 (22%)	21,29,29	3.08	5 (23%)
3	EDO	C	1452	-	3,3,3	0.53	0	2,2,2	0.54	0
3	EDO	A	1449	-	3,3,3	0.47	0	2,2,2	0.52	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	C	1449	-	-	1/1/1/1	-
3	EDO	C	1450	-	-	0/1/1/1	-
3	EDO	B	1452	-	-	1/1/1/1	-
3	EDO	B	1448	-	-	1/1/1/1	-
3	EDO	C	1453	-	-	0/1/1/1	-
3	EDO	B	1453	-	-	1/1/1/1	-
3	EDO	B	1450	-	-	1/1/1/1	-
3	EDO	B	1449	-	-	0/1/1/1	-
3	EDO	C	1451	-	-	1/1/1/1	-
3	EDO	A	1446	-	-	0/1/1/1	-
3	EDO	C	1446	-	-	0/1/1/1	-
3	EDO	C	1447	-	-	1/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	EDO	A	1450	-	-	0/1/1/1	-
3	EDO	A	1447	-	-	1/1/1/1	-
3	EDO	C	1448	-	-	1/1/1/1	-
3	EDO	A	1448	-	-	0/1/1/1	-
2	IK2	B	1447	-	-	2/9/13/13	0/1/1/1
3	EDO	B	1451	-	-	0/1/1/1	-
3	EDO	B	1446	-	-	0/1/1/1	-
2	IK2	C	1445	-	-	2/9/13/13	0/1/1/1
2	IK2	A	1445	-	-	2/9/13/13	0/1/1/1
3	EDO	C	1452	-	-	1/1/1/1	-
3	EDO	A	1449	-	-	1/1/1/1	-

All (11) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1447	IK2	C2A-C2	4.20	1.57	1.50
2	C	1445	IK2	C4A-N4A	-3.22	1.41	1.46
2	B	1447	IK2	C4A-N4A	-3.02	1.41	1.46
2	B	1447	IK2	P-O1P	2.99	1.60	1.50
2	A	1445	IK2	C4A-N4A	-2.66	1.42	1.46
2	A	1445	IK2	C3-C2	-2.53	1.38	1.40
2	A	1445	IK2	P-O1P	2.50	1.58	1.50
2	C	1445	IK2	C3-C2	-2.22	1.38	1.40
2	C	1445	IK2	OX-N4A	2.20	1.48	1.45
2	A	1445	IK2	C2A-C2	2.16	1.54	1.50
2	C	1445	IK2	P-O1P	2.07	1.57	1.50

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1447	IK2	C4A-C4-C5	9.50	130.27	119.71
2	A	1445	IK2	C4A-C4-C5	9.35	130.10	119.71
2	B	1447	IK2	C4A-C4-C3	-7.86	111.63	120.04
2	A	1445	IK2	C4A-C4-C3	-7.82	111.67	120.04
2	C	1445	IK2	C4-C4A-N4A	5.40	120.66	110.27
2	C	1445	IK2	C4A-C4-C3	5.00	125.40	120.04
2	A	1445	IK2	C2A-C2-N1	3.25	124.02	117.67
2	C	1445	IK2	C4A-C4-C5	-3.22	116.13	119.71
2	B	1447	IK2	C4-C4A-N4A	3.11	116.25	110.27
2	B	1447	IK2	C5A-C5-C6	-3.10	114.28	119.37
2	A	1445	IK2	C4-C4A-N4A	3.09	116.21	110.27

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1445	IK2	C2A-C2-C3	-2.60	117.68	120.89
2	C	1445	IK2	C6-C5-C4	2.58	119.94	118.12
2	C	1445	IK2	C5-C6-N1	-2.56	119.56	123.82
2	B	1447	IK2	C3-C2-N1	-2.42	117.64	120.77
2	B	1447	IK2	C6-N1-C2	2.19	123.22	119.17
2	C	1445	IK2	C6-N1-C2	2.00	122.88	119.17

There are no chirality outliers.

All (17) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	1447	IK2	C3-C4-C4A-N4A
2	B	1447	IK2	C5-C4-C4A-N4A
2	A	1445	IK2	C3-C4-C4A-N4A
2	A	1445	IK2	C5-C4-C4A-N4A
3	B	1448	EDO	O1-C1-C2-O2
3	C	1451	EDO	O1-C1-C2-O2
3	C	1448	EDO	O1-C1-C2-O2
3	B	1452	EDO	O1-C1-C2-O2
3	B	1453	EDO	O1-C1-C2-O2
2	C	1445	IK2	C3-C4-C4A-N4A
3	C	1449	EDO	O1-C1-C2-O2
3	A	1449	EDO	O1-C1-C2-O2
2	C	1445	IK2	C5-C4-C4A-N4A
3	B	1450	EDO	O1-C1-C2-O2
3	C	1447	EDO	O1-C1-C2-O2
3	A	1447	EDO	O1-C1-C2-O2
3	C	1452	EDO	O1-C1-C2-O2

There are no ring outliers.
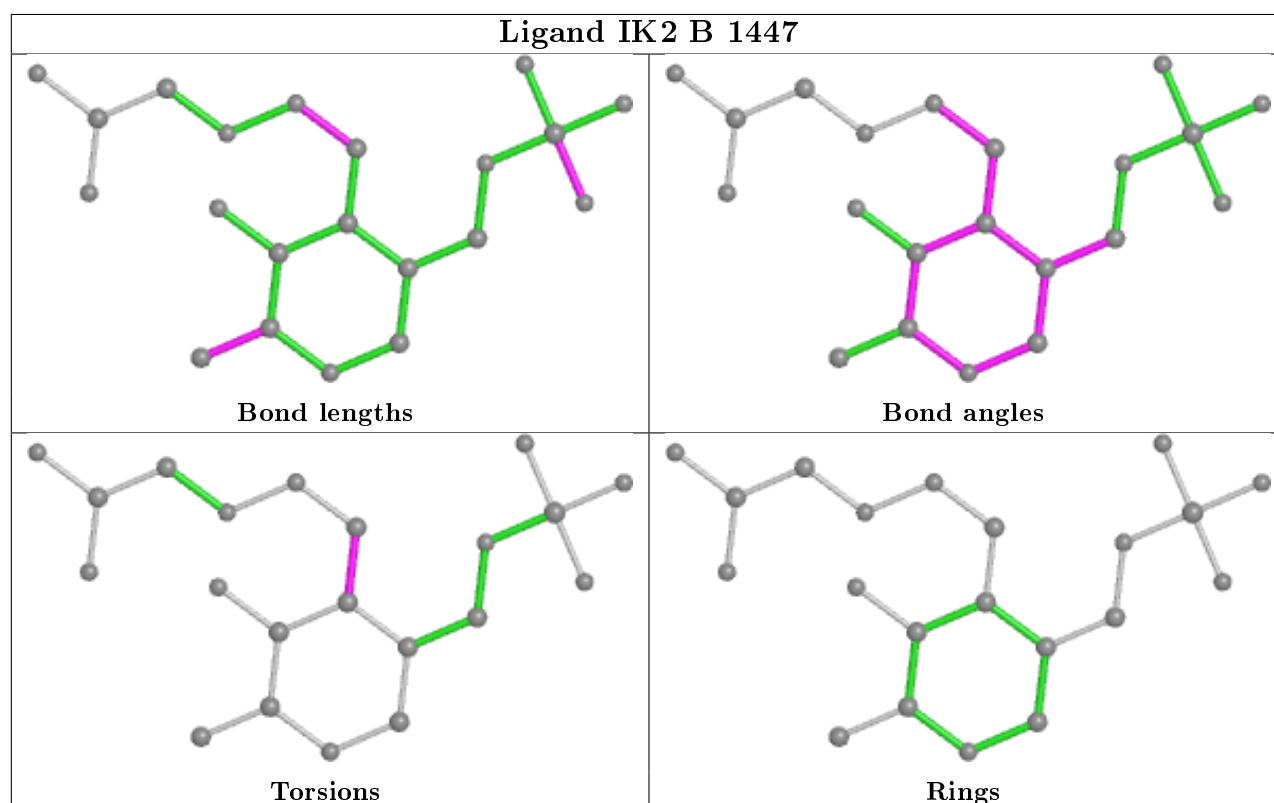
12 monomers are involved in 17 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	1449	EDO	3	0
3	C	1450	EDO	1	0
3	B	1448	EDO	1	0
3	B	1450	EDO	1	0
3	B	1449	EDO	1	0
3	C	1446	EDO	1	0
2	B	1447	IK2	2	0
3	B	1451	EDO	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	1446	EDO	1	0
2	C	1445	IK2	2	0
2	A	1445	IK2	3	0
3	A	1449	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 then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand IK2 B 1447

Bond lengths

Bond angles

Torsions

Rings

Ligand IK2 C 1445

Bond lengths

Bond angles

Torsions

Rings

Ligand IK2 A 1445

Bond lengths

Bond angles

Torsions

Rings
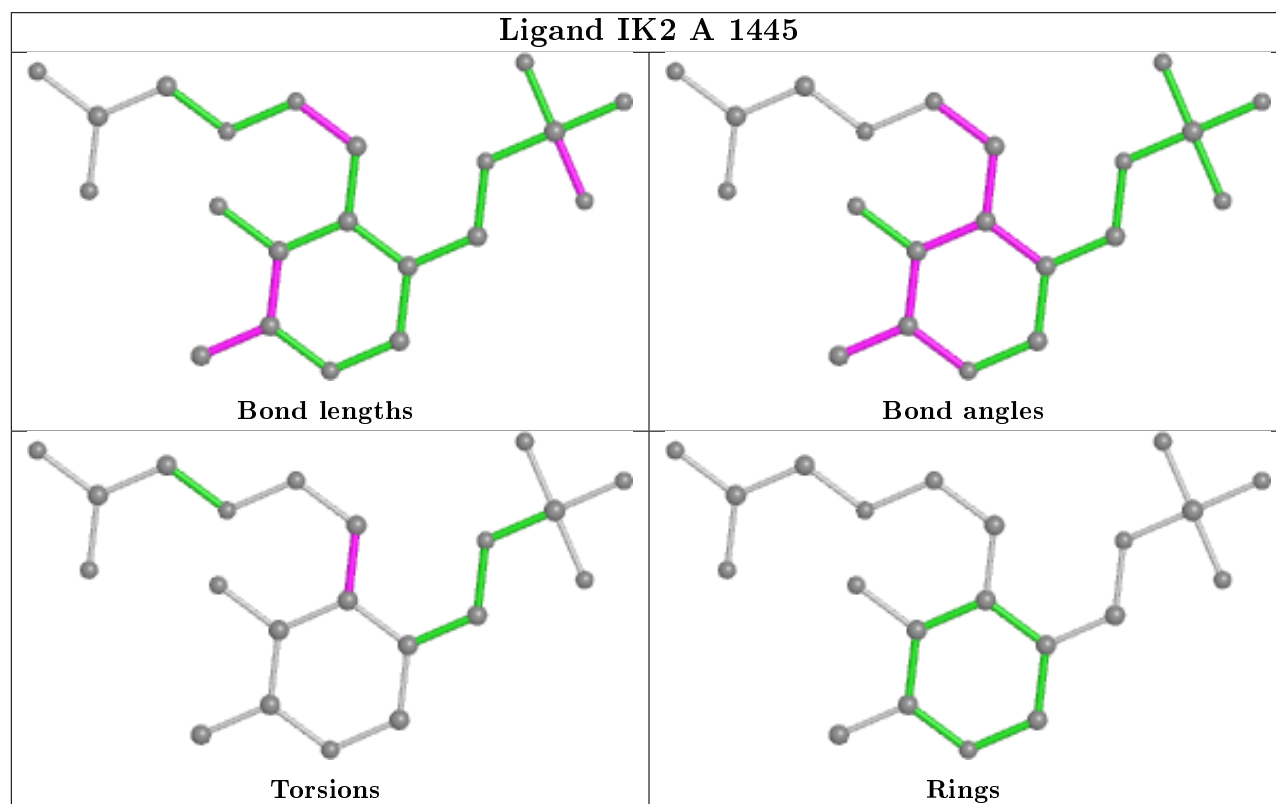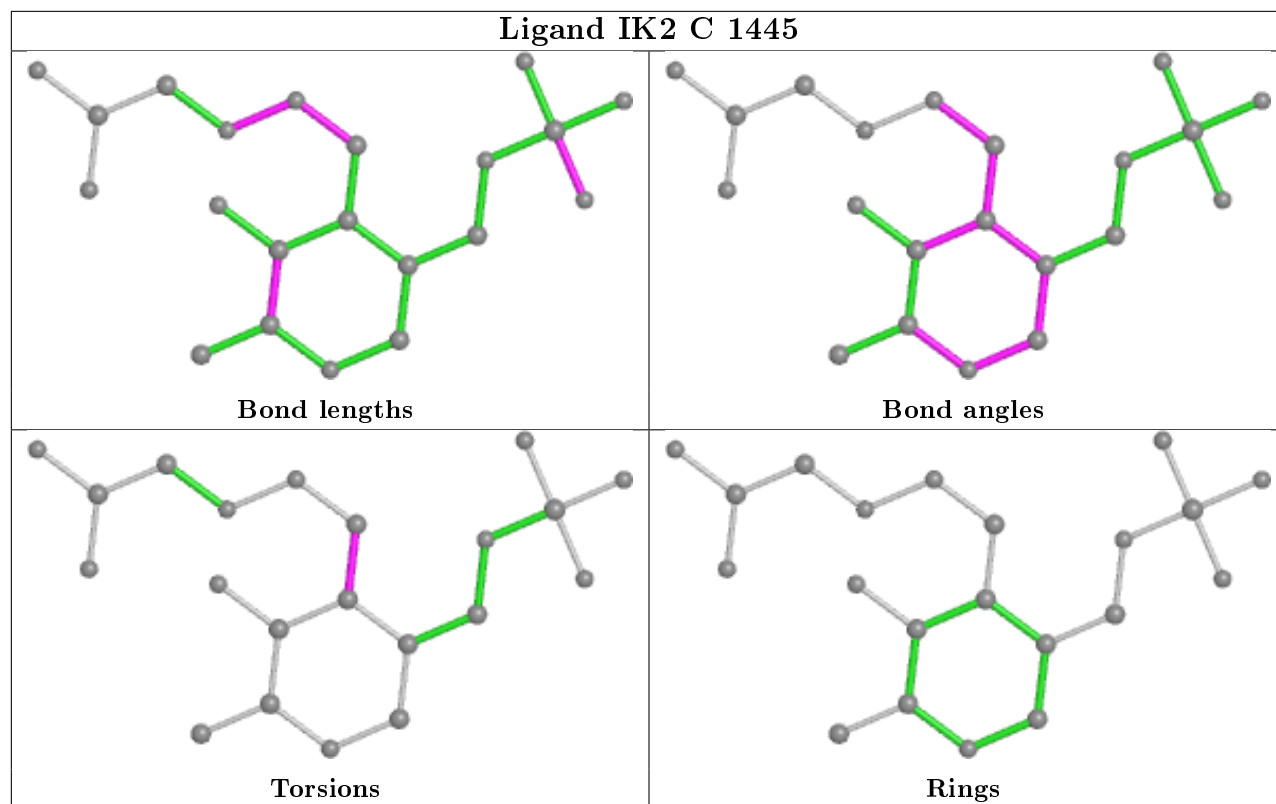
5.7   Other polymers (i)

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	432/465 (92%)	-0.25	8 (1%)	66	69	13, 21, 33, 44	0
1	B	430/465 (92%)	-0.28	10 (2%)	60	63	14, 21, 33, 45	0
1	C	430/465 (92%)	-0.42	8 (1%)	66	69	11, 17, 30, 42	0
All	All	1292/1395 (92%)	-0.32	26 (2%)	65	68	11, 20, 32, 45	0

All (26) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	445	MET	5.4
1	B	212	HIS	5.0
1	A	13	ALA	4.1
1	B	17	ALA	3.9
1	B	209	ARG	3.4
1	B	21	GLN	3.4
1	C	15	ASP	3.1
1	C	18	GLU	3.0
1	B	208	LYS	2.9
1	A	360	GLN	2.8
1	C	212	HIS	2.8
1	B	213	ASP	2.6
1	A	209	ARG	2.6
1	B	18	GLU	2.5
1	C	442	ALA	2.5
1	B	16	THR	2.5
1	C	441	ARG	2.4
1	A	213	ASP	2.2
1	A	306	ASP	2.2
1	B	205	ASP	2.2
1	A	32	ARG	2.2
1	C	209	ARG	2.2
1	A	378	ARG	2.1

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Mol	Chain	Res	Type	RSRZ
1	C	46	ARG	2.1
1	A	441	ARG	2.0
1	C	306	ASP	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 carbohydrates 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.
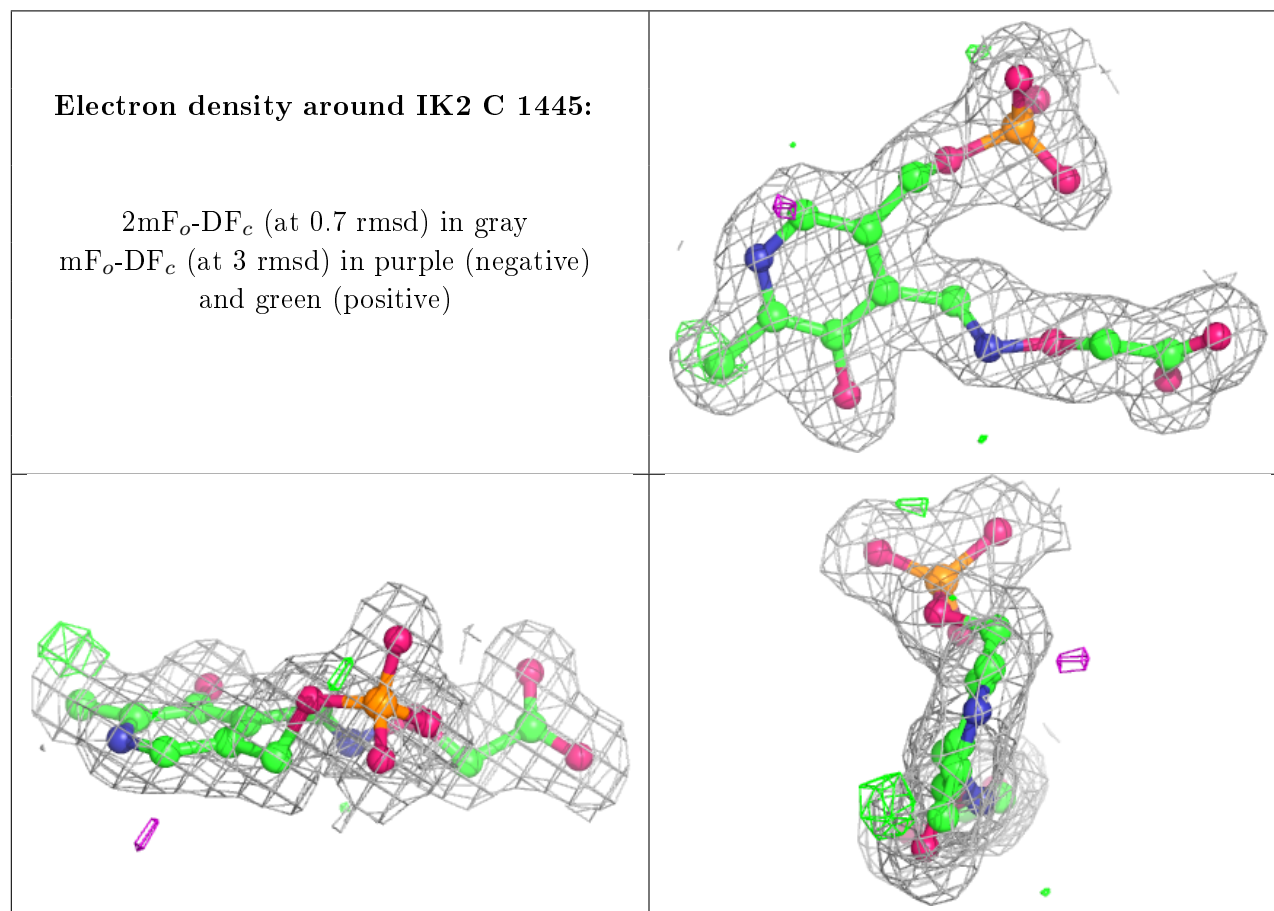
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	EDO	C	1448	4/4	0.83	0.20	45,46,46,46	0
3	EDO	B	1450	4/4	0.88	0.20	34,34,34,35	0
3	EDO	B	1453	4/4	0.89	0.13	41,42,42,42	0
3	EDO	C	1449	4/4	0.90	0.14	37,38,38,39	0
3	EDO	B	1452	4/4	0.91	0.10	29,29,30,33	0
3	EDO	C	1446	4/4	0.92	0.13	26,29,30,34	0
3	EDO	C	1447	4/4	0.92	0.12	24,27,27,32	0
3	EDO	B	1449	4/4	0.92	0.15	37,40,40,40	0
3	EDO	A	1446	4/4	0.93	0.11	37,38,39,40	0
3	EDO	C	1450	4/4	0.94	0.14	38,39,40,40	0
3	EDO	C	1451	4/4	0.94	0.11	34,34,35,35	0
3	EDO	A	1450	4/4	0.94	0.08	30,30,30,31	0
3	EDO	A	1447	4/4	0.94	0.14	25,25,26,26	0
3	EDO	B	1448	4/4	0.94	0.11	30,33,34,38	0
3	EDO	B	1451	4/4	0.95	0.11	30,32,32,33	0
3	EDO	C	1452	4/4	0.95	0.10	24,25,25,27	0
3	EDO	C	1453	4/4	0.96	0.08	21,25,27,30	0
3	EDO	A	1448	4/4	0.96	0.11	26,28,28,30	0
3	EDO	A	1449	4/4	0.96	0.08	25,28,29,29	0
2	IK2	C	1445	21/21	0.98	0.10	9,13,16,19	0

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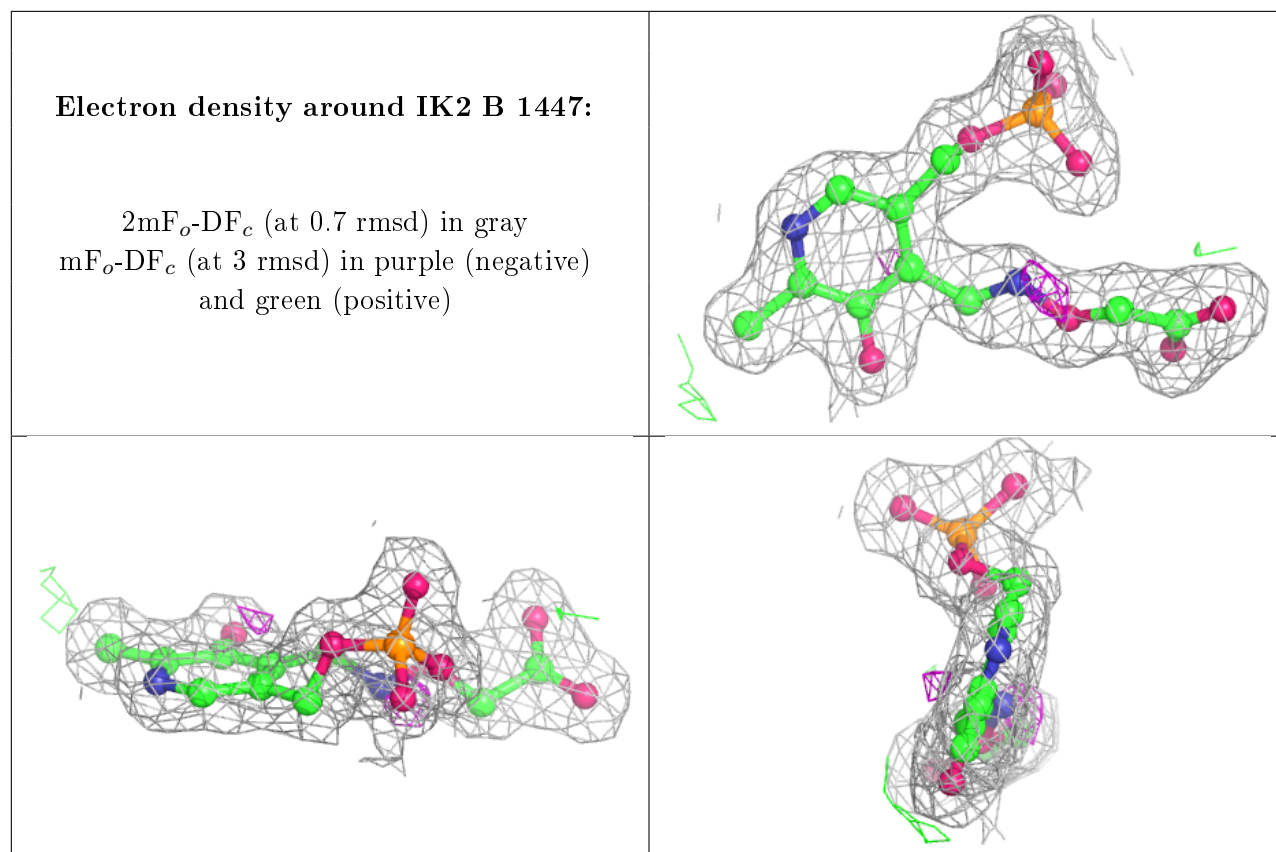| Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å²)	Q<0.9
2	IK2	A	1445	21/21	0.98	0.10	12,14,18,20	0
2	IK2	B	1447	21/21	0.98	0.11	12,15,19,22	0
3	EDO	B	1446	4/4	0.98	0.07	19,19,20,21	0

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 IK2 C 1445:

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

Electron density around IK2 A 1445:

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

Electron density around IK2 B 1447:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.