



# Full wwPDB X-ray Structure Validation Report ⓘ

May 16, 2020 – 05:27 am BST

PDB ID : 3O34  
Title : Crystal structure of TRIM24 PHD-Bromo complexed with H3(13-32)K23ac peptide  
Authors : Wang, Z.; Patel, D.J.  
Deposited on : 2010-07-23  
Resolution : 1.90 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](mailto: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.

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The following versions of software and data (see [references ⓘ](#)) 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  
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

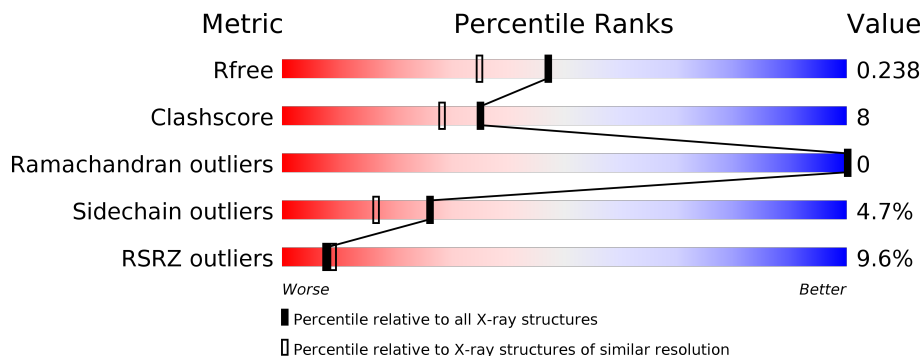
# 1 Overall quality at a glance

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	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  $\geq 3$ , 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	184	<p>9% 77% 17% . .</p>
2	B	22	<p>5% 41% 9% 5% 45%</p>

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 1637 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 Transcription intermediary factor 1-alpha.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	177	1438	922	229	272	15	0	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	823	SER	-	EXPRESSION TAG	UNP O15164

- Molecule 2 is a protein called Histone H3.1.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	B	12	91	57	17	17	0	0	0

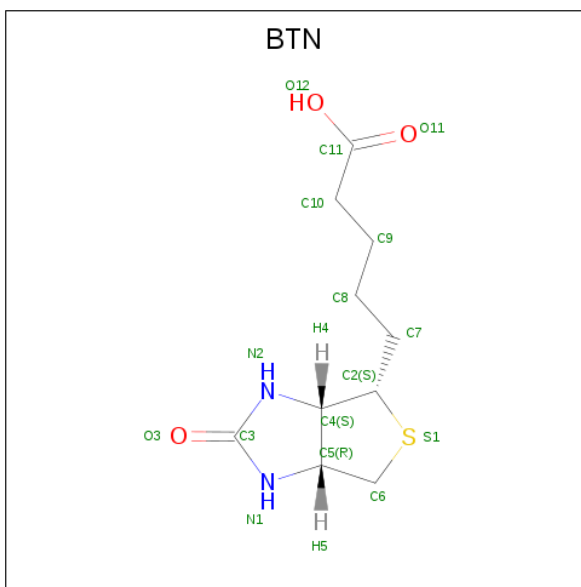
There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	33	TYR	-	SEE REMARK 999	UNP P68431
B	34	LYS	-	SEE REMARK 999	UNP P68431

- Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Zn		
3	A	2	2	2	0	0

- Molecule 4 is BIOTIN (three-letter code: BTN) (formula: C<sub>10</sub>H<sub>16</sub>N<sub>2</sub>O<sub>3</sub>S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
4	B	1	15	10	2	2	1	0	0

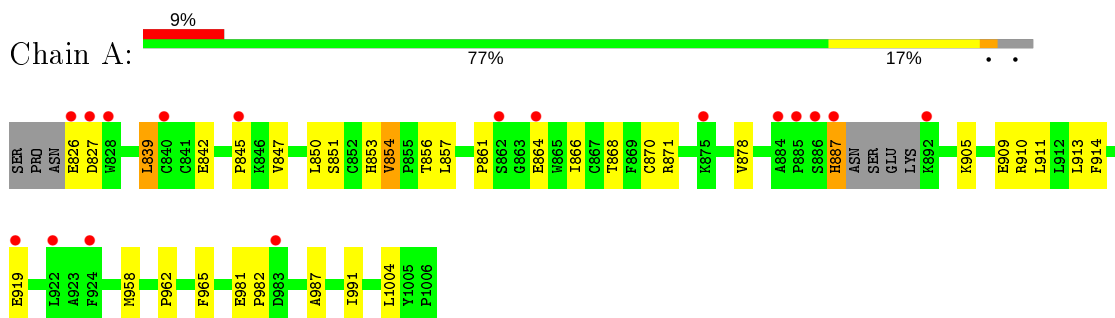
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	86	Total	O	0	0
			86	86		
5	B	5	Total	O	0	0
			5	5		

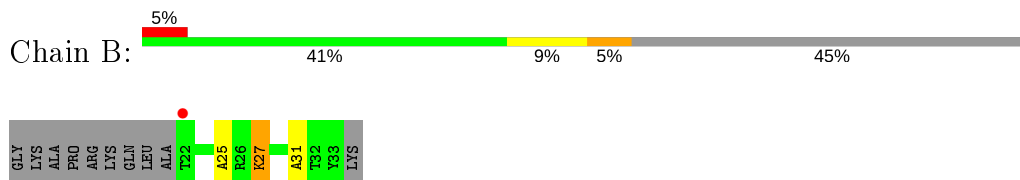
### 3 Residue-property plots [i](#)

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: Transcription intermediary factor 1-alpha



- Molecule 2: Histone H3.1



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	36.84Å 41.11Å 125.99Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.54 – 1.90 19.54 – 1.90	Depositor EDS
% Data completeness (in resolution range)	98.8 (19.54-1.90) 98.7 (19.54-1.90)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.06	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	4.90 (at 1.90Å)	Xtrriage
Refinement program	CNS	Depositor
R, $R_{free}$	0.217 , 0.241 0.213 , 0.238	Depositor DCC
$R_{free}$ test set	797 reflections (5.10%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	27.5	Xtrriage
Anisotropy	0.031	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.40 , 52.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	1637	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	35.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.96% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup> Intensities estimated from amplitudes.

<sup>2</sup> Theoretical 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: ZN, BTN, ALY

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	0.39	0/1475	0.60	0/1996
2	B	0.56	0/79	0.81	0/105
All	All	0.40	0/1554	0.61	0/2101

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	1438	0	1391	22	0
2	B	91	0	93	3	0
3	A	2	0	0	0	0
4	B	15	0	15	0	0
5	A	86	0	0	0	0
5	B	5	0	0	1	0
All	All	1637	0	1499	25	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 8.

All (25) 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:A:842:GLU:HG3	1:A:864:GLU:HG2	1.46	0.94
1:A:839:LEU:HD11	1:A:850:LEU:HD23	1.51	0.91
1:A:887:HIS:CD2	1:A:887:HIS:H	1.98	0.82
1:A:853:HIS:HE1	1:A:868:THR:H	1.25	0.81
2:B:27:LYS:CE	2:B:31:ALA:HB2	2.17	0.74
1:A:839:LEU:CD1	1:A:850:LEU:HD23	2.18	0.72
1:A:981:GLU:OE1	1:A:982:PRO:HD2	1.98	0.64
1:A:842:GLU:HG3	1:A:864:GLU:CG	2.23	0.64
1:A:887:HIS:CD2	1:A:887:HIS:N	2.68	0.58
1:A:853:HIS:CE1	1:A:868:THR:H	2.14	0.58
2:B:27:LYS:HE3	2:B:31:ALA:HB2	1.90	0.51
2:B:25:ALA:HB1	5:B:102:HOH:O	2.14	0.47
1:A:962:PRO:HA	1:A:965:PHE:CE2	2.50	0.46
1:A:839:LEU:HD21	1:A:861:PRO:HD3	1.97	0.46
1:A:854:VAL:HG13	1:A:913:LEU:HD13	1.98	0.45
1:A:826:GLU:HG2	1:A:845:PRO:O	2.16	0.45
1:A:851:SER:HA	1:A:856:THR:HG23	2.00	0.44
1:A:911:LEU:HG	1:A:1004:LEU:CD1	2.47	0.44
1:A:987:ALA:O	1:A:991:ILE:HG12	2.18	0.43
1:A:910:ARG:HG2	1:A:914:PHE:CE1	2.53	0.43
1:A:850:LEU:HB3	1:A:857:LEU:O	2.18	0.42
1:A:905:LYS:O	1:A:909:GLU:HG3	2.20	0.42
1:A:866:ILE:HD11	1:A:870:CYS:C	2.40	0.41
1:A:866:ILE:CG2	1:A:878:VAL:HG22	2.51	0.41
1:A:839:LEU:O	1:A:847:VAL:HA	2.21	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	173/184 (94%)	168 (97%)	5 (3%)	0	100	100
2	B	9/22 (41%)	9 (100%)	0	0	100	100
All	All	182/206 (88%)	177 (97%)	5 (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	165/172 (96%)	158 (96%)	7 (4%)	30	20
2	B	7/14 (50%)	6 (86%)	1 (14%)	3	1
All	All	172/186 (92%)	164 (95%)	8 (5%)	26	16

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	827	ASP
1	A	839	LEU
1	A	854	VAL
1	A	871	ARG
1	A	887	HIS
1	A	919	GLU
1	A	958	MET
2	B	27	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	853	HIS
1	A	887	HIS
1	A	1003	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](#)

1 non-standard protein/DNA/RNA residue is 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
2	ALY	B	23	2	10,11,12	0.64	0	7,12,14	1.47	2 (28%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	ALY	B	23	2	-	1/9/10/12	-

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	23	ALY	CD-CG-CB	-2.31	105.43	113.62
2	B	23	ALY	CH3-CH-NZ	2.16	119.91	116.09

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	23	ALY	CE-CD-CG-CB

There are no ring outliers.

No monomer is involved in short contacts.

## 5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

Of 3 ligands modelled in this entry, 2 are monoatomic - leaving 1 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
4	BTN	B	1	-	16,16,17	1.16	1 (6%)	21,21,23	3.24	10 (47%)

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	BTN	B	1	-	-	0/5/27/28	0/2/2/2

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	1	BTN	C2-S1	2.84	1.87	1.82

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	1	BTN	C6-C5-C4	6.37	114.19	108.66
4	B	1	BTN	C5-C6-S1	-5.37	101.71	106.31
4	B	1	BTN	C4-C2-S1	-5.32	100.14	105.20
4	B	1	BTN	N2-C3-N1	5.06	113.51	108.76
4	B	1	BTN	C2-C4-C5	4.96	114.70	108.94
4	B	1	BTN	C4-N2-C3	-4.11	108.79	112.62
4	B	1	BTN	C6-S1-C2	3.98	98.07	89.89
4	B	1	BTN	C8-C7-C2	-3.49	106.78	113.86

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	1	BTN	C5-N1-C3	-2.87	108.72	112.46
4	B	1	BTN	C4-C5-N1	2.33	104.90	102.43

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	177/184 (96%)	0.65	17 (9%) 8 9	17, 30, 64, 90	0
2	B	11/22 (50%)	0.76	1 (9%) 9 10	26, 39, 74, 93	0
All	All	188/206 (91%)	0.66	18 (9%) 8 9	17, 31, 64, 93	0

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	887	HIS	9.3
1	A	828	TRP	6.6
1	A	886	SER	5.4
1	A	885	PRO	5.0
2	B	22	THR	4.9
1	A	864	GLU	4.7
1	A	892	LYS	4.3
1	A	827	ASP	4.2
1	A	884	ALA	2.9
1	A	983	ASP	2.9
1	A	922	LEU	2.9
1	A	845	PRO	2.4
1	A	875	LYS	2.4
1	A	862	SER	2.4
1	A	826	GLU	2.2
1	A	840	CYS	2.1
1	A	924	PHE	2.1
1	A	919	GLU	2.0

### 6.2 Non-standard residues in protein, DNA, RNA chains [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, 95<sup>th</sup> 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( $\text{\AA}^2$ )	Q<0.9
2	ALY	B	23	12/13	0.78	0.23	32,39,52,59	0

### 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, 95<sup>th</sup> 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( $\text{\AA}^2$ )	Q<0.9
4	BTN	B	1	15/16	0.68	0.29	31,39,43,46	0
3	ZN	A	1	1/1	0.97	0.07	36,36,36,36	0
3	ZN	A	2	1/1	0.99	0.08	36,36,36,36	0

### 6.5 Other polymers [i](#)

There are no such residues in this entry.