



wwPDB X-ray Structure Validation Summary Report ⓘ

May 26, 2020 – 02:01 am BST

PDB ID : 6G6L
Title : The crystal structures of Human MYC:MAX bHLHZip complex
Authors : Allen, M.D.; Zinzalla, G.
Deposited on : 2018-04-01
Resolution : 2.20 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 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

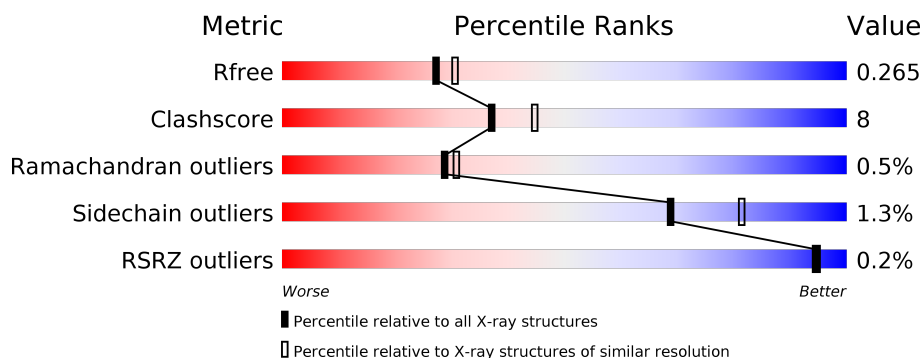
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 Å.

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





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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments 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 $\leq 5\%$. 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	94	<div> <div>67%</div> <div>15%</div> <div>•</div> <div>17%</div> </div>
1	C	94	<div> <div>76%</div> <div>7%</div> <div>•</div> <div>16%</div> </div>
1	E	94	<div> <div>67%</div> <div>13%</div> <div>•</div> <div>17%</div> </div>
1	G	94	<div> <div>%</div> <div>74%</div> <div>6%</div> <div>•</div> <div>18%</div> </div>
2	B	83	<div> <div>71%</div> <div>11%</div> <div>18%</div> </div>
2	D	83	<div> <div>69%</div> <div>17%</div> <div>14%</div> </div>

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Mol	Chain	Length	Quality of chain
2	F	83	 76% 10% 14%
2	H	83	 71% 10% 19%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 5511 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 Myc proto-oncogene protein.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
1	A	78	Total	C	N	O	0	0	0
			659	411	127	121			
1	C	79	Total	C	N	O	0	0	0
			669	417	130	122			
1	E	78	Total	C	N	O	0	0	0
			659	411	127	121			
1	G	77	Total	C	N	O	0	0	0
			651	407	125	119			

There are 28 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	891	MET	-	initiating methionine	UNP P01106
A	892	HIS	-	expression tag	UNP P01106
A	893	HIS	-	expression tag	UNP P01106
A	894	HIS	-	expression tag	UNP P01106
A	895	HIS	-	expression tag	UNP P01106
A	896	HIS	-	expression tag	UNP P01106
A	897	HIS	-	expression tag	UNP P01106
C	891	MET	-	initiating methionine	UNP P01106
C	892	HIS	-	expression tag	UNP P01106
C	893	HIS	-	expression tag	UNP P01106
C	894	HIS	-	expression tag	UNP P01106
C	895	HIS	-	expression tag	UNP P01106
C	896	HIS	-	expression tag	UNP P01106
C	897	HIS	-	expression tag	UNP P01106
E	891	MET	-	initiating methionine	UNP P01106
E	892	HIS	-	expression tag	UNP P01106
E	893	HIS	-	expression tag	UNP P01106
E	894	HIS	-	expression tag	UNP P01106
E	895	HIS	-	expression tag	UNP P01106
E	896	HIS	-	expression tag	UNP P01106
E	897	HIS	-	expression tag	UNP P01106

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Chain	Residue	Modelled	Actual	Comment	Reference
G	891	MET	-	initiating methionine	UNP P01106
G	892	HIS	-	expression tag	UNP P01106
G	893	HIS	-	expression tag	UNP P01106
G	894	HIS	-	expression tag	UNP P01106
G	895	HIS	-	expression tag	UNP P01106
G	896	HIS	-	expression tag	UNP P01106
G	897	HIS	-	expression tag	UNP P01106

- Molecule 2 is a protein called Protein max.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	68	Total	C	N	O	S	0	0	0
			569	346	115	107	1			
2	D	71	Total	C	N	O	S	0	0	0
			598	363	122	112	1			
2	F	71	Total	C	N	O	S	0	0	0
			598	363	122	112	1			
2	H	67	Total	C	N	O	S	0	0	0
			558	340	111	106	1			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	200	MET	-	initiating methionine	UNP P61244
D	200	MET	-	initiating methionine	UNP P61244
F	200	MET	-	initiating methionine	UNP P61244
H	200	MET	-	initiating methionine	UNP P61244

- Molecule 3 is SULFATE ION (three-letter code: SO₄) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	O	S	0	0
			5	4	1		
3	A	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		
3	C	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	D	1	Total	O	S	0	0
			5	4	1		
3	E	1	Total	O	S	0	0
			5	4	1		
3	F	1	Total	O	S	0	0
			5	4	1		
3	F	1	Total	O	S	0	0
			5	4	1		
3	G	1	Total	O	S	0	0
			5	4	1		
3	G	1	Total	O	S	0	0
			5	4	1		
3	H	1	Total	O	S	0	0
			5	4	1		
3	H	1	Total	O	S	0	0
			5	4	1		

- Molecule 4 is water.

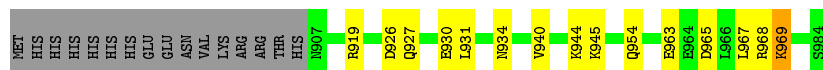
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	58	Total 58	O 58	0	0
4	B	56	Total 56	O 56	0	0
4	C	71	Total 71	O 71	0	0
4	D	51	Total 51	O 51	0	0
4	E	63	Total 63	O 63	0	0
4	F	47	Total 47	O 47	0	0
4	G	81	Total 81	O 81	0	0
4	H	53	Total 53	O 53	0	0

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: Myc proto-oncogene protein

Chain A: 



- Molecule 1: Myc proto-oncogene protein

Chain C: 




- Molecule 1: Myc proto-oncogene protein

Chain E: 



- Molecule 1: Myc proto-oncogene protein

Chain G: 



- Molecule 2: Protein max

Chain B: 



- Molecule 2: Protein max

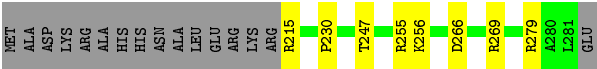
Chain D: 



● Molecule 2: Protein max



● Molecule 2: Protein max



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	48.68 Å 74.33 Å 80.06 Å 107.12° 107.67° 90.05°	Depositor
Resolution (Å)	46.16 – 2.20 70.69 – 2.20	Depositor EDS
% Data completeness (in resolution range)	80.4 (46.16-2.20) 80.2 (70.69-2.20)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.11 (at 2.20 Å)	Xtriage
Refinement program	PHENIX (1.12_2829: ???)	Depositor
R, R_{free}	0.215 , 0.268 0.215 , 0.265	Depositor DCC
R_{free} test set	1981 reflections (4.77%)	wwPDB-VP
Wilson B-factor (Å ²)	29.2	Xtriage
Anisotropy	0.584	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 30.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.467 for h,-k,-h-l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	5511	wwPDB-VP
Average B, all atoms (Å ²)	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 9.41% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: SO4

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	0.27	0/664	0.40	0/885
1	C	0.24	0/675	0.35	0/900
1	E	0.25	0/664	0.39	0/885
1	G	0.26	0/656	0.40	0/874
2	B	0.27	0/576	0.43	0/770
2	D	0.25	0/605	0.37	0/807
2	F	0.25	0/605	0.36	0/807
2	H	0.25	0/565	0.40	0/756
All	All	0.26	0/5010	0.39	0/6684

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	659	0	697	15	0
1	C	669	0	704	7	1
1	E	659	0	697	16	0
1	G	651	0	691	8	0
2	B	569	0	567	13	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	598	0	599	10	0
2	F	598	0	599	6	0
2	H	558	0	554	6	0
3	A	10	0	0	1	0
3	B	10	0	0	2	0
3	C	5	0	0	1	0
3	D	10	0	0	0	0
3	E	5	0	0	0	0
3	F	10	0	0	1	0
3	G	10	0	0	0	0
3	H	10	0	0	1	0
4	A	58	0	0	6	2
4	B	56	0	0	6	0
4	C	71	0	0	7	2
4	D	51	0	0	6	0
4	E	63	0	0	7	1
4	F	47	0	0	3	1
4	G	81	0	0	4	1
4	H	53	0	0	4	0
All	All	5511	0	5108	79	4

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.

The worst 5 of 79 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)
2:B:260:HIS:O	2:B:264:ILE:HD13	1.64	0.96
3:B:302:SO4:O3	4:B:401:HOH:O	1.90	0.88
1:A:927:GLN:HE22	2:B:251:GLN:HG3	1.39	0.87
2:F:227:ASP:OD2	4:F:401:HOH:O	1.92	0.86
3:F:302:SO4:O1	4:F:402:HOH:O	1.92	0.86

All (4) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:1155:HOH:O	4:C:1169:HOH:O[1_455]	2.09	0.11
4:C:1146:HOH:O	4:E:1150:HOH:O[1_556]	2.11	0.09
4:F:436:HOH:O	4:G:1151:HOH:O[1_655]	2.12	0.08

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:925:ARG:NH2	4:A:1104:HOH:O[1_655]	2.15	0.05

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	76/94 (81%)	75 (99%)	1 (1%)	0	100	100
1	C	77/94 (82%)	77 (100%)	0	0	100	100
1	E	76/94 (81%)	73 (96%)	0	3 (4%)	3	1
1	G	75/94 (80%)	74 (99%)	1 (1%)	0	100	100
2	B	66/83 (80%)	66 (100%)	0	0	100	100
2	D	69/83 (83%)	68 (99%)	1 (1%)	0	100	100
2	F	69/83 (83%)	69 (100%)	0	0	100	100
2	H	65/83 (78%)	65 (100%)	0	0	100	100
All	All	573/708 (81%)	567 (99%)	3 (0%)	3 (0%)	29	31

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	E	933	ASN
1	E	932	GLU
1	E	934	ASN

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	73/89 (82%)	72 (99%)	1 (1%)	67	80
1	C	74/89 (83%)	72 (97%)	2 (3%)	44	57
1	E	73/89 (82%)	73 (100%)	0	100	100
1	G	72/89 (81%)	71 (99%)	1 (1%)	67	80
2	B	62/74 (84%)	62 (100%)	0	100	100
2	D	65/74 (88%)	63 (97%)	2 (3%)	40	51
2	F	65/74 (88%)	65 (100%)	0	100	100
2	H	61/74 (82%)	60 (98%)	1 (2%)	62	76
All	All	545/652 (84%)	538 (99%)	7 (1%)	69	81

5 of 7 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	D	215	ARG
2	H	255	ARG
2	D	222	PHE
1	C	936	LYS
1	G	911	ARG

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

Mol	Chain	Res	Type
1	A	927	GLN

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

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
3	SO4	G	1001	-	4,4,4	0.15	0	6,6,6	0.06	0
3	SO4	H	301	-	4,4,4	0.16	0	6,6,6	0.06	0
3	SO4	A	1001	-	4,4,4	0.14	0	6,6,6	0.10	0
3	SO4	C	1001	-	4,4,4	0.16	0	6,6,6	0.08	0
3	SO4	D	302	-	4,4,4	0.15	0	6,6,6	0.06	0
3	SO4	B	301	-	4,4,4	0.11	0	6,6,6	0.09	0
3	SO4	F	301	1	4,4,4	0.12	0	6,6,6	0.14	0
3	SO4	B	302	1	4,4,4	0.19	0	6,6,6	0.16	0
3	SO4	D	301	-	4,4,4	0.14	0	6,6,6	0.09	0
3	SO4	H	302	-	4,4,4	0.16	0	6,6,6	0.11	0
3	SO4	A	1002	-	4,4,4	0.17	0	6,6,6	0.10	0
3	SO4	G	1002	-	4,4,4	0.14	0	6,6,6	0.09	0
3	SO4	E	1001	-	4,4,4	0.13	0	6,6,6	0.05	0
3	SO4	F	302	-	4,4,4	0.14	0	6,6,6	0.09	0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

6 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	1001	SO4	1	0
3	B	301	SO4	1	0
3	B	302	SO4	1	0
3	H	302	SO4	1	0
3	A	1002	SO4	1	0
3	F	302	SO4	1	0

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	78/94 (82%)	-0.25	0 100 100	22, 36, 59, 69	0
1	C	79/94 (84%)	-0.29	0 100 100	23, 36, 62, 74	0
1	E	78/94 (82%)	-0.32	0 100 100	21, 36, 61, 65	0
1	G	77/94 (81%)	-0.28	1 (1%) 77 75	20, 35, 56, 65	0
2	B	68/83 (81%)	-0.23	0 100 100	22, 34, 60, 69	0
2	D	71/83 (85%)	-0.25	0 100 100	23, 35, 69, 86	0
2	F	71/83 (85%)	-0.21	0 100 100	21, 34, 73, 93	0
2	H	67/83 (80%)	-0.25	0 100 100	21, 33, 55, 65	0
All	All	589/708 (83%)	-0.26	1 (0%) 95 94	20, 35, 62, 93	0

All (1) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	913	ARG	2.2

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(\AA^2)	Q<0.9
3	SO4	B	302	5/5	0.95	0.10	51,53,60,67	0
3	SO4	A	1001	5/5	0.96	0.11	48,52,63,63	0
3	SO4	F	301	5/5	0.96	0.11	49,50,53,70	0
3	SO4	H	301	5/5	0.96	0.09	48,53,58,78	0
3	SO4	D	302	5/5	0.97	0.09	63,64,71,71	0
3	SO4	G	1002	5/5	0.97	0.13	50,51,51,61	0
3	SO4	B	301	5/5	0.98	0.10	42,48,51,64	0
3	SO4	D	301	5/5	0.98	0.07	42,50,56,62	0
3	SO4	H	302	5/5	0.98	0.10	43,47,53,57	0
3	SO4	A	1002	5/5	0.98	0.09	43,44,54,70	0
3	SO4	C	1001	5/5	0.98	0.13	45,48,50,51	0
3	SO4	E	1001	5/5	0.98	0.10	68,68,70,82	0
3	SO4	G	1001	5/5	0.99	0.10	43,48,56,58	0
3	SO4	F	302	5/5	0.99	0.07	44,49,53,56	0

6.5 Other polymers

There are no such residues in this entry.