



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 5, 2024 – 12:51 pm BST

PDB ID : 2V4B
Title : Crystal Structure of Human ADAMTS-1 catalytic Domain and Cysteine- Rich Domain (apo-form)
Authors : Gerhardt, S.; Hassall, G.; Hawtin, P.; McCall, E.; Flavell, L.; Minshull, C.; Hargreaves, D.; Ting, A.; Paupit, R.A.; Parker, A.E.; Abbott, W.M.
Deposited on : 2007-06-28
Resolution : 2.00 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 3.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.003 (Gargrove)
Density-Fitness : 1.0.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

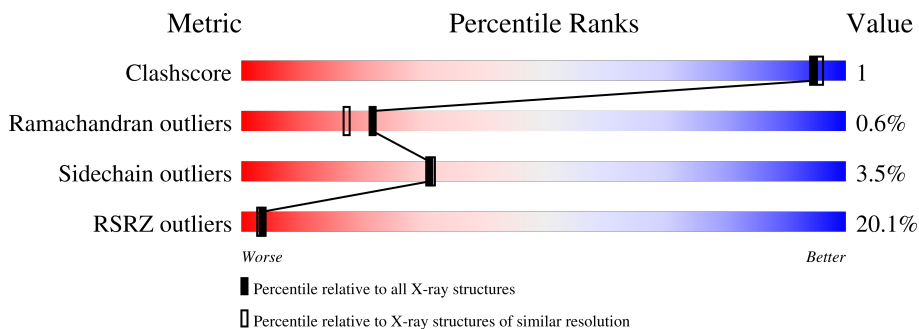
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 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))
Clashscore	180529	10737 (2.00-2.00)
Ramachandran outliers	177936	10628 (2.00-2.00)
Sidechain outliers	177891	10627 (2.00-2.00)
RSRZ outliers	164620	9409 (2.00-2.00)

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	300	
1	B	300	

2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 4556 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 ADAMTS-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	280	2151	1337	374	415	25	0	0	0
1	B	281	2164	1343	379	417	25	0	0	0

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Zn	0	0
			1	1		
2	B	1	Total	Zn	0	0
			1	1		

- Molecule 3 is CADMIUM ION (three-letter code: CD) (formula: Cd).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	2	Total	Cd	0	0
			2	2		
3	B	2	Total	Cd	0	0
			2	2		

- Molecule 4 is NICKEL (II) ION (three-letter code: NI) (formula: Ni).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	9	Total	Ni	0	0
			9	9		
4	B	5	Total	Ni	0	0
			5	5		

- Molecule 5 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	2	Total Mg 2 2	0	0
5	B	1	Total Mg 1 1	0	0

- Molecule 6 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	2	Total Na 2 2	0	0
6	B	2	Total Na 2 2	0	0

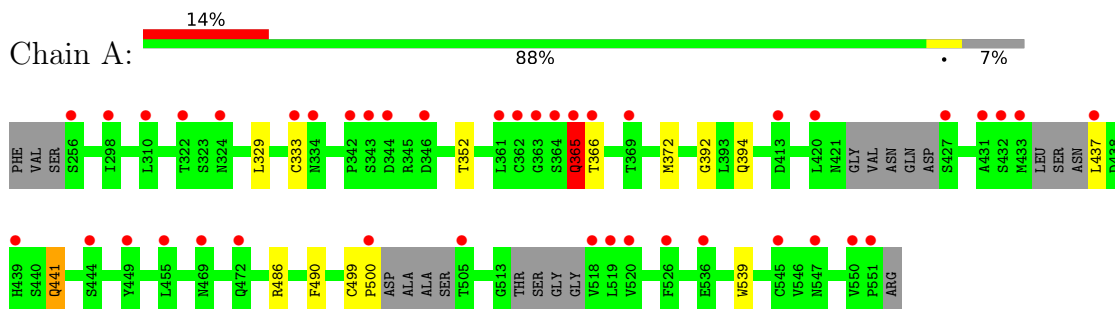
- Molecule 7 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	133	Total O 133 133	0	0
7	B	81	Total O 81 81	0	0

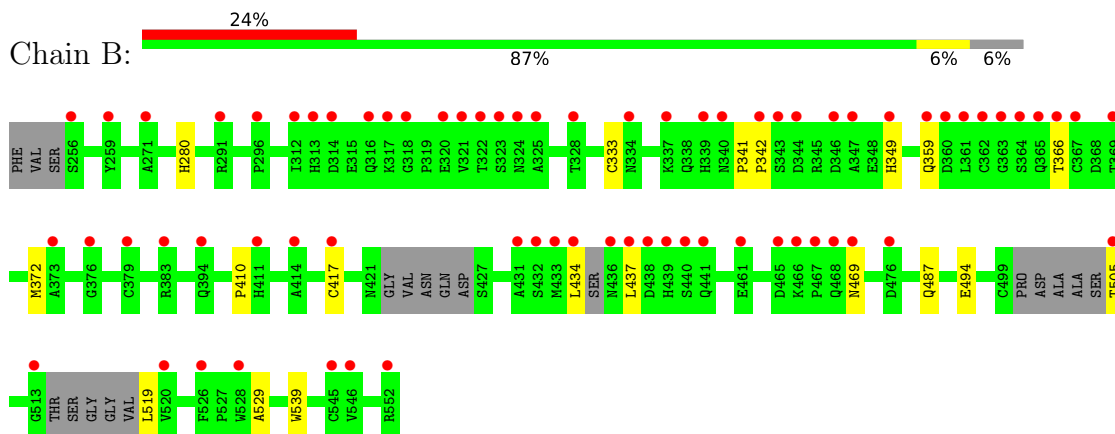
3 Residue-property plots [i](#)

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: ADAMTS-1



- Molecule 1: ADAMTS-1



4 Data and refinement statistics i

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	51.58Å 64.40Å 113.52Å 90.00° 90.91° 90.00°	Depositor
Resolution (Å)	40.26 – 2.00 40.26 – 2.00	Depositor EDS
% Data completeness (in resolution range)	99.9 (40.26-2.00) 99.9 (40.26-2.00)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.75 (at 2.00Å)	Xtrriage
Refinement program	REFMAC 5.2.0005	Depositor
R, R_{free}	0.220 , 0.263 (Not available) , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å ²)	27.5	Xtrriage
Anisotropy	0.458	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.39 , 46.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtrriage
Estimated twinning fraction	0.053 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	4556	wwPDB-VP
Average B, all atoms (Å ²)	38.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.53% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: NA, MG, NI, ZN, CD

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	0.50	0/2202	0.59	0/2988
1	B	0.49	0/2214	0.59	0/3002
All	All	0.50	0/4416	0.59	0/5990

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

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	2151	0	2021	6	0
1	B	2164	0	2035	4	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
3	A	2	0	0	0	0
3	B	2	0	0	0	0
4	A	9	0	0	0	0
4	B	5	0	0	0	0
5	A	2	0	0	0	0
5	B	1	0	0	0	0
6	A	2	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	B	2	0	0	0	0
7	A	133	0	0	0	0
7	B	81	0	0	0	0
All	All	4556	0	4056	9	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 1.

All (9) 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:499:CYS:HA	1:A:500:PRO:C	2.02	0.80
1:B:487:GLN:HE22	1:B:529:ALA:H	1.45	0.64
1:B:341:PRO:O	1:B:349:HIS:HD2	1.91	0.54
1:A:441:GLN:HE21	1:A:441:GLN:HA	1.74	0.52
1:A:365:GLN:HG2	1:A:366:THR:H	1.78	0.47
1:A:392:GLY:HA2	1:A:490:PHE:HB3	1.97	0.47
1:A:329:LEU:HD22	1:A:372:MET:HG3	1.98	0.44
1:A:486:ARG:HD3	1:B:280:HIS:HB2	2.02	0.41
1:B:410:PRO:HG2	1:B:417:CYS:SG	2.60	0.41

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	270/300 (90%)	267 (99%)	2 (1%)	1 (0%)	30	27
1	B	271/300 (90%)	264 (97%)	5 (2%)	2 (1%)	19	14
All	All	541/600 (90%)	531 (98%)	7 (1%)	3 (1%)	22	17

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	366	THR
1	A	365	GLN
1	B	342	PRO

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	243/259 (94%)	236 (97%)	7 (3%)	37	39
1	B	244/259 (94%)	234 (96%)	10 (4%)	26	25
All	All	487/518 (94%)	470 (96%)	17 (4%)	31	31

All (17) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	333	CYS
1	A	352	THR
1	A	365	GLN
1	A	394	GLN
1	A	437	LEU
1	A	441	GLN
1	A	539	TRP
1	B	333	CYS
1	B	359	GLN
1	B	372	MET
1	B	434	LEU
1	B	437	LEU
1	B	469	ASN
1	B	494	GLU
1	B	505	THR
1	B	519	LEU
1	B	539	TRP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	441	GLN
1	A	457	ASN
1	B	349	HIS
1	B	365	GLN
1	B	408	ASN
1	B	441	GLN
1	B	487	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 27 ligands modelled in this entry, 27 are monoatomic - leaving 0 for Mogul analysis.

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.

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, 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	280/300 (93%)	1.11	42 (15%) 6 5	23, 35, 48, 57	0
1	B	281/300 (93%)	1.57	71 (25%) 2 2	26, 39, 56, 62	0
All	All	561/600 (93%)	1.34	113 (20%) 3 3	23, 37, 53, 62	0

All (113) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	434	LEU	5.8
1	B	344	ASP	5.3
1	A	344	ASP	4.6
1	A	551	PRO	4.4
1	B	439	HIS	4.3
1	B	367	CYS	4.2
1	B	316	GLN	4.2
1	B	364	SER	4.1
1	B	433	MET	4.1
1	B	546	VAL	4.0
1	B	365	GLN	3.9
1	B	321	VAL	3.9
1	B	431	ALA	3.7
1	B	363	GLY	3.6
1	B	505	THR	3.5
1	A	363	GLY	3.5
1	B	318	GLY	3.5
1	A	433	MET	3.5
1	B	526	PHE	3.5
1	B	366	THR	3.4
1	B	461	GLU	3.4
1	A	437	LEU	3.3
1	B	369	THR	3.3
1	A	439	HIS	3.3

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Mol	Chain	Res	Type	RSRZ
1	B	373	ALA	3.2
1	A	520	VAL	3.2
1	B	436	ASN	3.2
1	A	500	PRO	3.1
1	B	513	GLY	3.0
1	B	323	SER	3.0
1	A	346	ASP	2.9
1	A	550	VAL	2.9
1	B	437	LEU	2.9
1	B	349	HIS	2.9
1	B	520	VAL	2.8
1	A	256	SER	2.8
1	B	465	ASP	2.8
1	B	361	LEU	2.8
1	A	518	VAL	2.8
1	B	312	ILE	2.8
1	B	362	CYS	2.8
1	B	314	ASP	2.8
1	B	528	TRP	2.8
1	B	411	HIS	2.7
1	B	466	LYS	2.7
1	B	440	SER	2.7
1	B	468	GLN	2.7
1	A	536	GLU	2.7
1	A	342	PRO	2.6
1	A	364	SER	2.6
1	B	552	ARG	2.6
1	A	519	LEU	2.6
1	B	271	ALA	2.6
1	A	505	THR	2.6
1	B	359	GLN	2.6
1	B	340	ASN	2.5
1	A	431	ALA	2.5
1	B	346	ASP	2.5
1	B	347	ALA	2.5
1	B	441	GLN	2.5
1	A	413	ASP	2.5
1	B	322	THR	2.5
1	B	317	LYS	2.5
1	A	365	GLN	2.5
1	A	472	GLN	2.5
1	A	334	ASN	2.5

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Mol	Chain	Res	Type	RSRZ
1	B	259	TYR	2.4
1	B	339	HIS	2.4
1	A	427	SER	2.4
1	B	324	ASN	2.4
1	B	256	SER	2.4
1	B	432	SER	2.4
1	B	394	GLN	2.4
1	A	333	CYS	2.4
1	B	469	ASN	2.4
1	B	379	CYS	2.4
1	A	420	LEU	2.3
1	A	547	ASN	2.3
1	B	383	ARG	2.3
1	A	432	SER	2.3
1	A	310	LEU	2.3
1	A	455	LEU	2.3
1	B	414	ALA	2.3
1	A	343	SER	2.3
1	B	360	ASP	2.3
1	A	449	TYR	2.3
1	B	328	THR	2.3
1	B	467	PRO	2.3
1	A	298	ILE	2.2
1	B	343	SER	2.2
1	B	545	CYS	2.2
1	B	313	HIS	2.2
1	A	444	SER	2.2
1	B	476	ASP	2.2
1	A	526	PHE	2.2
1	B	417	CYS	2.2
1	B	334	ASN	2.2
1	B	337	LYS	2.1
1	A	469	ASN	2.1
1	A	361	LEU	2.1
1	A	366	THR	2.1
1	A	545	CYS	2.1
1	B	325	ALA	2.1
1	B	342	PRO	2.1
1	A	324	ASN	2.1
1	B	320	GLU	2.1
1	A	369	THR	2.1
1	B	376	GLY	2.0

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Mol	Chain	Res	Type	RSRZ
1	A	362	CYS	2.0
1	B	291	ARG	2.0
1	A	322	THR	2.0
1	B	296	PRO	2.0
1	B	438	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 monosaccharides in this entry.

6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
5	MG	B	1558	1/1	0.87	0.16	51,51,51,51	0
6	NA	A	1567	1/1	0.91	0.14	40,40,40,40	0
4	NI	B	1560	1/1	0.93	0.15	64,64,64,64	0
5	MG	A	1560	1/1	0.93	0.13	39,39,39,39	0
6	NA	B	1563	1/1	0.93	0.11	45,45,45,45	0
4	NI	A	1559	1/1	0.94	0.14	59,59,59,59	0
4	NI	A	1561	1/1	0.95	0.11	34,34,34,34	0
4	NI	A	1563	1/1	0.96	0.08	48,48,48,48	0
4	NI	A	1564	1/1	0.96	0.12	68,68,68,68	0
6	NA	B	1562	1/1	0.96	0.09	45,45,45,45	0
5	MG	A	1565	1/1	0.96	0.10	52,52,52,52	0
4	NI	B	1559	1/1	0.97	0.09	30,30,30,30	0
3	CD	B	1556	1/1	0.97	0.15	41,41,41,41	0
2	ZN	B	1553	1/1	0.98	0.08	26,26,26,26	0
4	NI	B	1561	1/1	0.98	0.06	44,44,44,44	0
4	NI	B	1557	1/1	0.98	0.09	29,29,29,29	0
3	CD	A	1554	1/1	0.98	0.10	35,35,35,35	0
4	NI	A	1557	1/1	0.99	0.06	28,28,28,28	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	NI	A	1558	1/1	0.99	0.04	37,37,37,37	0
2	ZN	A	1552	1/1	0.99	0.05	25,25,25,25	0
3	CD	B	1554	1/1	0.99	0.06	43,43,43,43	0
4	NI	A	1562	1/1	0.99	0.08	53,53,53,53	0
3	CD	A	1553	1/1	0.99	0.10	38,38,38,38	0
6	NA	A	1566	1/1	0.99	0.06	29,29,29,29	0
4	NI	A	1555	1/1	0.99	0.06	40,40,40,40	0
4	NI	B	1555	1/1	0.99	0.05	49,49,49,49	0
4	NI	A	1556	1/1	0.99	0.03	26,26,26,26	0

6.5 Other polymers [i](#)

There are no such residues in this entry.