



# Full wwPDB X-ray Structure Validation Report ⓘ

Jul 6, 2023 – 05:20 pm BST

PDB ID : 8004  
Title : X-ray structure of the adduct formed upon reaction of cisplatin with human angiogenin after 1 month soaking  
Authors : Ferraro, G.; Merlino, A.  
Deposited on : 2023-04-04  
Resolution : 1.99 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.

The types of validation reports are described at

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

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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  
Xtriage (Phenix) : 1.13  
EDS : 2.34  
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) : 2.34

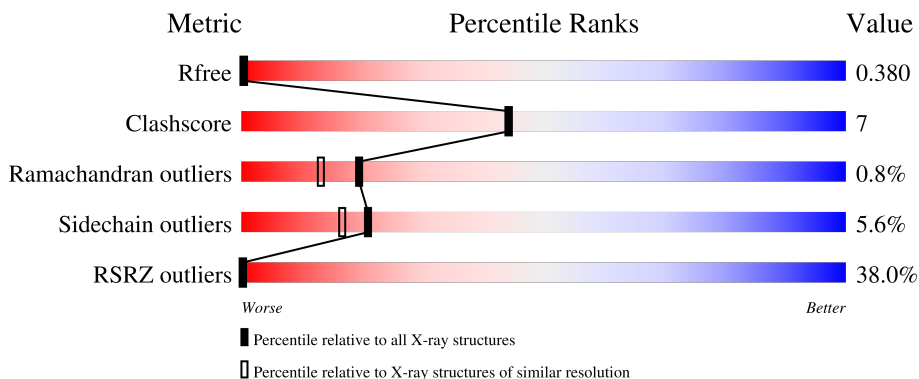
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.99 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	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (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  $\geq 3$ , 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	AAA	123	

## 2 Entry composition [i](#)

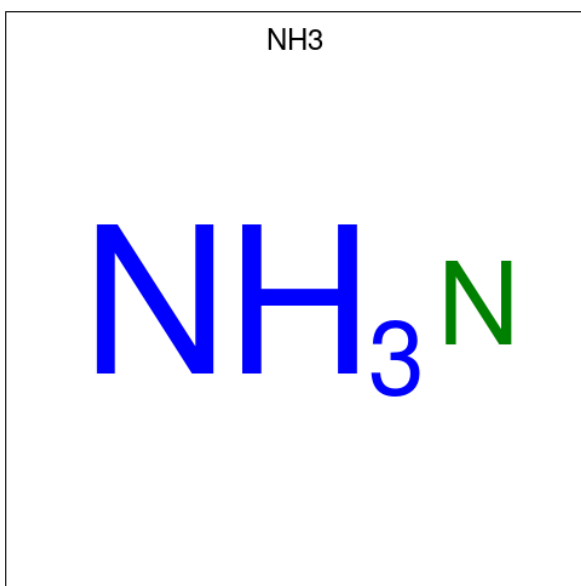
There are 4 unique types of molecules in this entry. The entry contains 1051 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Angiogenin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	AAA	121	993	609	199	178	7	0	2	0

- Molecule 2 is AMMONIA (three-letter code: NH3) (formula: H<sub>3</sub>N) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	AAA	1	Total	N	0	0
			1	1		

- Molecule 3 is PLATINUM (II) ION (three-letter code: PT) (formula: Pt) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	AAA	1	Total	Pt	0	0
			1	1		

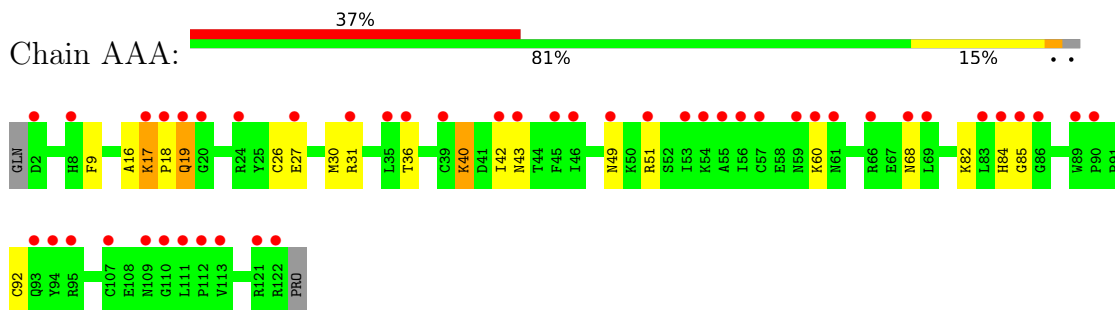
- Molecule 4 is water.

<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
4	AAA	56	Total	O	0	0
			56	56		

### 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: Angiogenin



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	85.25Å 37.51Å 38.16Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	42.62 – 1.99 42.63 – 1.99	Depositor EDS
% Data completeness (in resolution range)	96.1 (42.62-1.99) 96.1 (42.63-1.99)	Depositor EDS
$R_{merge}$	0.08	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.55 (at 1.98Å)	Xtrriage
Refinement program	REFMAC 5.8.0258	Depositor
R, $R_{free}$	0.308 , 0.367 0.314 , 0.380	Depositor DCC
$R_{free}$ test set	380 reflections (4.46%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	13.4	Xtrriage
Anisotropy	0.182	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 31.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.51$ , $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	0.036 for -h,l,k	Xtrriage
$F_o, F_c$ correlation	0.83	EDS
Total number of atoms	1051	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	25.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 10.41% 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: PT, NH3

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	AAA	0.68	0/1016	0.86	0/1368

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	AAA	993	0	963	13	0
2	AAA	1	0	0	0	0
3	AAA	1	0	0	0	0
4	AAA	56	0	0	5	0
All	All	1051	0	963	13	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 7.

All (13) 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:AAA:49:ASN:HB2	4:AAA:310:HOH:O	1.94	0.68
1:AAA:31[B]:ARG:HD3	1:AAA:36:THR:HG21	1.76	0.67
1:AAA:49:ASN:CB	4:AAA:310:HOH:O	2.48	0.62
1:AAA:26:CYS:O	1:AAA:30:MET:HG2	2.09	0.51
1:AAA:31[B]:ARG:NH2	1:AAA:92:CYS:H	2.11	0.48
1:AAA:84:HIS:CD2	1:AAA:85:GLY:H	2.33	0.47
1:AAA:9:PHE:HA	4:AAA:312:HOH:O	2.17	0.45
1:AAA:82:LYS:HD2	4:AAA:351:HOH:O	2.16	0.44
1:AAA:27:GLU:O	1:AAA:31[B]:ARG:HG2	2.18	0.44
1:AAA:18:PRO:O	1:AAA:19:GLN:HB2	2.21	0.41
1:AAA:40:LYS:NZ	1:AAA:43:ASN:OD1	2.54	0.41
1:AAA:49:ASN:HB3	4:AAA:310:HOH:O	2.18	0.40
1:AAA:16:ALA:C	1:AAA:17:LYS:HG3	2.42	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	AAA	121/123 (98%)	110 (91%)	10 (8%)	1 (1%)	19 13

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	AAA	19	GLN

### 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	AAA	110/110 (100%)	104 (94%)	6 (6%)	21 17

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	AAA	17	LYS
1	AAA	40	LYS
1	AAA	42	ILE
1	AAA	51	ARG
1	AAA	60	LYS
1	AAA	68	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 2 ligands modelled in this entry, 1 is modelled with single atom and 1 is 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

### 6.1 Protein, DNA and RNA chains

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	AAA	121/123 (98%)	1.95	46 (38%) <b>0</b> <b>0</b>	12, 23, 39, 46	0

All (46) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	AAA	19	GLN	6.0
1	AAA	107	CYS	5.4
1	AAA	122	ARG	5.1
1	AAA	59	ASN	4.9
1	AAA	85	GLY	4.6
1	AAA	60	LYS	4.5
1	AAA	51	ARG	4.2
1	AAA	39	CYS	3.6
1	AAA	86	GLY	3.5
1	AAA	36	THR	3.2
1	AAA	111	LEU	3.0
1	AAA	53	ILE	3.0
1	AAA	31[A]	ARG	3.0
1	AAA	57	CYS	3.0
1	AAA	109	ASN	3.0
1	AAA	2	ASP	3.0
1	AAA	49	ASN	2.9
1	AAA	35	LEU	2.8
1	AAA	46	ILE	2.8
1	AAA	83	LEU	2.8
1	AAA	45	PHE	2.7
1	AAA	84	HIS	2.7
1	AAA	66	ARG	2.7
1	AAA	121	ARG	2.6
1	AAA	89	TRP	2.6
1	AAA	8	HIS	2.5
1	AAA	56	ILE	2.5

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Mol	Chain	Res	Type	RSRZ
1	AAA	113	VAL	2.5
1	AAA	112	PRO	2.5
1	AAA	55	ALA	2.4
1	AAA	42	ILE	2.4
1	AAA	17	LYS	2.4
1	AAA	61	ASN	2.4
1	AAA	54	LYS	2.4
1	AAA	20	GLY	2.3
1	AAA	110	GLY	2.3
1	AAA	24	ARG	2.3
1	AAA	95	ARG	2.3
1	AAA	90	PRO	2.3
1	AAA	18	PRO	2.1
1	AAA	68	ASN	2.1
1	AAA	27	GLU	2.1
1	AAA	94	TYR	2.1
1	AAA	43	ASN	2.1
1	AAA	93	GLN	2.1
1	AAA	69	LEU	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.

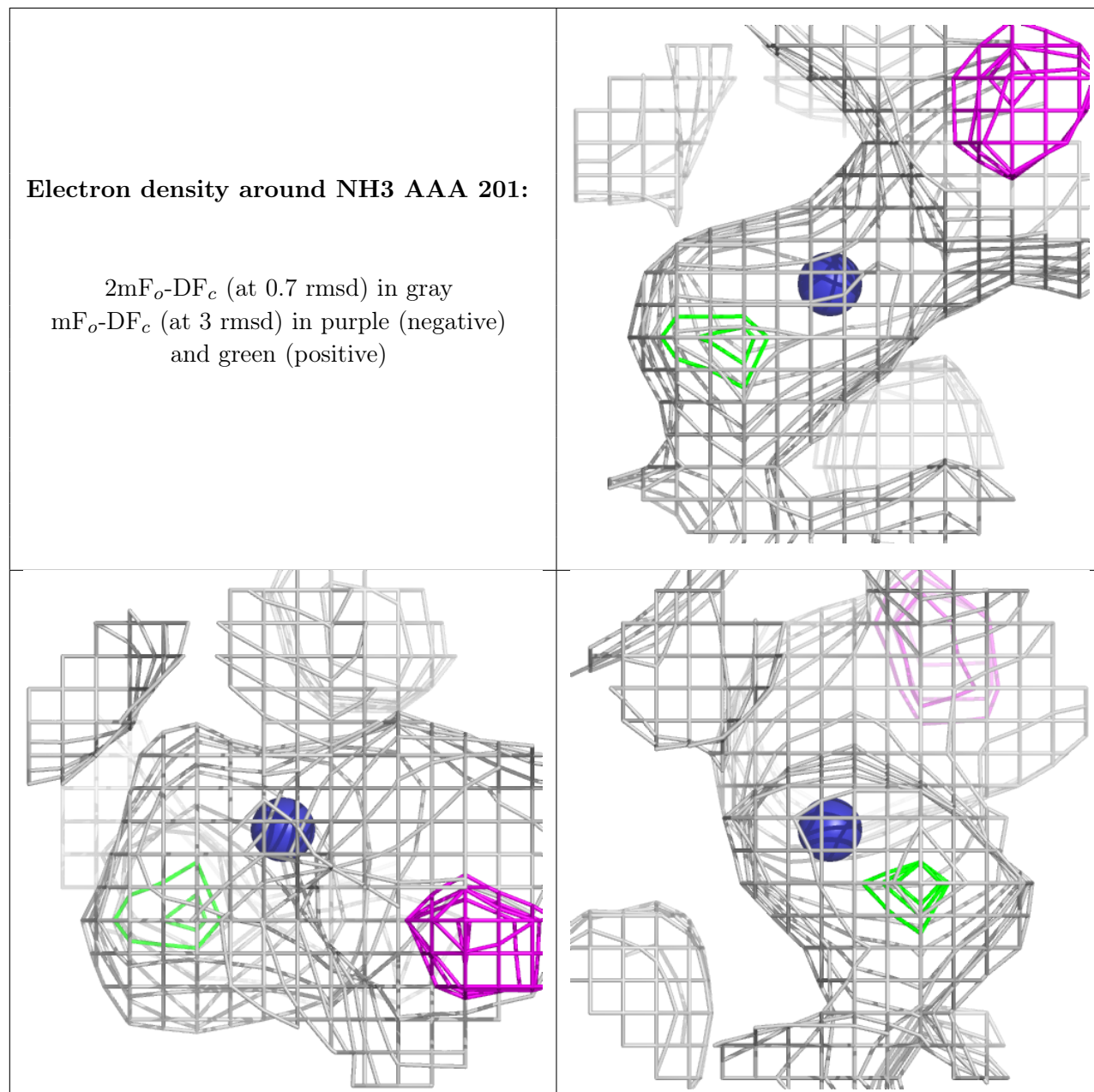
## 6.4 Ligands [i](#)

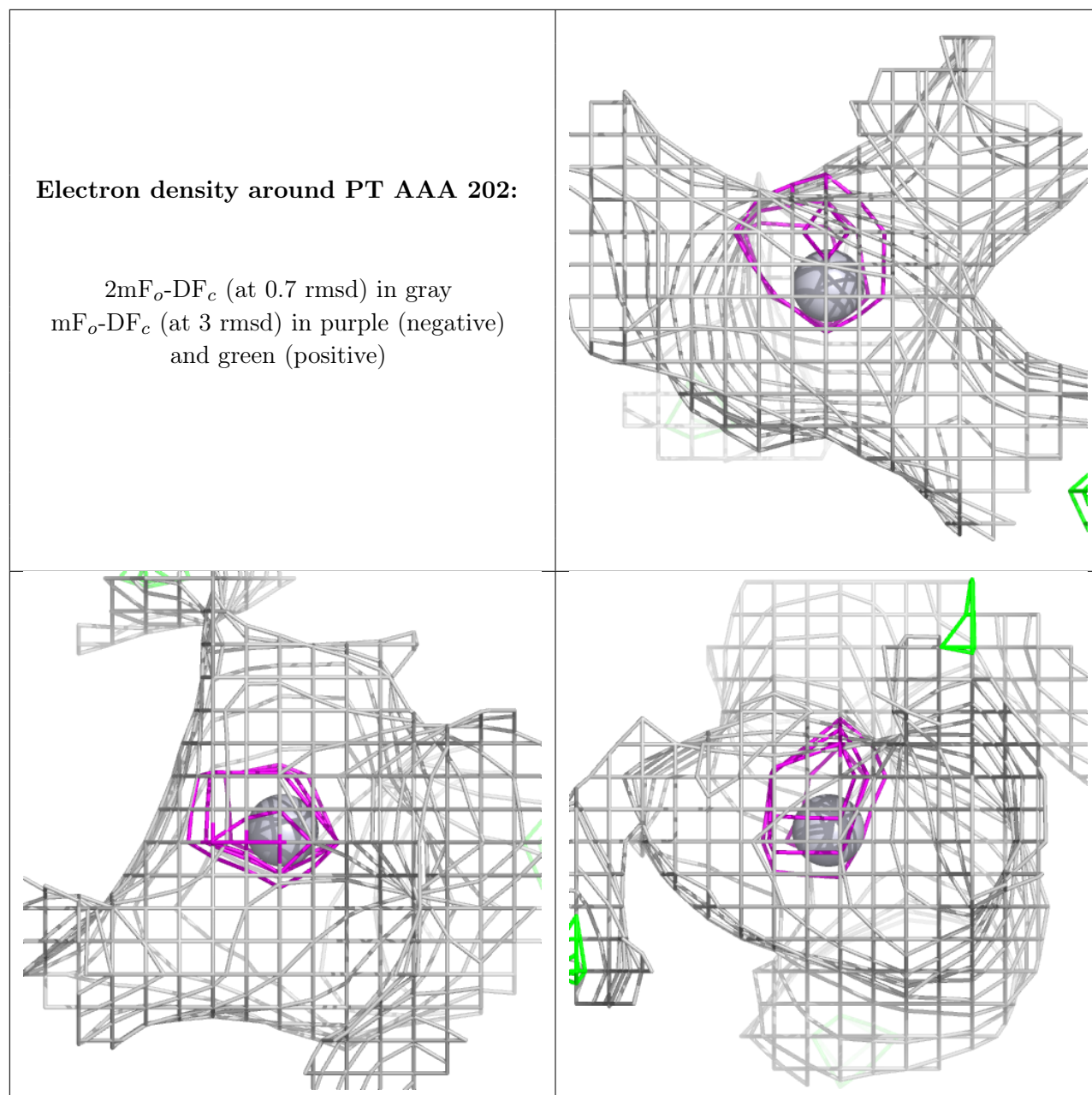
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	NH3	AAA	201	1/1	0.35	0.34	27,27,27,27	0
3	PT	AAA	202	1/1	0.38	0.18	63,63,63,63	1

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.





## 6.5 Other polymers ⓘ

There are no such residues in this entry.