



Full wwPDB X-ray Structure Validation Report ⓘ

May 10, 2024 – 02:48 PM JST

PDB ID : 8ZGB
Title : W-degron fused ZZ-domain of the Arabidopsis thaliana E3 ubiquitin-protein
ligase PRT1
Deposited on : 2024-05-09
Resolution : 2.79 Å (reported)

This wwPDB validation report is for manuscript review

This is a Full wwPDB X-ray Structure Validation Report.

This report is produced by the wwPDB biocuration pipeline after annotation of the structure.

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
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36.2
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)

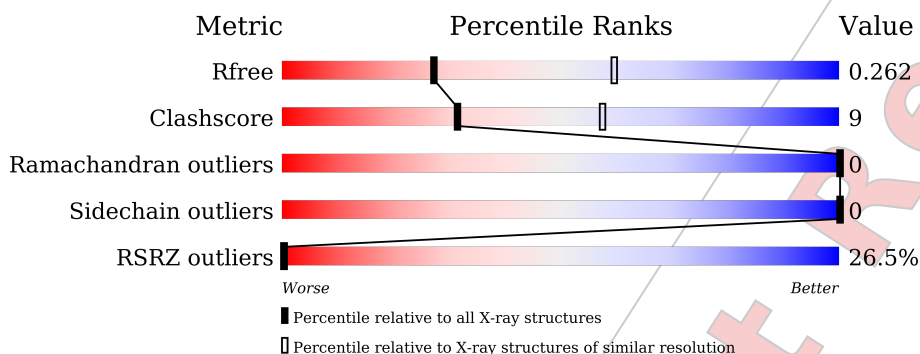
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.79 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	4107 (2.80-2.76)
Clashscore	141614	4575 (2.80-2.76)
Ramachandran outliers	138981	4487 (2.80-2.76)
Sidechain outliers	138945	4489 (2.80-2.76)
RSRZ outliers	127900	4027 (2.80-2.76)

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	69	20% 81% 17%
1	B	69	32% 84% 14%

Ideal geometry (DNA, RNA) : Parkinson et al. (1996)

Validation Pipeline (wwPDB-VP) : 2.36.2

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 2005 atoms, of which 946 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.

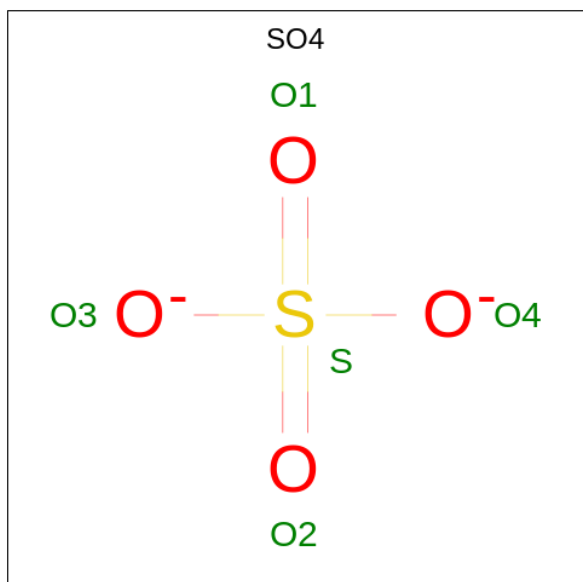
- Molecule 1 is a protein called W-degron,E3 ubiquitin-protein ligase PRT1.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	68	Total	C	H	N	O	S	0	0	0
			1011	327	482	95	101	6			
1	B	68	Total	C	H	N	O	S	0	0	0
			985	321	464	93	101	6			

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

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

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O₄S) (labeled as "Ligand of Interest" by depositor).



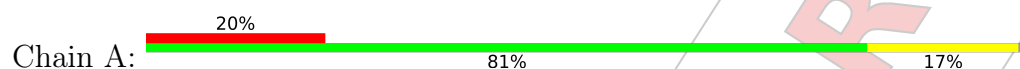
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	O	S	0	0
			5	4	1		

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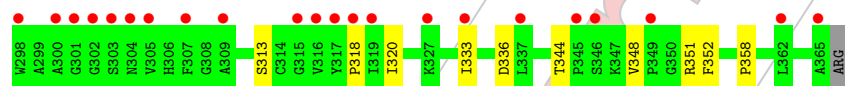
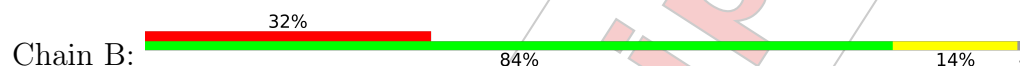
3 Residue-property plots [i](#)

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: W-degron,E3 ubiquitin-protein ligase PRT1



- Molecule 1: W-degron,E3 ubiquitin-protein ligase PRT1



4 Data and refinement statistics

Property	Value	Source
Space group	I 41 2 2	Depositor
Cell constants a, b, c, α , β , γ	106.26Å 106.26Å 97.06Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	40.77 – 2.79 42.68 – 2.78	Depositor EDS
% Data completeness (in resolution range)	99.6 (40.77-2.79) 95.7 (42.68-2.78)	Depositor EDS
R_{merge}	0.13	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	0.46 (at 2.77Å)	Xtriage
Refinement program	PHENIX 1.18rc7_3834	Depositor
R, R_{free}	0.234 , 0.261 0.235 , 0.262	Depositor DCC
R_{free} test set	721 reflections (10.01%)	wwPDB-VP
Wilson B-factor (Å ²)	122.3	Xtriage
Anisotropy	0.016	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 114.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	2005	wwPDB-VP
Average B, all atoms (Å ²)	158.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.67% 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, ZN

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	0.49	0/543	0.60	0/733
1	B	0.44	0/535	0.57	0/725
All	All	0.47	0/1078	0.58	0/1458

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	529	482	482	10	0
1	B	521	464	460	9	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
3	A	5	0	0	0	0
All	All	1059	946	942	18	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 9.

All (18) 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:348:VAL:HG22	1:B:351:ARG:HG2	1.57	0.85
1:A:318:PRO:O	1:A:320:ILE:HD12	1.97	0.64
1:A:333:ILE:HD12	1:A:333:ILE:H	1.72	0.55
1:B:318:PRO:O	1:B:320:ILE:HD12	2.09	0.52
1:A:339:LYS:HE3	1:A:343:GLU:OE2	2.11	0.50
1:A:348:VAL:O	1:A:348:VAL:HG23	2.13	0.49
1:A:312:ASP:H	1:A:337:LEU:HD23	1.78	0.49
1:A:311:CYS:SG	1:A:337:LEU:HD22	2.55	0.47
1:A:336:ASP:O	1:A:337:LEU:HD23	2.14	0.47
1:B:344:THR:HG23	1:B:344:THR:O	2.16	0.45
1:B:344:THR:O	1:B:351:ARG:NH2	2.50	0.44
1:B:333:ILE:HD12	1:B:333:ILE:N	2.31	0.44
1:B:352:PHE:CE1	1:B:358:PRO:HA	2.54	0.43
1:B:313:SER:OG	1:B:348:VAL:HG21	2.18	0.42
1:A:298:TRP:N	1:B:336:ASP:OD1	2.53	0.42
1:B:333:ILE:N	1:B:333:ILE:CD1	2.84	0.41
1:A:348:VAL:O	1:A:348:VAL:CG2	2.68	0.41
1:A:327:LYS:HD2	1:A:327:LYS:HA	1.93	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	66/69 (96%)	65 (98%)	1 (2%)	0	100	100
1	B	66/69 (96%)	65 (98%)	1 (2%)	0	100	100
All	All	132/138 (96%)	130 (98%)	2 (2%)	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	56/57 (98%)	56 (100%)	0	100	100
1	B	54/57 (95%)	54 (100%)	0	100	100
All	All	110/114 (96%)	110 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

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 5 ligands modelled in this entry, 4 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
3	SO4	A	403	-	4,4,4	0.17	0	6,6,6	0.09	0

There are no bond length outliers.

There are no bond angle outliers.

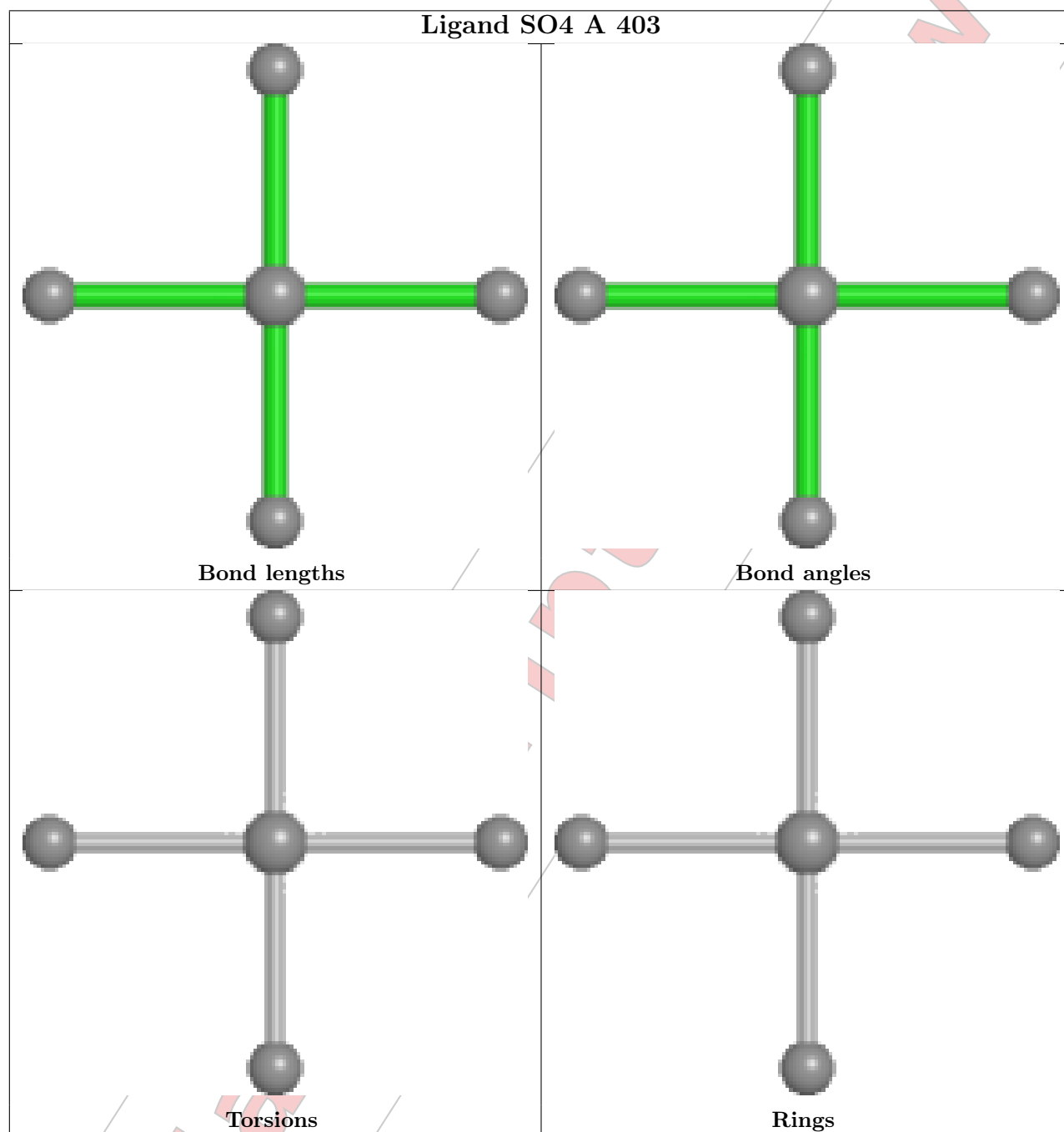
There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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 than 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.



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	68/69 (98%)	1.24	14 (20%)	106, 131, 161, 170	0
1	B	68/69 (98%)	1.51	22 (32%)	104, 147, 217, 225	0
All	All	136/138 (98%)	1.37	36 (26%)	104, 138, 208, 225	0

All (36) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	304	ASN	4.7
1	B	317	TYR	4.6
1	B	362	LEU	3.9
1	B	300	ALA	3.8
1	A	337	LEU	3.8
1	A	300	ALA	3.6
1	B	319	ILE	3.5
1	A	319	ILE	3.4
1	B	345	PRO	3.4
1	B	337	LEU	3.3
1	B	301	GLY	3.3
1	B	349	PRO	3.2
1	B	327	LYS	3.0
1	B	333	ILE	3.0
1	A	335	TYR	2.9
1	B	303	SER	2.7
1	A	358	PRO	2.7
1	B	305	VAL	2.7
1	B	318	PRO	2.7
1	A	320	ILE	2.6
1	B	346	SER	2.5
1	A	333	ILE	2.4
1	B	315	GLY	2.4
1	A	302	GLY	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	324	TYR	2.3
1	A	301	GLY	2.3
1	A	307	PHE	2.3
1	A	308	GLY	2.3
1	B	365	ALA	2.2
1	B	316	VAL	2.2
1	A	359	ASP	2.2
1	A	309	ALA	2.2
1	B	302	GLY	2.1
1	B	307	PHE	2.1
1	B	309	ALA	2.0
1	B	298	TRP	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](#)

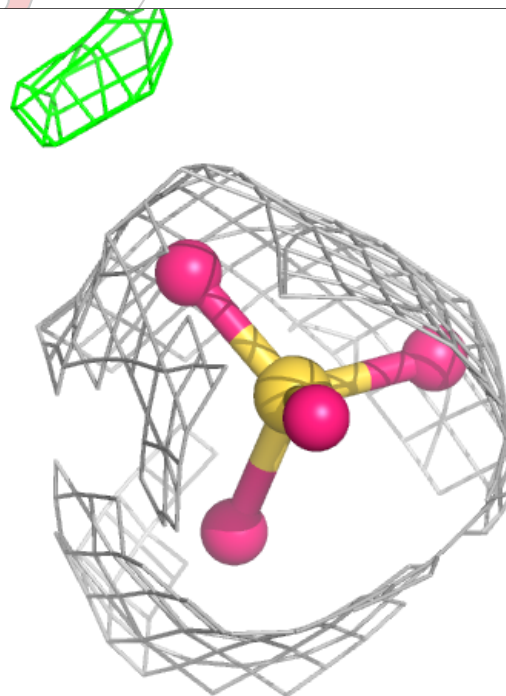
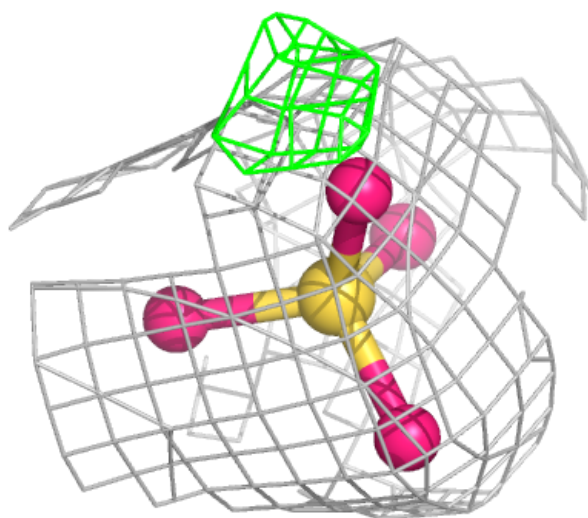
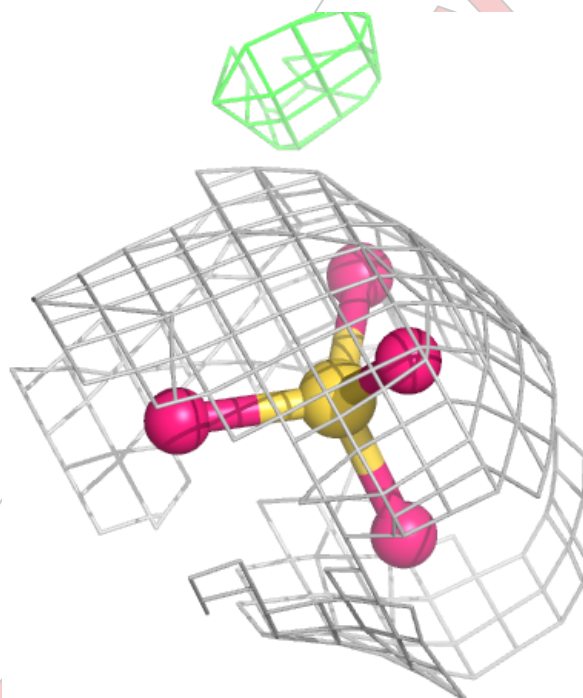
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	SO4	A	403	5/5	0.79	0.33	147,159,167,171	0
2	ZN	B	402	1/1	0.96	0.21	118,118,118,118	0
2	ZN	A	401	1/1	0.97	0.11	128,128,128,128	0
2	ZN	B	401	1/1	0.97	0.13	124,124,124,124	0
2	ZN	A	402	1/1	1.00	0.20	132,132,132,132	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.

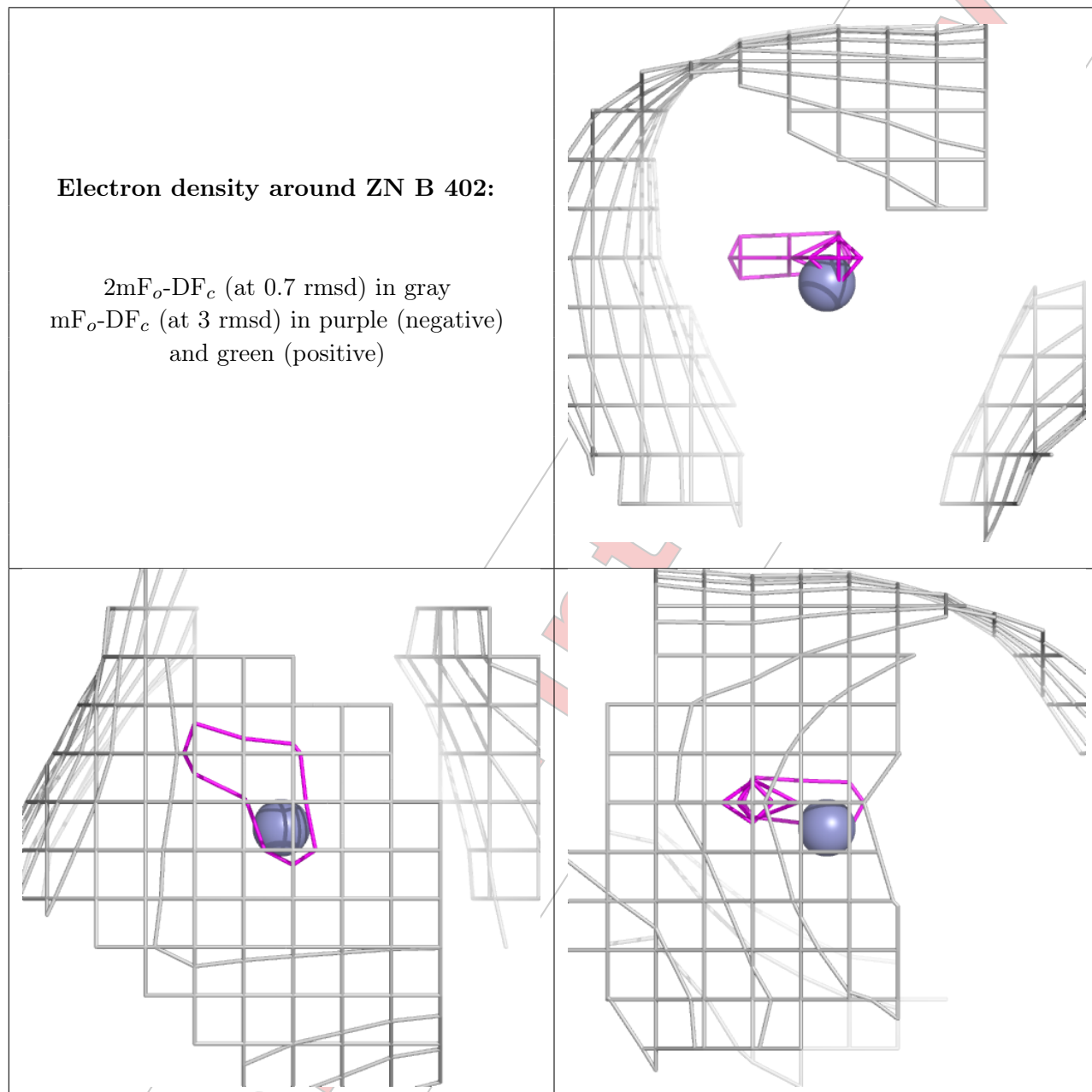
Electron density around SO4 A 403:

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

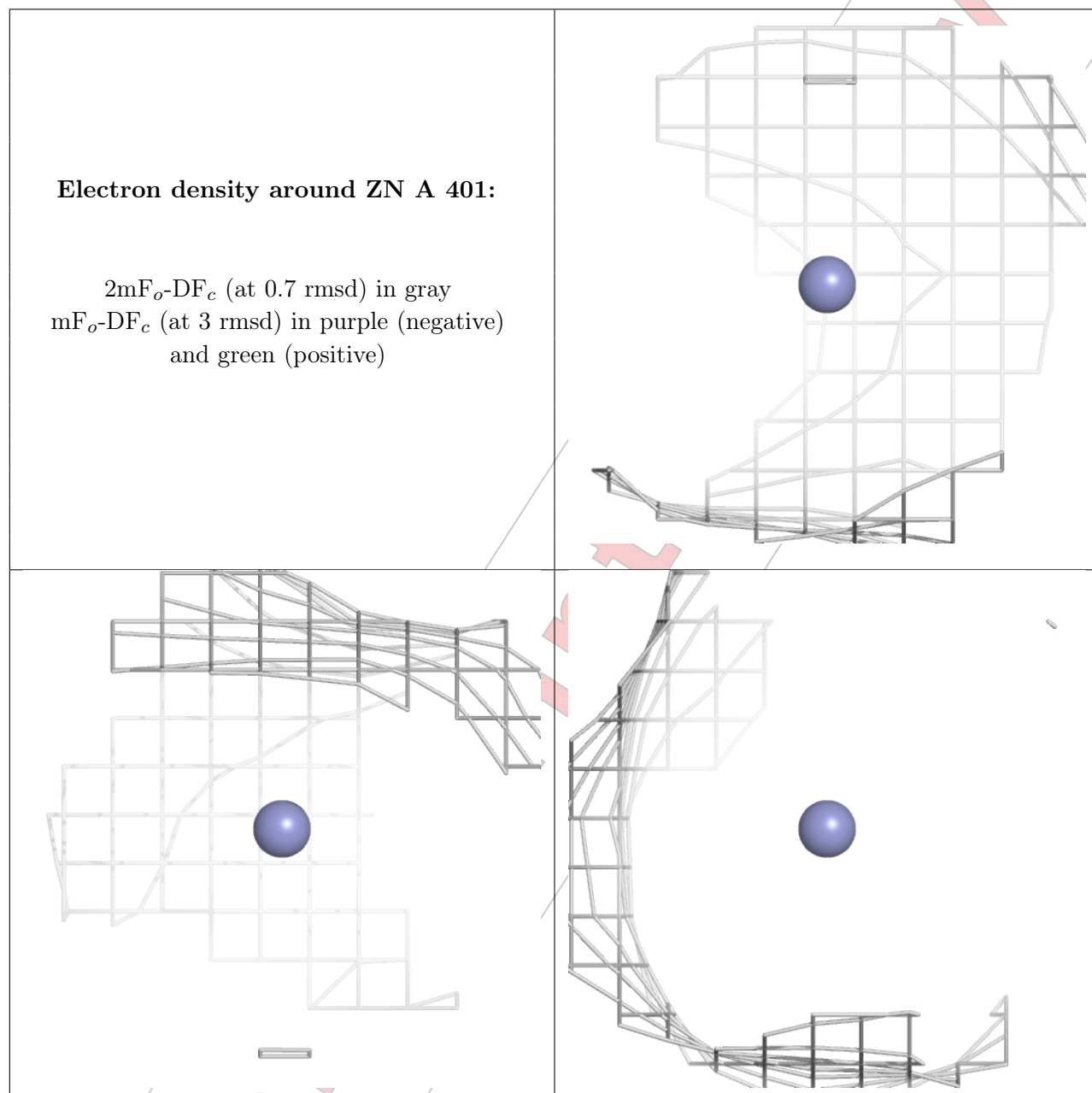


Electron density around ZN B 402:

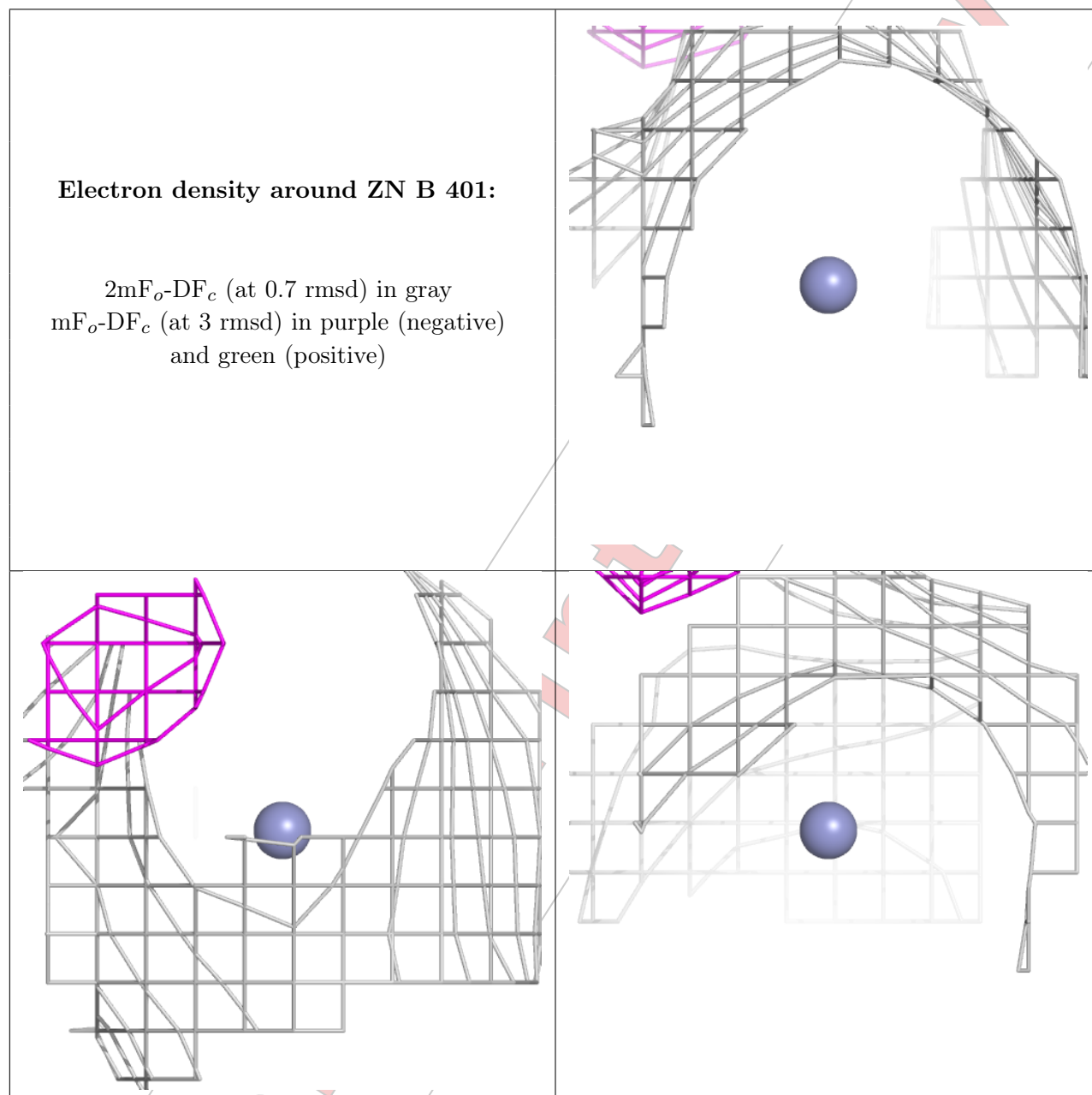
$2mF_o - DF_c$ (at 0.7 rmsd) in gray
 $mF_o - DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)



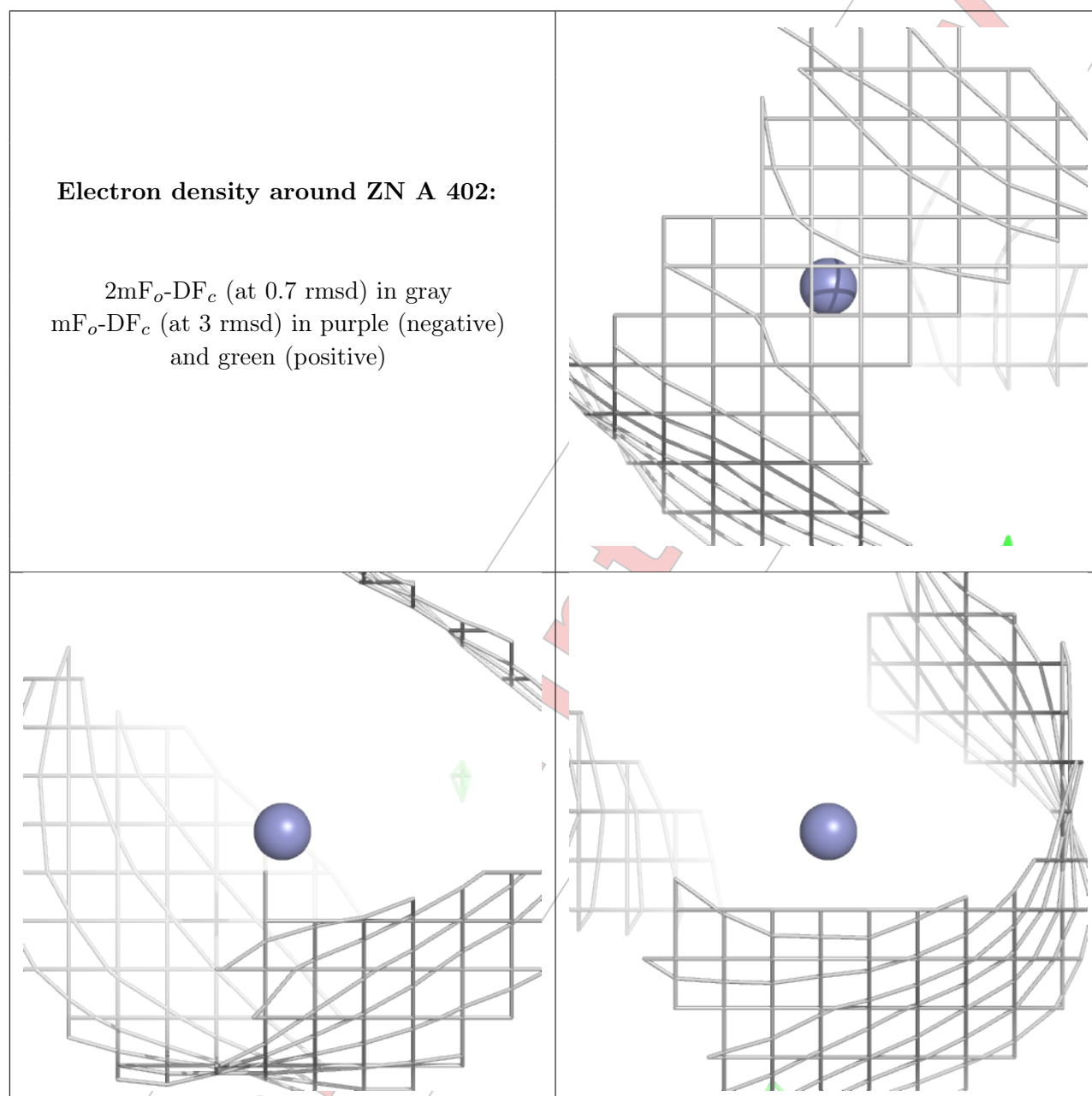
For Ma



For Ma



For Ma



6.5 Other polymers ⓘ

There are no such residues in this entry.