Full wwPDB X-ray Structure Validation Report ⓘ

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PDB ID	:	8Z3F
Title	:	Complex structure of CIB2 and TMC1 CR1
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Deposited on	:	2024-04-15
Resolution	:	1.74 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:

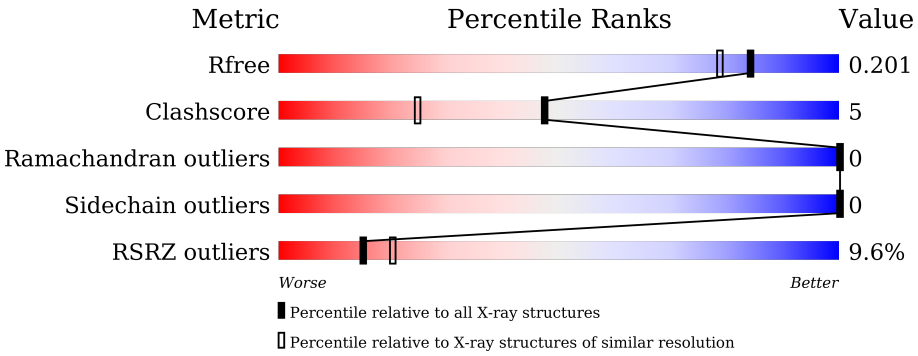
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.21
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.004 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

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 1.74 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}	164625	1043 (1.74-1.74)
Clashscore	180529	1119 (1.74-1.74)
Ramachandran outliers	177936	1112 (1.74-1.74)
Sidechain outliers	177891	1112 (1.74-1.74)
RSRZ outliers	164620	1043 (1.74-1.74)

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 <=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	191	5% 89% 7% .
2	B	54	22% 69% 15% 17%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 2113 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 Calcium and integrin-binding family member 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	183	Total	C	N	O	S	0	1	0
			1495	957	235	293	10			

There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-3	GLY	-	expression tag	UNP Q9Z309
A	-2	PRO	-	expression tag	UNP Q9Z309
A	-1	GLY	-	expression tag	UNP Q9Z309
A	0	SER	-	expression tag	UNP Q9Z309
A	141	ASN	GLU	engineered mutation	UNP Q9Z309

- Molecule 2 is a protein called Transmembrane channel-like protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	45	Total	C	N	O	S	0	0	0
			354	228	61	62	3			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	7	GLY	-	expression tag	UNP Q8R4P5
B	8	PRO	-	expression tag	UNP Q8R4P5
B	9	GLY	-	expression tag	UNP Q8R4P5
B	10	SER	-	expression tag	UNP Q8R4P5

- Molecule 3 is CALCIUM ION (three-letter code: CA) (formula: Ca) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	3	Total	Ca	0	0
			3	3		

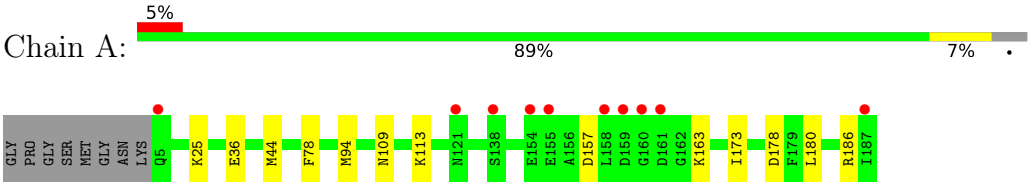
- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	221	Total O 221 221	0	0
4	B	40	Total O 40 40	0	0

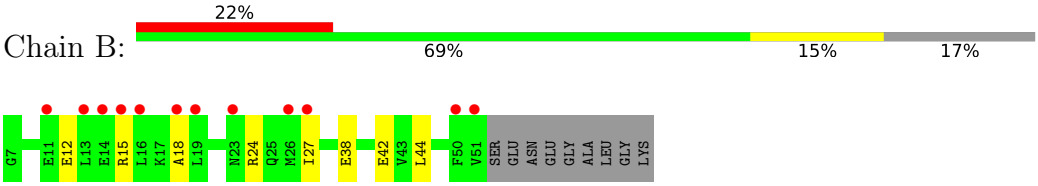
3 Residue-property plots (i)

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: Calcium and integrin-binding family member 2



• Molecule 2: Transmembrane channel-like protein 1



4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	109.18Å 36.23Å 63.50Å 90.00° 98.87° 90.00°	Depositor
Resolution (Å)	25.52 – 1.74 25.52 – 1.74	Depositor EDS
% Data completeness (in resolution range)	98.4 (25.52-1.74) 98.3 (25.52-1.74)	Depositor EDS
R_{merge}	0.13	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.41 (at 1.74Å)	Xtriage
Refinement program	PHENIX 1.18.2_3874	Depositor
R, R_{free}	0.177 , 0.200 0.178 , 0.201	Depositor DCC
R_{free} test set	1671 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å^2)	15.9	Xtriage
Anisotropy	0.266	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.38 , 50.9	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	2113	wwPDB-VP
Average B, all atoms (Å^2)	23.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.92% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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: CA

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	0.41	0/1529	0.63	0/2064
2	B	0.35	0/358	0.63	0/476
All	All	0.40	0/1887	0.63	0/2540

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	1495	0	1443	12	0
2	B	354	0	376	8	0
3	A	3	0	0	0	0
4	A	221	0	0	5	3
4	B	40	0	0	5	1
All	All	2113	0	1819	20	3

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 5.

All (20) 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:157:ASP:O	4:A:301:HOH:O	1.99	0.80
1:A:36:GLU:OE1	4:A:302:HOH:O	2.02	0.76
2:B:38:GLU:OE1	4:B:101:HOH:O	2.10	0.68
2:B:38:GLU:O	2:B:42:GLU:HG3	1.95	0.67
1:A:25:LYS:HD3	1:A:25:LYS:N	2.10	0.67
2:B:24:ARG:NH1	4:B:103:HOH:O	2.30	0.64
1:A:173:ILE:HD12	1:A:180:LEU:HD11	1.94	0.49
2:B:18:ALA:HA	4:B:102:HOH:O	2.11	0.49
1:A:78:PHE:CG	1:A:94:MET:HB2	2.49	0.47
1:A:178[B]:ASP:CG	4:A:309:HOH:O	2.52	0.47
1:A:113:LYS:N	1:A:113:LYS:HD2	2.29	0.47
2:B:12:GLU:OE1	2:B:15:ARG:NH2	2.48	0.47
1:A:186:ARG:NH1	4:A:308:HOH:O	2.50	0.45
2:B:24:ARG:NH2	4:B:102:HOH:O	2.25	0.44
1:A:163:LYS:NZ	4:A:310:HOH:O	2.51	0.43
2:B:27:ILE:HG23	2:B:44:LEU:HD22	2.01	0.42
1:A:25:LYS:N	1:A:25:LYS:CD	2.80	0.42
1:A:44:MET:HE2	1:A:44:MET:HB2	1.96	0.41
1:A:109:ASN:O	1:A:113:LYS:HD3	2.21	0.41
2:B:24:ARG:NH1	4:B:105:HOH:O	2.54	0.40

All (3) 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:409:HOH:O	4:A:478:HOH:O[4_445]	1.95	0.25
4:A:470:HOH:O	4:B:128:HOH:O[2_555]	2.04	0.16
4:A:464:HOH:O	4:A:510:HOH:O[2_555]	2.11	0.09

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	182/191 (95%)	179 (98%)	3 (2%)	0	100	100
2	B	43/54 (80%)	43 (100%)	0	0	100	100
All	All	225/245 (92%)	222 (99%)	3 (1%)	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	167/172 (97%)	167 (100%)	0	100	100
2	B	37/46 (80%)	37 (100%)	0	100	100
All	All	204/218 (94%)	204 (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 oligosaccharides in this entry.

5.6 Ligand geometry

Of 3 ligands modelled in this entry, 3 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

There are no such residues in this entry.

5.8 Polymer linkage issues

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^{th} 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	183/191 (95%)	-0.14	10 (5%) 32 38	9, 17, 44, 69	1 (0%)
2	B	45/54 (83%)	0.89	12 (26%) 2 1	12, 31, 52, 69	0
All	All	228/245 (93%)	0.06	22 (9%) 15 20	9, 19, 50, 69	1 (0%)

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	158	LEU	5.3
1	A	159	ASP	3.9
1	A	160	GLY	3.8
2	B	51	VAL	3.7
2	B	15	ARG	3.3
2	B	14	GLU	3.1
2	B	18	ALA	3.0
1	A	161	ASP	3.0
1	A	138	SER	2.6
2	B	16	LEU	2.4
1	A	5	GLN	2.4
2	B	23	ASN	2.4
2	B	50	PHE	2.3
2	B	19	LEU	2.3
2	B	13	LEU	2.3
1	A	121	ASN	2.3
2	B	11	GLU	2.3
1	A	155	GLU	2.2
1	A	154	GLU	2.1
1	A	187	ILE	2.1
2	B	26	MET	2.1
2	B	27	ILE	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)

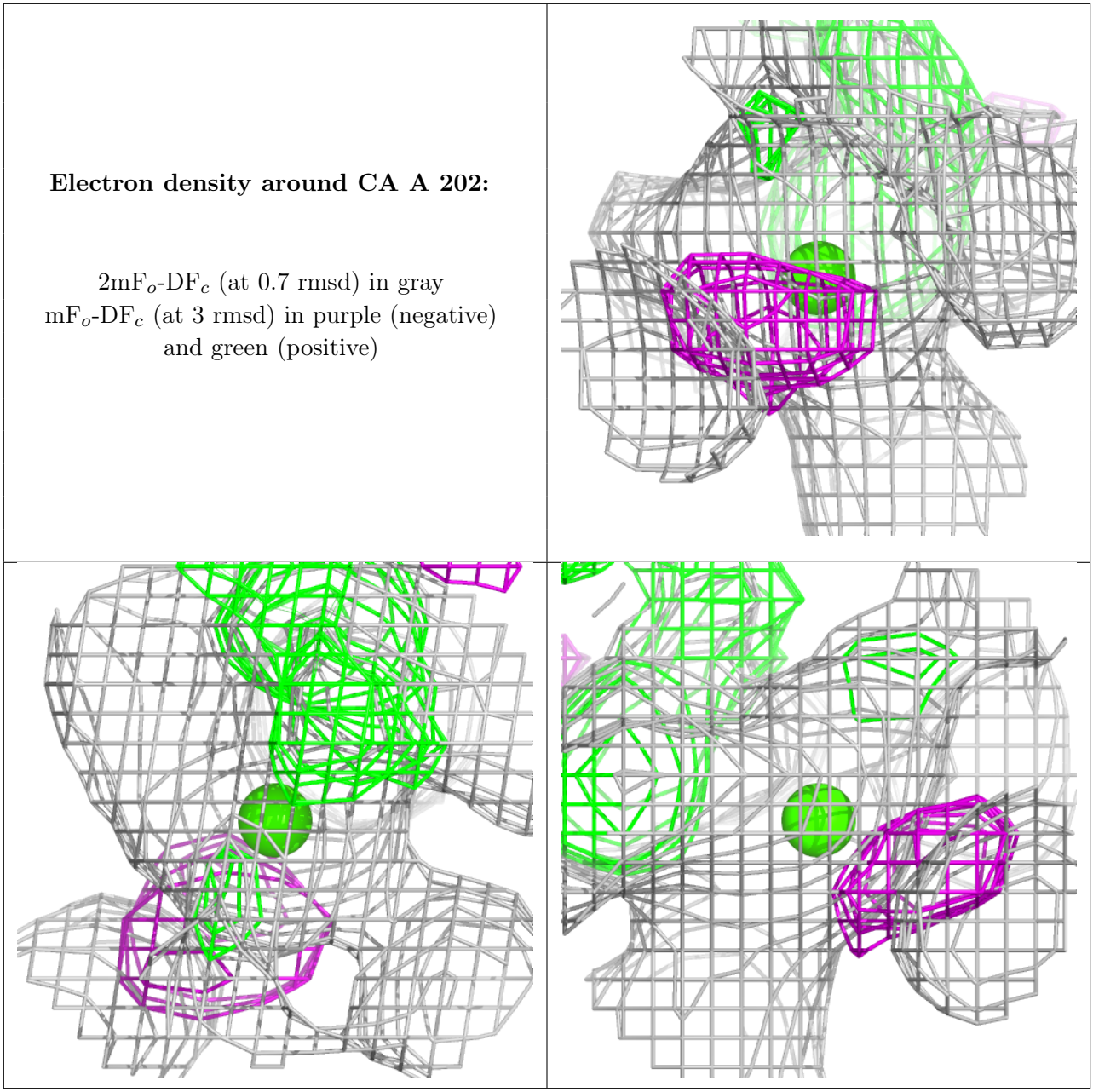
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	CA	A	202	1/1	0.88	0.11	40,40,40,40	0
3	CA	A	203	1/1	0.91	0.24	85,85,85,85	0
3	CA	A	201	1/1	0.99	0.03	18,18,18,18	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.

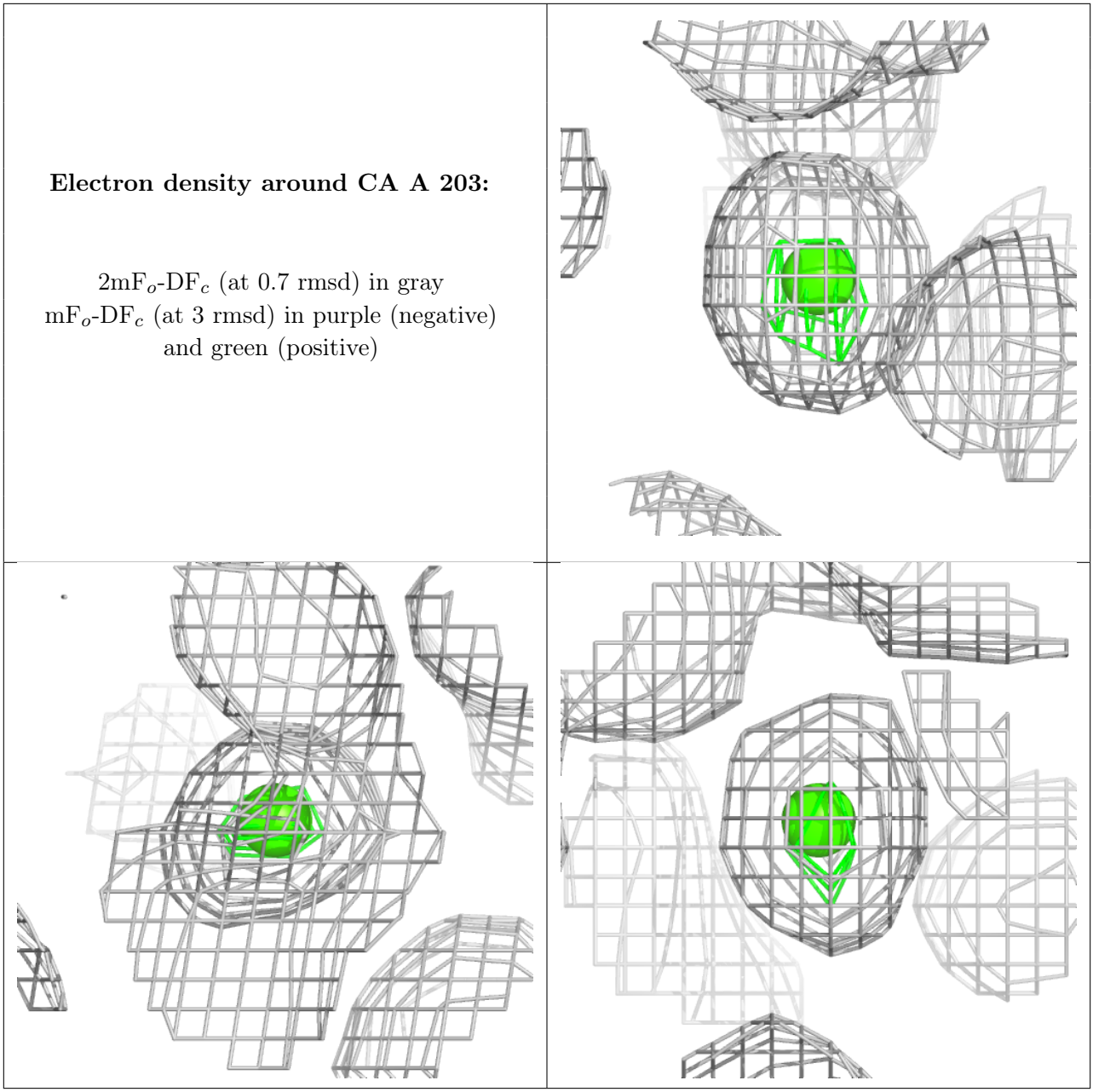
Electron density around CA A 202:

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



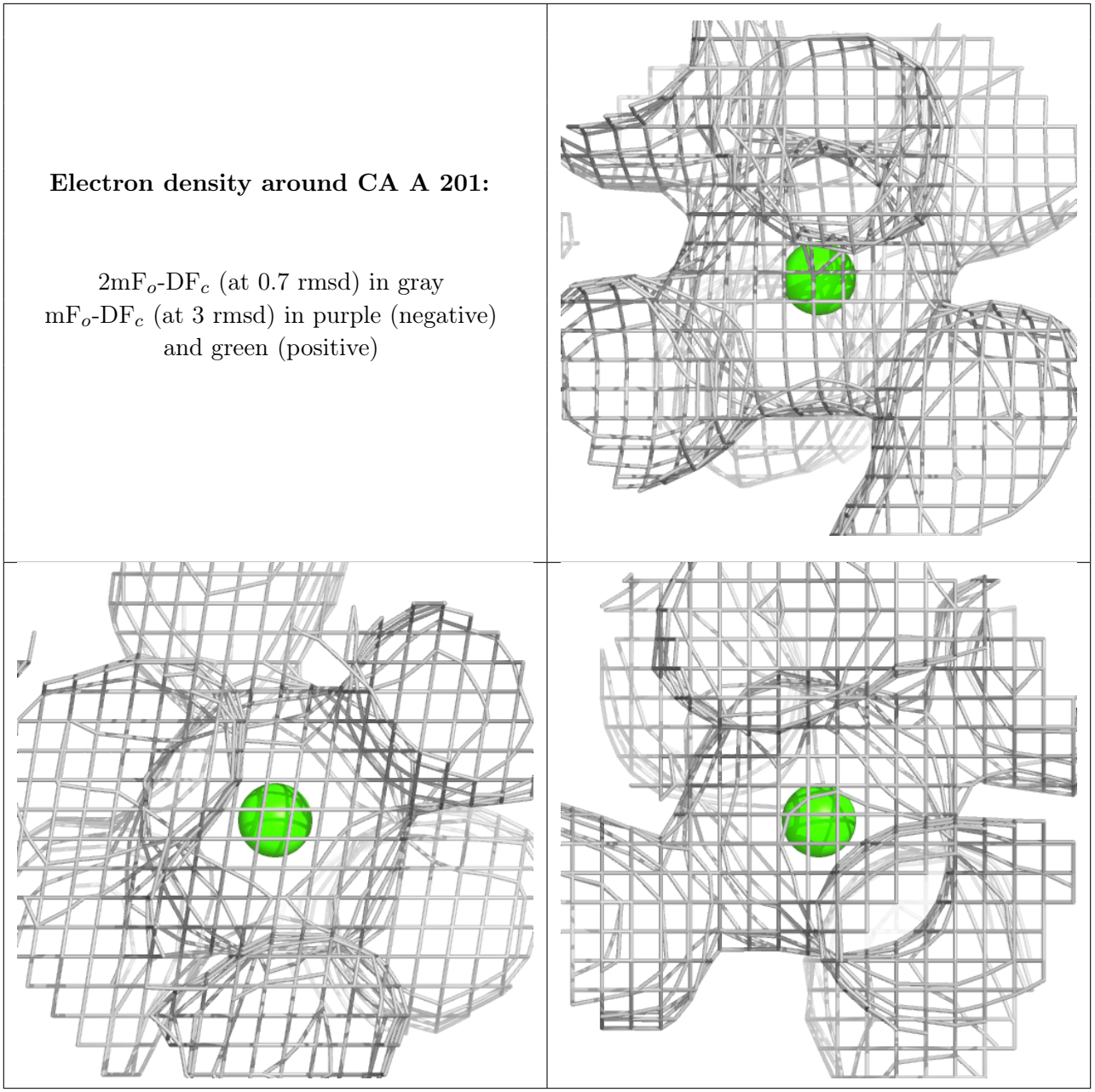
Electron density around CA A 203:

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



Electron density around CA A 201:

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



6.5 Other polymers

There are no such residues in this entry.