Full wwPDB X-ray Structure Validation Report ⓘ

Feb 27, 2024 – 02:35 PM EST

PDB ID	:	8SNF
Title	:	Crystal structure of metformin hydrolase (MfmAB) from Pseudomonas mendocina sp. MET-2 with Ni2+2 bound
Authors	:	Tassoulas, L.J.; Rankin, J.A.; Elias, M.H.; Wackett, L.P.
Deposited on	:	2023-04-27
Resolution	:	2.30 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:

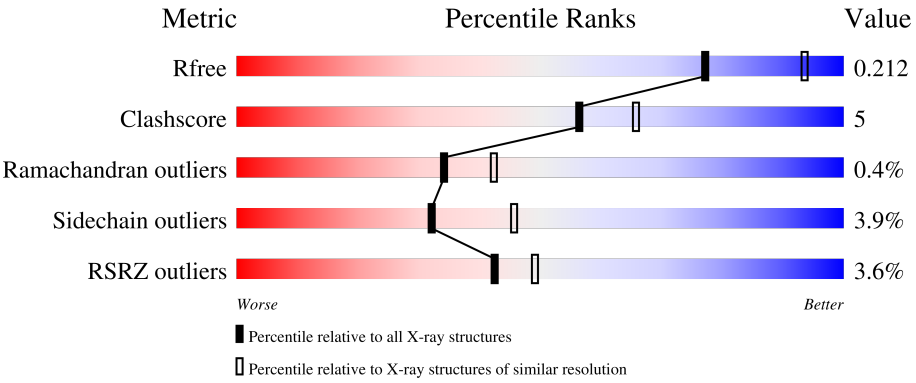
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 2.30 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	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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	348	3% 82% 9% • 6%
1	B	348	5% 81% 11% • 6%
1	C	348	5% 81% 11% • 6%
1	E	348	3% 82% 11% • 6%
2	D	364	2% 80% 12% •• 5%

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Mol	Chain	Length	Quality of chain
2	F	364	

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 15792 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 metformin hydrolase subunit B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	326	Total	C	N	O	S	0	0	0
			2507	1579	439	470	19			
1	B	326	Total	C	N	O	S	0	0	0
			2507	1579	439	470	19			
1	C	326	Total	C	N	O	S	0	0	0
			2507	1579	439	470	19			
1	E	326	Total	C	N	O	S	0	0	0
			2507	1579	439	470	19			

- Molecule 2 is a protein called metformin hydrolase subunit A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	D	347	Total	C	N	O	S	0	0	0
			2715	1711	476	505	23			
2	F	347	Total	C	N	O	S	0	0	0
			2715	1711	476	505	23			

- Molecule 3 is NICKEL (II) ION (three-letter code: NI) (formula: Ni) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	D	2	Total	Ni	0	0
			2	2		
3	F	2	Total	Ni	0	0
			2	2		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	55	Total	O	0	0
			55	55		

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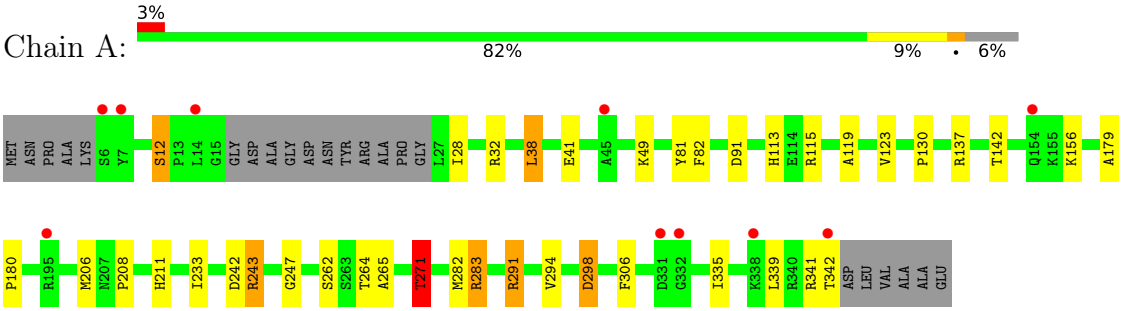
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	27	Total O 27 27	0	0
4	C	24	Total O 24 24	0	0
4	D	91	Total O 91 91	0	0
4	E	57	Total O 57 57	0	0
4	F	76	Total O 76 76	0	0

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.

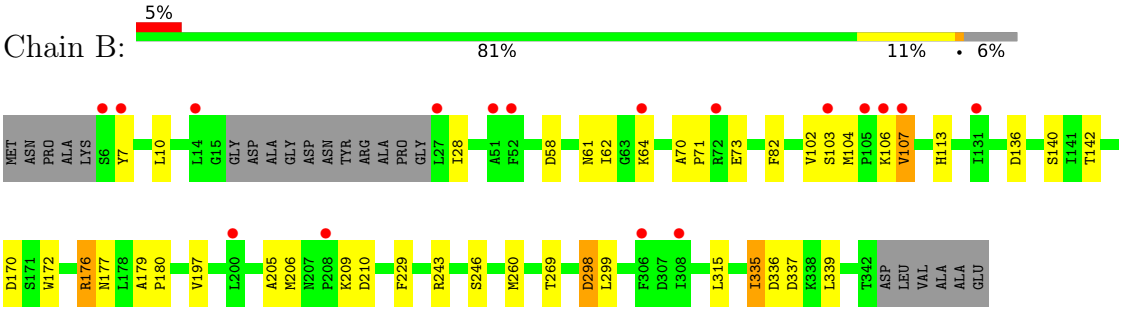
• Molecule 1: metformin hydrolase subunit B

Chain A:



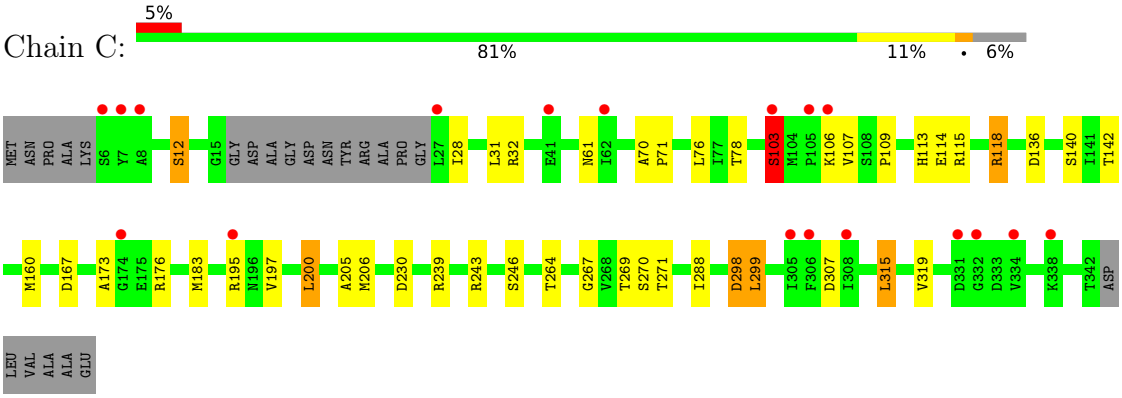
• Molecule 1: metformin hydrolase subunit B

Chain B:



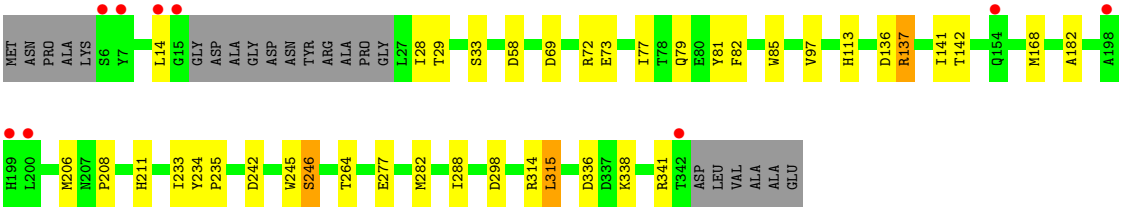
• Molecule 1: metformin hydrolase subunit B

Chain C:



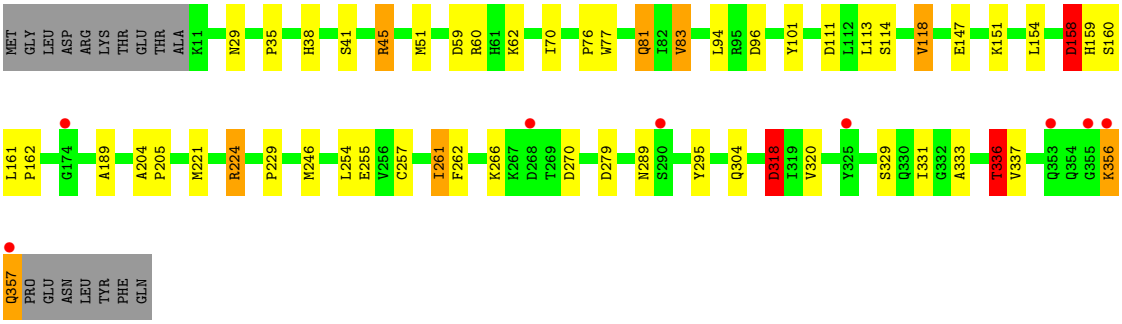
• Molecule 1: metformin hydrolase subunit B

Chain E:



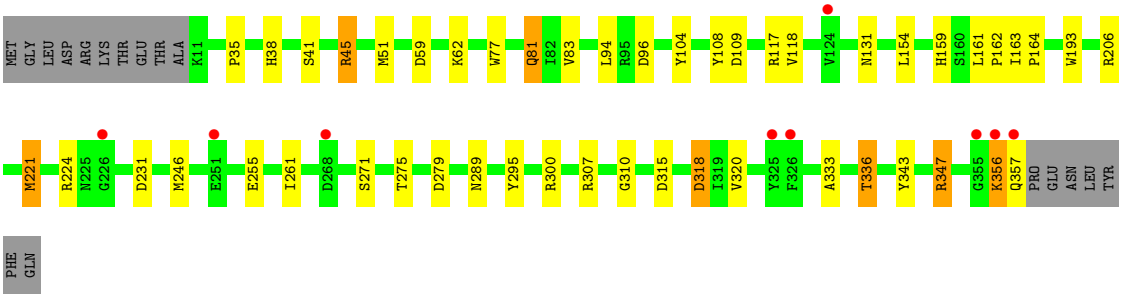
• Molecule 2: metformin hydrolase subunit A

Chain D:



• Molecule 2: metformin hydrolase subunit A

Chain F:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	83.40Å 96.40Å 96.70Å 115.50° 106.20° 101.10°	Depositor
Resolution (Å)	19.86 – 2.30 19.86 – 2.30	Depositor EDS
% Data completeness (in resolution range)	91.6 (19.86-2.30) 91.8 (19.86-2.30)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.99 (at 2.30Å)	Xtriage
Refinement program	REFMAC 5.8.0411	Depositor
R, R_{free}	0.172 , 0.219 0.171 , 0.212	Depositor DCC
R_{free} test set	5056 reflections (5.10%)	wwPDB-VP
Wilson B-factor (Å^2)	69.3	Xtriage
Anisotropy	0.122	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 58.7	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	15792	wwPDB-VP
Average B, all atoms (Å^2)	78.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.92% 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: NI

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	0.43	0/2558	0.80	4/3459 (0.1%)
1	B	0.36	0/2558	0.66	0/3459
1	C	0.37	0/2558	0.69	0/3459
1	E	0.43	0/2558	0.76	0/3459
2	D	0.40	0/2787	0.79	3/3777 (0.1%)
2	F	0.40	0/2787	0.73	0/3777
All	All	0.40	0/15806	0.74	7/21390 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	5
1	E	0	3
2	D	0	2
2	F	0	4
All	All	0	14

There are no bond length outliers.

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	283	ARG	NE-CZ-NH1	8.47	124.54	120.30
2	D	158	ASP	CB-CA-C	-7.85	94.70	110.40
1	A	283	ARG	NE-CZ-NH2	-7.25	116.68	120.30
1	A	271	THR	CB-CA-C	-5.69	96.24	111.60
2	D	318	ASP	CB-CA-C	5.49	121.37	110.40
2	D	336	THR	N-CA-CB	-5.41	100.02	110.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	243	ARG	NE-CZ-NH2	-5.30	117.65	120.30

There are no chirality outliers.

All (14) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	115	ARG	Sidechain
1	A	137	ARG	Sidechain
1	A	243	ARG	Sidechain
1	A	291	ARG	Sidechain
1	A	32	ARG	Sidechain
2	D	224	ARG	Sidechain
2	D	45	ARG	Sidechain
1	E	137	ARG	Sidechain
1	E	341	ARG	Sidechain
1	E	58	ASP	Peptide
2	F	117	ARG	Sidechain
2	F	206	ARG	Sidechain
2	F	347	ARG	Sidechain
2	F	45	ARG	Sidechain

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	2507	0	2475	22	0
1	B	2507	0	2475	31	0
1	C	2507	0	2475	28	0
1	E	2507	0	2475	24	0
2	D	2715	0	2600	35	0
2	F	2715	0	2600	31	0
3	D	2	0	0	0	0
3	F	2	0	0	0	0
4	A	55	0	0	0	0
4	B	27	0	0	0	0
4	C	24	0	0	1	0
4	D	91	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	E	57	0	0	1	0
4	F	76	0	0	0	0
All	All	15792	0	15100	153	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 5.

All (153) 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:C:206:MET:HE1	1:E:81:TYR:HA	1.50	0.92
2:D:94:LEU:HD23	2:D:336:THR:CG2	2.04	0.88
2:F:94:LEU:HD23	2:F:336:THR:HG23	1.59	0.84
1:B:113:HIS:ND1	1:B:142:THR:HG21	1.95	0.81
2:D:94:LEU:HD23	2:D:336:THR:HG23	1.64	0.80
2:D:81:GLN:HB2	2:D:158:ASP:OD1	1.84	0.77
1:A:208:PRO:HG2	1:A:211:HIS:CD2	2.26	0.71
1:A:81:TYR:HA	1:B:206:MET:HE1	1.73	0.71
2:F:221:MET:CE	2:F:261:ILE:HG12	2.21	0.70
2:F:45:ARG:HD3	2:F:96:ASP:OD2	1.90	0.70
1:B:260:MET:HG3	1:B:315:LEU:HD21	1.73	0.70
2:F:221:MET:HE2	2:F:261:ILE:HG12	1.74	0.69
2:F:59:ASP:OD2	2:F:62:LYS:HG2	1.92	0.69
1:C:197:VAL:O	1:C:243:ARG:NH2	2.23	0.69
2:D:257:CYS:O	2:D:261:ILE:HD13	1.92	0.69
1:C:113:HIS:ND1	1:C:142:THR:HG21	2.09	0.68
2:D:158:ASP:HB3	2:D:160:SER:H	1.59	0.67
1:C:173:ALA:HA	1:E:14:LEU:O	1.95	0.67
2:F:333:ALA:O	2:F:336:THR:HG22	1.96	0.66
1:C:114:GLU:O	1:C:118:ARG:HD3	1.95	0.66
1:C:176:ARG:NH1	4:C:401:HOH:O	2.28	0.66
2:D:60:ARG:NH1	2:D:147:GLU:HG2	2.12	0.64
1:B:113:HIS:ND1	1:B:142:THR:CG2	2.61	0.63
1:A:81:TYR:HA	1:B:206:MET:CE	2.29	0.61
1:B:7:TYR:HB3	1:B:10:LEU:HD12	1.84	0.60
2:D:45:ARG:HD3	2:D:96:ASP:OD1	2.03	0.58
2:F:279:ASP:HB3	2:F:289:ASN:OD1	2.04	0.57
1:E:208:PRO:HG2	1:E:211:HIS:CD2	2.39	0.57
1:B:260:MET:HG3	1:B:315:LEU:CD2	2.35	0.56
2:F:356:LYS:O	2:F:357:GLN:C	2.43	0.56
1:B:170:ASP:OD1	1:B:176:ARG:NH2	2.38	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:141:ILE:HD11	1:E:182:ALA:HA	1.86	0.56
1:A:91:ASP:HB2	1:A:335:ILE:HD11	1.88	0.56
2:D:29:ASN:ND2	4:D:504:HOH:O	2.37	0.56
2:F:104:TYR:OH	2:F:109:ASP:OD1	2.24	0.55
1:C:205:ALA:O	1:E:82:PHE:HB2	2.07	0.55
2:F:159:HIS:CG	2:F:320:VAL:HG21	2.42	0.54
1:B:70:ALA:N	1:B:71:PRO:CD	2.71	0.54
2:F:51:MET:HG2	2:F:51:MET:O	2.06	0.54
2:F:45:ARG:CD	2:F:96:ASP:OD2	2.57	0.53
1:B:61:ASN:HD21	1:B:269:THR:HG21	1.73	0.52
1:A:12:SER:OG	1:B:210:ASP:OD2	2.26	0.52
1:B:140:SER:OG	1:B:298:ASP:OD2	2.26	0.52
2:D:113:LEU:HA	2:D:118:VAL:HG13	1.91	0.52
1:E:314:ARG:HB2	1:E:314:ARG:NH1	2.25	0.52
1:A:298:ASP:OD1	1:A:298:ASP:C	2.47	0.52
1:B:28:ILE:HD11	1:E:28:ILE:HG12	1.90	0.52
2:D:51:MET:O	2:D:51:MET:HG2	2.10	0.52
1:B:298:ASP:C	1:B:298:ASP:OD1	2.48	0.51
2:F:161:LEU:N	2:F:162:PRO:HD2	2.25	0.51
1:C:267:GLY:HA3	1:C:307:ASP:HB2	1.91	0.51
1:A:306:PHE:O	2:D:329:SER:HB3	2.11	0.50
1:A:156:LYS:HE3	1:A:247:GLY:O	2.11	0.50
1:A:341:ARG:O	1:A:342:THR:C	2.49	0.50
2:F:94:LEU:HD23	2:F:336:THR:CG2	2.36	0.50
1:A:28:ILE:HG12	1:C:28:ILE:HD11	1.94	0.49
2:D:35:PRO:HB2	2:D:38:HIS:O	2.13	0.49
2:D:254:LEU:HD23	2:D:304:GLN:NE2	2.28	0.49
1:A:271:THR:HG21	2:D:331:ILE:HG22	1.95	0.49
2:F:221:MET:HE1	2:F:261:ILE:HG12	1.93	0.49
1:B:179:ALA:HB3	1:B:180:PRO:HD3	1.95	0.49
1:C:264:THR:HG22	1:C:315:LEU:HD13	1.94	0.48
2:F:246:MET:HG2	2:F:295:TYR:O	2.13	0.48
1:A:38:LEU:HD21	1:A:119:ALA:HA	1.94	0.48
1:C:70:ALA:N	1:C:71:PRO:CD	2.77	0.48
2:D:94:LEU:HD23	2:D:336:THR:HG22	1.93	0.48
2:F:35:PRO:HB2	2:F:38:HIS:O	2.13	0.48
1:C:31:LEU:HD12	1:C:78:THR:HB	1.95	0.48
2:F:77:TRP:CZ2	2:F:131:ASN:HA	2.49	0.48
2:D:333:ALA:O	2:D:336:THR:HG22	2.13	0.48
2:F:271:SER:HA	2:F:315:ASP:OD1	2.14	0.48
2:D:246:MET:HG2	2:D:295:TYR:O	2.15	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:76:PRO:O	2:D:77:TRP:C	2.53	0.47
2:D:154:LEU:O	2:D:318:ASP:HA	2.15	0.47
1:A:242:ASP:OD1	1:A:291:ARG:NH2	2.47	0.47
2:D:204:ALA:HB3	2:D:205:PRO:HD3	1.97	0.46
1:E:141:ILE:CG1	1:E:182:ALA:HA	2.46	0.46
1:A:206:MET:O	1:A:206:MET:HG3	2.16	0.46
2:F:310:GLY:O	2:F:347:ARG:HA	2.15	0.45
2:D:221:MET:SD	2:D:261:ILE:HD11	2.56	0.45
1:B:64:LYS:N	1:B:64:LYS:HD2	2.32	0.45
1:A:113:HIS:ND1	1:A:142:THR:OG1	2.44	0.45
1:C:12:SER:HB3	2:F:193:TRP:CE3	2.51	0.45
1:C:167:ASP:O	1:C:183:MET:HB2	2.16	0.45
2:D:279:ASP:HB3	2:D:289:ASN:OD1	2.16	0.45
1:C:12:SER:OG	2:F:231:ASP:OD2	2.34	0.45
1:C:61:ASN:HD21	1:C:269:THR:HG21	1.82	0.45
2:D:257:CYS:O	2:D:261:ILE:CD1	2.63	0.45
1:E:33:SER:HB3	1:E:97:VAL:HA	1.98	0.45
1:E:69:ASP:HB3	1:E:72:ARG:NH2	2.32	0.45
1:B:62:ILE:CD1	1:B:172:TRP:CE2	3.00	0.45
1:B:197:VAL:O	1:B:243:ARG:NH2	2.48	0.45
1:A:283:ARG:HH22	1:B:229:PHE:HB3	1.82	0.44
2:D:81:GLN:HG3	2:D:83:VAL:H	1.82	0.44
1:E:315:LEU:O	1:E:315:LEU:HG	2.17	0.44
1:B:106:LYS:O	1:B:107:VAL:C	2.55	0.44
1:C:12:SER:HB3	2:F:193:TRP:CZ3	2.52	0.44
1:E:113:HIS:ND1	1:E:142:THR:CG2	2.80	0.44
1:C:200:LEU:N	1:C:200:LEU:CD2	2.80	0.44
1:B:206:MET:HA	1:B:206:MET:HE2	1.99	0.44
2:D:189:ALA:HA	2:D:205:PRO:CD	2.48	0.44
2:D:59:ASP:OD2	2:D:62:LYS:HG2	2.18	0.44
1:E:77:ILE:HG21	1:E:314:ARG:HA	1.99	0.44
1:B:336:ASP:OD2	1:B:339:LEU:HD13	2.17	0.44
1:C:264:THR:CG2	1:C:315:LEU:HD13	2.47	0.43
1:E:29:THR:O	1:E:79:GLN:NE2	2.51	0.43
1:E:277:GLU:HG3	2:F:300:ARG:NH2	2.33	0.43
2:D:70:ILE:HD13	2:D:151:LYS:HB2	2.00	0.43
2:D:101:TYR:CD2	2:D:337:VAL:HG11	2.54	0.43
1:E:242:ASP:O	1:E:246:SER:HB2	2.19	0.43
1:B:102:VAL:HG12	1:B:104:MET:CE	2.49	0.42
1:B:209:LYS:O	1:B:209:LYS:HD3	2.18	0.42
1:C:205:ALA:HB2	1:E:85:TRP:CE2	2.54	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:159:HIS:CG	2:D:320:VAL:HG21	2.54	0.42
2:D:356:LYS:O	2:D:357:GLN:C	2.57	0.42
1:A:82:PHE:HB2	1:B:205:ALA:O	2.18	0.42
1:E:168:MET:HB2	1:E:211:HIS:HB3	2.02	0.42
1:B:10:LEU:HD11	1:B:335:ILE:HD13	2.01	0.42
2:D:161:LEU:N	2:D:162:PRO:HD2	2.34	0.42
1:E:234:TYR:N	1:E:235:PRO:CD	2.82	0.42
2:F:343:TYR:CD2	2:F:343:TYR:C	2.93	0.42
1:A:123:VAL:HG11	1:A:130:PRO:HB3	2.01	0.42
1:C:103:SER:O	1:C:115:ARG:HD2	2.20	0.42
2:D:45:ARG:CD	2:D:96:ASP:OD1	2.68	0.42
2:D:111:ASP:OD2	2:D:114:SER:OG	2.26	0.42
2:F:163:ILE:HB	2:F:164:PRO:HD3	2.01	0.42
2:F:81:GLN:HG3	2:F:83:VAL:H	1.83	0.42
1:E:73:GLU:HG3	4:E:418:HOH:O	2.19	0.42
1:E:141:ILE:CD1	1:E:182:ALA:HA	2.50	0.42
1:C:140:SER:OG	1:C:298:ASP:OD1	2.28	0.42
1:C:315:LEU:O	1:C:319:VAL:HG23	2.20	0.42
2:F:108:TYR:HE1	2:F:307:ARG:HD3	1.86	0.41
1:A:49:LYS:HA	1:A:49:LYS:HD2	1.88	0.41
1:A:265:ALA:O	1:A:271:THR:HG23	2.20	0.41
1:C:113:HIS:ND1	1:C:142:THR:CG2	2.82	0.41
1:B:62:ILE:HD13	1:B:172:TRP:CE2	2.55	0.41
1:A:262:SER:HA	1:A:271:THR:HG22	2.03	0.41
1:B:10:LEU:HD11	1:B:335:ILE:CD1	2.51	0.41
1:B:62:ILE:CD1	1:B:172:TRP:CZ2	3.03	0.41
1:B:337:ASP:OD1	1:B:337:ASP:C	2.59	0.41
1:C:160:MET:HE1	1:C:288:ILE:HG12	2.03	0.41
1:C:299:LEU:N	1:C:299:LEU:HD23	2.36	0.41
2:D:262:PHE:O	2:D:266:LYS:HG3	2.20	0.41
1:E:113:HIS:ND1	1:E:142:THR:HG21	2.36	0.41
2:F:159:HIS:NE2	2:F:275:THR:OG1	2.51	0.41
1:B:82:PHE:CZ	2:D:229:PRO:HG3	2.56	0.41
2:F:154:LEU:O	2:F:318:ASP:HA	2.20	0.41
2:F:163:ILE:HB	2:F:164:PRO:CD	2.52	0.40
1:E:336:ASP:OD1	1:E:338:LYS:HD3	2.21	0.40
1:C:28:ILE:HD13	1:C:76:LEU:HD21	2.03	0.40
1:A:179:ALA:N	1:A:180:PRO:HD2	2.36	0.40
1:C:298:ASP:OD2	1:C:298:ASP:C	2.60	0.40
1:E:245:TRP:CH2	1:E:288:ILE:HG23	2.56	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	322/348 (92%)	311 (97%)	10 (3%)	1 (0%)	41	50
1	B	322/348 (92%)	311 (97%)	10 (3%)	1 (0%)	41	50
1	C	322/348 (92%)	307 (95%)	12 (4%)	3 (1%)	17	20
1	E	322/348 (92%)	311 (97%)	10 (3%)	1 (0%)	41	50
2	D	345/364 (95%)	323 (94%)	21 (6%)	1 (0%)	41	50
2	F	345/364 (95%)	323 (94%)	22 (6%)	0	100	100
All	All	1978/2120 (93%)	1886 (95%)	85 (4%)	7 (0%)	34	42

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	103	SER
1	B	107	VAL
1	C	107	VAL
1	E	233	ILE
2	D	83	VAL
1	A	233	ILE
1	C	109	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	265/279 (95%)	256 (97%)	9 (3%)	37	51

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	B	265/279 (95%)	255 (96%)	10 (4%)	33 47
1	C	265/279 (95%)	249 (94%)	16 (6%)	19 26
1	E	265/279 (95%)	257 (97%)	8 (3%)	41 57
2	D	287/302 (95%)	275 (96%)	12 (4%)	30 42
2	F	287/302 (95%)	278 (97%)	9 (3%)	40 55
All	All	1634/1720 (95%)	1570 (96%)	64 (4%)	32 46

All (64) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	12	SER
1	A	38	LEU
1	A	41	GLU
1	A	264	THR
1	A	271	THR
1	A	282	MET
1	A	294	VAL
1	A	298	ASP
1	A	339	LEU
1	B	58	ASP
1	B	73	GLU
1	B	103	SER
1	B	136	ASP
1	B	176	ARG
1	B	177	ASN
1	B	246	SER
1	B	298	ASP
1	B	299	LEU
1	B	335	ILE
1	C	12	SER
1	C	32	ARG
1	C	103	SER
1	C	106	LYS
1	C	118	ARG
1	C	136	ASP
1	C	195	ARG
1	C	200	LEU
1	C	230	ASP
1	C	239	ARG
1	C	246	SER

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Mol	Chain	Res	Type
1	C	270	SER
1	C	271	THR
1	C	298	ASP
1	C	299	LEU
1	C	315	LEU
2	D	41	SER
2	D	81	GLN
2	D	118	VAL
2	D	158	ASP
2	D	224	ARG
2	D	255	GLU
2	D	261	ILE
2	D	270	ASP
2	D	318	ASP
2	D	336	THR
2	D	356	LYS
2	D	357	GLN
1	E	136	ASP
1	E	137	ARG
1	E	206	MET
1	E	246	SER
1	E	264	THR
1	E	282	MET
1	E	298	ASP
1	E	315	LEU
2	F	41	SER
2	F	81	GLN
2	F	118	VAL
2	F	221	MET
2	F	224	ARG
2	F	255	GLU
2	F	318	ASP
2	F	336	THR
2	F	356	LYS

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	177	ASN
1	B	61	ASN
1	C	165	GLN
2	D	13	GLN

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Mol	Chain	Res	Type
2	D	304	GLN
1	E	79	GLN
2	F	357	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 monosaccharides in this entry.

5.6 Ligand geometry

Of 4 ligands modelled in this entry, 4 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	326/348 (93%)	-0.21	10 (3%)	49	56	54, 72, 103, 150	0
1	B	326/348 (93%)	0.05	17 (5%)	27	34	62, 82, 115, 181	0
1	C	326/348 (93%)	0.04	18 (5%)	25	31	63, 84, 117, 174	0
1	E	326/348 (93%)	-0.29	9 (2%)	53	60	53, 70, 101, 139	0
2	D	347/364 (95%)	-0.22	8 (2%)	60	67	54, 70, 95, 149	0
2	F	347/364 (95%)	-0.20	9 (2%)	56	63	55, 72, 100, 140	0
All	All	1998/2120 (94%)	-0.14	71 (3%)	42	49	53, 75, 108, 181	0

All (71) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	106	LYS	6.0
2	D	356	LYS	5.8
1	C	7	TYR	5.6
2	F	355	GLY	5.2
1	C	306	PHE	4.9
2	D	355	GLY	4.8
1	B	7	TYR	4.4
2	F	356	LYS	4.2
1	E	200	LEU	4.0
1	E	198	ALA	4.0
1	E	342	THR	3.9
1	A	342	THR	3.8
1	B	6	SER	3.8
1	C	308	ILE	3.8
1	E	6	SER	3.7
1	C	6	SER	3.7
1	B	306	PHE	3.5
1	B	107	VAL	3.5
1	A	7	TYR	3.4

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Mol	Chain	Res	Type	RSRZ
2	F	325	TYR	3.2
1	B	27	LEU	3.2
2	D	357	GLN	3.2
1	C	105	PRO	3.2
1	E	7	TYR	3.1
1	C	62	ILE	3.1
1	A	14	LEU	3.0
1	E	15	GLY	2.9
2	D	353	GLN	2.9
1	E	14	LEU	2.8
1	C	106	LYS	2.8
1	B	105	PRO	2.8
1	A	6	SER	2.8
2	F	124	VAL	2.8
1	B	64	LYS	2.8
1	C	103	SER	2.7
1	C	27	LEU	2.7
1	A	154	GLN	2.6
1	A	195	ARG	2.6
2	F	251	GLU	2.6
1	B	131	ILE	2.6
1	C	174	GLY	2.5
2	D	174	GLY	2.4
2	F	326	PHE	2.4
1	A	338	LYS	2.4
1	C	338	LYS	2.4
2	F	226	GLY	2.4
2	F	357	GLN	2.4
1	A	45	ALA	2.3
1	C	8	ALA	2.3
1	B	72	ARG	2.3
1	C	41	GLU	2.3
1	C	305	ILE	2.3
1	E	154	GLN	2.3
1	C	334	VAL	2.3
1	B	51	ALA	2.3
1	A	332	GLY	2.2
2	D	290	SER	2.2
1	C	195	ARG	2.2
2	D	325	TYR	2.2
1	B	14	LEU	2.2
1	B	208	PRO	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	52	PHE	2.2
1	A	331	ASP	2.2
1	C	331	ASP	2.2
1	B	200	LEU	2.1
2	D	268	ASP	2.1
1	E	199	HIS	2.1
1	C	332	GLY	2.1
2	F	268	ASP	2.1
1	B	103	SER	2.1
1	B	308	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)

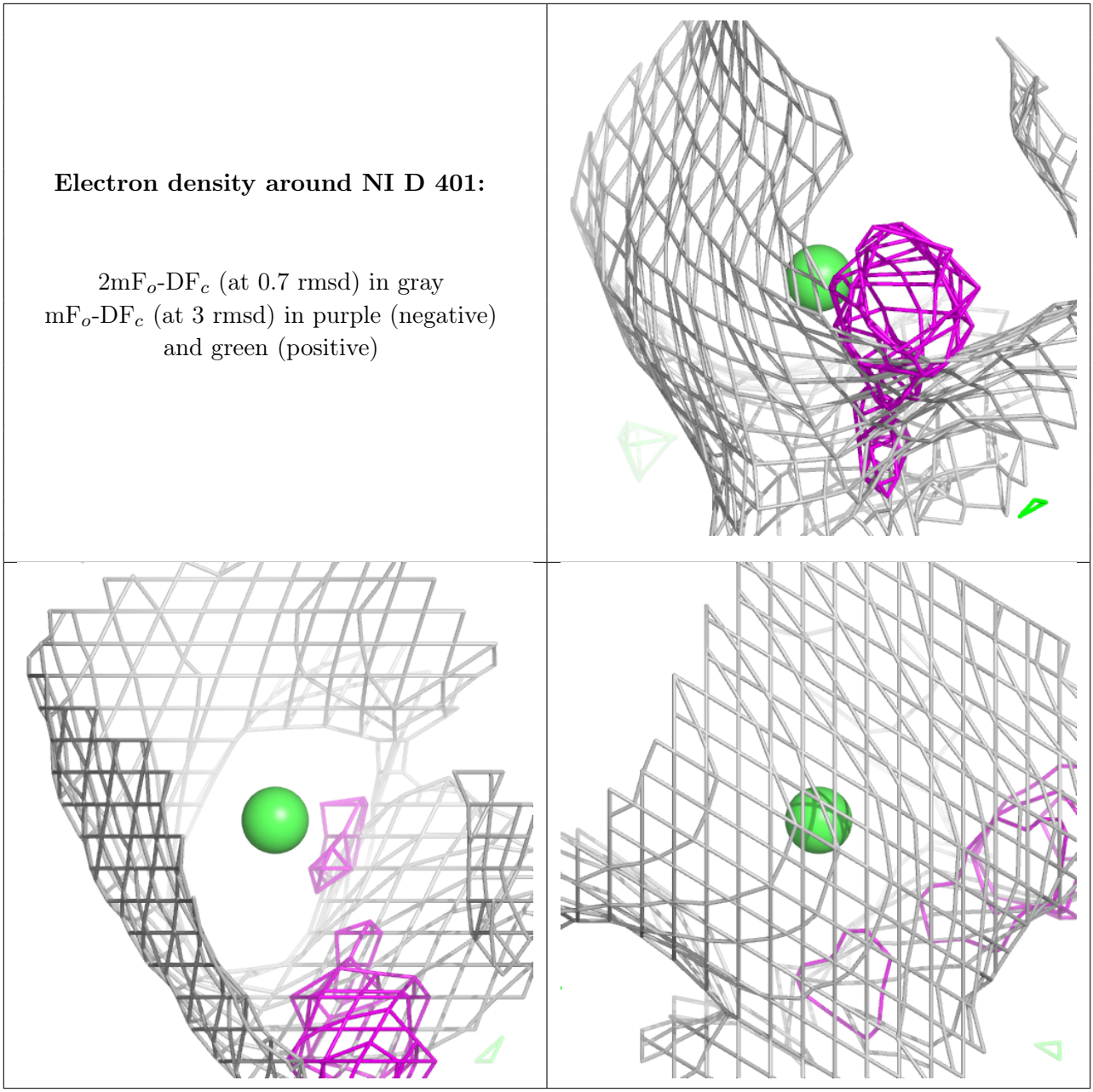
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' 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	NI	D	401	1/1	0.96	0.03	112,112,112,112	0
3	NI	F	402	1/1	0.96	0.05	125,125,125,125	0
3	NI	F	401	1/1	0.98	0.02	95,95,95,95	0
3	NI	D	402	1/1	0.98	0.04	87,87,87,87	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.

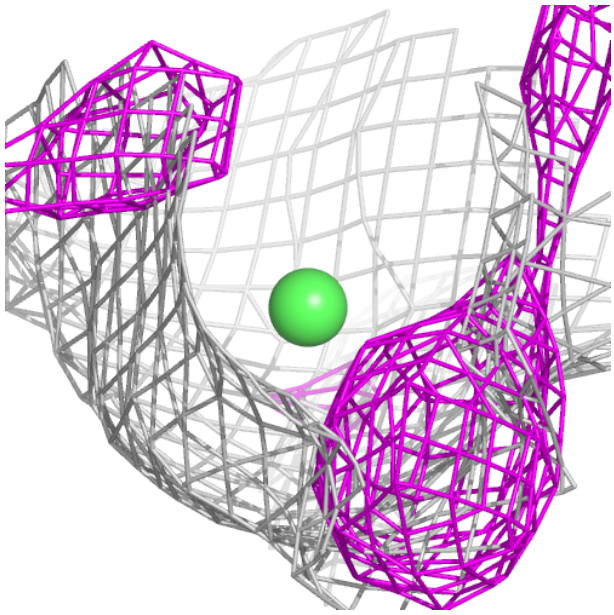
Electron density around NI D 401:

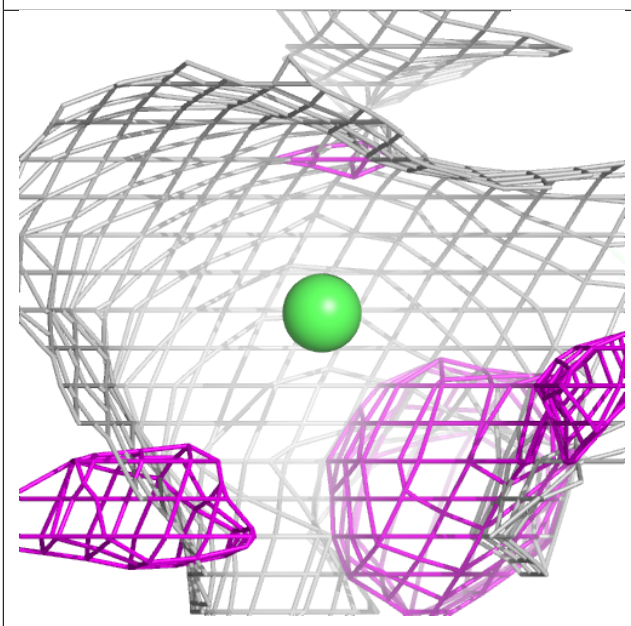
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

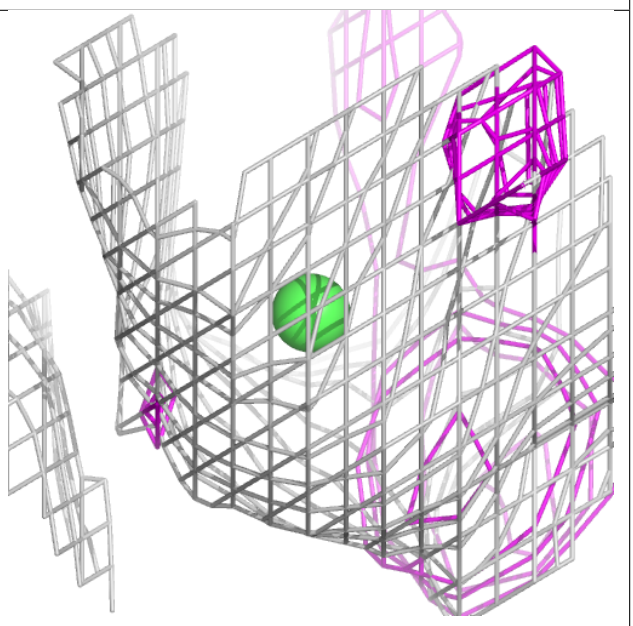


Electron density around NI F 402:

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

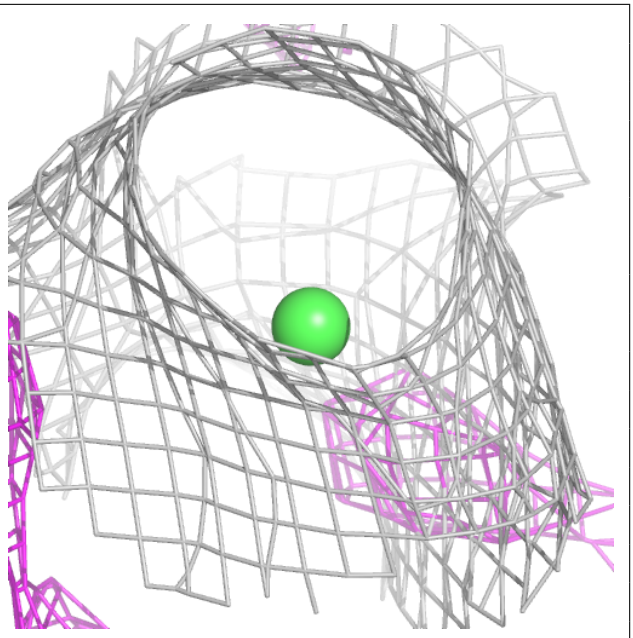


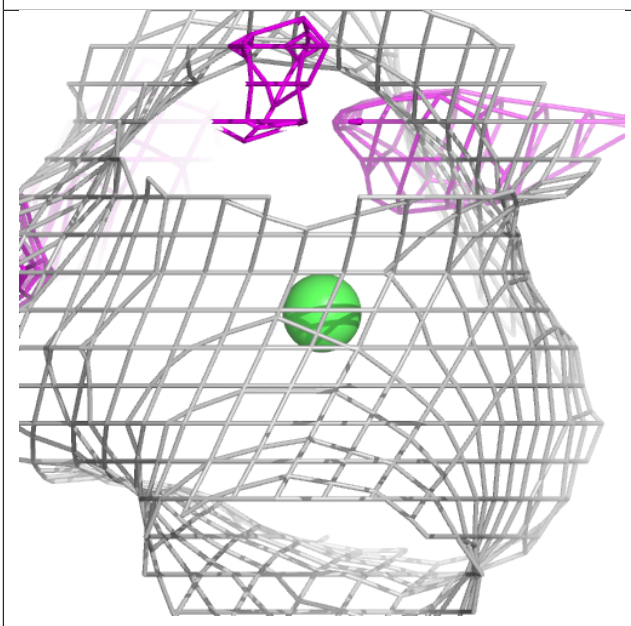


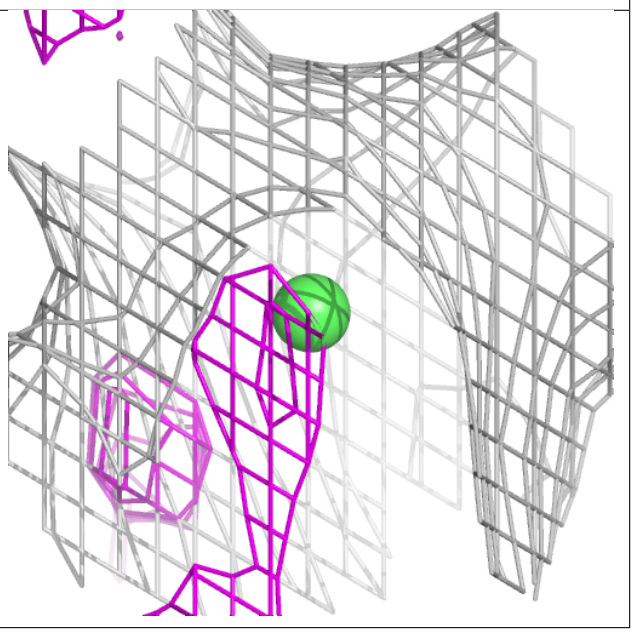


Electron density around NI F 401:

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

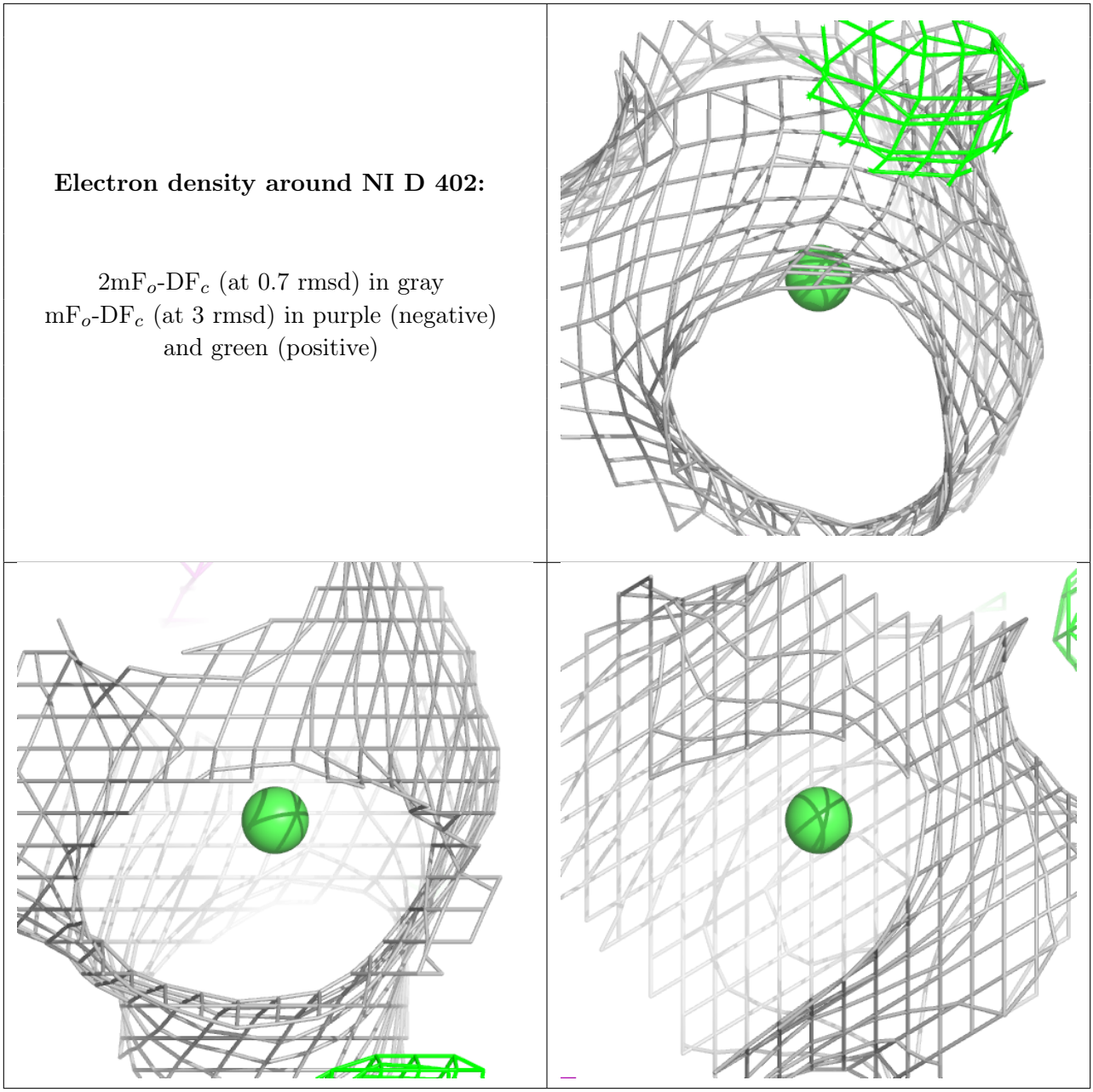






Electron density around NI D 402:

$2mF_o$-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 (i)

There are no such residues in this entry.