



Full wwPDB X-ray Structure Validation Report ⓘ

Dec 2, 2023 – 06:25 pm GMT

PDB ID : 1OI9
Title : Structure of human Thr160-phospho CDK2/cyclin A complexed with a 6-cyclohexylmethoxy-2-anilino-purine inhibitor
Authors : Pratt, D.J.; Endicott, J.A.; Noble, M.E.M.
Deposited on : 2003-06-10
Resolution : 2.10 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
Mogul : 1.8.4, CSD as541be (2020)
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

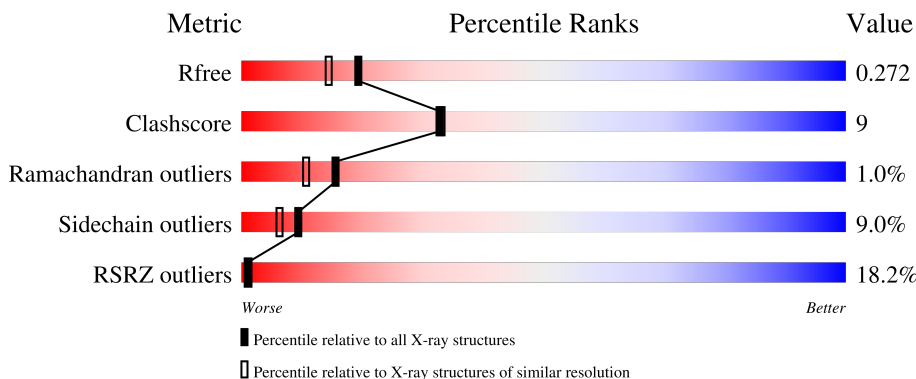
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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	5197 (2.10-2.10)
Clashscore	141614	5710 (2.10-2.10)
Ramachandran outliers	138981	5647 (2.10-2.10)
Sidechain outliers	138945	5648 (2.10-2.10)
RSRZ outliers	127900	5083 (2.10-2.10)

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	302	 5% 72% 22% . .
1	C	302	 30% 66% 25% 7% .
2	B	260	 7% 83% 13% . .
2	D	260	 29% 74% 21% . .

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 9318 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.

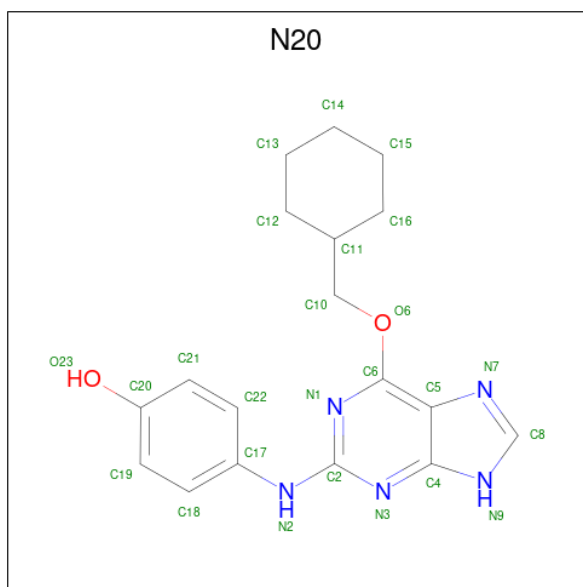
- Molecule 1 is a protein called CELL DIVISION PROTEIN KINASE 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	N	O	P				S
1	A	296	Total 2388	C 1549	N 404	O 426	P 1	S 8	0	3	0
1	C	297	Total 2392	C 1552	N 405	O 426	P 1	S 8	0	1	0

- Molecule 2 is a protein called CYCLIN A2.

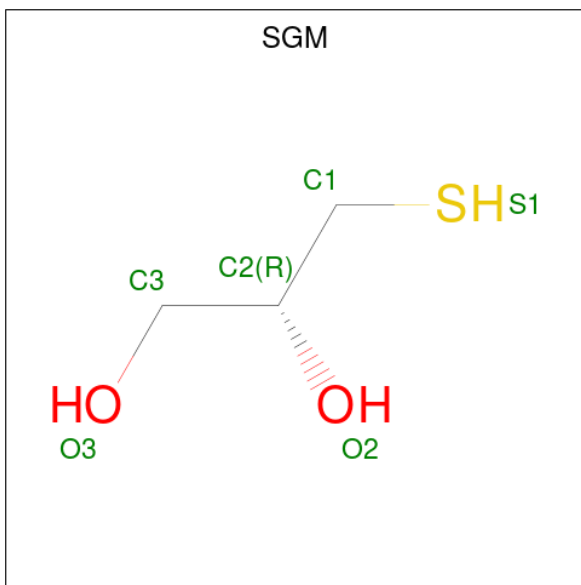
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	258	Total 2089	C 1354	N 339	O 383	S 13	0	2	0
2	D	253	Total 2045	C 1326	N 333	O 375	S 11	0	0	0

- Molecule 3 is 6-CYCLOHEXYLMETHYLOXY-2-(4'-HYDROXYANILINO)PURINE (three-letter code: N20) (formula: C₁₈H₂₁N₅O₂).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			25	18	5	2		
3	C	1	Total	C	N	O	0	0
			25	18	5	2		

- Molecule 4 is MONOTHIOGLYCEROL (three-letter code: SGM) (formula: C₃H₈O₂S).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	B	1	Total	C	O	S	0	0
			6	3	2	1		
4	D	1	Total	C	O	S	0	0
			6	3	2	1		

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

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

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	144	Total	O	0	0
			144	144		
6	B	132	Total	O	0	0
			132	132		

Continued on next page...

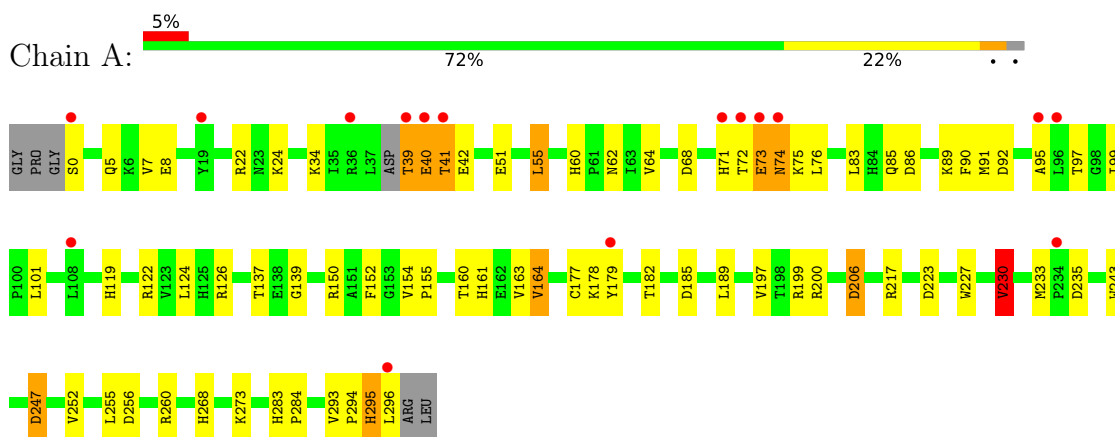
Continued from previous page...

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	C	41	Total	O	0	0
			41	41		
6	D	24	Total	O	0	0
			24	24		

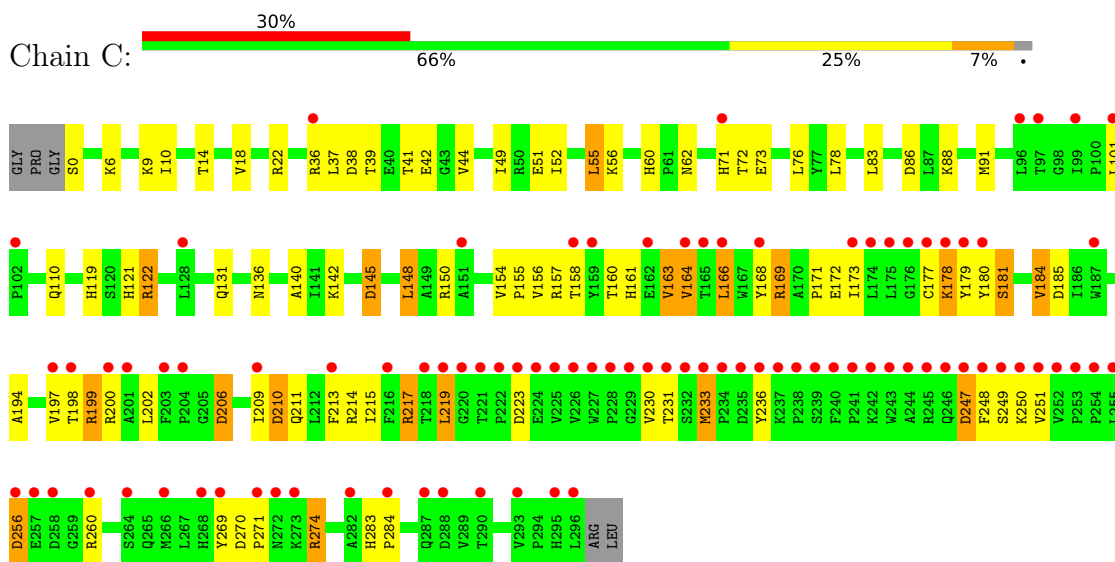
3 Residue-property plots

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.

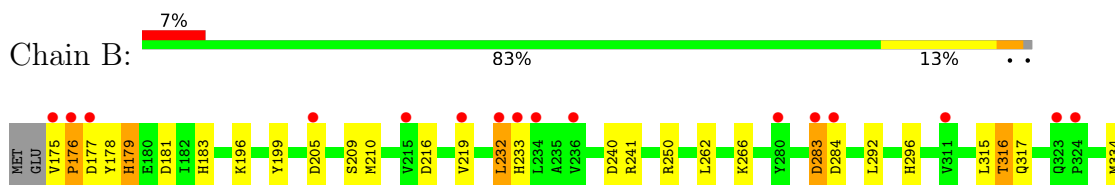
- Molecule 1: CELL DIVISION PROTEIN KINASE 2

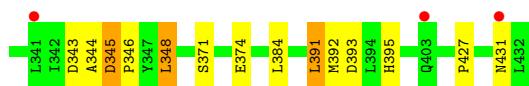


- Molecule 1: CELL DIVISION PROTEIN KINASE 2

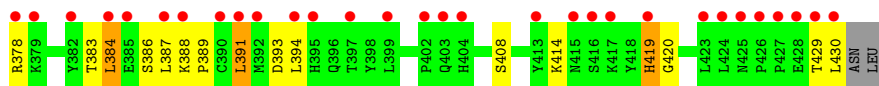
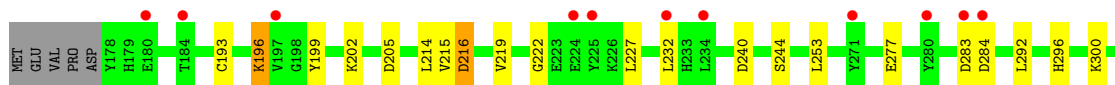
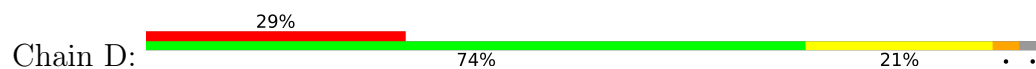


- Molecule 2: CYCLIN A2





● Molecule 2: CYCLIN A2



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	74.12Å 134.73Å 148.24Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	100.00 – 2.10 35.95 – 2.10	Depositor EDS
% Data completeness (in resolution range)	98.7 (100.00-2.10) 98.6 (35.95-2.10)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.60 (at 2.10Å)	Xtrriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.233 , 0.276 0.232 , 0.272	Depositor DCC
R_{free} test set	4305 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	29.0	Xtrriage
Anisotropy	0.153	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 53.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	9318	wwPDB-VP
Average B, all atoms (Å ²)	36.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.08% 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: N20, TPO, SGM, MG

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	0.64	0/2451	0.84	10/3324 (0.3%)
1	C	0.50	0/2446	0.75	7/3319 (0.2%)
2	B	0.64	0/2147	0.77	10/2915 (0.3%)
2	D	0.48	0/2094	0.72	6/2842 (0.2%)
All	All	0.57	0/9138	0.77	33/12400 (0.3%)

There are no bond length outliers.

All (33) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	230	VAL	CB-CA-C	-6.99	98.12	111.40
1	C	210	ASP	CB-CG-OD2	6.78	124.40	118.30
1	A	247	ASP	CB-CG-OD2	6.76	124.38	118.30
1	A	86	ASP	CB-CG-OD2	6.47	124.12	118.30
1	C	86	ASP	CB-CG-OD2	6.37	124.03	118.30
2	B	240	ASP	CB-CG-OD2	6.01	123.71	118.30
1	A	256[A]	ASP	CB-CG-OD2	5.74	123.47	118.30
1	A	256[B]	ASP	CB-CG-OD2	5.74	123.47	118.30
2	D	343	ASP	CB-CG-OD2	5.70	123.43	118.30
1	A	223	ASP	CB-CG-OD2	5.66	123.40	118.30
2	D	393	ASP	CB-CG-OD2	5.62	123.36	118.30
1	A	92	ASP	CB-CG-OD2	5.60	123.34	118.30
2	D	283	ASP	CB-CG-OD2	5.55	123.29	118.30
1	A	235	ASP	CB-CG-OD2	5.54	123.29	118.30
2	B	205	ASP	CB-CG-OD2	5.49	123.24	118.30
2	D	205	ASP	CB-CG-OD2	5.47	123.23	118.30
2	B	343	ASP	CB-CG-OD2	5.46	123.21	118.30
2	B	181	ASP	CB-CG-OD2	5.36	123.13	118.30
2	B	283	ASP	CB-CG-OD2	5.30	123.07	118.30
1	A	206	ASP	CB-CG-OD2	5.28	123.05	118.30

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	216	ASP	CB-CG-OD2	5.24	123.02	118.30
1	C	206	ASP	CB-CG-OD2	5.23	123.00	118.30
1	C	223	ASP	CB-CG-OD2	5.20	122.98	118.30
2	D	240	ASP	CB-CG-OD2	5.19	122.97	118.30
2	B	393	ASP	CB-CG-OD2	5.18	122.96	118.30
1	C	256	ASP	CB-CG-OD2	5.10	122.89	118.30
1	C	38	ASP	CB-CG-OD2	5.08	122.88	118.30
1	C	247	ASP	CB-CG-OD2	5.06	122.85	118.30
2	B	391	LEU	CA-CB-CG	5.05	126.92	115.30
2	B	345	ASP	CB-CG-OD2	5.05	122.84	118.30
2	D	216	ASP	CB-CG-OD2	5.05	122.84	118.30
1	A	68	ASP	CB-CG-OD2	5.02	122.82	118.30
2	B	241	ARG	NE-CZ-NH2	-5.02	117.79	120.30

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	2388	0	2428	45	1
1	C	2392	0	2432	54	0
2	B	2089	0	2112	31	1
2	D	2045	0	2070	35	0
3	A	25	0	20	3	0
3	C	25	0	20	2	0
4	B	6	0	7	0	0
4	D	6	0	8	1	0
5	B	1	0	0	0	0
6	A	144	0	0	6	0
6	B	132	0	0	8	0
6	C	41	0	0	4	0
6	D	24	0	0	0	0
All	All	9318	0	9097	158	1

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 (158) 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)
2:B:210:MET:HE3	2:B:250:ARG:HB2	1.45	0.95
2:B:210:MET:CE	2:B:250:ARG:HB2	2.07	0.84
1:A:60:HIS:HD2	1:A:62:ASN:H	1.26	0.84
1:A:227:TRP:O	1:A:230:VAL:HG22	1.84	0.77
1:C:39:THR:HG21	6:C:2023:HOH:O	1.85	0.77
2:D:222:GLY:HA2	2:D:227:LEU:HD12	1.66	0.76
1:A:60:HIS:CD2	1:A:62:ASN:H	2.02	0.76
2:B:177:ASP:OD2	6:B:2015:HOH:O	2.05	0.74
1:A:71:HIS:CD2	1:A:76:LEU:HD13	2.23	0.74
1:A:154:VAL:O	2:B:316:THR:HG23	1.91	0.70
1:C:60:HIS:HD2	1:C:62:ASN:H	1.38	0.70
1:C:71:HIS:NE2	2:D:296:HIS:CE1	2.60	0.70
2:B:315:LEU:HD12	2:B:334[A]:MET:CE	2.23	0.69
2:B:315:LEU:CD1	2:B:334[A]:MET:HE2	2.23	0.68
2:D:335:PHE:CZ	2:D:339:LEU:HD11	2.29	0.68
1:C:60:HIS:CD2	1:C:62:ASN:H	2.12	0.68
1:C:168:TYR:O	6:C:2036:HOH:O	2.13	0.67
2:B:315:LEU:HD13	2:B:334[A]:MET:HE2	1.77	0.67
2:B:344:ALA:HB1	2:B:348:LEU:HD22	1.77	0.67
1:A:154:VAL:O	2:B:316:THR:CG2	2.43	0.66
1:A:295:HIS:ND1	1:A:295:HIS:N	2.43	0.66
2:D:193:CYS:SG	4:D:1193:SGM:S1	2.55	0.64
1:A:161:HIS:HD2	6:A:2087:HOH:O	1.81	0.63
1:A:268:HIS:CD2	1:A:273:LYS:HB2	2.34	0.63
1:A:89:LYS:HD2	6:A:2144:HOH:O	1.98	0.62
2:B:219:VAL:HG22	2:B:232:LEU:HD11	1.81	0.62
2:B:315:LEU:CD1	2:B:334[A]:MET:CE	2.78	0.61
1:C:52:ILE:HD11	1:C:78:LEU:HD21	1.81	0.61
1:C:83:LEU:HD11	1:C:142:LYS:HD2	1.83	0.61
2:B:210:MET:HE3	2:B:250:ARG:CB	2.25	0.61
1:A:177:CYS:SG	1:A:179:TYR:O	2.53	0.60
1:A:74:ASN:N	1:A:74:ASN:OD1	2.35	0.59
1:A:137:THR:O	1:A:293:VAL:HG13	2.02	0.59
1:C:156:VAL:HG21	1:C:180:TYR:O	2.02	0.58
1:A:197:VAL:HG11	1:A:252:VAL:CG1	2.33	0.58
2:D:414:LYS:HA	2:D:420:GLY:HA2	1.85	0.58
2:B:183:HIS:HB2	2:B:317:GLN:HE22	1.67	0.58
1:C:71:HIS:CD2	2:D:296:HIS:CE1	2.92	0.58

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:260:ARG:HD3	6:C:2039:HOH:O	2.03	0.57
2:D:344:ALA:HB1	2:D:348:LEU:HD22	1.87	0.56
2:B:175:VAL:N	2:B:179:HIS:HE1	2.02	0.56
1:C:213:PHE:O	1:C:217:ARG:HB2	2.04	0.56
2:D:337:GLY:O	2:D:340:SER:OG	2.23	0.56
2:B:395:HIS:HE1	2:B:427:PRO:O	1.89	0.56
1:C:177:CYS:C	1:C:179:TYR:H	2.09	0.55
1:C:219:LEU:HB2	1:C:269:TYR:HE2	1.72	0.55
1:C:177:CYS:O	1:C:179:TYR:N	2.40	0.55
2:D:347:TYR:OH	2:D:394:LEU:HA	2.08	0.54
2:D:388:LYS:HB3	2:D:389:PRO:HD3	1.88	0.54
2:B:175:VAL:O	6:B:2012:HOH:O	2.19	0.54
1:C:51:GLU:O	1:C:55:LEU:HB2	2.07	0.54
1:C:88:LYS:HE3	1:C:131:GLN:NE2	2.23	0.54
1:C:88:LYS:HB2	1:C:131:GLN:HE21	1.73	0.53
1:C:177:CYS:C	1:C:179:TYR:N	2.61	0.53
1:C:163:VAL:HG13	1:C:164:VAL:HG23	1.89	0.53
2:B:316:THR:HG21	6:B:2005:HOH:O	2.08	0.53
1:A:154:VAL:HG13	2:B:179:HIS:CE1	2.45	0.52
1:A:64:VAL:HG21	3:A:1298:N20:C8	2.40	0.52
2:D:383:THR:O	2:D:386:SER:N	2.42	0.52
1:A:126:ARG:HB3	1:A:163:VAL:HG22	1.91	0.52
1:C:219:LEU:HB2	1:C:269:TYR:CE2	2.45	0.52
1:A:95:ALA:HA	6:A:2044:HOH:O	2.11	0.51
1:A:197:VAL:HG11	1:A:252:VAL:HG12	1.93	0.51
1:C:72:THR:HG22	1:C:73:GLU:N	2.26	0.51
1:C:172:GLU:CD	1:C:274:ARG:HH22	2.13	0.51
3:A:1298:N20:N1	3:A:1298:N20:H18	2.26	0.50
2:B:233:HIS:HE1	6:B:2089:HOH:O	1.93	0.50
1:A:39:THR:C	1:A:41:THR:H	2.15	0.50
1:A:119:HIS:HD2	6:B:2016:HOH:O	1.94	0.50
1:C:83:LEU:HD23	1:C:136:ASN:HB3	1.94	0.49
1:A:227:TRP:CE3	1:A:230:VAL:HG13	2.47	0.49
1:A:5:GLN:HB2	1:A:24:LYS:HE2	1.94	0.49
1:C:181:SER:O	1:C:184:VAL:HG13	2.12	0.49
2:D:374:GLU:HA	2:D:377:ILE:HG13	1.94	0.48
1:A:126:ARG:HB3	1:A:163:VAL:CG2	2.43	0.48
1:C:71:HIS:CD2	1:C:76:LEU:HD13	2.48	0.48
2:D:361:HIS:HD2	2:D:391:LEU:HD21	1.77	0.48
1:C:154:VAL:O	2:D:316:THR:HB	2.13	0.48
1:A:119:HIS:CD2	1:A:182:THR:HB	2.48	0.48

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:175:VAL:O	2:B:177:ASP:N	2.46	0.48
1:C:110:GLN:OE1	1:C:140:ALA:HA	2.13	0.48
2:B:296:HIS:CD2	6:B:2067:HOH:O	2.66	0.48
2:D:216:ASP:OD2	2:D:408:SER:HB2	2.13	0.48
1:A:163:VAL:HG13	1:A:164:VAL:HG23	1.96	0.48
1:C:49:ILE:HG23	2:D:306:LEU:HD12	1.95	0.48
1:A:72:THR:HG22	1:A:73:GLU:H	1.79	0.47
1:C:71:HIS:CE1	2:D:296:HIS:NE2	2.82	0.47
1:C:155:PRO:HD2	2:D:316:THR:HG22	1.95	0.47
1:C:42:GLU:HB3	6:C:2013:HOH:O	2.13	0.47
2:D:419:HIS:ND1	2:D:419:HIS:N	2.62	0.47
1:A:51:GLU:O	1:A:55:LEU:HB2	2.15	0.47
2:B:175:VAL:N	2:B:179:HIS:CE1	2.81	0.47
2:D:367:VAL:HG12	2:D:368:THR:HG23	1.96	0.47
1:A:139:GLY:HA2	1:A:294:PRO:HD3	1.97	0.46
1:C:10:ILE:HD12	1:C:18:VAL:HG12	1.97	0.46
1:A:124:LEU:HG	1:A:152:PHE:CD1	2.51	0.46
2:B:296:HIS:NE2	6:B:2065:HOH:O	2.36	0.46
3:C:1298:N20:N1	3:C:1298:N20:C18	2.78	0.46
1:A:85:GLN:HE21	1:A:90:PHE:HB2	1.81	0.45
1:A:283:HIS:CG	1:A:284:PRO:HD2	2.51	0.45
1:C:62:ASN:HA	1:C:142:LYS:HG2	1.98	0.45
2:D:196:LYS:HB3	2:D:244:SER:HB3	1.99	0.45
2:B:176:PRO:HA	2:B:179:HIS:CG	2.52	0.45
1:C:211:GLN:O	1:C:215:ILE:HG12	2.17	0.45
1:A:126:ARG:HD2	1:A:163:VAL:HG21	1.99	0.44
2:B:345:ASP:HA	2:B:346:PRO:HA	1.74	0.44
1:C:119:HIS:HE1	1:C:185:ASP:OD2	2.00	0.44
1:C:194:ALA:CB	1:C:202:LEU:HD22	2.48	0.44
1:C:248:PHE:HA	1:C:251:VAL:HG23	2.00	0.44
1:A:7:VAL:HG12	1:A:8:GLU:HG2	1.99	0.44
1:C:161:HIS:CD2	1:C:173:ILE:HG22	2.53	0.44
1:C:231:THR:HA	1:C:236:TYR:CD1	2.52	0.44
1:A:268:HIS:CD2	6:A:2130:HOH:O	2.70	0.44
2:B:183:HIS:HB2	2:B:317:GLN:NE2	2.32	0.44
1:C:71:HIS:CE1	2:D:296:HIS:CD2	3.06	0.43
2:D:344:ALA:O	2:D:348:LEU:HB2	2.18	0.43
1:A:260:ARG:HD3	6:A:2123:HOH:O	2.17	0.43
3:A:1298:N20:N1	3:A:1298:N20:C18	2.79	0.43
1:A:293:VAL:HG13	1:A:294:PRO:HD2	2.01	0.43
2:B:262:LEU:HD11	2:B:266:LYS:HE3	1.99	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:166:LEU:HA	1:C:169:ARG:HH21	1.83	0.43
1:C:210:ASP:O	1:C:214:ARG:HG3	2.18	0.43
1:A:177:CYS:HB2	1:A:233:MET:CE	2.48	0.43
1:C:88:LYS:HA	1:C:91:MET:HE2	2.01	0.43
1:C:37:LEU:HD22	1:C:44:VAL:HG22	2.00	0.43
1:C:161:HIS:HD2	1:C:173:ILE:HG22	1.83	0.43
3:C:1298:N20:N1	3:C:1298:N20:H18	2.34	0.43
2:D:215:VAL:O	2:D:219:VAL:HG23	2.18	0.43
2:D:323:GLN:HA	2:D:323:GLN:OE1	2.19	0.43
1:C:283:HIS:CG	1:C:284:PRO:HD2	2.54	0.43
2:B:199:TYR:CE2	2:B:348:LEU:HD21	2.54	0.43
1:C:14:THR:HG23	1:C:145:ASP:OD2	2.19	0.43
1:C:71:HIS:NE2	2:D:296:HIS:NE2	2.67	0.43
1:A:91:MET:HG2	1:A:99:ILE:HD11	2.01	0.42
1:A:60:HIS:HD2	1:A:62:ASN:N	2.07	0.42
1:C:177:CYS:HB2	1:C:233:MET:CE	2.50	0.42
1:A:154:VAL:HA	1:A:155:PRO:HA	1.86	0.42
2:B:210:MET:CE	2:B:250:ARG:CB	2.87	0.42
2:D:335:PHE:CE2	2:D:339:LEU:HD11	2.54	0.42
6:A:2039:HOH:O	2:D:202:LYS:HE2	2.20	0.42
1:C:121:HIS:C	1:C:122:ARG:HG3	2.40	0.42
2:D:196:LYS:HG2	2:D:199:TYR:HB3	2.01	0.42
2:D:323:GLN:HA	2:D:324:PRO:HA	1.76	0.42
2:D:327:CYS:HB3	2:D:419:HIS:CD2	2.54	0.42
1:C:169:ARG:HE	1:C:169:ARG:HB2	1.59	0.41
1:C:270:ASP:O	1:C:271:PRO:C	2.58	0.41
2:D:345:ASP:HA	2:D:346:PRO:HA	1.76	0.41
1:A:41:THR:HB	1:A:42:GLU:H	1.60	0.41
1:A:217:ARG:HG2	1:A:243:TRP:CE2	2.55	0.41
2:D:214:LEU:HD22	2:D:253:LEU:HG	2.03	0.41
1:A:217:ARG:HG2	1:A:243:TRP:CD2	2.56	0.41
1:C:148:LEU:HD12	1:C:148:LEU:HA	1.86	0.41
1:A:119:HIS:HE1	1:A:185:ASP:OD2	2.04	0.41
2:B:178:TYR:N	6:B:2012:HOH:O	2.23	0.41
1:C:198:THR:O	1:C:199:ARG:HB2	2.21	0.41
2:D:386:SER:C	2:D:388:LYS:H	2.24	0.40
2:D:361:HIS:CD2	2:D:391:LEU:HD21	2.56	0.40

All (1) 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)
1:A:199:ARG:NH2	2:B:374:GLU:OE2[4_456]	2.07	0.13

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	294/302 (97%)	283 (96%)	9 (3%)	2 (1%)	22	18
1	C	295/302 (98%)	270 (92%)	19 (6%)	6 (2%)	7	3
2	B	258/260 (99%)	254 (98%)	3 (1%)	1 (0%)	34	32
2	D	251/260 (96%)	236 (94%)	13 (5%)	2 (1%)	19	15
All	All	1098/1124 (98%)	1043 (95%)	44 (4%)	11 (1%)	15	11

All (11) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	176	PRO
1	C	164	VAL
1	C	166	LEU
1	C	178	LYS
1	A	40	GLU
1	A	164	VAL
1	C	145	ASP
2	D	387	LEU
1	C	199	ARG
2	D	384	LEU
1	C	171	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	263/264 (100%)	239 (91%)	24 (9%)	9	6
1	C	262/264 (99%)	230 (88%)	32 (12%)	5	2
2	B	234/234 (100%)	220 (94%)	14 (6%)	19	16
2	D	227/234 (97%)	209 (92%)	18 (8%)	12	9
All	All	986/996 (99%)	898 (91%)	88 (9%)	9	6

All (88) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	0	SER
1	A	22	ARG
1	A	34	LYS
1	A	39	THR
1	A	40	GLU
1	A	41	THR
1	A	55	LEU
1	A	73	GLU
1	A	74	ASN
1	A	75	LYS
1	A	83	LEU
1	A	97	THR
1	A	101	LEU
1	A	122	ARG
1	A	150	ARG
1	A	178	LYS
1	A	189	LEU
1	A	200	ARG
1	A	206	ASP
1	A	230	VAL
1	A	247	ASP
1	A	255	LEU
1	A	295	HIS
1	A	296	LEU
2	B	179	HIS
2	B	196	LYS
2	B	209	SER
2	B	232	LEU
2	B	283	ASP
2	B	284	ASP

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
2	B	292	LEU
2	B	316	THR
2	B	348	LEU
2	B	371	SER
2	B	384	LEU
2	B	391	LEU
2	B	392	MET
2	B	431	ASN
1	C	0	SER
1	C	6	LYS
1	C	9	LYS
1	C	22	ARG
1	C	36	ARG
1	C	41	THR
1	C	55	LEU
1	C	56	LYS
1	C	101	LEU
1	C	122	ARG
1	C	148	LEU
1	C	150	ARG
1	C	157	ARG
1	C	158	THR
1	C	163	VAL
1	C	169	ARG
1	C	178	LYS
1	C	181	SER
1	C	184	VAL
1	C	197	VAL
1	C	200	ARG
1	C	206	ASP
1	C	209	ILE
1	C	217	ARG
1	C	219	LEU
1	C	230	VAL
1	C	233	MET
1	C	247	ASP
1	C	249	SER
1	C	250	LYS
1	C	256	ASP
1	C	274	ARG
2	D	196	LYS
2	D	232	LEU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
2	D	277	GLU
2	D	284	ASP
2	D	292	LEU
2	D	300	LYS
2	D	316	THR
2	D	328	LYS
2	D	331	SER
2	D	334	MET
2	D	362	LEU
2	D	377	ILE
2	D	378	ARG
2	D	384	LEU
2	D	391	LEU
2	D	419	HIS
2	D	429	THR
2	D	430	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	60	HIS
1	A	71	HIS
1	A	85	GLN
1	A	119	HIS
1	A	161	HIS
1	A	268	HIS
2	B	179	HIS
2	B	233	HIS
2	B	296	HIS
2	B	317	GLN
2	B	395	HIS
1	C	60	HIS
1	C	119	HIS
1	C	131	GLN
1	C	161	HIS
2	D	296	HIS
2	D	361	HIS

5.3.3 RNA

There are no RNA molecules in this entry.

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

2 non-standard protein/DNA/RNA residues are modelled in this entry.

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
1	TPO	C	160	1	8,10,11	1.22	1 (12%)	10,14,16	0.78	0
1	TPO	A	160	1	8,10,11	1.39	1 (12%)	10,14,16	0.92	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	TPO	C	160	1	-	0/9/11/13	-
1	TPO	A	160	1	-	0/9/11/13	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	160	TPO	P-O1P	3.30	1.61	1.50
1	C	160	TPO	P-O1P	2.54	1.58	1.50

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.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry

Of 5 ligands modelled in this entry, 1 is monoatomic - leaving 4 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	N20	C	1298	-	25,28,28	0.87	1 (4%)	29,38,38	1.78	5 (17%)
3	N20	A	1298	-	25,28,28	1.15	4 (16%)	29,38,38	1.59	6 (20%)
4	SGM	D	1193	-	5,5,5	0.31	0	5,5,5	0.60	0
4	SGM	B	1193	-	5,5,5	0.67	0	5,5,5	0.47	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	N20	C	1298	-	-	0/9/17/17	0/4/4/4
3	N20	A	1298	-	-	0/9/17/17	0/4/4/4
4	SGM	D	1193	-	-	3/4/4/4	-
4	SGM	B	1193	-	-	1/4/4/4	-

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1298	N20	O6-C6	2.74	1.37	1.35
3	A	1298	N20	C4-N9	2.71	1.39	1.34
3	A	1298	N20	C17-N2	-2.17	1.35	1.40
3	A	1298	N20	C6-N1	2.14	1.35	1.31
3	C	1298	N20	C6-N1	2.08	1.35	1.31

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	1298	N20	C10-O6-C6	4.57	121.87	117.50
3	A	1298	N20	C2-N1-C6	4.48	123.08	115.18

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	1298	N20	C2-N1-C6	4.31	122.79	115.18
3	C	1298	N20	C2-N3-C4	4.18	120.03	115.28
3	A	1298	N20	C2-N3-C4	3.63	119.40	115.28
3	C	1298	N20	N3-C2-N1	-3.42	120.82	126.23
3	A	1298	N20	C5-C6-N1	-3.01	117.53	123.26
3	A	1298	N20	N3-C2-N1	-2.94	121.58	126.23
3	C	1298	N20	C5-C6-N1	-2.43	118.64	123.26
3	A	1298	N20	O6-C6-N1	2.18	122.01	120.12
3	A	1298	N20	C10-O6-C6	2.13	119.54	117.50

There are no chirality outliers.

All (4) torsion outliers are listed below:

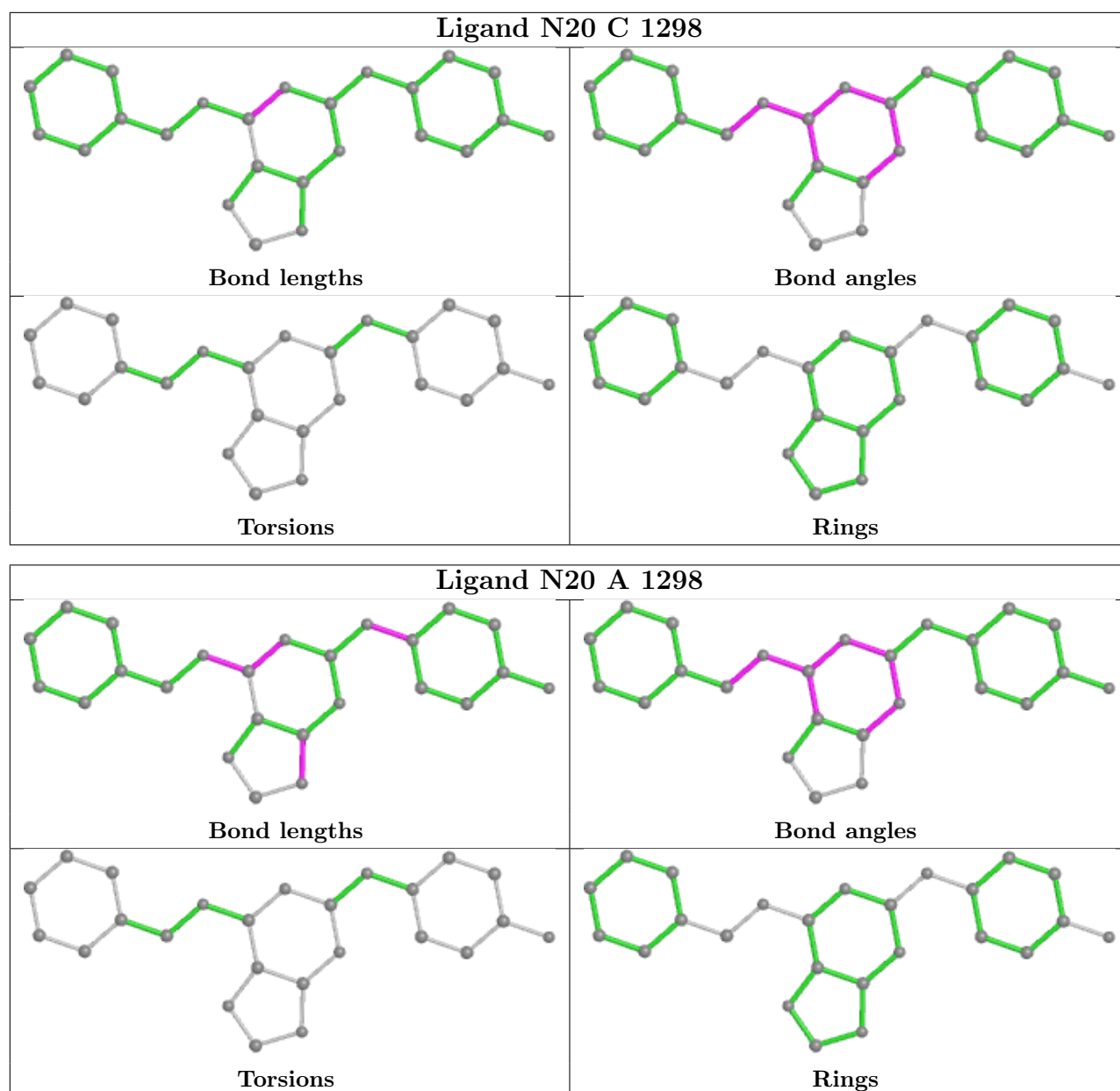
Mol	Chain	Res	Type	Atoms
4	D	1193	SGM	O2-C2-C3-O3
4	D	1193	SGM	C1-C2-C3-O3
4	B	1193	SGM	S1-C1-C2-O2
4	D	1193	SGM	S1-C1-C2-O2

There are no ring outliers.

3 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	1298	N20	2	0
3	A	1298	N20	3	0
4	D	1193	SGM	1	0

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

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, 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	295/302 (97%)	0.42	16 (5%) 25 31	12, 21, 45, 62	0
1	C	296/302 (98%)	1.61	91 (30%) 0 0	23, 46, 75, 79	0
2	B	258/260 (99%)	0.43	19 (7%) 14 18	11, 23, 41, 53	0
2	D	253/260 (97%)	1.55	75 (29%) 0 0	21, 49, 70, 76	0
All	All	1102/1124 (98%)	1.00	201 (18%) 1 1	11, 33, 69, 79	0

All (201) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	234	PRO	8.9
1	C	173	ILE	7.4
2	B	175	VAL	7.3
1	C	243	TRP	7.1
1	C	253	PRO	7.1
1	C	233	MET	6.8
1	C	229	GLY	6.7
1	C	236	TYR	6.6
2	D	384	LEU	6.6
1	C	250	LYS	6.5
1	C	246	GLN	6.5
2	D	372	TRP	6.3
1	A	40	GLU	6.1
1	A	39	THR	5.8
1	C	225	VAL	5.8
1	C	249	SER	5.7
2	D	429	THR	5.7
1	C	232	SER	5.7
1	C	224	GLU	5.6
1	C	175	LEU	5.6
1	C	227	TRP	5.6

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	C	248	PHE	5.5
1	A	96	LEU	5.4
1	C	295	HIS	5.4
2	D	367	VAL	5.4
1	C	228	PRO	5.3
1	C	231	THR	5.2
1	C	235	ASP	5.2
2	D	280	TYR	5.1
2	D	391	LEU	5.1
2	D	430	LEU	5.1
2	D	399	LEU	5.0
2	D	325	ALA	5.0
2	D	364	LEU	4.9
1	C	245	ARG	4.8
1	C	273	LYS	4.7
2	B	323	GLN	4.7
2	D	428	GLU	4.7
2	D	423	LEU	4.6
1	C	247	ASP	4.5
1	C	251	VAL	4.5
2	D	368	THR	4.5
2	D	324	PRO	4.5
1	A	73	GLU	4.5
2	D	416	SER	4.4
2	D	320	LEU	4.3
2	D	327	CYS	4.3
1	C	244	ALA	4.3
1	C	223	ASP	4.3
2	D	388	LYS	4.2
1	C	238	PRO	4.2
1	C	166	LEU	4.2
1	C	221	THR	4.2
2	D	427	PRO	4.2
1	C	178	LYS	4.2
2	D	395	HIS	4.2
2	D	284	ASP	4.1
2	D	424	LEU	4.1
1	C	256	ASP	4.0
2	D	360	PHE	3.9
2	D	382	TYR	3.9
1	C	101	LEU	3.9
2	B	284	ASP	3.9

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	C	230	VAL	3.8
2	D	369	GLY	3.8
2	D	363	ALA	3.8
1	C	219	LEU	3.7
1	C	241	PRO	3.7
1	C	288	ASP	3.6
2	D	375	SER	3.6
2	D	419	HIS	3.6
1	C	180	TYR	3.6
1	A	36	ARG	3.6
2	D	366	THR	3.6
1	C	242	LYS	3.5
1	C	174	LEU	3.5
1	C	220	GLY	3.5
2	D	326	ASN	3.5
1	C	159	TYR	3.5
2	D	373	PRO	3.4
1	C	258	ASP	3.4
1	C	293	VAL	3.4
1	C	102	PRO	3.3
2	D	197	VAL	3.3
2	D	341	LEU	3.3
2	D	390	CYS	3.3
1	C	200	ARG	3.2
1	C	213	PHE	3.2
2	B	234	LEU	3.2
1	A	95	ALA	3.2
2	D	328	LYS	3.2
2	D	350	TYR	3.2
2	D	376	LEU	3.2
1	C	257	GLU	3.1
2	D	387	LEU	3.1
1	A	71	HIS	3.1
1	C	226	VAL	3.1
2	D	283	ASP	3.1
2	D	180	GLU	3.1
1	C	97	THR	3.1
1	C	99	ILE	3.1
2	D	356	ALA	3.1
1	C	203	PHE	3.0
2	B	324	PRO	3.0
2	D	402	PRO	3.0

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	C	177	CYS	3.0
1	A	179	TYR	3.0
2	D	365	TYR	3.0
2	B	177	ASP	3.0
1	C	254	PRO	3.0
1	C	222	PRO	3.0
1	C	282	ALA	3.0
1	C	296	LEU	2.9
1	C	237	LYS	2.9
2	D	379	LYS	2.9
2	D	425	ASN	2.9
1	C	179	TYR	2.9
1	C	271	PRO	2.9
1	C	198	THR	2.9
2	D	378	ARG	2.8
1	C	176	GLY	2.8
2	D	374	GLU	2.8
1	A	296	LEU	2.8
2	D	403	GLN	2.8
2	D	415	ASN	2.8
1	C	158	THR	2.8
1	C	187	TRP	2.8
2	B	176	PRO	2.8
2	D	370	GLN	2.8
2	D	232	LEU	2.8
1	C	209	ILE	2.7
1	C	216	PHE	2.7
1	C	255	LEU	2.7
2	B	341	LEU	2.7
2	D	417	LYS	2.7
2	B	283	ASP	2.7
1	C	272	ASN	2.7
1	C	287	GLN	2.6
1	C	260	ARG	2.6
1	A	41	THR	2.6
1	C	252	VAL	2.6
1	C	290	THR	2.6
2	D	321	HIS	2.6
2	D	426	PRO	2.6
2	D	311	VAL	2.6
1	C	164	VAL	2.5
1	C	269	TYR	2.5

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
2	D	323	GLN	2.5
1	A	72	THR	2.5
1	C	266	MET	2.5
1	C	128	LEU	2.4
1	C	165	THR	2.4
1	C	71	HIS	2.4
1	C	268	HIS	2.4
2	D	184	THR	2.4
2	D	334	MET	2.4
1	C	96	LEU	2.4
1	A	0	SER	2.4
1	C	204	PRO	2.4
1	C	240	PHE	2.4
2	D	332	LEU	2.4
1	C	239	SER	2.4
1	C	218	THR	2.4
1	C	36	ARG	2.3
2	D	385	GLU	2.3
2	B	403	GLN	2.3
2	D	317	GLN	2.3
1	C	168	TYR	2.3
2	D	224	GLU	2.3
1	C	201	ALA	2.2
2	D	234	LEU	2.2
2	D	271	TYR	2.2
2	B	205	ASP	2.2
2	B	236	VAL	2.2
2	D	315	LEU	2.2
1	A	19	TYR	2.2
1	C	162	GLU	2.2
1	A	234	PRO	2.2
1	A	74	ASN	2.2
2	B	431	ASN	2.2
1	C	197	VAL	2.1
2	B	233	HIS	2.1
1	C	151	ALA	2.1
2	D	344	ALA	2.1
2	D	339	LEU	2.1
2	D	319	PHE	2.1
2	B	232	LEU	2.1
2	D	397	THR	2.1
2	D	392	MET	2.1

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	C	284	PRO	2.1
1	A	108	LEU	2.1
1	C	264	SER	2.1
2	D	394	LEU	2.1
2	B	280	TYR	2.1
2	D	413	TYR	2.0
2	D	342	ILE	2.0
2	B	215	VAL	2.0
2	B	219	VAL	2.0
2	D	225	TYR	2.0
2	D	404	HIS	2.0
2	B	311	VAL	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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(Å ²)	Q<0.9
1	TPO	C	160	11/12	0.92	0.15	39,48,51,52	0
1	TPO	A	160	11/12	0.99	0.11	14,18,19,20	0

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.

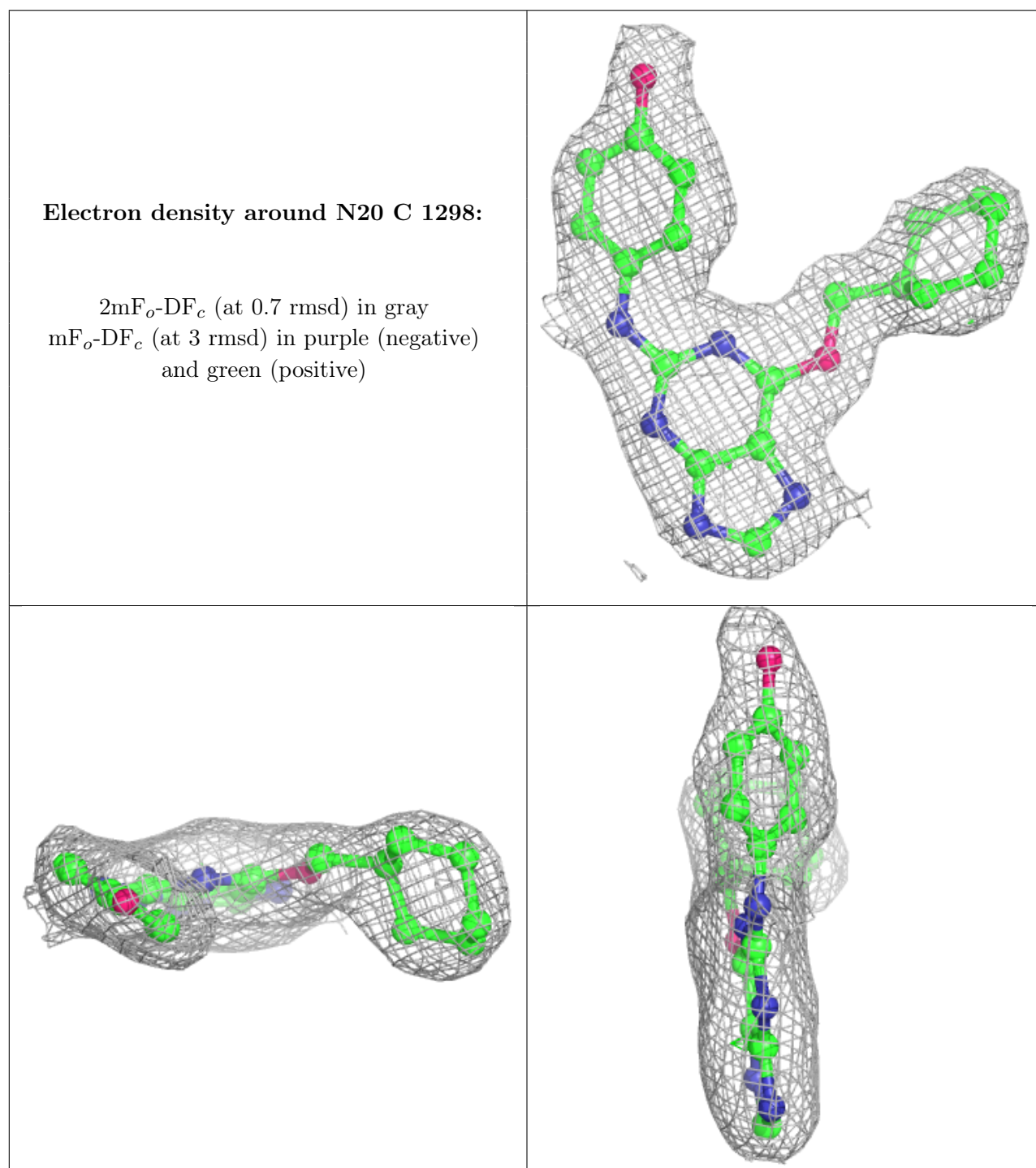
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	SGM	D	1193	6/6	0.85	0.17	51,54,55,55	0
4	SGM	B	1193	6/6	0.91	0.17	34,38,41,47	0
3	N20	C	1298	25/25	0.94	0.14	29,35,38,42	0
3	N20	A	1298	25/25	0.96	0.12	24,26,29,30	0

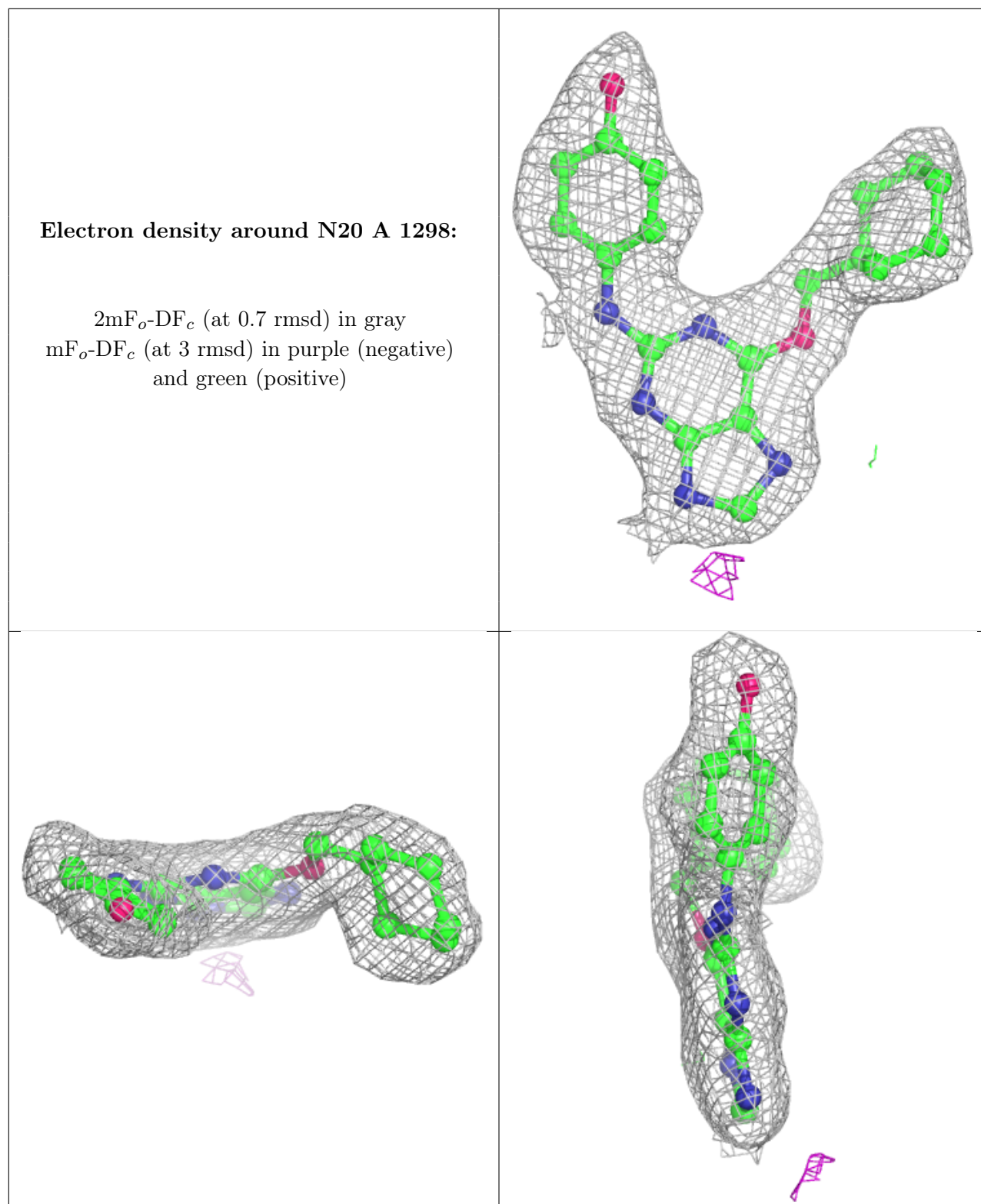
Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
5	MG	B	1433	1/1	0.99	0.09	35,35,35,35	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.





6.5 Other polymers ⓘ

There are no such residues in this entry.