



Full wwPDB X-ray Structure Validation Report ⓘ

Nov 22, 2023 – 10:11 PM JST

PDB ID : 7WAS
Title : SbSOMT in complex with pterostilbene and nicotinamide adenine dinucleotide(NAD+)
Authors : Pow, K.C.; Hao, Q.
Deposited on : 2021-12-14
Resolution : 2.40 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 : 1.8.5 (274361), 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

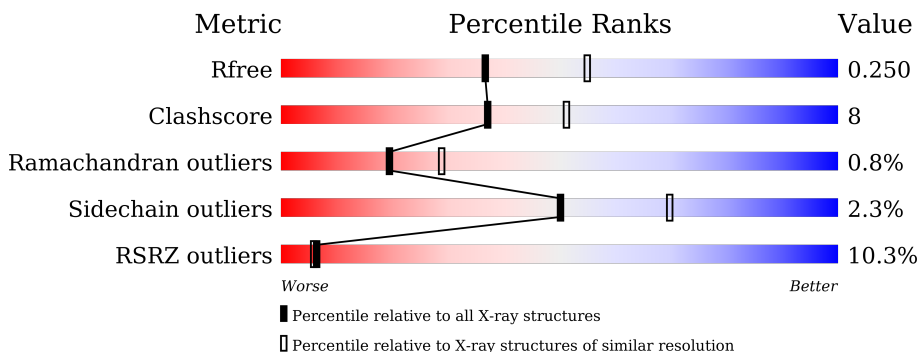
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION


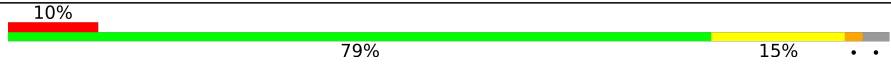
The reported resolution of this entry is 2.40 Å.

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	3907 (2.40-2.40)
Clashscore	141614	4398 (2.40-2.40)
Ramachandran outliers	138981	4318 (2.40-2.40)
Sidechain outliers	138945	4319 (2.40-2.40)
RSRZ outliers	127900	3811 (2.40-2.40)

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	376	 10% 82% 12% . .
1	B	376	 10% 79% 15% . .

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	NAD	B	403	-	-	-	X
4	GOL	B	407	-	-	X	-

2 Entry composition i

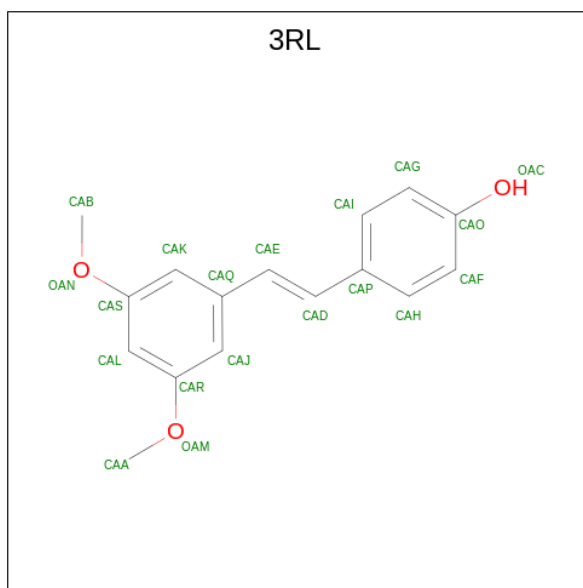
There are 8 unique types of molecules in this entry. The entry contains 6104 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 stilbene O-methyltransferase.

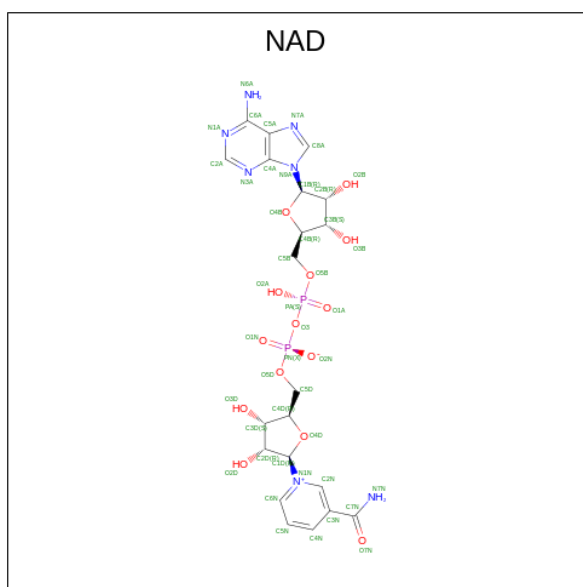
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	363	Total 2861	C 1822	N 478	O 538	S 23	0	6	0
1	B	363	Total 2860	C 1822	N 478	O 536	S 24	0	6	0

- Molecule 2 is Pterostilbene (three-letter code: 3RL) (formula: C₁₆H₁₆O₃) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
2	A	1	Total 19	C 16	O 3	0	0
2	B	1	Total 19	C 16	O 3	0	0

- Molecule 3 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (three-letter code: NAD) (formula: C₂₁H₂₇N₇O₁₄P₂).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	N	O			P
3	A	1	44	21	7	14	2	0	0
3	B	1	44	21	7	14	2	0	0

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



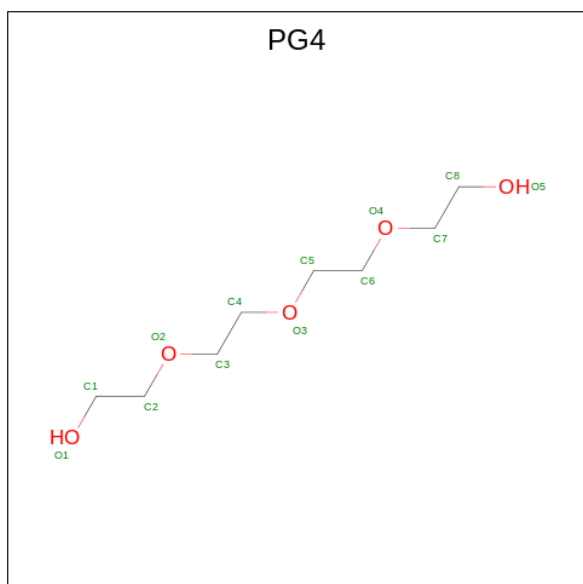
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
4	A	1	6	3	3	0	0
4	A	1	6	3	3	0	0

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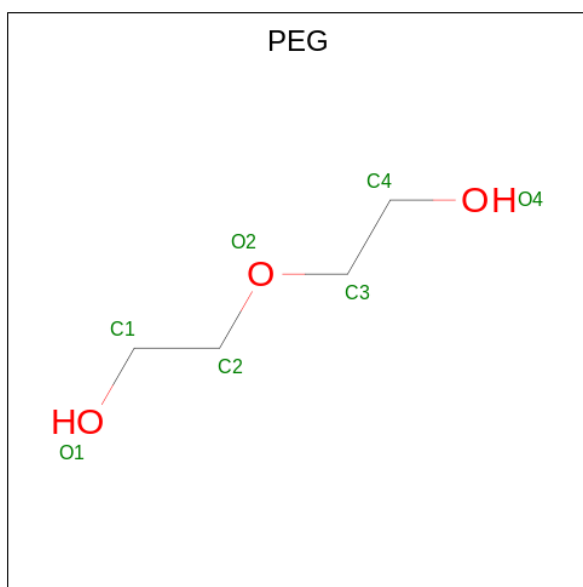
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	B	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		

- Molecule 5 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula: C₈H₁₈O₅).



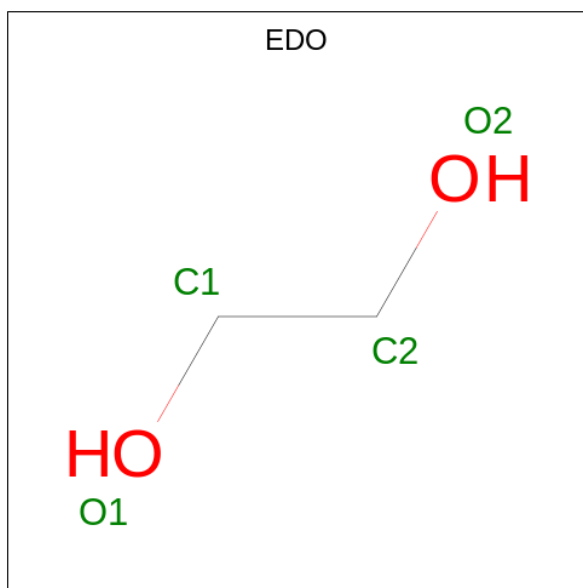
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			13	8	5		

- Molecule 6 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: C₄H₁₀O₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			7	4	3		

- Molecule 7 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C₂H₆O₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total	C	O	0	0
			4	2	2		
7	A	1	Total	C	O	0	0
			4	2	2		
7	B	1	Total	C	O	0	0
			4	2	2		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	B	1	Total	C	O	0	0
			4	2	2		
7	B	1	Total	C	O	0	0
			4	2	2		


- Molecule 8 is water.

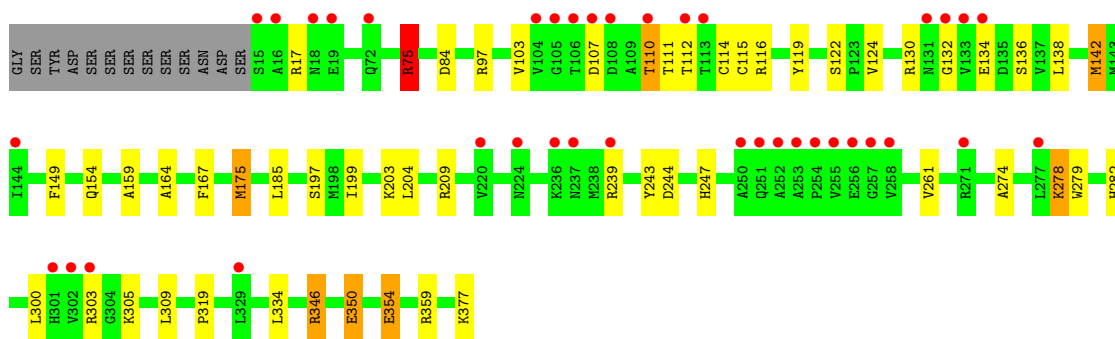
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	79	Total	O	0	0
			79	79		
8	B	90	Total	O	0	0
			90	90		

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.

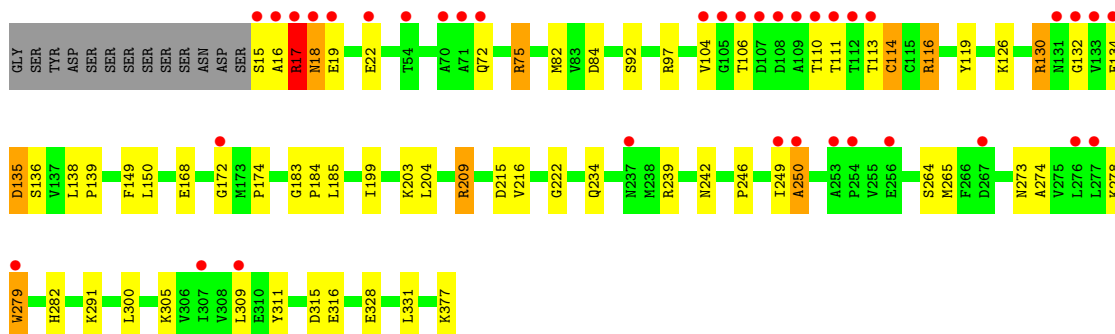
- Molecule 1: stilbene O-methyltransferase

Chain A: 



- Molecule 1: stilbene O-methyltransferase

Chain B: 



4 Data and refinement statistics

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α , β , γ	96.47Å 96.47Å 169.43Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	31.42 – 2.40 31.40 – 2.40	Depositor EDS
% Data completeness (in resolution range)	99.1 (31.42-2.40) 99.2 (31.40-2.40)	Depositor EDS
R_{merge}	0.20	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.74 (at 2.39Å)	Xtrriage
Refinement program	REFMAC 5.8.0352	Depositor
R, R_{free}	0.187 , 0.246 0.194 , 0.250	Depositor DCC
R_{free} test set	1899 reflections (5.27%)	wwPDB-VP
Wilson B-factor (Å ²)	39.3	Xtrriage
Anisotropy	0.087	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.41 , 50.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	0.022 for -h,-k,l	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	6104	wwPDB-VP
Average B, all atoms (Å ²)	46.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.86% 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: GOL, EDO, PEG, NAD, 3RL, PG4

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	0.74	5/2919 (0.2%)	0.99	1/3957 (0.0%)
1	B	0.75	0/2918	0.99	2/3955 (0.1%)
All	All	0.75	5/5837 (0.1%)	0.99	3/7912 (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	6
1	B	0	7
All	All	0	13

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	354	GLU	CD-OE2	6.19	1.32	1.25
1	A	350	GLU	CD-OE2	6.12	1.32	1.25
1	A	142	MET	CG-SD	5.98	1.96	1.81
1	A	175	MET	CG-SD	-5.43	1.67	1.81
1	A	354	GLU	CD-OE1	5.27	1.31	1.25

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	311	TYR	CB-CG-CD2	-6.17	117.30	121.00
1	A	110	THR	CA-CB-OG1	5.98	121.56	109.00
1	B	82	MET	CG-SD-CE	5.83	109.53	100.20

There are no chirality outliers.

All (13) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	116	ARG	Sidechain
1	A	239	ARG	Sidechain
1	A	303	ARG	Sidechain
1	A	346	ARG	Sidechain
1	A	359	ARG	Sidechain
1	A	75	ARG	Sidechain
1	B	114	CYS	Peptide
1	B	116	ARG	Sidechain
1	B	130	ARG	Sidechain
1	B	132	GLY	Peptide
1	B	17	ARG	Sidechain
1	B	209	ARG	Sidechain
1	B	75	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	2861	0	2832	33	0
1	B	2860	0	2835	59	0
2	A	19	0	16	0	0
2	B	19	0	16	5	0
3	A	44	0	26	1	0
3	B	44	0	26	8	0
4	A	12	0	16	0	0
4	B	36	0	48	9	0
5	A	13	0	18	3	0
6	A	7	0	10	3	0
7	A	8	0	12	2	0
7	B	12	0	18	0	0
8	A	79	0	0	3	0
8	B	90	0	0	10	0
All	All	6104	0	5873	92	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 8.

All (92) 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:291:LYS:HD2	3:B:403:NAD:H5N	1.43	0.97
1:A:17:ARG:NH1	6:A:406:PEG:H12	1.78	0.97
1:A:124:VAL:HB	5:A:405:PG4:H71	1.51	0.90
1:B:17:ARG:O	1:B:19:GLU:N	2.04	0.90
1:B:291:LYS:CD	3:B:403:NAD:H5N	2.07	0.84
1:A:122:SER:HB3	5:A:405:PG4:H61	1.58	0.83
1:B:246:PRO:O	1:B:249:ILE:O	1.97	0.82
1:B:316[B]:GLU:OE1	8:B:501:HOH:O	1.98	0.80
2:B:402:3RL:OAC	4:B:407:GOL:H12	1.81	0.80
1:B:126:LYS:NZ	8:B:503:HOH:O	2.20	0.74
1:B:264:SER:OG	3:B:403:NAD:H52A	1.92	0.69
1:A:142:MET:HE3	8:A:526:HOH:O	1.93	0.68
1:B:249:ILE:O	1:B:250:ALA:HB2	1.96	0.66
1:B:110:THR:CG2	8:B:558:HOH:O	2.43	0.65
1:B:106:THR:HG23	1:B:113:THR:HG22	1.79	0.65
1:B:106:THR:HG23	1:B:113:THR:CG2	2.28	0.63
1:A:130:ARG:HG2	1:A:138:LEU:CD2	2.30	0.61
1:B:315[A]:ASP:O	1:B:316[A]:GLU:HG3	2.01	0.59
1:A:154:GLN:HE22	1:B:150:LEU:HD12	1.68	0.59
1:B:215:ASP:HB2	1:B:273:ASN:OD1	2.03	0.58
1:A:84:ASP:OD2	1:A:111:THR:HG22	2.05	0.57
1:A:300:LEU:O	1:A:377:LYS:NZ	2.32	0.57
1:B:278:LYS:HD3	1:B:279:TRP:HB2	1.86	0.56
1:B:291:LYS:HD2	3:B:403:NAD:C5N	2.26	0.55
1:B:328:GLU:CD	4:B:407:GOL:H32	2.25	0.55
1:B:249:ILE:O	1:B:250:ALA:CB	2.53	0.55
1:B:300:LEU:O	1:B:377:LYS:NZ	2.34	0.54
1:B:199:ILE:O	1:B:203:LYS:HG2	2.08	0.54
1:A:247:HIS:HB3	7:A:407:EDO:C1	2.38	0.54
1:B:84:ASP:OD2	1:B:111:THR:HG22	2.08	0.53
1:B:265:MET:H	3:B:403:NAD:C2A	2.21	0.53
1:B:222:GLY:HA3	1:B:242:ASN:OD1	2.09	0.51
1:A:197:SER:OG	1:A:278:LYS:NZ	2.25	0.51
1:B:135:ASP:OD2	8:B:502:HOH:O	2.19	0.51
2:B:402:3RL:OAC	4:B:407:GOL:C1	2.57	0.51
1:A:199:ILE:O	1:A:203:LYS:HG2	2.11	0.51
1:B:15:SER:OG	1:B:22:GLU:HG3	2.11	0.51
1:A:350:GLU:O	1:A:354:GLU:HG2	2.11	0.50
1:B:17:ARG:C	1:B:19:GLU:N	2.65	0.50
1:B:15:SER:C	1:B:17:ARG:H	2.15	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:168[A]:GLU:OE2	4:B:409:GOL:O1	2.27	0.50
1:B:110:THR:HG22	8:B:558:HOH:O	2.07	0.49
1:B:130:ARG:HG2	1:B:138:LEU:HD22	1.93	0.49
1:B:279:TRP:CH2	2:B:402:3RL:HAH	2.48	0.48
2:B:402:3RL:CAO	4:B:407:GOL:H12	2.43	0.48
1:A:114:CYS:C	1:A:115:CYS:SG	2.92	0.48
1:A:209:ARG:HD3	8:A:577:HOH:O	2.14	0.48
1:B:264:SER:HA	3:B:403:NAD:H2A	1.94	0.48
1:B:110:THR:HB	8:B:558:HOH:O	2.14	0.48
1:A:17:ARG:HH11	6:A:406:PEG:H12	1.73	0.48
1:A:110:THR:HG23	1:A:112:THR:O	2.14	0.48
1:B:138:LEU:HB3	1:B:139:PRO:HD3	1.96	0.47
1:A:103:VAL:HG11	1:A:107:ASP:HB2	1.97	0.47
1:B:15:SER:O	1:B:17:ARG:N	2.38	0.47
1:B:18:ASN:O	1:B:19:GLU:HB3	2.14	0.47
1:A:97:ARG:O	1:A:119:TYR:HA	2.14	0.46
1:B:75:ARG:HG2	1:B:75:ARG:HH11	1.81	0.46
1:B:328:GLU:OE1	4:B:407:GOL:H32	2.16	0.46
1:B:172:GLY:O	4:B:409:GOL:O2	2.33	0.45
1:A:111:THR:O	1:A:111:THR:OG1	2.32	0.45
1:B:279:TRP:CE3	2:B:402:3RL:HAM	2.53	0.44
1:B:149:PHE:CE2	1:B:185:LEU:HD11	2.52	0.44
1:B:97:ARG:HA	4:B:404:GOL:H12	2.00	0.44
1:B:116:ARG:HD2	8:B:571:HOH:O	2.17	0.44
1:B:97:ARG:O	1:B:119:TYR:HA	2.18	0.43
1:B:234:GLN:HB2	8:B:540:HOH:O	2.17	0.43
1:A:247:HIS:HB3	7:A:407:EDO:C2	2.48	0.43
1:B:110:THR:CB	8:B:558:HOH:O	2.65	0.43
1:B:291:LYS:NZ	3:B:403:NAD:H5N	2.33	0.43
1:B:328:GLU:CD	4:B:407:GOL:C3	2.87	0.43
1:A:334:LEU:HD23	1:A:334:LEU:C	2.39	0.43
1:B:183:GLY:N	1:B:184:PRO:CD	2.81	0.43
1:A:244:ASP:HA	3:A:402:NAD:N1A	2.33	0.43
1:A:319:PRO:HA	1:B:92:SER:O	2.19	0.42
1:B:216:VAL:HA	1:B:239:ARG:O	2.19	0.42
1:A:159:ALA:HB1	1:A:164:ALA:O	2.18	0.42
1:B:15:SER:C	1:B:17:ARG:N	2.73	0.42
1:A:204:LEU:HD22	1:A:309:LEU:HD21	2.01	0.42
1:A:97:ARG:HH12	5:A:405:PG4:H41	1.85	0.42
1:B:204:LEU:HD22	1:B:309:LEU:HD21	2.01	0.42
1:B:15:SER:N	8:B:518:HOH:O	2.53	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:18:ASN:O	1:B:19:GLU:CB	2.67	0.41
1:A:346:ARG:CZ	1:B:114:CYS:HB3	2.51	0.41
1:B:265:MET:N	3:B:403:NAD:H2A	2.36	0.41
1:A:167:PHE:CE1	1:A:175:MET:HA	2.55	0.41
1:A:243:TYR:HA	1:A:261:VAL:O	2.21	0.41
1:A:274:ALA:HA	1:A:305:LYS:O	2.20	0.41
1:B:274:ALA:HA	1:B:305:LYS:O	2.21	0.41
1:A:75:ARG:NH2	8:A:512:HOH:O	2.54	0.41
1:B:168[B]:GLU:HG2	1:B:174:PRO:HA	2.04	0.40
1:A:17:ARG:HH12	6:A:406:PEG:H12	1.73	0.40
1:A:149:PHE:CE2	1:A:185:LEU:HD11	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	367/376 (98%)	348 (95%)	17 (5%)	2 (0%)	29	41
1	B	367/376 (98%)	353 (96%)	10 (3%)	4 (1%)	14	20
All	All	734/752 (98%)	701 (96%)	27 (4%)	6 (1%)	19	29

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	134	GLU
1	B	16	ALA
1	B	18	ASN
1	B	250	ALA
1	B	104	VAL
1	A	132	GLY

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	306/312 (98%)	301 (98%)	5 (2%)	62	79
1	B	306/312 (98%)	297 (97%)	9 (3%)	42	62
All	All	612/624 (98%)	598 (98%)	14 (2%)	50	70

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	75	ARG
1	A	136	SER
1	A	278	LYS
1	A	279	TRP
1	A	282	HIS
1	B	17	ARG
1	B	72	GLN
1	B	134	GLU
1	B	135	ASP
1	B	136	SER
1	B	209	ARG
1	B	279	TRP
1	B	282	HIS
1	B	331	LEU

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](#)

19 ligands 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
3	NAD	B	403	-	42,48,48	0.89	2 (4%)	50,73,73	1.17	5 (10%)
4	GOL	B	408	-	5,5,5	0.16	0	5,5,5	0.35	0
5	PG4	A	405	-	12,12,12	0.28	0	11,11,11	0.53	0
7	EDO	A	408	-	3,3,3	0.73	0	2,2,2	0.92	0
7	EDO	B	406	-	3,3,3	0.37	0	2,2,2	0.82	0
7	EDO	B	411	-	3,3,3	0.20	0	2,2,2	0.17	0
4	GOL	B	409	-	5,5,5	0.41	0	5,5,5	0.94	0
4	GOL	A	403	-	5,5,5	0.45	0	5,5,5	0.81	0
3	NAD	A	402	-	42,48,48	0.74	1 (2%)	50,73,73	1.30	6 (12%)
2	3RL	A	401	-	20,20,20	0.69	0	26,26,26	0.55	0
7	EDO	B	405	-	3,3,3	0.15	0	2,2,2	0.05	0
4	GOL	B	410	-	5,5,5	0.29	0	5,5,5	0.57	0
4	GOL	A	404	-	5,5,5	0.34	0	5,5,5	0.60	0
2	3RL	B	402	-	20,20,20	0.68	0	26,26,26	0.64	0
7	EDO	A	407	-	3,3,3	0.83	0	2,2,2	0.91	0
6	PEG	A	406	-	6,6,6	0.65	0	5,5,5	0.39	0
4	GOL	B	404	-	5,5,5	0.23	0	5,5,5	0.40	0
4	GOL	B	407	-	5,5,5	0.49	0	5,5,5	0.99	0
4	GOL	B	401	-	5,5,5	0.32	0	5,5,5	1.12	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	NAD	B	403	-	-	9/26/62/62	0/5/5/5
4	GOL	B	408	-	-	0/4/4/4	-
5	PG4	A	405	-	-	5/10/10/10	-
7	EDO	A	408	-	-	1/1/1/1	-
7	EDO	B	406	-	-	1/1/1/1	-
7	EDO	B	411	-	-	1/1/1/1	-
4	GOL	B	409	-	-	0/4/4/4	-
4	GOL	A	403	-	-	3/4/4/4	-
3	NAD	A	402	-	-	9/26/62/62	0/5/5/5
2	3RL	A	401	-	-	2/9/9/9	0/2/2/2
7	EDO	B	405	-	-	0/1/1/1	-
4	GOL	B	410	-	-	0/4/4/4	-
4	GOL	A	404	-	-	1/4/4/4	-
2	3RL	B	402	-	-	0/9/9/9	0/2/2/2
7	EDO	A	407	-	-	1/1/1/1	-
6	PEG	A	406	-	-	2/4/4/4	-
4	GOL	B	404	-	-	4/4/4/4	-
4	GOL	B	407	-	-	2/4/4/4	-
4	GOL	B	401	-	-	1/4/4/4	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	403	NAD	C2N-N1N	3.14	1.38	1.35
3	A	402	NAD	C2N-N1N	2.47	1.38	1.35
3	B	403	NAD	C2A-N1A	-2.26	1.29	1.33

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	402	NAD	C2N-C3N-C7N	-4.28	107.03	119.46
3	A	402	NAD	C4N-C3N-C7N	4.16	132.17	121.04
3	B	403	NAD	C5A-C6A-N6A	3.02	124.94	120.35
3	B	403	NAD	C4N-C3N-C7N	-2.73	113.72	121.04
3	A	402	NAD	C5A-C6A-N6A	2.71	124.47	120.35
3	B	403	NAD	C2N-C3N-C7N	2.36	126.30	119.46
3	A	402	NAD	C2N-C3N-C4N	2.24	120.79	118.26
3	B	403	NAD	O3D-C3D-C2D	-2.08	105.08	111.82
3	B	403	NAD	O3D-C3D-C4D	2.08	117.07	111.05
3	A	402	NAD	O7N-C7N-C3N	-2.08	117.14	119.63
3	A	402	NAD	C3N-C7N-N7N	2.07	120.23	117.75

There are no chirality outliers.

All (42) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	402	NAD	C5D-O5D-PN-O3
3	A	402	NAD	C5D-O5D-PN-O2N
3	A	402	NAD	O4D-C4D-C5D-O5D
3	A	402	NAD	C2D-C1D-N1N-C2N
3	A	402	NAD	C2D-C1D-N1N-C6N
3	B	403	NAD	C5B-O5B-PA-O1A
3	B	403	NAD	C5B-O5B-PA-O2A
4	A	403	GOL	O1-C1-C2-C3
4	B	404	GOL	O1-C1-C2-O2
4	B	404	GOL	C1-C2-C3-O3
4	B	407	GOL	O1-C1-C2-C3
5	A	405	PG4	O3-C5-C6-O4
3	A	402	NAD	C3D-C4D-C5D-O5D
6	A	406	PEG	O2-C3-C4-O4
4	B	401	GOL	C1-C2-C3-O3
4	B	404	GOL	O1-C1-C2-C3
4	A	403	GOL	O1-C1-C2-O2
4	B	404	GOL	O2-C2-C3-O3
7	B	406	EDO	O1-C1-C2-O2
4	B	407	GOL	O1-C1-C2-O2
4	A	404	GOL	O1-C1-C2-O2
5	A	405	PG4	C5-C6-O4-C7
7	A	407	EDO	O1-C1-C2-O2
7	B	411	EDO	O1-C1-C2-O2
3	A	402	NAD	C4D-C5D-O5D-PN
3	B	403	NAD	C4D-C5D-O5D-PN
4	A	403	GOL	O2-C2-C3-O3
3	A	402	NAD	PN-O3-PA-O1A
5	A	405	PG4	C1-C2-O2-C3
3	B	403	NAD	C4B-C5B-O5B-PA
3	A	402	NAD	C5D-O5D-PN-O1N
2	A	401	3RL	CAE-CAD-CAP-CAI
7	A	408	EDO	O1-C1-C2-O2
2	A	401	3RL	CAL-CAR-OAM-CAA
5	A	405	PG4	C8-C7-O4-C6
3	B	403	NAD	O4B-C4B-C5B-O5B
5	A	405	PG4	O2-C3-C4-O3
3	B	403	NAD	C5B-O5B-PA-O3
3	B	403	NAD	O4D-C4D-C5D-O5D
3	B	403	NAD	PA-O3-PN-O2N

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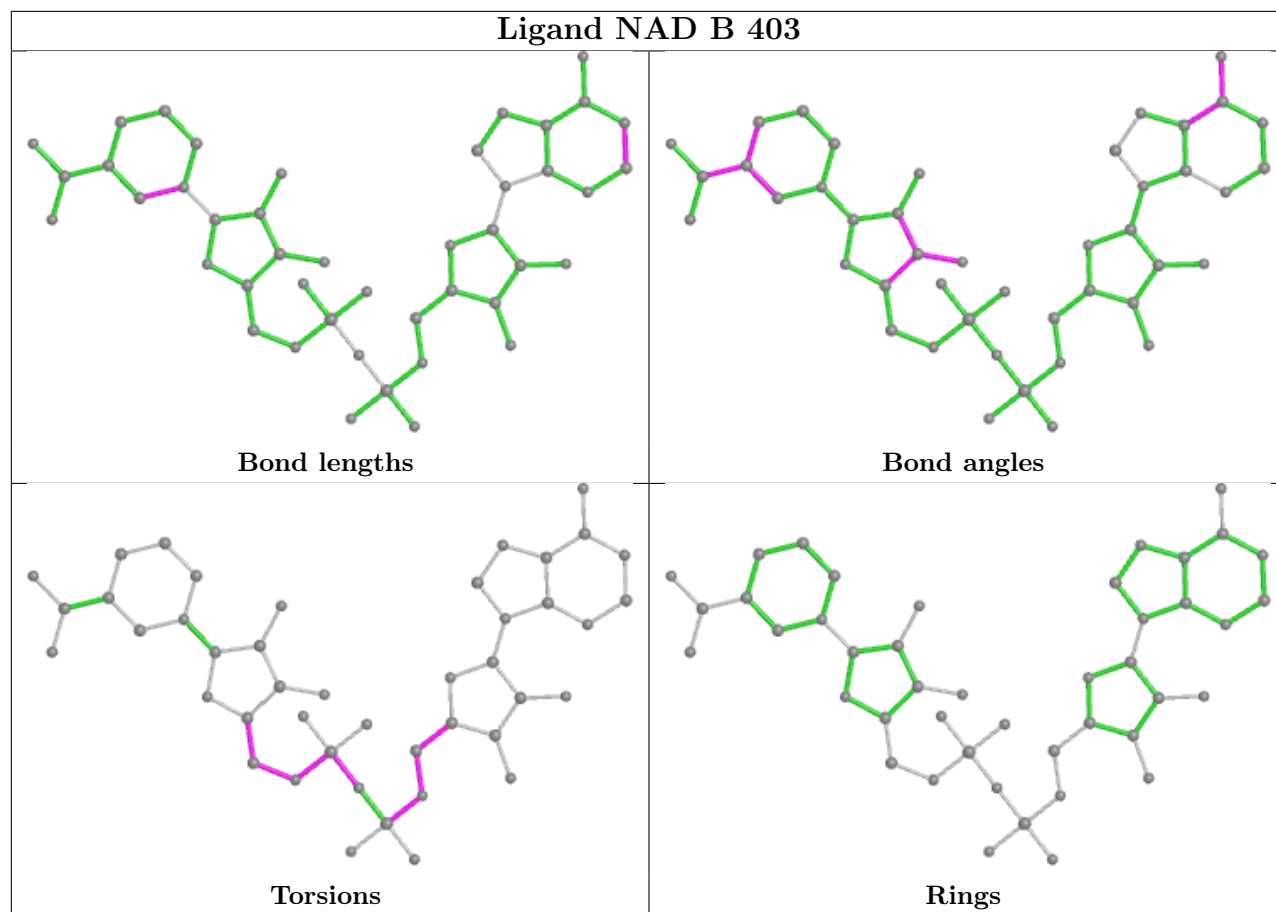
Mol	Chain	Res	Type	Atoms
3	B	403	NAD	C5D-O5D-PN-O1N
6	A	406	PEG	C1-C2-O2-C3

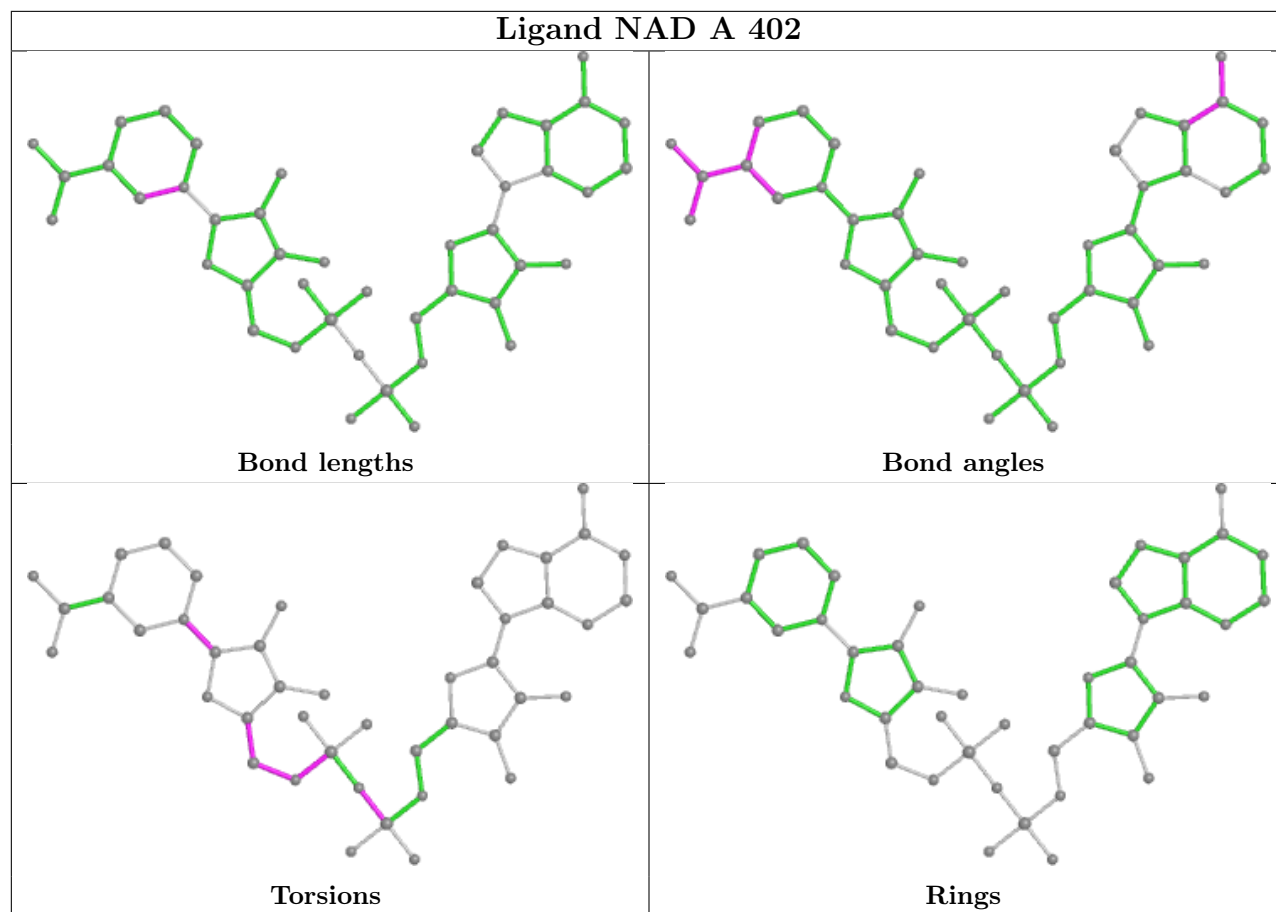
There are no ring outliers.

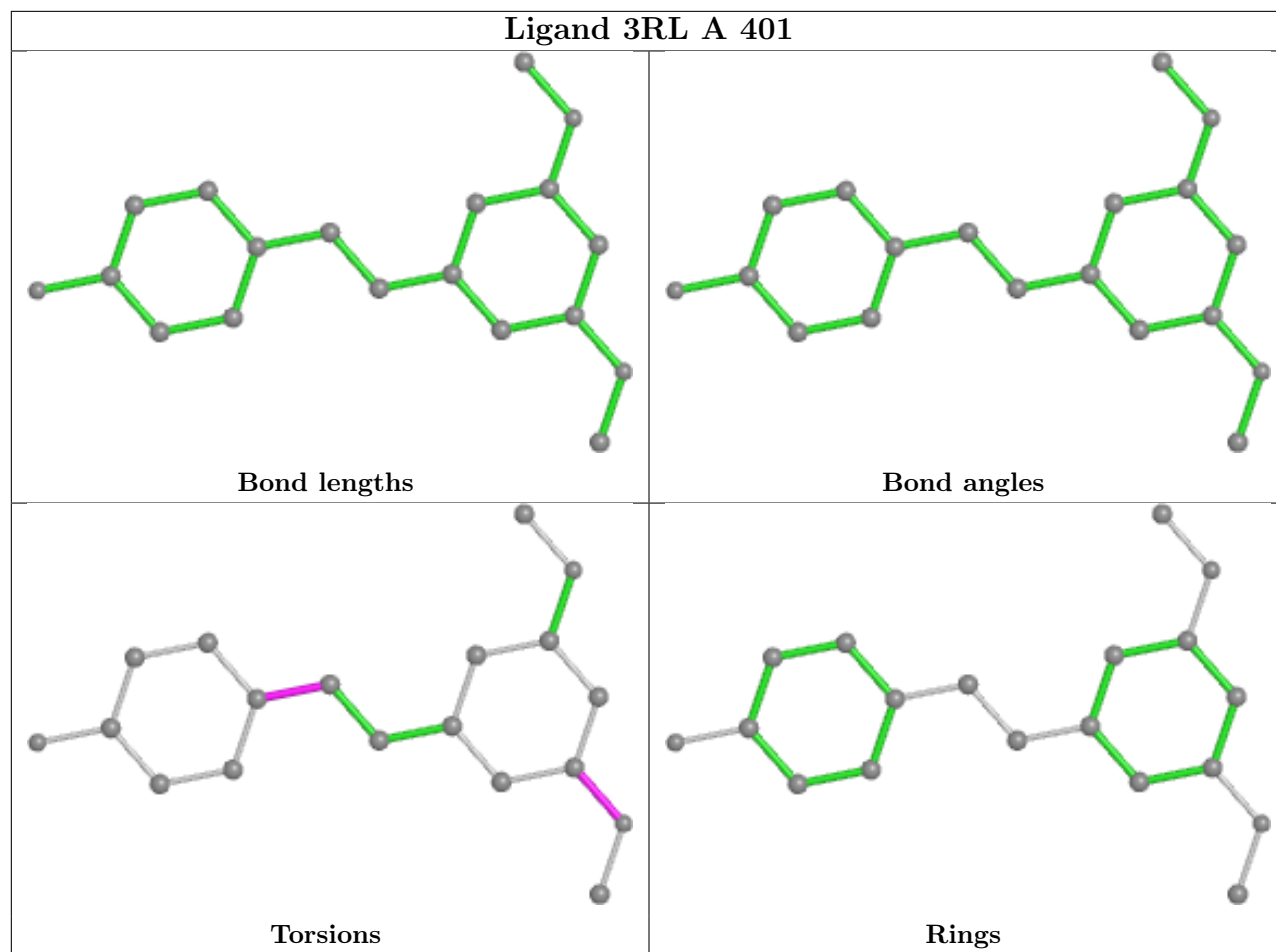
9 monomers are involved in 28 short contacts:

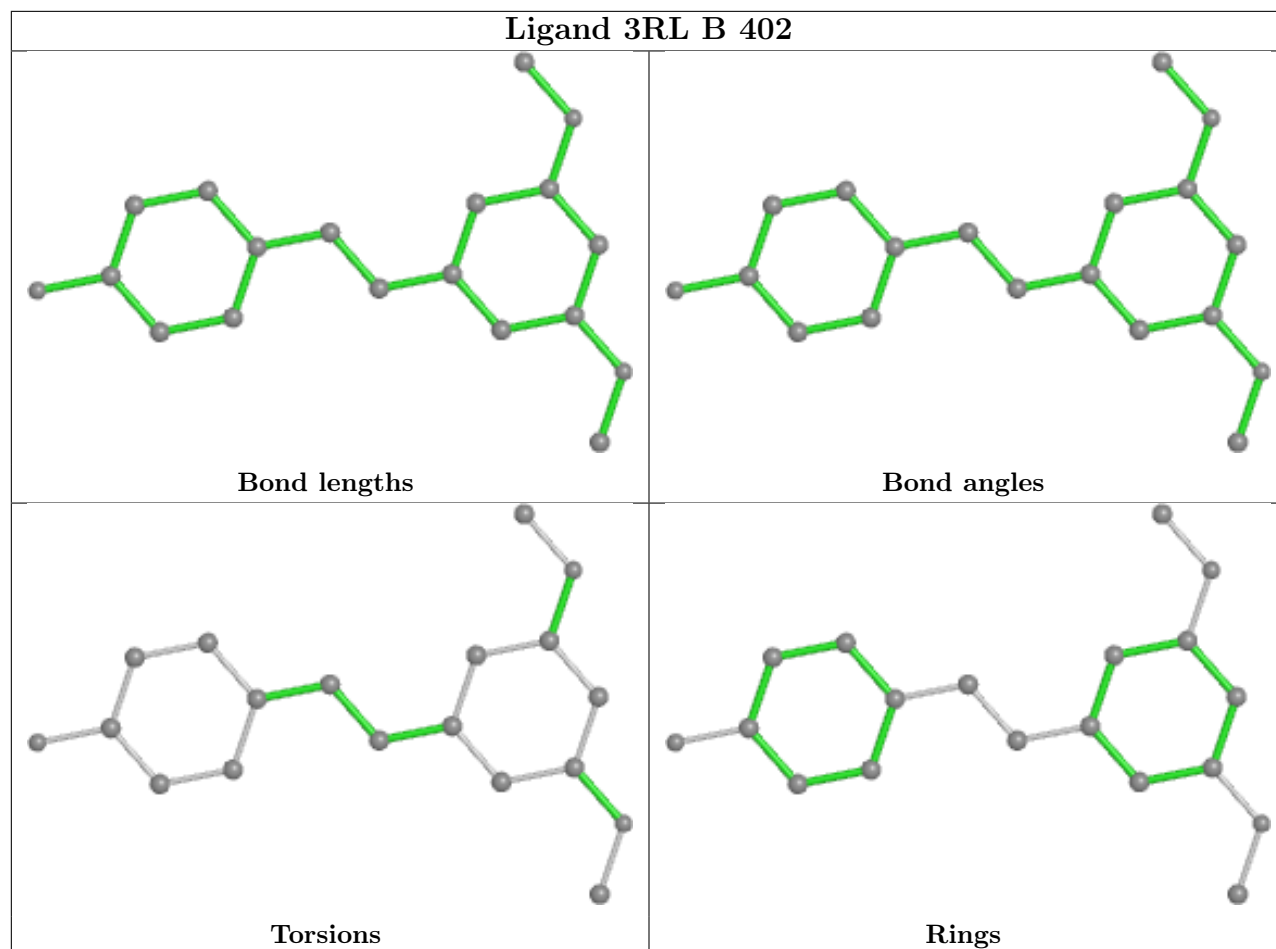
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	403	NAD	8	0
5	A	405	PG4	3	0
4	B	409	GOL	2	0
3	A	402	NAD	1	0
2	B	402	3RL	5	0
7	A	407	EDO	2	0
6	A	406	PEG	3	0
4	B	404	GOL	1	0
4	B	407	GOL	6	0

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	363/376 (96%)	0.47	38 (10%) 6 5	25, 41, 94, 155	0
1	B	363/376 (96%)	0.37	37 (10%) 6 6	25, 38, 90, 143	0
All	All	726/752 (96%)	0.42	75 (10%) 6 6	25, 39, 94, 155	0

All (75) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	106	THR	14.0
1	A	106	THR	12.3
1	A	112	THR	9.9
1	A	107	ASP	9.0
1	A	133	VAL	8.8
1	A	131	ASN	7.9
1	B	133	VAL	7.6
1	B	108	ASP	7.1
1	B	113	THR	6.7
1	A	16	ALA	6.6
1	A	255	VAL	6.2
1	B	104	VAL	5.9
1	A	105	GLY	5.9
1	A	253	ALA	5.7
1	B	109	ALA	5.7
1	B	112	THR	5.7
1	A	250	ALA	5.5
1	B	107	ASP	5.4
1	A	18	ASN	5.3
1	B	70	ALA	5.2
1	B	18	ASN	5.2
1	A	15	SER	5.0
1	A	251	GLN	4.7
1	B	72	GLN	4.6

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Mol	Chain	Res	Type	RSRZ
1	A	132	GLY	4.6
1	B	54	THR	4.4
1	A	72	GLN	4.3
1	B	134	GLU	4.3
1	A	254	PRO	4.2
1	B	132	GLY	4.1
1	A	302	VAL	4.1
1	A	301	HIS	4.0
1	B	110	THR	3.8
1	B	17	ARG	3.7
1	B	15	SER	3.7
1	B	131	ASN	3.7
1	A	108	ASP	3.5
1	A	236	LYS	3.4
1	A	134	GLU	3.4
1	A	257	GLY	3.3
1	A	252	ALA	3.3
1	A	110	THR	3.2
1	A	256	GLU	3.0
1	A	271	ARG	2.8
1	A	104	VAL	2.8
1	A	144	ILE	2.7
1	B	19	GLU	2.7
1	A	303	ARG	2.7
1	A	237	ASN	2.6
1	B	111	THR	2.6
1	B	254	PRO	2.5
1	A	277	LEU	2.5
1	B	276	LEU	2.5
1	B	277	LEU	2.5
1	B	309	LEU	2.4
1	B	249	ILE	2.4
1	B	22	GLU	2.4
1	B	307	ILE	2.3
1	A	329	LEU	2.3
1	B	71	ALA	2.3
1	B	279	TRP	2.3
1	B	267	ASP	2.3
1	A	19	GLU	2.3
1	B	256	GLU	2.3
1	B	250	ALA	2.2
1	B	253	ALA	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	105	GLY	2.1
1	A	220	VAL	2.1
1	B	237	ASN	2.1
1	B	172	GLY	2.1
1	A	258	VAL	2.1
1	A	113	THR	2.1
1	A	239	ARG	2.1
1	A	224	ASN	2.0
1	B	16	ALA	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.

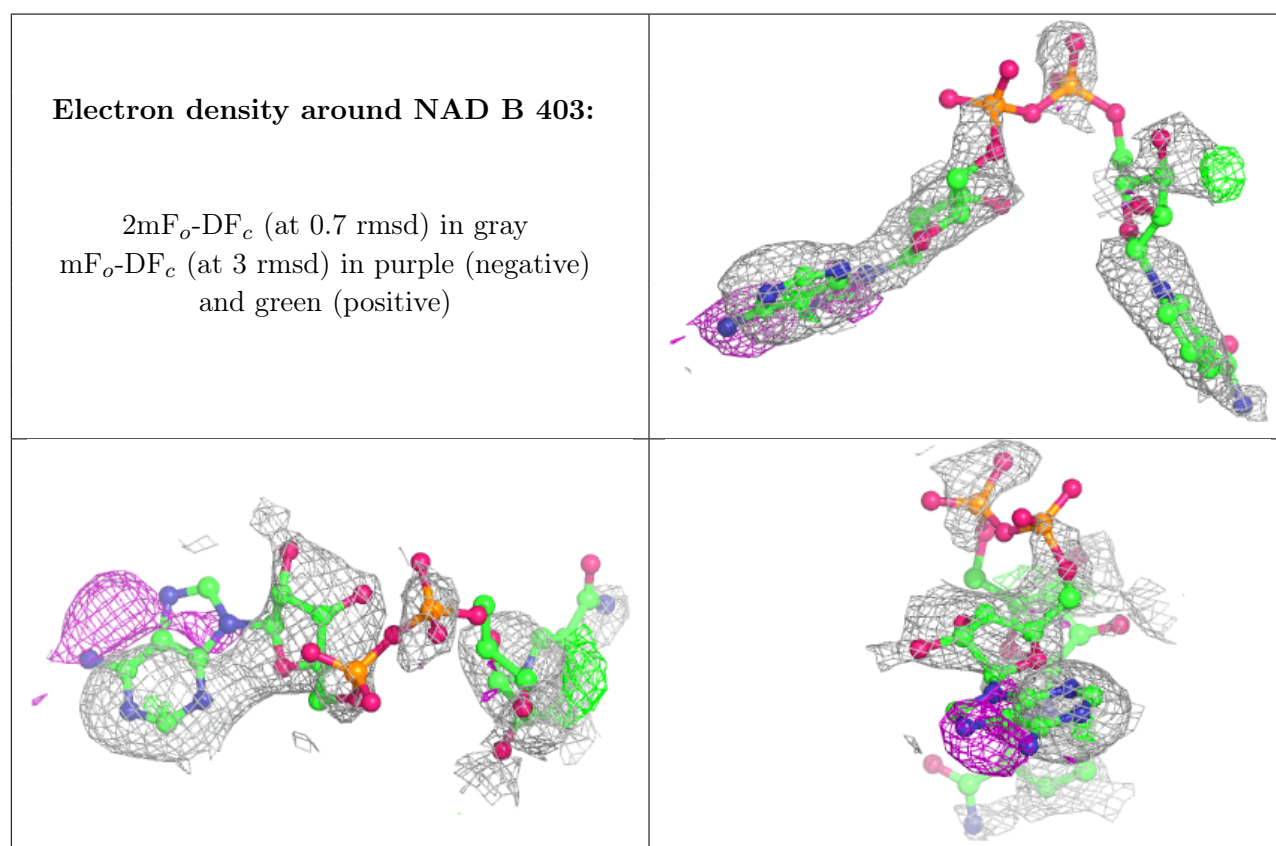
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	GOL	B	410	6/6	0.46	0.34	64,71,76,79	0
3	NAD	B	403	44/44	0.61	0.42	38,111,153,176	0
4	GOL	B	408	6/6	0.66	0.27	78,79,94,97	0
4	GOL	B	409	6/6	0.69	0.29	48,65,68,71	0
7	EDO	B	406	4/4	0.72	0.25	55,61,67,69	0
6	PEG	A	406	7/7	0.76	0.23	60,70,80,81	0
4	GOL	B	407	6/6	0.76	0.30	53,57,66,67	0
3	NAD	A	402	44/44	0.80	0.26	50,73,126,132	0
7	EDO	A	407	4/4	0.81	0.22	54,62,64,70	0
7	EDO	A	408	4/4	0.81	0.41	48,58,63,63	0
4	GOL	A	403	6/6	0.81	0.28	46,50,66,73	0
7	EDO	B	405	4/4	0.82	0.33	68,69,80,93	0
4	GOL	B	401	6/6	0.86	0.30	49,59,68,70	0
5	PG4	A	405	13/13	0.89	0.39	40,71,117,126	0

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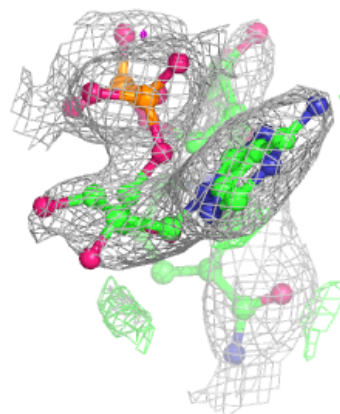
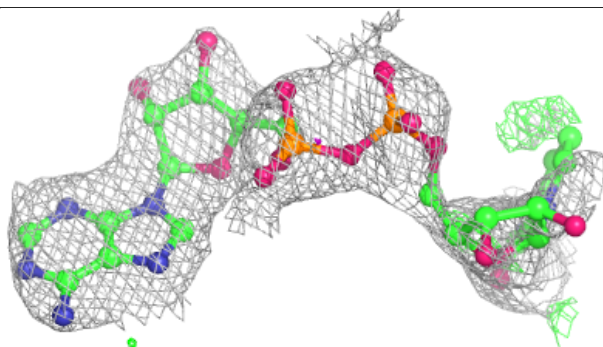
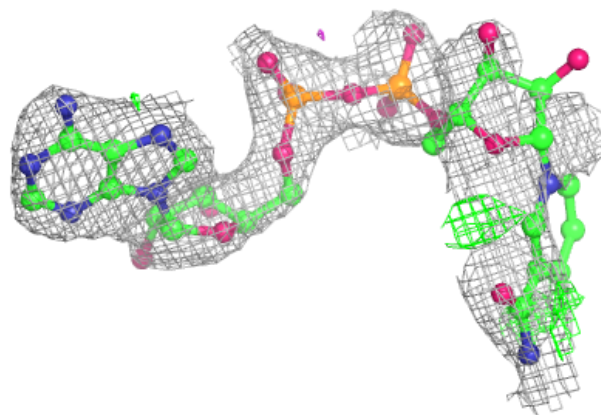
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	3RL	B	402	19/19	0.89	0.29	39,45,54,57	0
7	EDO	B	411	4/4	0.89	0.23	66,66,67,70	0
2	3RL	A	401	19/19	0.91	0.25	38,46,59,63	0
4	GOL	B	404	6/6	0.92	0.17	53,54,60,68	0
4	GOL	A	404	6/6	0.94	0.11	40,48,49,56	0

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.

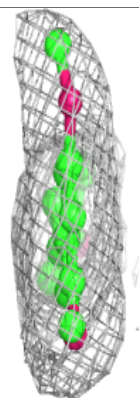
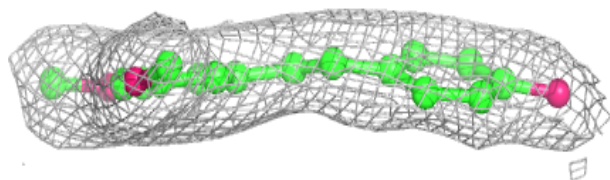
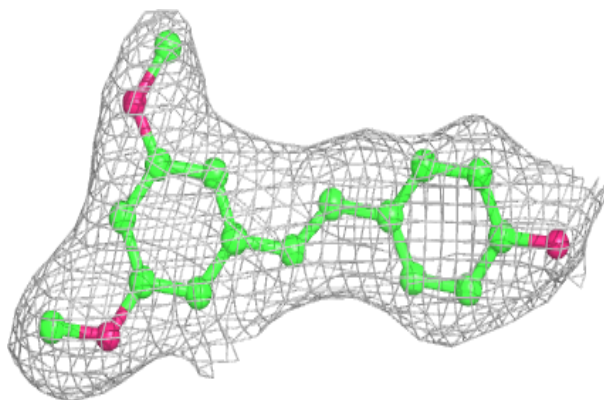


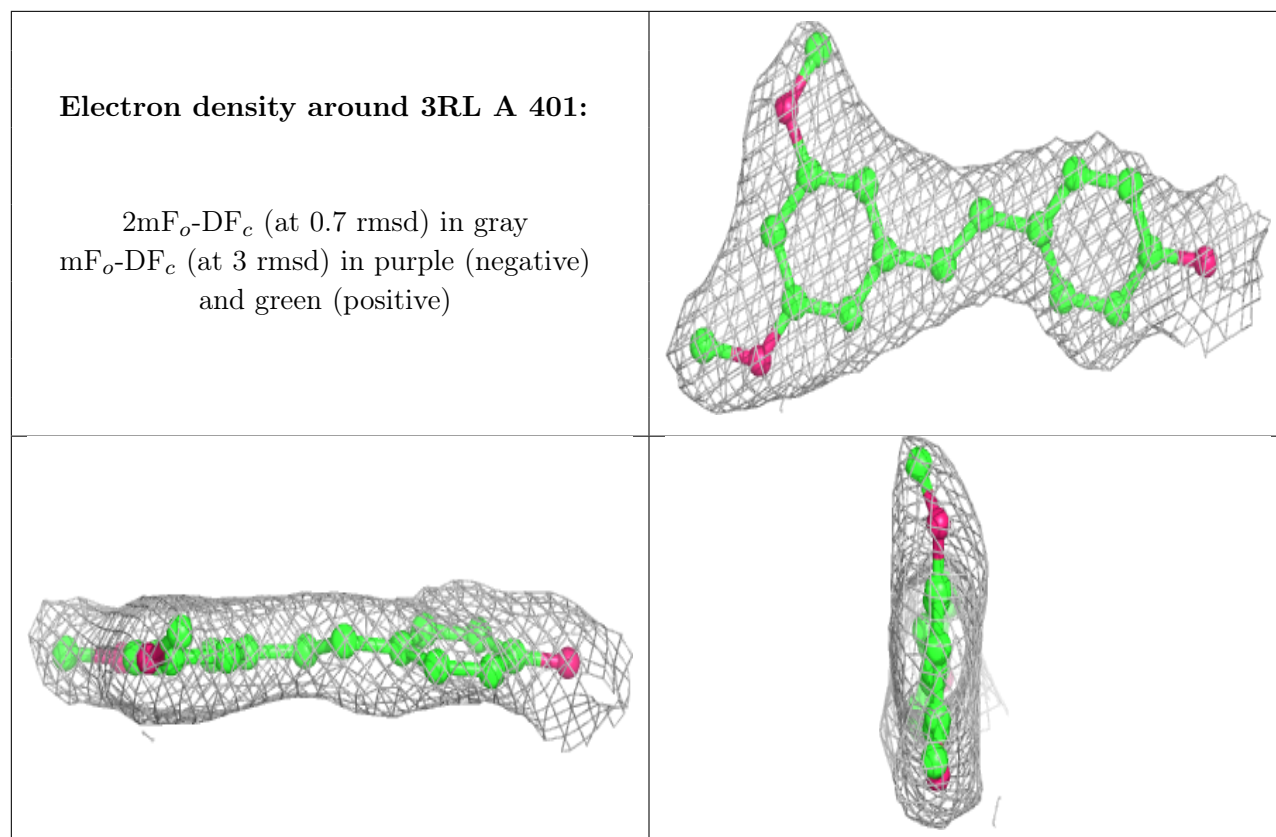
Electron density around NAD A 402:

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

**Electron density around 3RL 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)





6.5 Other polymers [i](#)

There are no such residues in this entry.