



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 20, 2020 – 08:59 AM BST

PDB ID : 4UX9
Title : Crystal structure of JNK1 bound to a MKK7 docking motif
Authors : Kragelj, J.; Palencia, A.; Nanao, M.H.; Maurin, D.; Bouvignies, G.; Blackledge, M.; Ringkjober-Jensen, M.
Deposited on : 2014-08-20
Resolution : 2.34 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 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 : 2.13
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) : 2.13

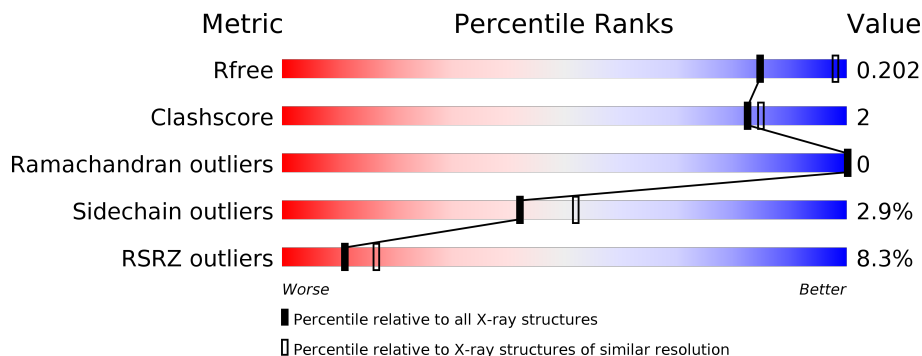
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.34 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	2096 (2.36-2.32)
Clashscore	141614	2193 (2.36-2.32)
Ramachandran outliers	138981	2159 (2.36-2.32)
Sidechain outliers	138945	2160 (2.36-2.32)
RSRZ outliers	127900	2067 (2.36-2.32)

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 on 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	364	 10% 84% 9% • 6%
1	B	364	 10% 85% • 10%
1	C	364	 7% 82% 8% • 9%
1	D	364	 4% 85% 8% • 5%
2	F	12	 83% 17%
2	G	12	 8% 67% 33%

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Mol	Chain	Length	Quality of chain
2	H	12	 92% 8%
2	I	12	 8% 75% 25%

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
4	SO4	A	1365	-	-	X	-
4	SO4	C	1366	-	-	X	-

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 11697 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.

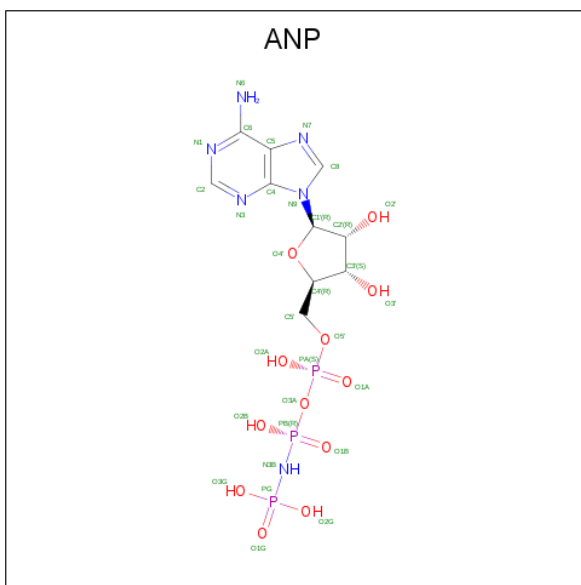
- Molecule 1 is a protein called MITOGEN-ACTIVATED PROTEIN KINASE 8.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	343	Total 2770	C 1782	N 466	O 502	S 20	0	0	0
1	B	327	Total 2643	C 1704	N 443	O 475	S 21	0	1	0
1	C	333	Total 2692	C 1737	N 452	O 483	S 20	0	0	0
1	D	344	Total 2802	C 1804	N 467	O 508	S 23	0	1	0

- Molecule 2 is a protein called DUAL SPECIFICITY MITOGEN-ACTIVATED PROTEIN KINASE KINASE 7.

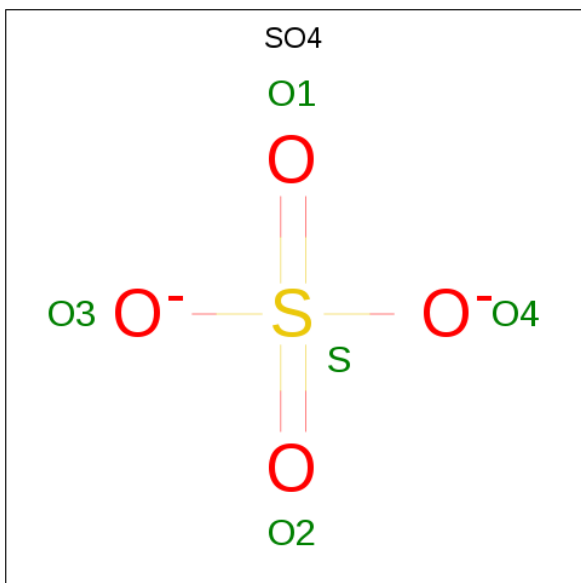
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	F	10	Total 77	C 51	N 14	O 12	0	0	0
2	G	8	Total 59	C 40	N 9	O 10	0	0	0
2	H	12	Total 97	C 62	N 20	O 15	0	0	0
2	I	9	Total 77	C 49	N 17	O 11	0	0	0

- Molecule 3 is PHOSPHOAMINOPHOSPHONIC ACID-ADENYLATE ESTER (three-letter code: ANP) (formula: C₁₀H₁₇N₆O₁₂P₃).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
3	A	1	Total	C	N	O	P	0	0
			31	10	6	12	3		
3	B	1	Total	C	N	O	P	0	0
			31	10	6	12	3		
3	C	1	Total	C	N	O	P	0	0
			31	10	6	12	3		
3	D	1	Total	C	N	O	P	0	0
			31	10	6	12	3		

- Molecule 4 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total O S 5 4 1	0	0
4	A	1	Total O S 5 4 1	0	0
4	A	1	Total O S 5 4 1	0	0
4	A	1	Total O S 5 4 1	0	0
4	B	1	Total O S 5 4 1	0	0
4	B	1	Total O S 5 4 1	0	0
4	B	1	Total O S 5 4 1	0	0
4	B	1	Total O S 5 4 1	0	0
4	C	1	Total O S 5 4 1	0	0
4	C	1	Total O S 5 4 1	0	0
4	C	1	Total O S 5 4 1	0	0
4	C	1	Total O S 5 4 1	0	0
4	D	1	Total O S 5 4 1	0	0
4	D	1	Total O S 5 4 1	0	0
4	D	1	Total O S 5 4 1	0	0
4	H	1	Total O S 5 4 1	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	79	Total O 79 79	0	0
5	B	66	Total O 66 66	0	0
5	C	61	Total O 61 61	0	0
5	D	69	Total O 69 69	0	0

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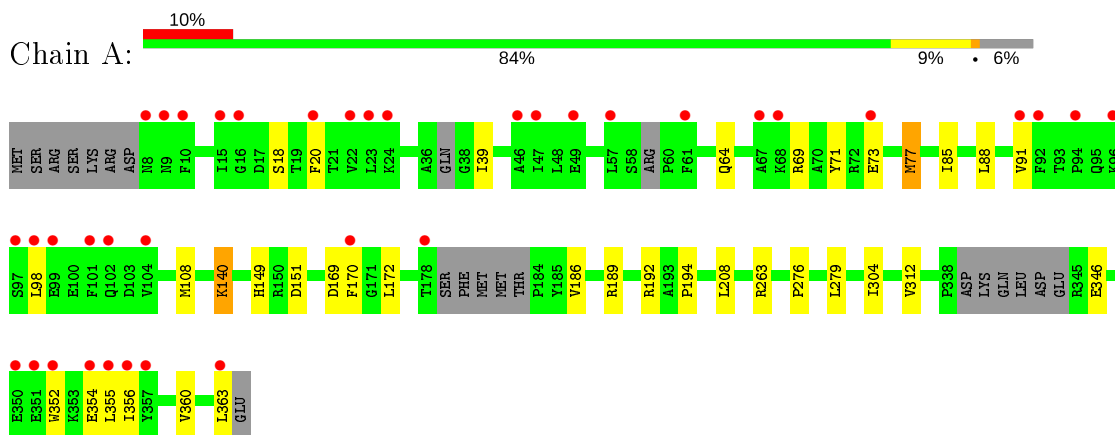
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	F	1	Total	O	0	0
			1	1		

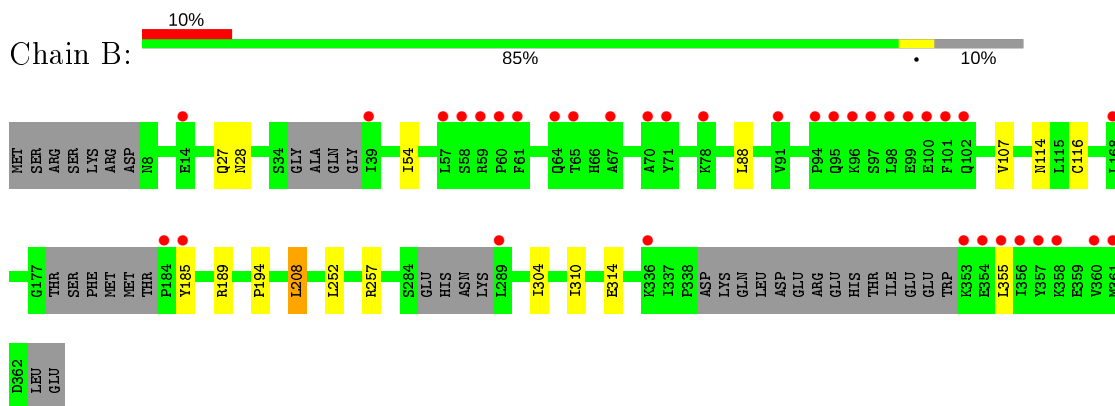
3 Residue-property plots [i](#)

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.

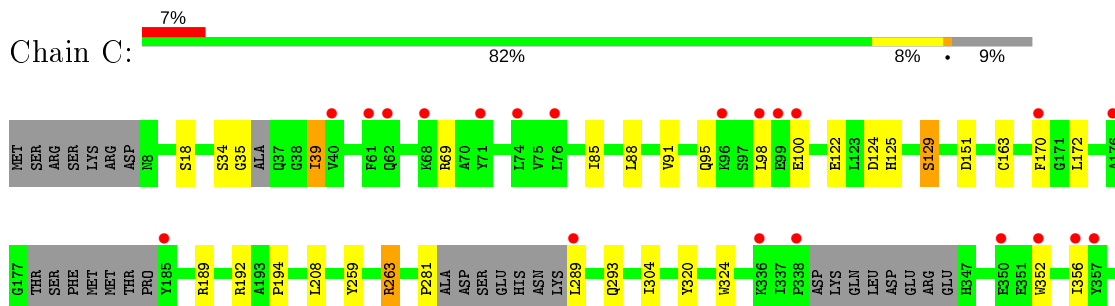
- Molecule 1: MITOGEN-ACTIVATED PROTEIN KINASE 8



- Molecule 1: MITOGEN-ACTIVATED PROTEIN KINASE 8



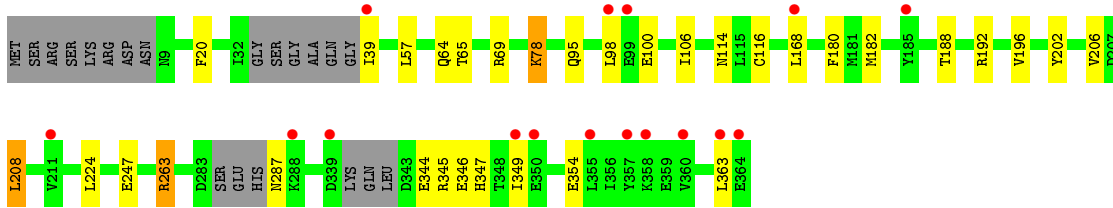
- Molecule 1: MITOGEN-ACTIVATED PROTEIN KINASE 8





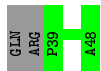
- Molecule 1: MITOGEN-ACTIVATED PROTEIN KINASE 8

Chain D: 4% 85% 8% 5%



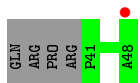
- Molecule 2: DUAL SPECIFICITY MITOGEN-ACTIVATED PROTEIN KINASE KINASE 7

Chain F: 83% 17%



- Molecule 2: DUAL SPECIFICITY MITOGEN-ACTIVATED PROTEIN KINASE KINASE 7

Chain G: 8% 67% 33%



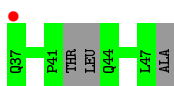
- Molecule 2: DUAL SPECIFICITY MITOGEN-ACTIVATED PROTEIN KINASE KINASE 7

Chain H: 92% 8%



- Molecule 2: DUAL SPECIFICITY MITOGEN-ACTIVATED PROTEIN KINASE KINASE 7

Chain I: 8% 75% 25%



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	108.67Å 180.16Å 101.14Å 90.00° 110.30° 90.00°	Depositor
Resolution (Å)	49.21 – 2.34 49.21 – 2.34	Depositor EDS
% Data completeness (in resolution range)	98.4 (49.21-2.34) 98.4 (49.21-2.34)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.42 (at 2.34Å)	Xtrriage
Refinement program	BUSTER 2.10.0	Depositor
R, R_{free}	0.200 , 0.240 0.203 , 0.202	Depositor DCC
R_{free} test set	3796 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å ²)	54.7	Xtrriage
Anisotropy	0.107	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 54.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	11697	wwPDB-VP
Average B, all atoms (Å ²)	66.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.52% 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: ANP, SO4

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	0.52	0/2831	0.66	0/3825
1	B	0.54	2/2703 (0.1%)	0.66	0/3652
1	C	0.52	0/2751	0.67	0/3718
1	D	0.54	0/2867	0.69	2/3876 (0.1%)
2	F	0.51	0/79	0.72	0/108
2	G	0.42	0/60	0.56	0/82
2	H	0.48	0/99	0.65	0/135
2	I	0.64	0/78	0.56	0/104
All	All	0.53	2/11468 (0.0%)	0.67	2/15500 (0.0%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	185	TYR	CA-C	-7.24	1.34	1.52
1	B	185	TYR	C-O	6.03	1.34	1.23

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	208	LEU	CA-CB-CG	-5.40	102.88	115.30
1	D	247	GLU	N-CA-CB	-5.32	101.02	110.60

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen

atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2770	0	2792	18	0
1	B	2643	0	2682	8	0
1	C	2692	0	2721	19	0
1	D	2802	0	2825	11	0
2	F	77	0	87	0	0
2	G	59	0	67	0	0
2	H	97	0	107	1	0
2	I	77	0	83	0	0
3	A	31	0	13	0	0
3	B	31	0	13	0	0
3	C	31	0	13	1	0
3	D	31	0	13	0	0
4	A	20	0	0	2	0
4	B	20	0	0	1	0
4	C	20	0	0	2	0
4	D	15	0	0	0	0
4	H	5	0	0	0	0
5	A	79	0	0	0	0
5	B	66	0	0	0	0
5	C	61	0	0	1	0
5	D	69	0	0	1	0
5	F	1	0	0	0	0
All	All	11697	0	11416	56	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 2.

All (56) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:208:LEU:HD21	1:A:312:VAL:HG22	1.79	0.64
1:A:276:PRO:HD2	1:A:279:LEU:HD12	1.81	0.62
1:C:88:LEU:HD11	1:C:91:VAL:HG23	1.83	0.61
1:A:189:ARG:HD3	4:A:1365:SO4:O1	2.02	0.60
1:D:57:LEU:HD21	1:D:106:ILE:HD12	1.84	0.59
1:D:192:ARG:HD2	1:D:196:VAL:HG11	1.85	0.58
1:A:208:LEU:HD21	1:A:312:VAL:CG2	2.35	0.56
1:D:202:TYR:HB2	1:D:206:VAL:HG21	1.87	0.55
1:C:125:HIS:O	1:C:129:SER:HB2	2.07	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:34:SER:HB3	1:C:39:ILE:HD12	1.90	0.54
1:A:352:TRP:O	1:A:356:ILE:HG12	2.07	0.54
1:C:151:ASP:HB2	1:C:172:LEU:HD12	1.89	0.53
1:A:192:ARG:NH2	4:A:1365:SO4:O1	2.42	0.52
1:C:35:GLY:HA3	3:C:1000:ANP:HNB1	1.76	0.51
1:A:208:LEU:CD2	1:A:312:VAL:HG22	2.41	0.51
1:B:54:ILE:HG12	1:B:107:VAL:HG22	1.93	0.51
1:B:189:ARG:HD3	4:B:1366:SO4:O1	2.11	0.50
1:D:95:GLN:HB3	1:D:100:GLU:O	2.12	0.50
1:C:129:SER:HB3	1:C:324:TRP:HE1	1.76	0.50
1:C:352:TRP:O	1:C:356:ILE:HG12	2.12	0.49
1:D:65:THR:O	1:D:69:ARG:HG3	2.11	0.49
1:B:194:PRO:HG2	1:B:304:ILE:HA	1.94	0.49
1:A:149:HIS:NE2	1:A:169:ASP:O	2.45	0.48
1:B:27:GLN:O	1:B:28:ASN:HB2	2.12	0.48
1:C:194:PRO:HG2	1:C:304:ILE:HA	1.95	0.48
1:A:151:ASP:HB2	1:A:172:LEU:HD12	1.95	0.47
1:A:98:LEU:HD11	1:A:354:GLU:HG3	1.96	0.47
1:C:95:GLN:HG2	1:C:100:GLU:O	2.14	0.47
1:C:163:CYS:HB2	2:H:43:LEU:O	2.14	0.47
1:D:346:GLU:HG2	1:D:347:HIS:N	2.29	0.46
1:A:88:LEU:HD11	1:A:91:VAL:CG2	2.46	0.46
1:C:189:ARG:HD3	4:C:1366:SO4:O2	2.15	0.46
1:C:192:ARG:NH2	4:C:1366:SO4:O2	2.41	0.46
1:C:263:ARG:HD2	1:C:263:ARG:HA	1.74	0.45
1:D:263:ARG:HD2	5:D:2055:HOH:O	2.16	0.45
1:A:71:TYR:CE1	1:A:355:LEU:HG	2.52	0.45
1:C:263:ARG:HD2	5:C:2042:HOH:O	2.16	0.45
1:D:78:LYS:HB2	1:D:363:LEU:HD21	1.98	0.45
1:A:73:GLU:O	1:A:77:MET:HB2	2.17	0.45
1:C:259:TYR:CZ	1:C:263:ARG:HD3	2.51	0.45
1:A:85:ILE:HG23	1:A:170:PHE:CZ	2.53	0.44
1:C:289:LEU:N	1:C:293:GLN:OE1	2.51	0.43
1:D:64:GLN:HG3	1:D:349:ILE:HG13	2.01	0.43
1:C:124:ASP:HA	1:C:281:PRO:HB3	2.01	0.43
1:B:310:ILE:HG12	1:B:314:GLU:HB2	2.01	0.42
1:D:114:ASN:HB3	1:D:116:CYS:H	1.83	0.42
1:B:252:LEU:HB2	1:B:257:ARG:HB2	2.01	0.42
1:A:140:LYS:HD2	1:A:140:LYS:HA	1.89	0.42
1:D:98:LEU:HD21	1:D:354:GLU:HA	2.01	0.41
1:A:208:LEU:HD13	1:A:208:LEU:HA	1.87	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:85:ILE:HG23	1:C:170:PHE:CZ	2.55	0.41
1:B:114:ASN:HB3	1:B:116:CYS:H	1.86	0.41
1:C:129:SER:OG	1:C:320:TYR:O	2.38	0.41
1:A:194:PRO:HG2	1:A:304:ILE:HA	2.02	0.40
1:A:356:ILE:O	1:A:360:VAL:HG23	2.21	0.40
1:B:208:LEU:HD22	1:B:310:ILE:HG23	2.03	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	333/364 (92%)	323 (97%)	10 (3%)	0	100	100
1	B	318/364 (87%)	305 (96%)	13 (4%)	0	100	100
1	C	323/364 (89%)	316 (98%)	7 (2%)	0	100	100
1	D	337/364 (93%)	325 (96%)	12 (4%)	0	100	100
2	F	8/12 (67%)	6 (75%)	2 (25%)	0	100	100
2	G	6/12 (50%)	5 (83%)	1 (17%)	0	100	100
2	H	10/12 (83%)	10 (100%)	0	0	100	100
2	I	5/12 (42%)	5 (100%)	0	0	100	100
All	All	1340/1504 (89%)	1295 (97%)	45 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	307/328 (94%)	295 (96%)	12 (4%)	32	41
1	B	295/328 (90%)	292 (99%)	3 (1%)	76	85
1	C	298/328 (91%)	290 (97%)	8 (3%)	44	55
1	D	313/328 (95%)	300 (96%)	13 (4%)	30	37
2	F	9/11 (82%)	9 (100%)	0	100	100
2	G	7/11 (64%)	7 (100%)	0	100	100
2	H	11/11 (100%)	11 (100%)	0	100	100
2	I	9/11 (82%)	9 (100%)	0	100	100
All	All	1249/1356 (92%)	1213 (97%)	36 (3%)	42	52

All (36) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	18	SER
1	A	20	PHE
1	A	39	ILE
1	A	64	GLN
1	A	69	ARG
1	A	77	MET
1	A	108	MET
1	A	140	LYS
1	A	186	VAL
1	A	263	ARG
1	A	346	GLU
1	A	363	LEU
1	B	88	LEU
1	B	208	LEU
1	B	355	LEU
1	C	18	SER
1	C	39	ILE
1	C	69	ARG
1	C	98	LEU
1	C	122	GLU
1	C	129	SER
1	C	208	LEU
1	C	263	ARG
1	D	20	PHE

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Mol	Chain	Res	Type
1	D	39	ILE
1	D	78	LYS
1	D	168	LEU
1	D	180	PHE
1	D	182	MET
1	D	188	THR
1	D	208	LEU
1	D	224	LEU
1	D	263	ARG
1	D	287	ASN
1	D	344	GLU
1	D	345	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	102	GLN
1	D	62	GLN

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](#)

20 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
4	SO4	B	1366	-	4,4,4	0.30	0	6,6,6	0.21	0
4	SO4	A	1366	-	4,4,4	0.18	0	6,6,6	0.15	0
3	ANP	D	1000	-	29,33,33	1.13	4 (13%)	31,52,52	0.91	2 (6%)
4	SO4	C	1366	-	4,4,4	0.33	0	6,6,6	0.25	0
4	SO4	C	1365	-	4,4,4	0.16	0	6,6,6	0.08	0
4	SO4	B	1363	-	4,4,4	0.19	0	6,6,6	0.17	0
4	SO4	A	1365	-	4,4,4	0.17	0	6,6,6	0.51	0
3	ANP	C	1000	-	29,33,33	1.06	3 (10%)	31,52,52	1.00	3 (9%)
3	ANP	A	1000	-	29,33,33	1.05	3 (10%)	31,52,52	0.90	1 (3%)
4	SO4	B	1364	-	4,4,4	0.16	0	6,6,6	0.05	0
4	SO4	D	1367	-	4,4,4	0.16	0	6,6,6	0.08	0
4	SO4	H	1049	-	4,4,4	0.13	0	6,6,6	0.07	0
4	SO4	C	1364	-	4,4,4	0.14	0	6,6,6	0.21	0
4	SO4	A	1367	-	4,4,4	0.25	0	6,6,6	0.13	0
4	SO4	D	1365	-	4,4,4	0.15	0	6,6,6	0.08	0
4	SO4	C	1367	-	4,4,4	0.14	0	6,6,6	0.07	0
4	SO4	B	1365	-	4,4,4	0.14	0	6,6,6	0.07	0
4	SO4	A	1364	-	4,4,4	0.20	0	6,6,6	0.09	0
3	ANP	B	1000	-	29,33,33	1.18	4 (13%)	31,52,52	0.98	1 (3%)
4	SO4	D	1366	-	4,4,4	0.14	0	6,6,6	0.22	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	ANP	D	1000	-	-	4/14/38/38	0/3/3/3
3	ANP	C	1000	-	-	6/14/38/38	0/3/3/3
3	ANP	B	1000	-	-	1/14/38/38	0/3/3/3
3	ANP	A	1000	-	-	5/14/38/38	0/3/3/3

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	1000	ANP	PG-O1G	2.87	1.50	1.46
3	B	1000	ANP	PG-O1G	2.79	1.50	1.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1000	ANP	PG-O1G	2.73	1.50	1.46
3	C	1000	ANP	PG-O1G	2.71	1.50	1.46
3	B	1000	ANP	PB-O3A	2.54	1.62	1.59
3	B	1000	ANP	PG-O3G	-2.47	1.50	1.56
3	D	1000	ANP	PG-O2G	-2.43	1.50	1.56
3	C	1000	ANP	PG-O2G	-2.33	1.50	1.56
3	C	1000	ANP	PG-O3G	-2.31	1.50	1.56
3	A	1000	ANP	PG-O2G	-2.30	1.50	1.56
3	B	1000	ANP	PG-O2G	-2.30	1.50	1.56
3	D	1000	ANP	PG-O3G	-2.26	1.50	1.56
3	A	1000	ANP	PG-O3G	-2.25	1.50	1.56
3	D	1000	ANP	PB-O1B	2.13	1.49	1.46

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	1000	ANP	C4-C5-N7	2.69	112.20	109.40
3	B	1000	ANP	C5-C6-N6	2.32	123.88	120.35
3	A	1000	ANP	C5-C6-N6	2.26	123.78	120.35
3	D	1000	ANP	C4-C5-N7	2.21	111.70	109.40
3	C	1000	ANP	O1B-PB-N3B	-2.08	108.71	111.77
3	C	1000	ANP	C5-C6-N6	2.06	123.49	120.35
3	D	1000	ANP	C5-C6-N6	2.06	123.48	120.35

There are no chirality outliers.

All (16) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	D	1000	ANP	PB-N3B-PG-O1G
3	D	1000	ANP	PG-N3B-PB-O1B
3	C	1000	ANP	PB-N3B-PG-O1G
3	C	1000	ANP	PG-N3B-PB-O1B
3	C	1000	ANP	PA-O3A-PB-O1B
3	C	1000	ANP	PA-O3A-PB-O2B
3	A	1000	ANP	PB-N3B-PG-O1G
3	A	1000	ANP	PA-O3A-PB-O1B
3	A	1000	ANP	PA-O3A-PB-O2B
3	B	1000	ANP	PB-N3B-PG-O1G
3	D	1000	ANP	PB-O3A-PA-O5'
3	D	1000	ANP	O4'-C4'-C5'-O5'
3	C	1000	ANP	PB-O3A-PA-O1A
3	A	1000	ANP	PB-O3A-PA-O1A

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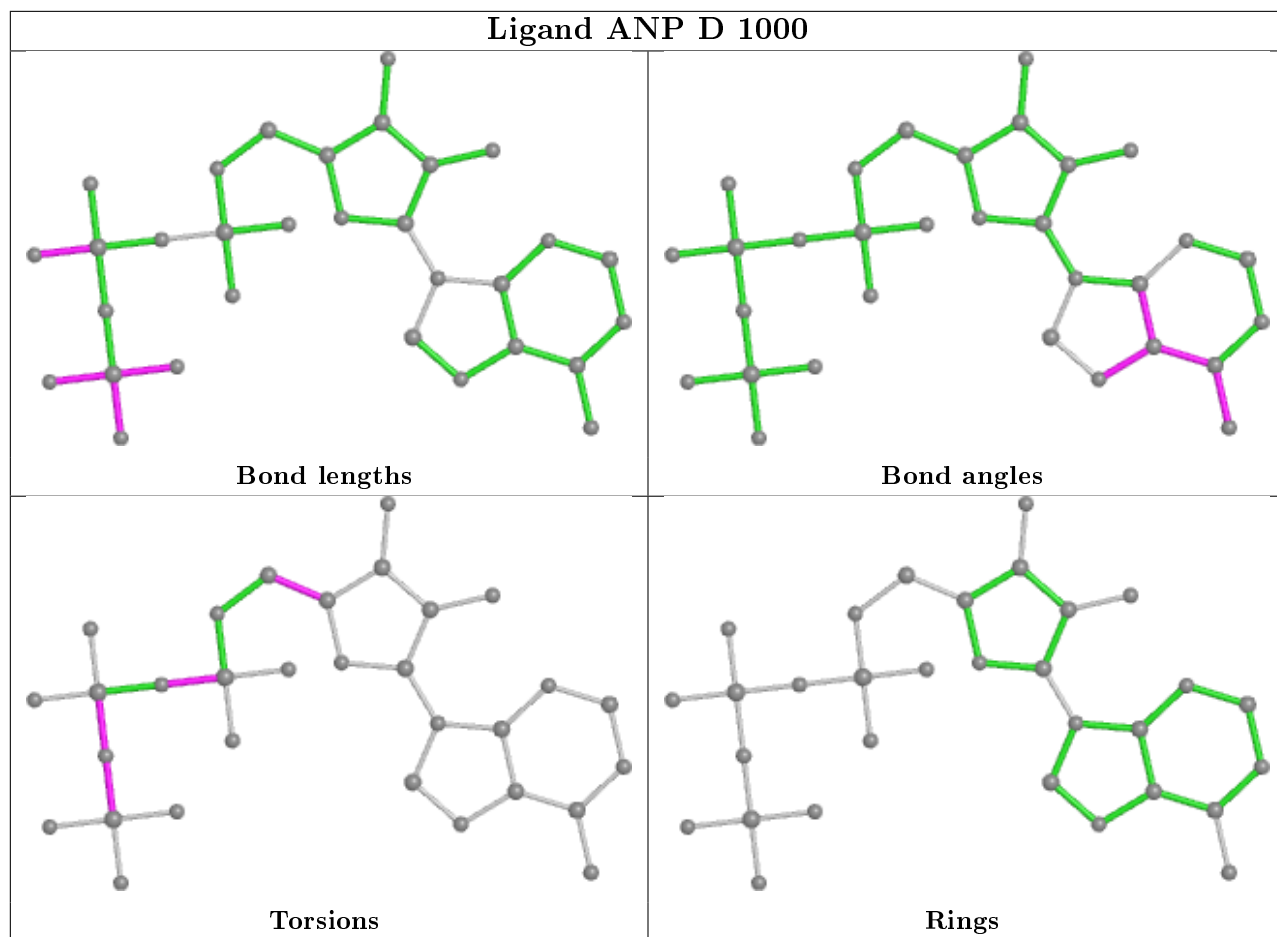
Mol	Chain	Res	Type	Atoms
3	C	1000	ANP	PB-O3A-PA-O2A
3	A	1000	ANP	PB-O3A-PA-O2A

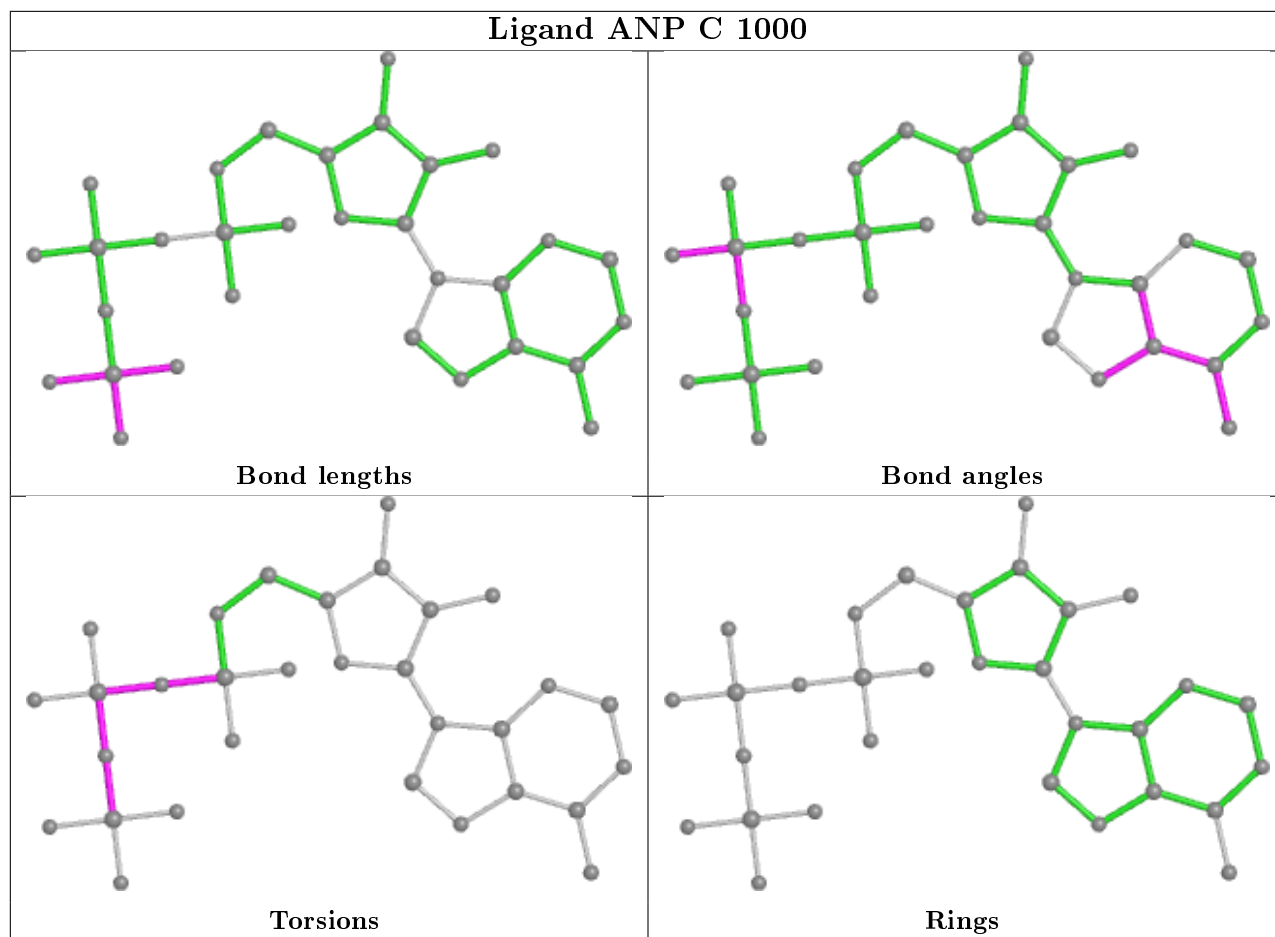
There are no ring outliers.

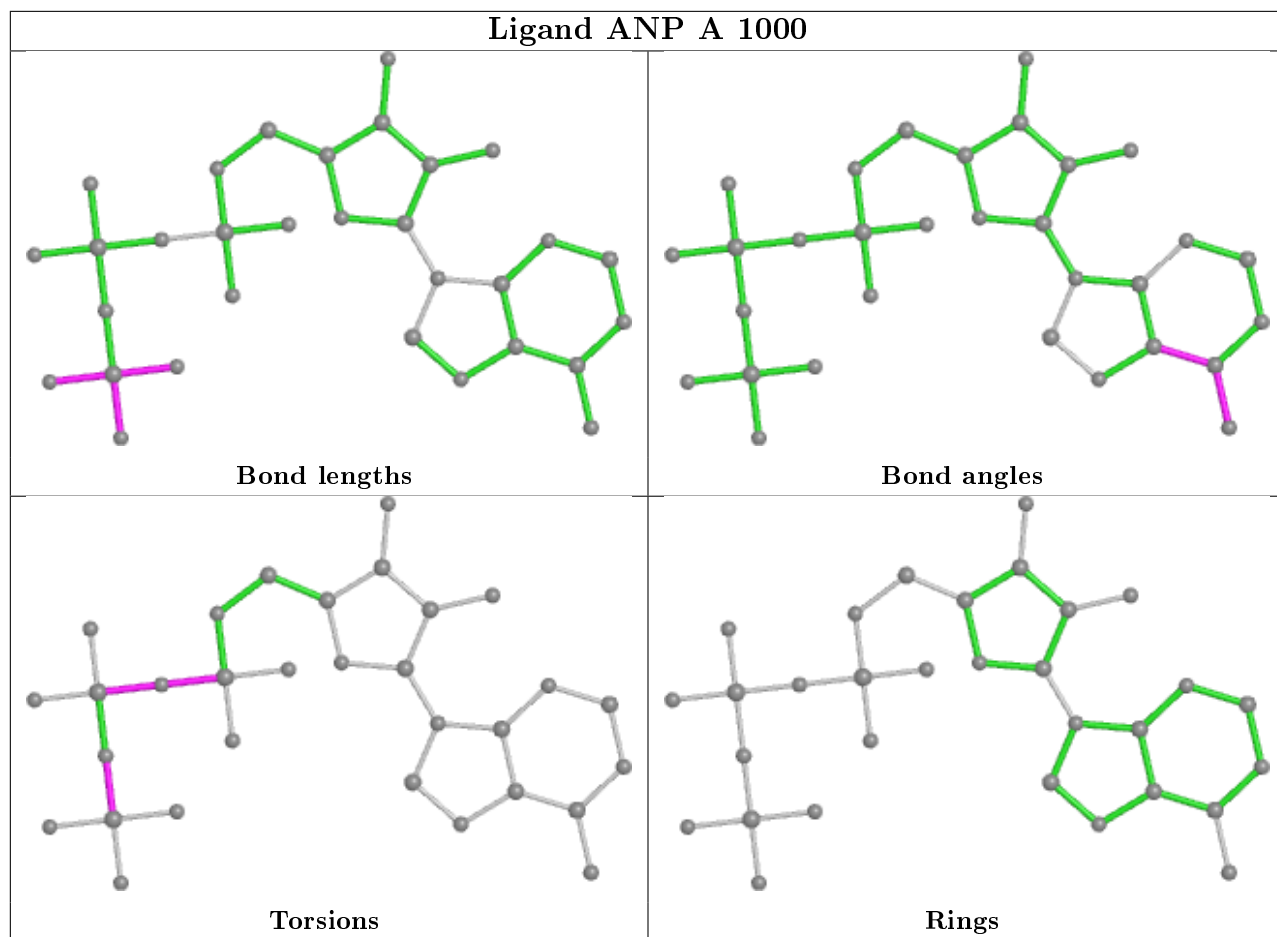
4 monomers are involved in 6 short contacts:

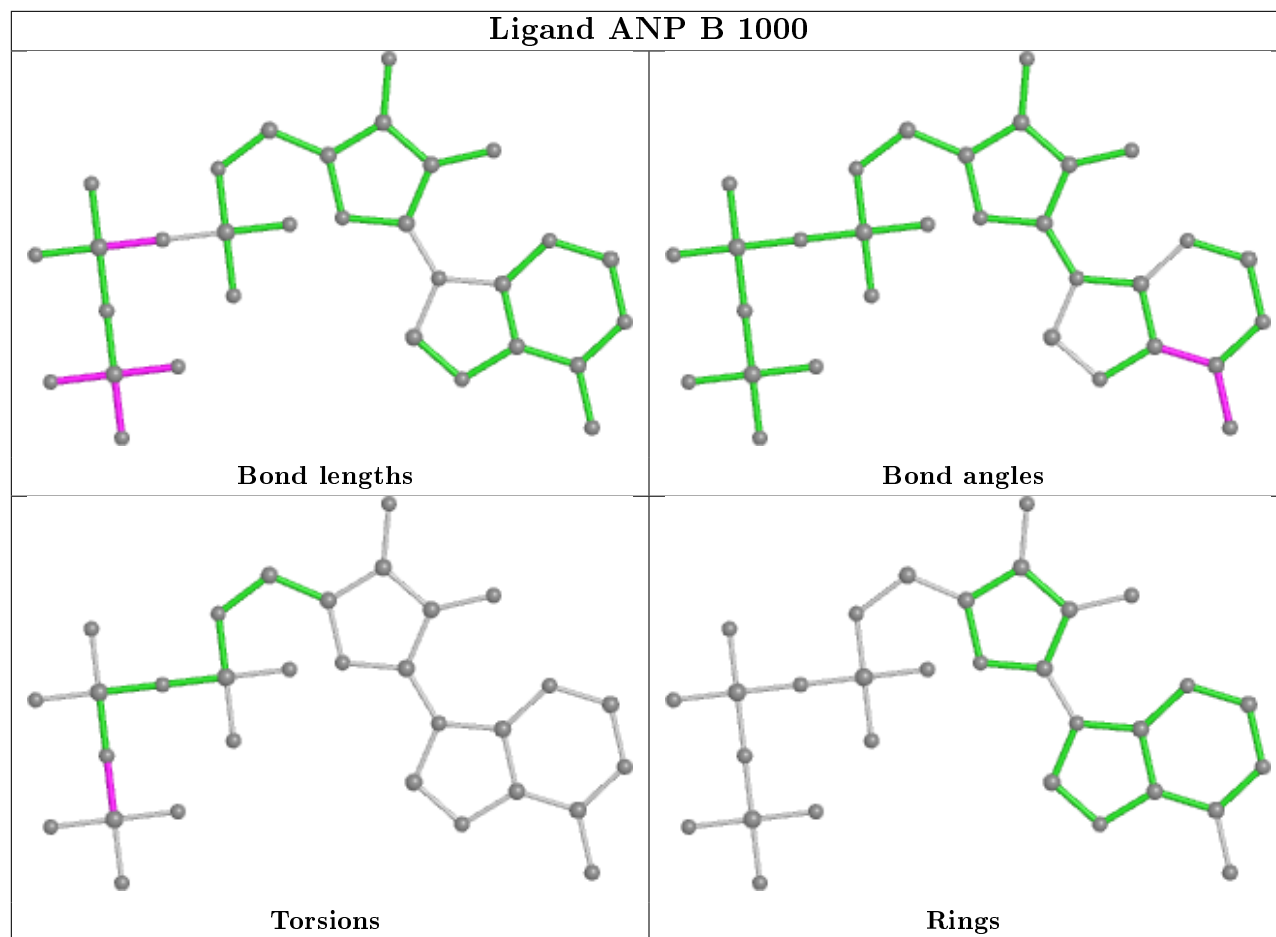
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	1366	SO4	1	0
4	C	1366	SO4	2	0
4	A	1365	SO4	2	0
3	C	1000	ANP	1	0

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	343/364 (94%)	0.71	37 (10%) 5 9	38, 59, 107, 123	0
1	B	327/364 (89%)	0.78	36 (11%) 5 9	38, 61, 109, 135	0
1	C	333/364 (91%)	0.61	24 (7%) 15 22	40, 61, 105, 122	0
1	D	344/364 (94%)	0.53	16 (4%) 31 42	39, 59, 96, 129	0
2	F	10/12 (83%)	0.59	0 100 100	60, 83, 99, 110	0
2	G	8/12 (66%)	0.92	1 (12%) 3 6	69, 83, 97, 103	0
2	H	12/12 (100%)	0.52	0 100 100	66, 70, 95, 102	0
2	I	9/12 (75%)	1.09	1 (11%) 5 9	57, 74, 91, 106	0
All	All	1386/1504 (92%)	0.66	115 (8%) 11 17	38, 61, 106, 135	0

All (115) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	61	PHE	7.9
1	C	363	LEU	7.4
1	A	363	LEU	7.0
1	D	363	LEU	6.8
1	B	356	ILE	6.2
1	B	357	TYR	5.9
1	B	98	LEU	5.5
1	B	96	LYS	5.4
1	B	57	LEU	5.3
1	B	58	SER	5.2
1	A	101	PHE	5.1
1	A	10	PHE	4.7
1	A	98	LEU	4.3
1	B	355	LEU	4.3
1	B	59	ARG	4.2
1	A	178	THR	4.1

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Mol	Chain	Res	Type	RSRZ
1	B	97	SER	4.1
1	A	352	TRP	4.1
1	A	170	PHE	4.0
1	B	71	TYR	3.9
1	B	102	GLN	3.9
2	I	37	GLN	3.8
1	A	94	PRO	3.7
1	B	361	MET	3.6
1	A	99	GLU	3.6
1	A	24	LYS	3.6
1	B	101	PHE	3.6
1	A	67	ALA	3.5
1	B	65	THR	3.5
1	A	354	GLU	3.5
1	C	99	GLU	3.5
1	B	289	LEU	3.4
1	A	96	LYS	3.3
1	A	356	ILE	3.3
1	A	355	LEU	3.3
1	A	9	ASN	3.3
1	C	176	ALA	3.3
1	C	68	LYS	3.2
1	B	185	TYR	3.2
1	D	99	GLU	3.2
1	C	76	LEU	3.2
1	B	360	VAL	3.1
1	A	15	ILE	3.1
1	C	61	PHE	3.1
1	A	350	GLU	3.0
1	D	360	VAL	3.0
1	C	185	TYR	2.9
1	B	100	GLU	2.9
1	D	98	LEU	2.9
1	D	355	LEU	2.9
1	D	185	TYR	2.9
1	A	91	VAL	2.9
1	A	61	PHE	2.9
1	C	350	GLU	2.8
1	B	94	PRO	2.8
1	C	96	LYS	2.8
1	A	46	ALA	2.8
2	G	48	ALA	2.8

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Mol	Chain	Res	Type	RSRZ
1	A	23	LEU	2.8
1	B	60	PRO	2.8
1	C	338	PRO	2.8
1	C	357	TYR	2.8
1	A	8	ASN	2.8
1	D	364	GLU	2.7
1	B	14	GLU	2.7
1	C	336	LYS	2.7
1	B	67	ALA	2.7
1	C	100	GLU	2.7
1	D	350	GLU	2.7
1	D	349	ILE	2.7
1	A	57	LEU	2.7
1	A	97	SER	2.6
1	B	336	LYS	2.6
1	B	64	GLN	2.6
1	B	353	LYS	2.6
1	C	98	LEU	2.5
1	A	104	VAL	2.5
1	C	170	PHE	2.5
1	C	356	ILE	2.5
1	B	39	ILE	2.5
1	B	184	PRO	2.5
1	B	70	ALA	2.5
1	B	91	VAL	2.4
1	B	78	LYS	2.4
1	C	352	TRP	2.4
1	C	289	LEU	2.4
1	A	357	TYR	2.3
1	B	354	GLU	2.3
1	B	358	LYS	2.3
1	A	68	LYS	2.3
1	D	168	LEU	2.3
1	D	39	ILE	2.3
1	C	40	VAL	2.2
1	A	49	GLU	2.2
1	C	74	LEU	2.2
1	C	361	MET	2.2
1	A	47	ILE	2.2
1	B	168	LEU	2.2
1	D	358	LYS	2.2
1	A	22	VAL	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	95	GLN	2.2
1	A	351	GLU	2.2
1	C	362	ASP	2.2
1	D	339	ASP	2.1
1	A	16	GLY	2.1
1	B	99	GLU	2.1
1	A	92	PHE	2.1
1	C	62	GLN	2.1
1	A	102	GLN	2.1
1	D	211	VAL	2.1
1	A	20	PHE	2.1
1	C	71	TYR	2.1
1	D	357	TYR	2.0
1	D	288	LYS	2.0
1	A	73	GLU	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.

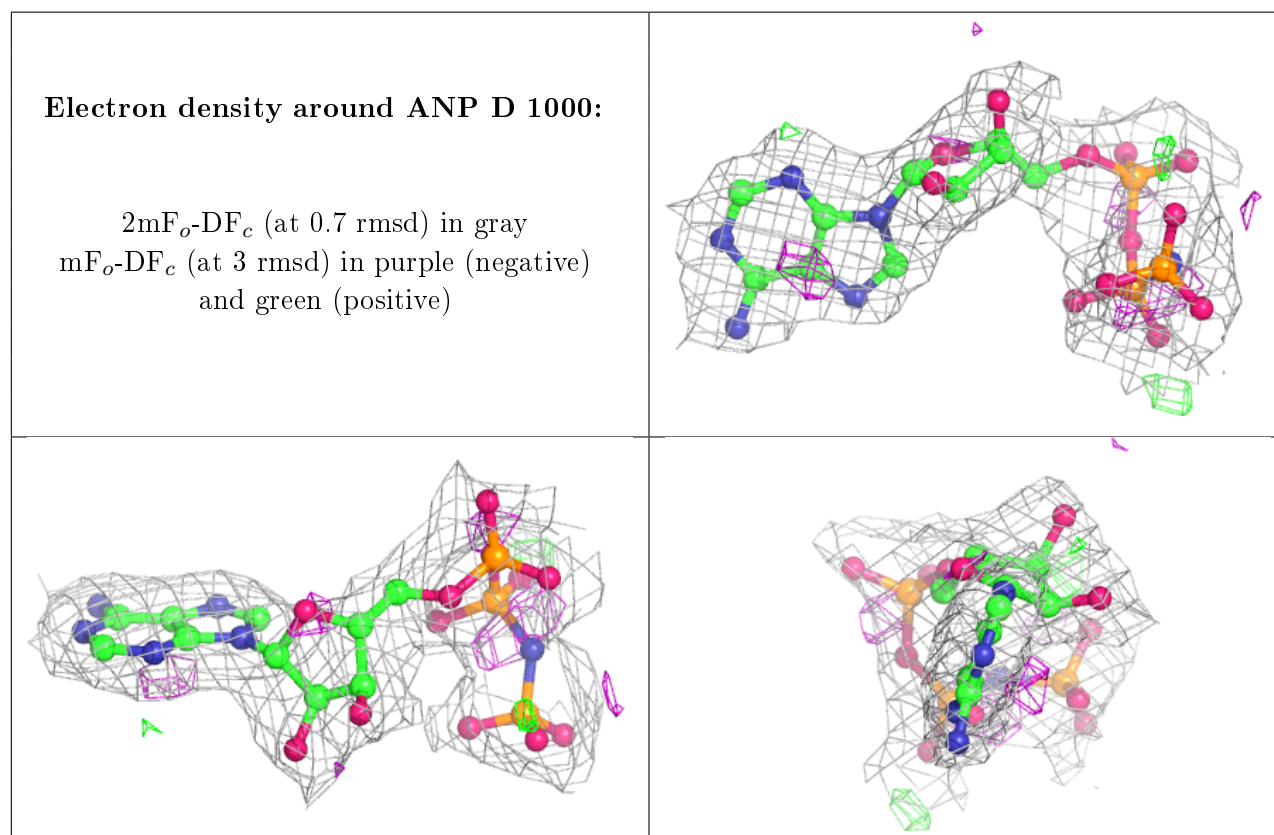
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	SO4	A	1367	5/5	0.74	0.27	121,121,123,124	0
4	SO4	C	1365	5/5	0.80	0.28	147,147,147,147	0
3	ANP	D	1000	31/31	0.81	0.18	64,95,144,145	0
4	SO4	B	1365	5/5	0.83	0.13	145,145,146,146	0
4	SO4	D	1365	5/5	0.84	0.13	145,145,146,146	0
4	SO4	H	1049	5/5	0.84	0.14	136,137,137,137	0
4	SO4	A	1366	5/5	0.85	0.18	124,124,125,126	0
4	SO4	B	1363	5/5	0.87	0.18	113,114,115,115	0

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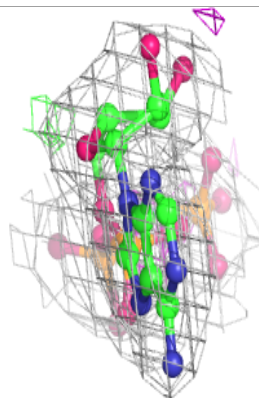
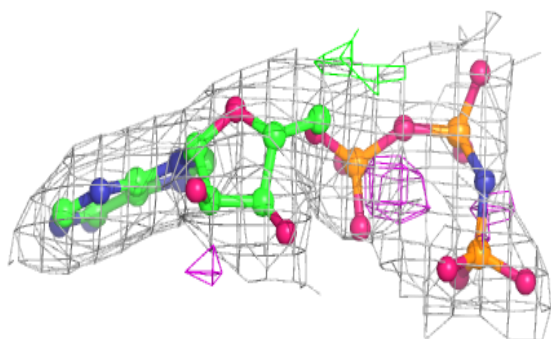
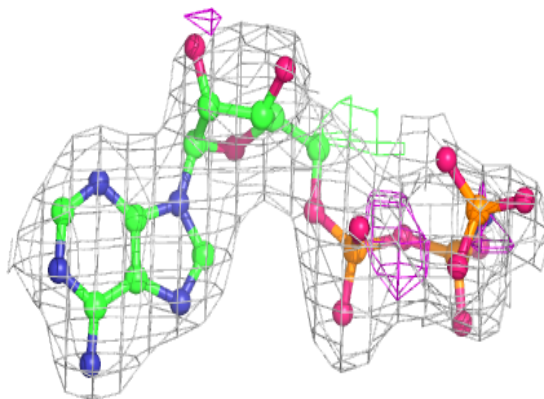
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	SO4	A	1364	5/5	0.88	0.21	134,134,135,136	0
4	SO4	B	1364	5/5	0.89	0.17	155,156,156,156	0
3	ANP	B	1000	31/31	0.89	0.17	59,86,136,136	0
3	ANP	A	1000	31/31	0.90	0.17	55,72,133,134	0
4	SO4	C	1367	5/5	0.93	0.19	129,130,130,130	0
3	ANP	C	1000	31/31	0.94	0.15	58,76,122,124	0
4	SO4	C	1364	5/5	0.94	0.12	99,100,100,102	0
4	SO4	D	1367	5/5	0.95	0.16	126,126,126,126	0
4	SO4	B	1366	5/5	0.99	0.18	41,45,48,49	0
4	SO4	C	1366	5/5	0.99	0.17	44,48,50,54	0
4	SO4	A	1365	5/5	0.99	0.16	51,51,52,54	0
4	SO4	D	1366	5/5	0.99	0.12	78,78,79,80	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.

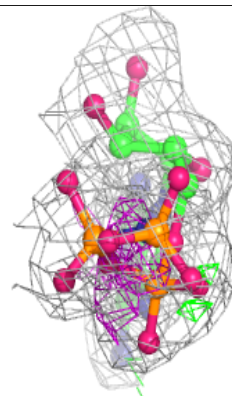
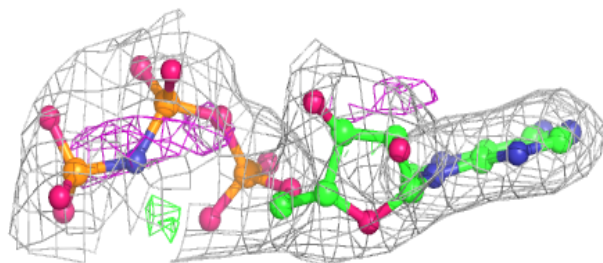
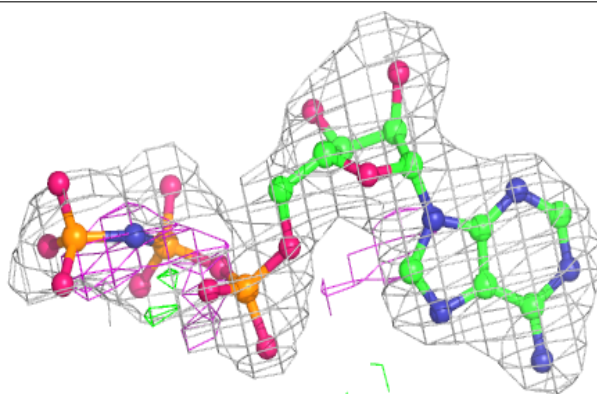


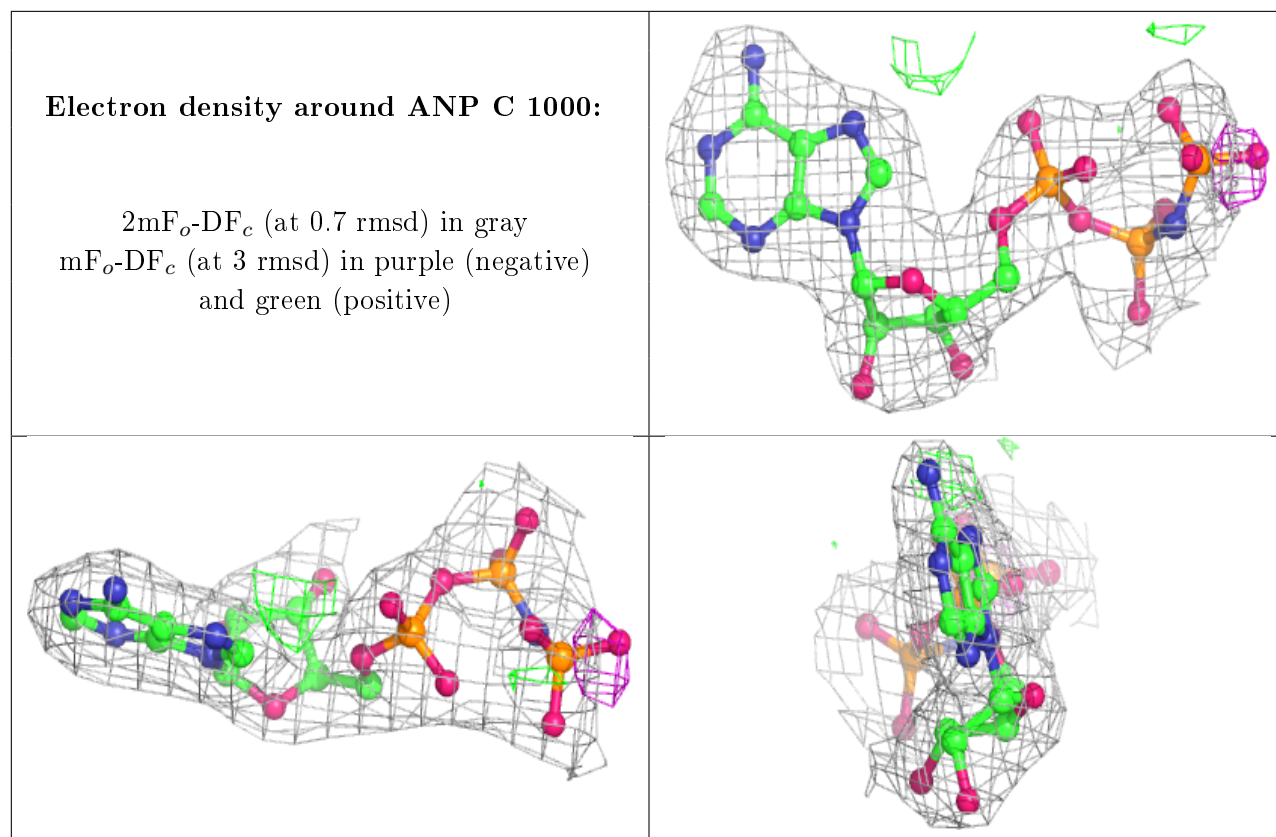
Electron density around ANP B 1000:

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

**Electron density around ANP A 1000:**

$2mF_o-DF_c$ (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.