wwPDB X-ray Structure Validation Summary Report (i)

Jul 10, 2024 – 12:43 am BST

PDB ID	:	9FIH
Title	:	Crystal Structure of NuoEF variant P228R(NuoF) from Aquifex aeolicus bound to NADH under anoxic conditions after 10 min soaking
Authors	:	Wohlwend, D.; Friedrich, T.; Goeppert-Asadollahpour, S.
Deposited on	:	2024-05-29
Resolution	:	2.08 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 (i) 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 (i)) were used in the production of this report:

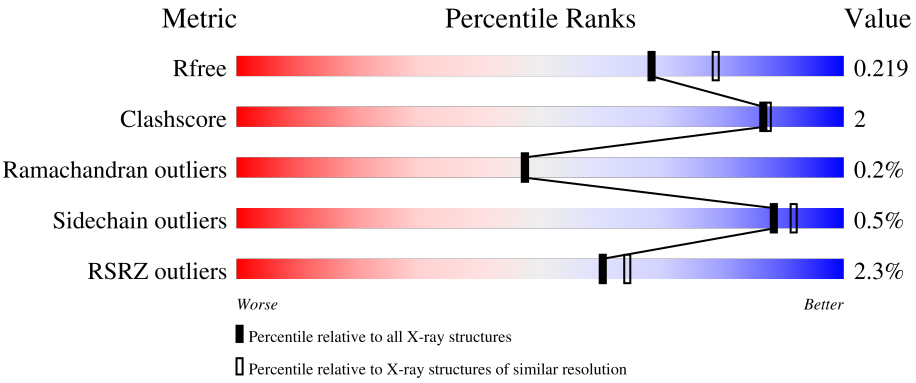
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.37.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

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 2.08 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	6189 (2.10-2.06)
Clashscore	141614	6738 (2.10-2.06)
Ramachandran outliers	138981	6663 (2.10-2.06)
Sidechain outliers	138945	6664 (2.10-2.06)
RSRZ outliers	127900	6057 (2.10-2.06)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	160	7% 89% 8%
1	C	160	5% 96%
2	B	434	% 91% 5%
2	D	434	% 91%

2 Entry composition (i)

There are 10 unique types of molecules in this entry. The entry contains 10301 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 NADH-quinone oxidoreductase subunit E.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	156	Total	C	N	O	S	0	0	0
			1268	821	204	234	9			
1	C	156	Total	C	N	O	S	0	1	0
			1279	827	208	235	9			

- Molecule 2 is a protein called NADH-quinone oxidoreductase subunit F.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	418	Total	C	N	O	S	0	2	0
			3304	2122	551	618	13			
2	D	418	Total	C	N	O	S	0	1	0
			3298	2119	550	616	13			

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	228	ARG	PRO	engineered mutation	UNP O66841
B	427	ALA	-	expression tag	UNP O66841
B	428	GLY	-	expression tag	UNP O66841
B	429	HIS	-	expression tag	UNP O66841
B	430	HIS	-	expression tag	UNP O66841
B	431	HIS	-	expression tag	UNP O66841
B	432	HIS	-	expression tag	UNP O66841
B	433	HIS	-	expression tag	UNP O66841
B	434	HIS	-	expression tag	UNP O66841
D	228	ARG	PRO	engineered mutation	UNP O66841
D	427	ALA	-	expression tag	UNP O66841
D	428	GLY	-	expression tag	UNP O66841
D	429	HIS	-	expression tag	UNP O66841
D	430	HIS	-	expression tag	UNP O66841
D	431	HIS	-	expression tag	UNP O66841
D	432	HIS	-	expression tag	UNP O66841

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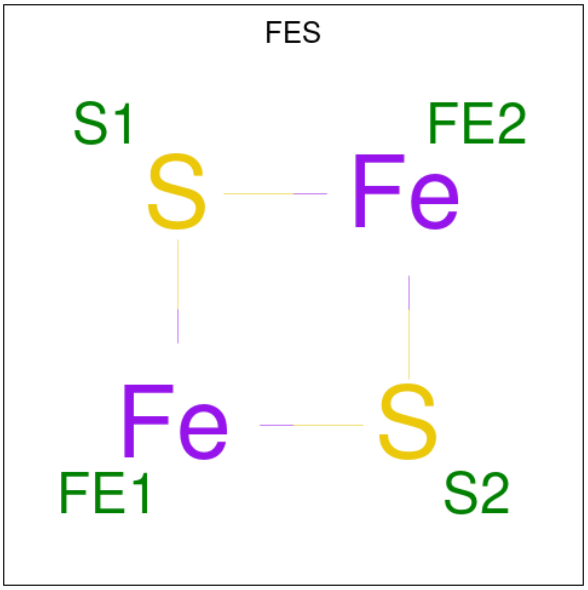
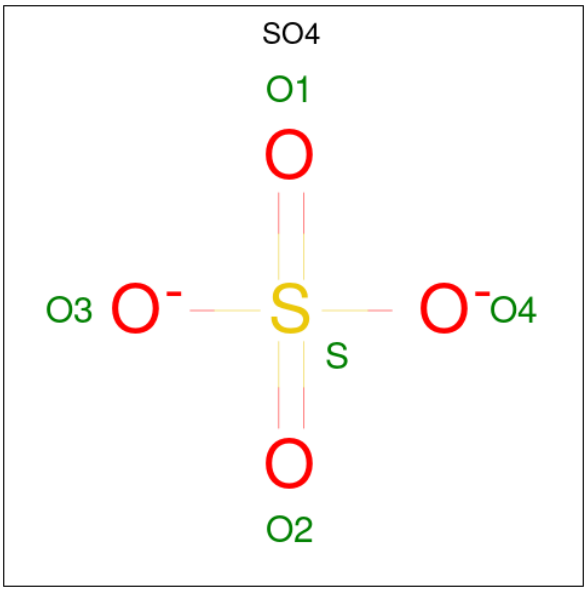
Chain	Residue	Modelled	Actual	Comment	Reference
D	433	HIS	-	expression tag	UNP O66841
D	434	HIS	-	expression tag	UNP O66841

- Molecule 3 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe_2S_2) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total Fe S 4 2 2	0	0
3	C	1	Total Fe S 4 2 2	0	0

- Molecule 4 is SULFATE ION (three-letter code: SO4) (formula: O_4S).

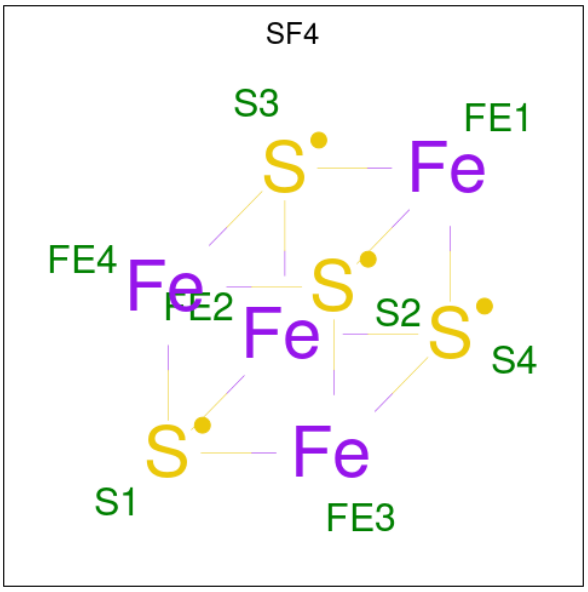


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total O S 5 4 1	0	0
4	A	1	Total O S 5 4 1	0	0
4	C	1	Total O S 5 4 1	0	0
4	C	1	Total O S 5 4 1	0	0

- Molecule 5 is SODIUM ION (three-letter code: NA) (formula: Na).

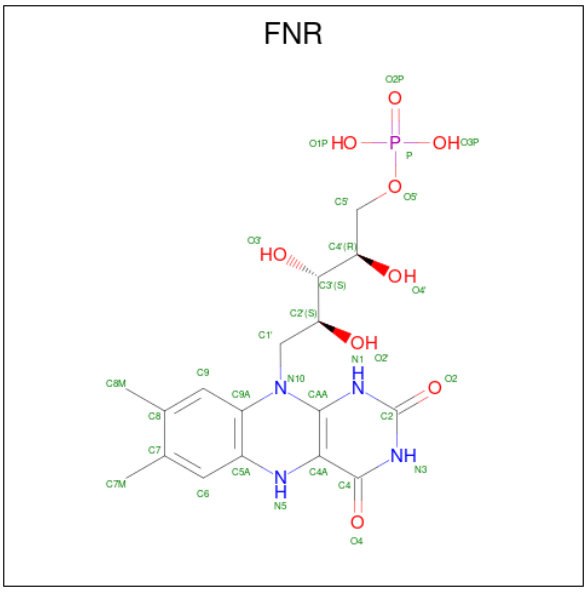
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total Na 1 1	0	0
5	B	3	Total Na 3 3	0	0
5	D	6	Total Na 6 6	0	0

- Molecule 6 is IRON/SULFUR CLUSTER (three-letter code: SF4) (formula: Fe_4S_4) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	B	1	Total Fe S 8 4 4	0	0
6	D	1	Total Fe S 8 4 4	0	0

- Molecule 7 is 1-DEOXY-1-(7,8-DIMETHYL-2,4-DIOXO-3,4-DIHYDRO-2H-BENZO[G]PTERIDIN-1-ID-10(5H)-YL)-5-O-PHOSPHONATO-D-RIBITOL (three-letter code: FNR) (formula: $C_{17}H_{23}N_4O_9P$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	B	1	Total C N O P 31 17 4 9 1	0	0

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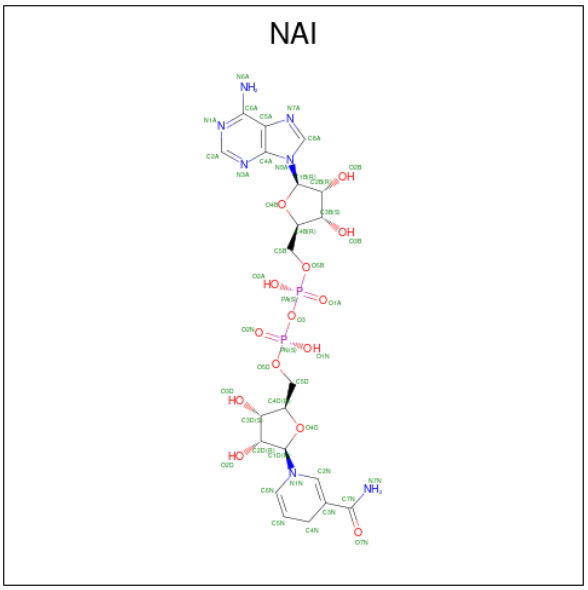
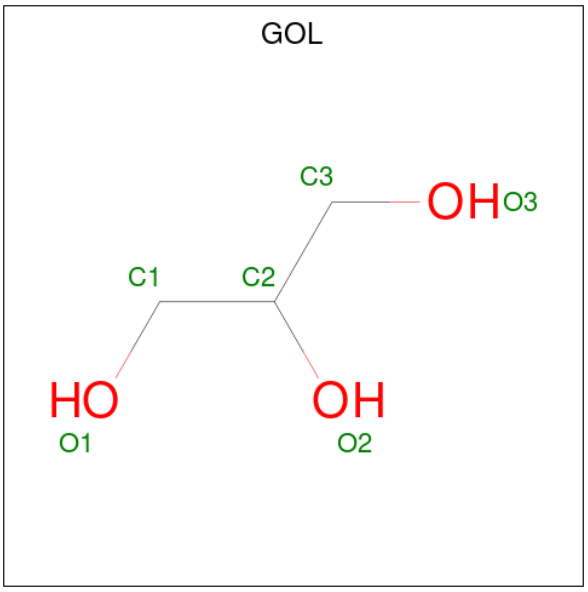
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
7	D	1	Total	C	N	O	P	0	0
			31	17	4	9	1		

- Molecule 8 is 1,4-DIHYDRONICOTINAMIDE ADENINE DINUCLEOTIDE (three-letter code: NAI) (formula: $C_{21}H_{29}N_7O_{14}P_2$) (labeled as "Ligand of Interest" by depositor).



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

- Molecule 9 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

- Molecule 10 is water.

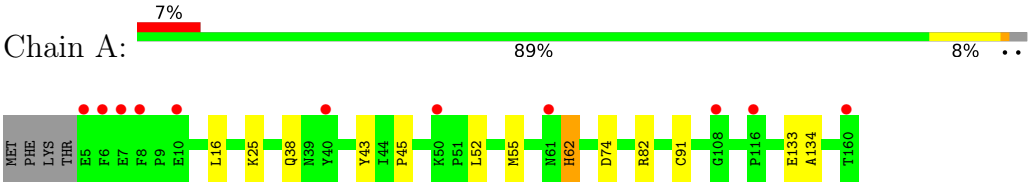
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	A	113	Total O 113 113	0	0
10	B	333	Total O 333 333	0	0
10	C	140	Total O 140 140	0	0
10	D	338	Total O 338 338	0	0

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

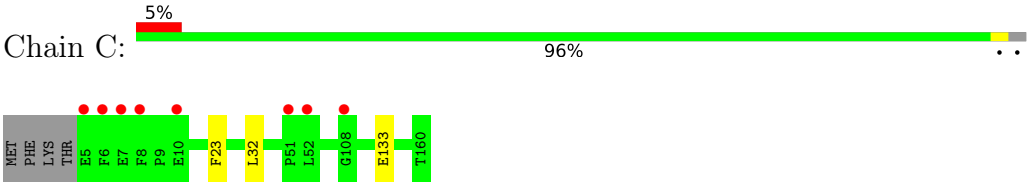
• Molecule 1: NADH-quinone oxidoreductase subunit E

Chain A:



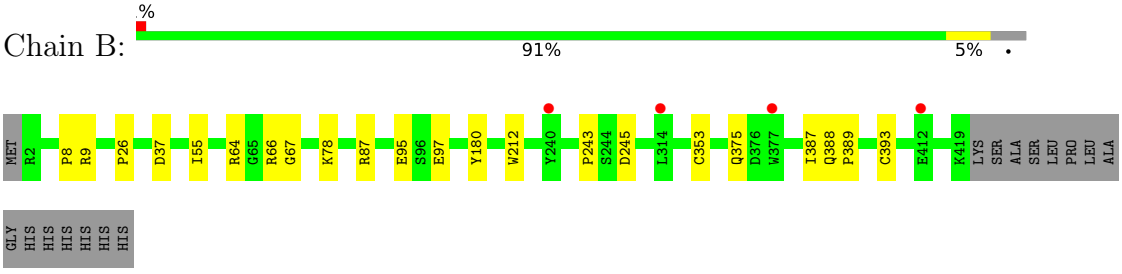
• Molecule 1: NADH-quinone oxidoreductase subunit E

Chain C:



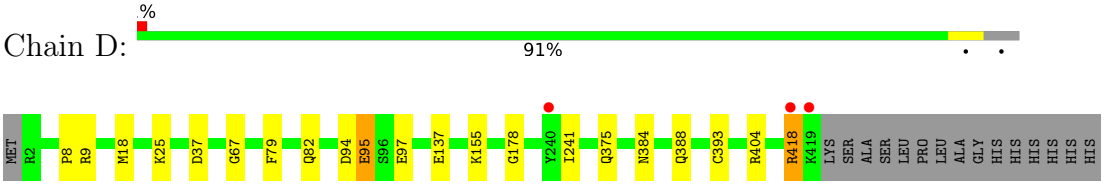
• Molecule 2: NADH-quinone oxidoreductase subunit F

Chain B:



• Molecule 2: NADH-quinone oxidoreductase subunit F

Chain D:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	63.52Å 116.36Å 190.18Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.14 – 2.08 48.10 – 2.08	Depositor EDS
% Data completeness (in resolution range)	99.7 (48.14-2.08) 99.7 (48.10-2.08)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.05 (at 2.08Å)	Xtriage
Refinement program	REFMAC 5.8.0425	Depositor
R, R_{free}	0.179 , 0.213 0.187 , 0.219	Depositor DCC
R_{free} test set	4272 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å^2)	21.0	Xtriage
Anisotropy	0.679	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 39.8	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	10301	wwPDB-VP
Average B, all atoms (Å^2)	27.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 44.21 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.5764e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, SF4, NA, SO4, NAI, FNR, FES

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	0.36	0/1297	0.67	0/1752
1	C	0.35	0/1308	0.68	0/1766
2	B	0.40	0/3385	0.70	1/4581 (0.0%)
2	D	0.40	0/3378	0.69	0/4569
All	All	0.39	0/9368	0.69	1/12668 (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	1
2	B	0	1
All	All	0	2

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	66	ARG	NE-CZ-NH2	5.04	122.82	120.30

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	82	ARG	Sidechain
2	B	64	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	1268	0	1269	9	0
1	C	1279	0	1281	2	0
2	B	3304	0	3259	15	0
2	D	3298	0	3265	16	0
3	A	4	0	0	0	0
3	C	4	0	0	0	0
4	A	10	0	0	0	0
4	C	10	0	0	0	0
5	A	1	0	0	0	0
5	B	3	0	0	0	0
5	D	6	0	0	0	0
6	B	8	0	0	0	0
6	D	8	0	0	0	0
7	B	31	0	22	0	0
7	D	31	0	22	0	0
8	B	44	0	27	4	0
8	D	44	0	27	2	0
9	B	12	0	16	1	0
9	D	12	0	16	1	0
10	A	113	0	0	1	0
10	B	333	0	0	2	0
10	C	140	0	0	0	0
10	D	338	0	0	4	0
All	All	10301	0	9204	39	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.

The worst 5 of 39 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:375:GLN:HG2	10:B:821:HOH:O	1.75	0.85
1:A:38:GLN:HE22	1:A:74:ASP:H	1.38	0.72
2:D:388:GLN:HG3	10:D:645:HOH:O	1.90	0.71
2:B:97[A]:GLU:HB2	8:B:503:NAI:H42N	1.74	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:97:GLU:HB2	8:D:503:NAI:H42N	1.74	0.69

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	154/160 (96%)	150 (97%)	4 (3%)	0	100	100
1	C	155/160 (97%)	150 (97%)	5 (3%)	0	100	100
2	B	418/434 (96%)	408 (98%)	9 (2%)	1 (0%)	47	47
2	D	417/434 (96%)	408 (98%)	8 (2%)	1 (0%)	47	47
All	All	1144/1188 (96%)	1116 (98%)	26 (2%)	2 (0%)	47	47

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	95	GLU
2	D	95	GLU

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	142/146 (97%)	141 (99%)	1 (1%)	84	87

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	C	143/146 (98%)	143 (100%)	0	100 100
2	B	343/357 (96%)	342 (100%)	1 (0%)	92 95
2	D	343/357 (96%)	340 (99%)	3 (1%)	78 83
All	All	971/1006 (96%)	966 (100%)	5 (0%)	88 92

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	62	HIS
2	B	393	CYS
2	D	9	ARG
2	D	393	CYS
2	D	418	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 9 such sidechains are listed below:

Mol	Chain	Res	Type
2	D	360	GLN
2	D	384	ASN
2	B	384	ASN
1	C	62	HIS
2	D	220	ASN

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)

Of 26 ligands modelled in this entry, 10 are monoatomic - leaving 16 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	$\#\|Z\| > 2$
9	GOL	B	504	-	5,5,5	0.13	0	5,5,5	0.39	0
8	NAI	B	503	5	42,48,48	0.64	0	47,73,73	0.69	1 (2%)
6	SF4	B	501	2	0,12,12	-	-	-		
4	SO4	A	203	-	4,4,4	0.35	0	6,6,6	0.11	0
4	SO4	A	202	-	4,4,4	0.27	0	6,6,6	0.12	0
6	SF4	D	501	2	0,12,12	-	-	-		
3	FES	A	201	1	0,4,4	-	-	-		
7	FNR	B	502	-	32,33,33	0.50	0	40,50,50	0.62	0
8	NAI	D	503	5	42,48,48	0.65	0	47,73,73	0.68	1 (2%)
7	FNR	D	502	-	32,33,33	0.43	0	40,50,50	0.48	0
3	FES	C	201	1	0,4,4	-	-	-		
9	GOL	B	505	-	5,5,5	0.20	0	5,5,5	0.34	0
4	SO4	C	202	-	4,4,4	0.32	0	6,6,6	0.14	0
9	GOL	D	505	-	5,5,5	0.32	0	5,5,5	0.73	0
4	SO4	C	203	-	4,4,4	0.32	0	6,6,6	0.06	0
9	GOL	D	504	-	5,5,5	0.18	0	5,5,5	0.55	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
9	GOL	B	504	-	-	1/4/4/4	-
8	NAI	B	503	5	-	1/25/72/72	0/5/5/5
6	SF4	B	501	2	-	-	0/6/5/5
6	SF4	D	501	2	-	-	0/6/5/5
3	FES	A	201	1	-	-	0/1/1/1
7	FNR	B	502	-	-	3/18/18/18	0/3/3/3
8	NAI	D	503	5	-	2/25/72/72	0/5/5/5

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
7	FNR	D	502	-	-	2/18/18/18	0/3/3/3
3	FES	C	201	1	-	-	0/1/1/1
9	GOL	B	505	-	-	0/4/4/4	-
9	GOL	D	505	-	-	0/4/4/4	-
9	GOL	D	504	-	-	2/4/4/4	-

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
8	D	503	NAI	C5A-C6A-N6A	2.17	123.66	120.35
8	B	503	NAI	C4D-O4D-C1D	-2.02	105.01	109.47

There are no chirality outliers.

5 of 11 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
9	D	504	GOL	C1-C2-C3-O3
9	D	504	GOL	O2-C2-C3-O3
9	B	504	GOL	O1-C1-C2-O2
8	D	503	NAI	O4D-C1D-N1N-C2N
8	B	503	NAI	O4D-C1D-N1N-C2N

There are no ring outliers.

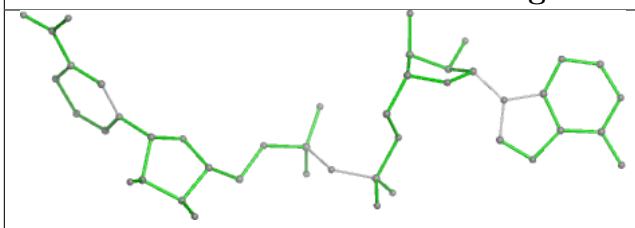
4 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	B	504	GOL	1	0
8	B	503	NAI	4	0
8	D	503	NAI	2	0
9	D	505	GOL	1	0

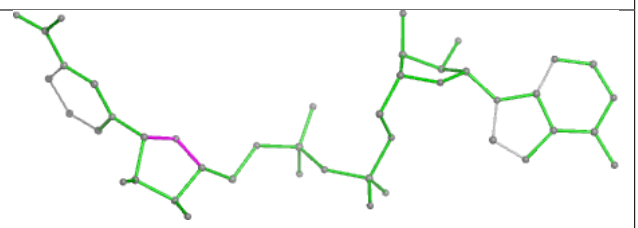
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 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.

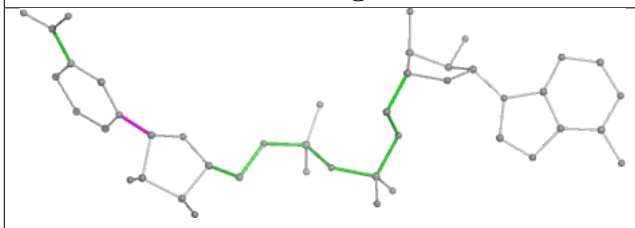
Ligand NAI B 503



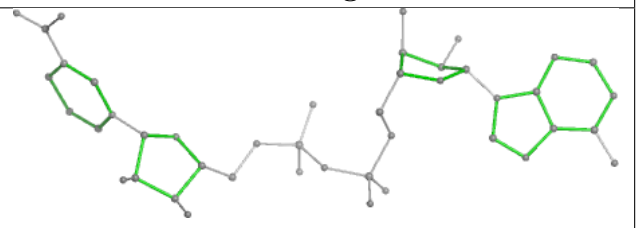
Bond lengths



Bond angles

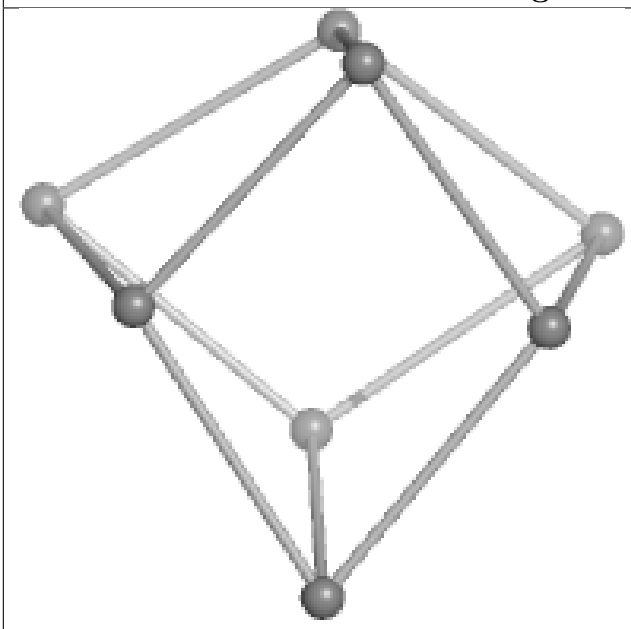


Torsions

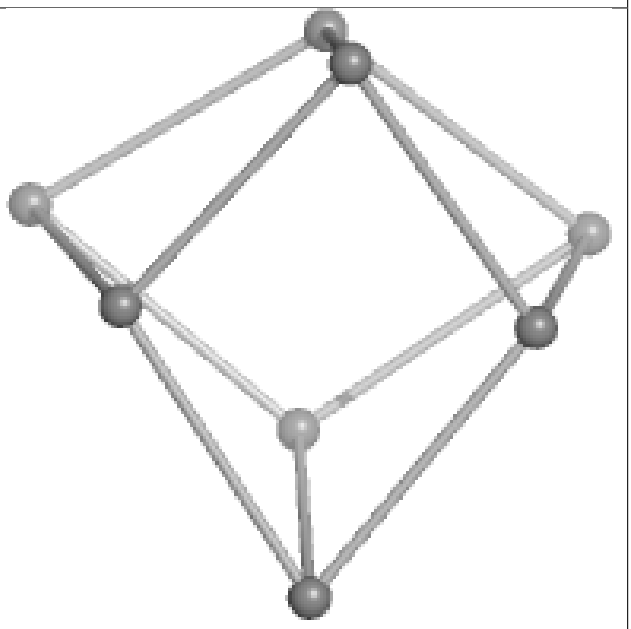


Rings

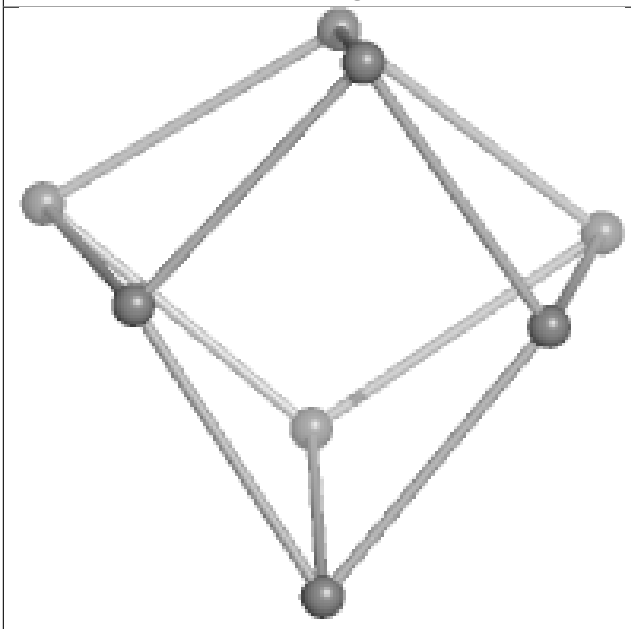
Ligand SF4 B 501



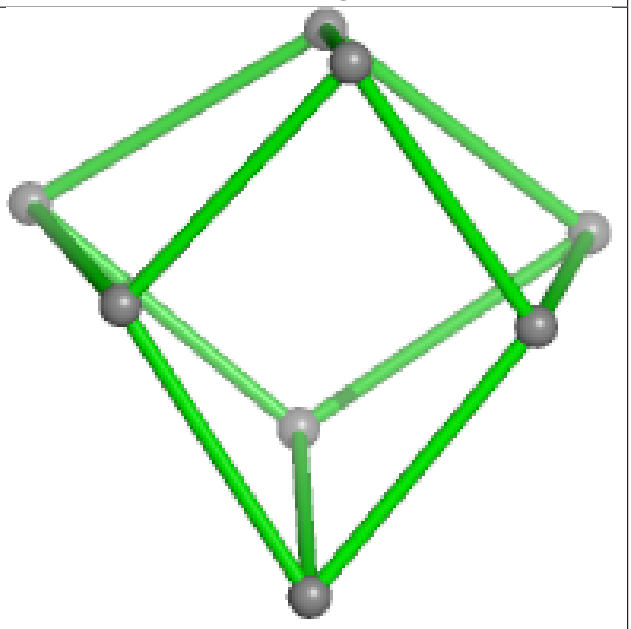
Bond lengths



Bond angles

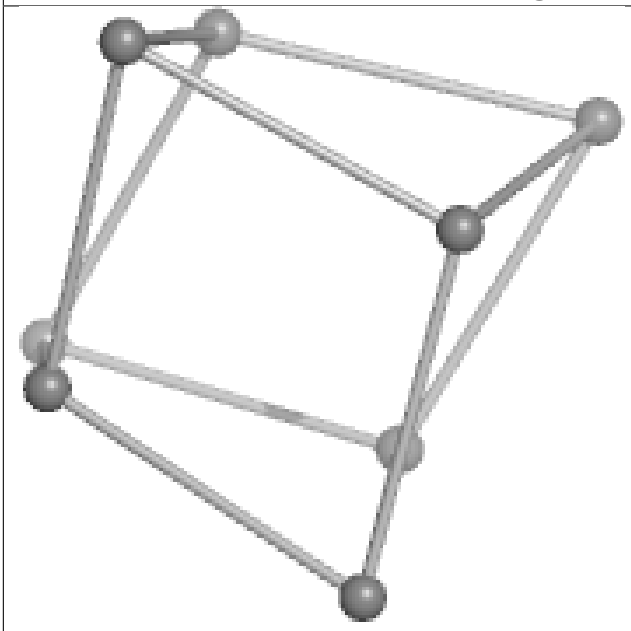


Torsions

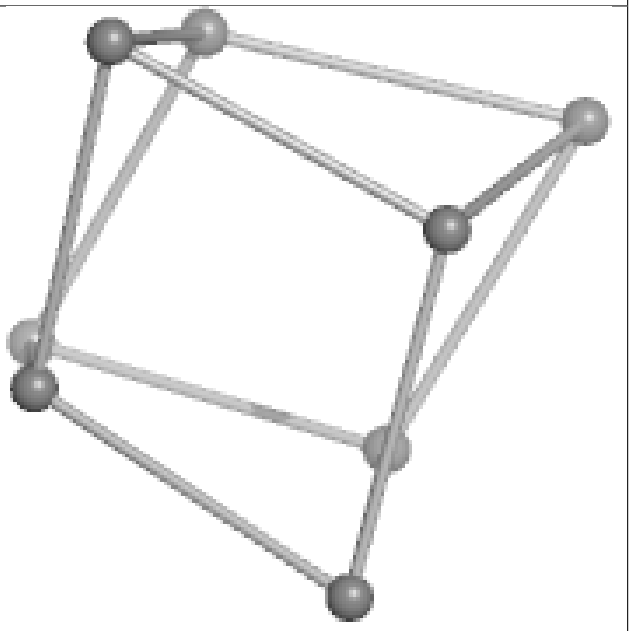


Rings

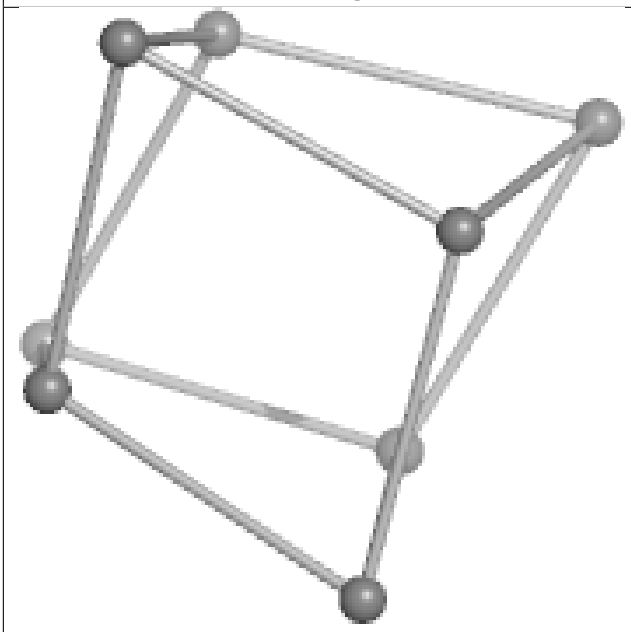
Ligand SF4 D 501



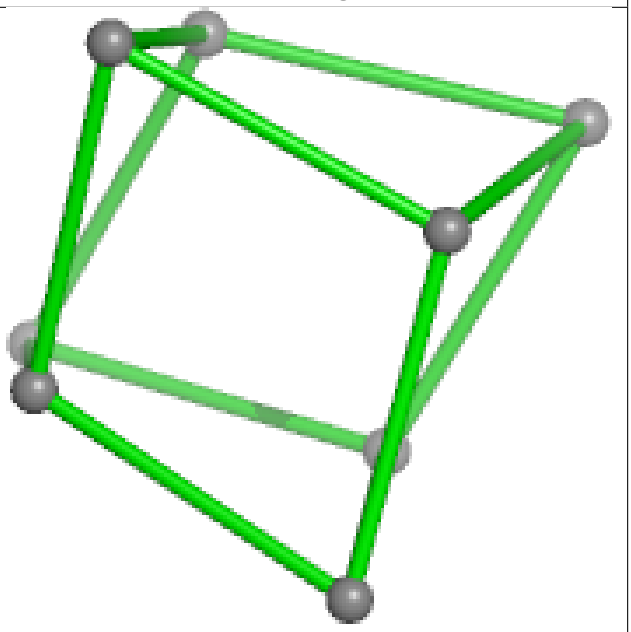
Bond lengths



Bond angles

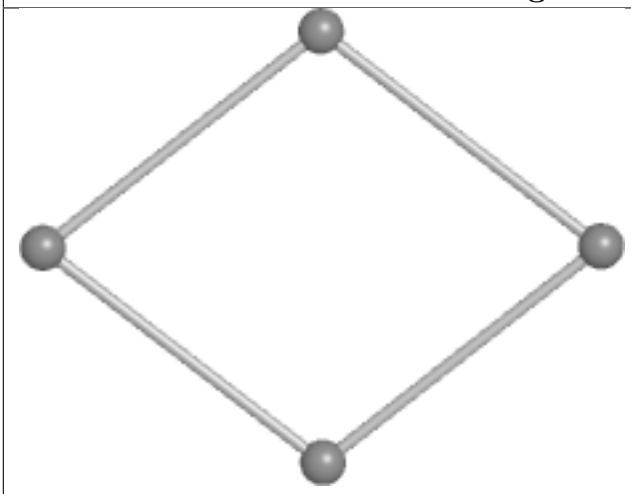


Torsions

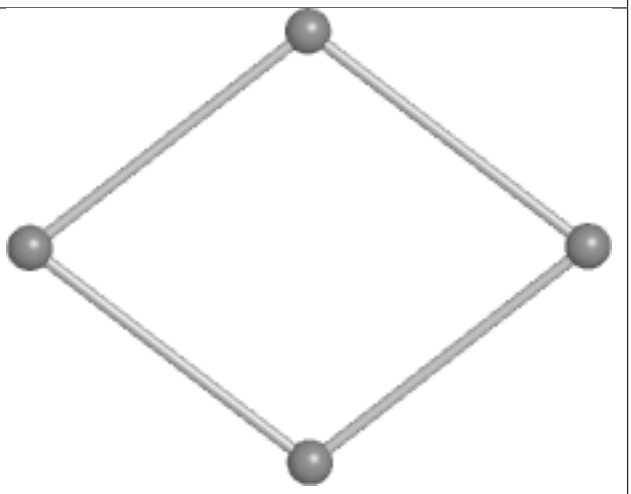


Rings

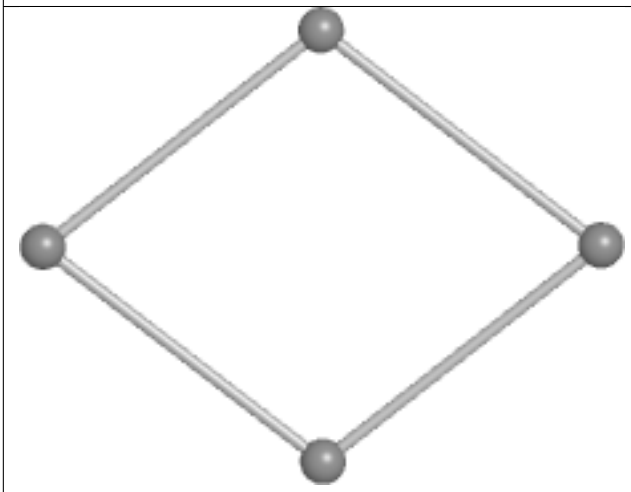
Ligand FES A 201



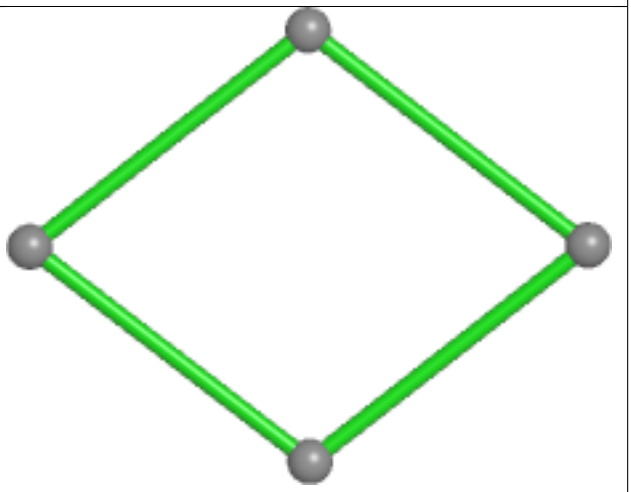
Bond lengths



Bond angles

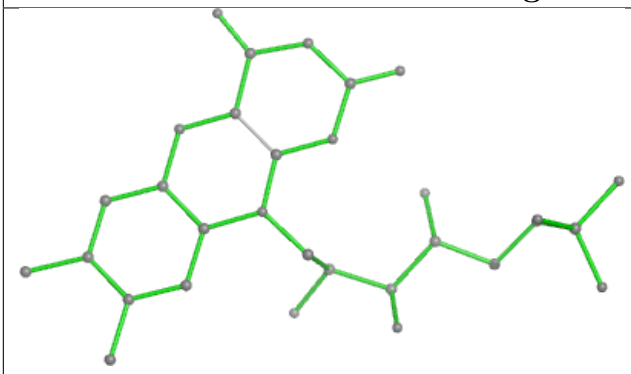


Torsions

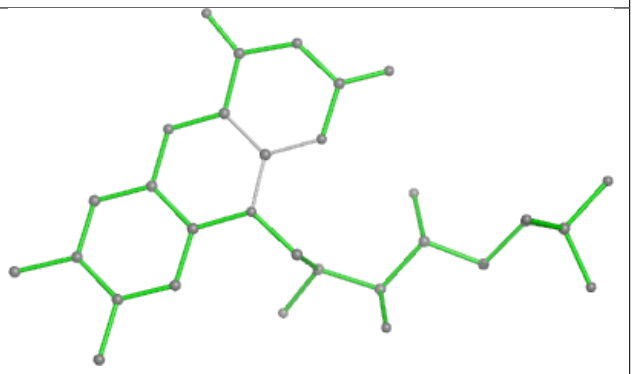


Rings

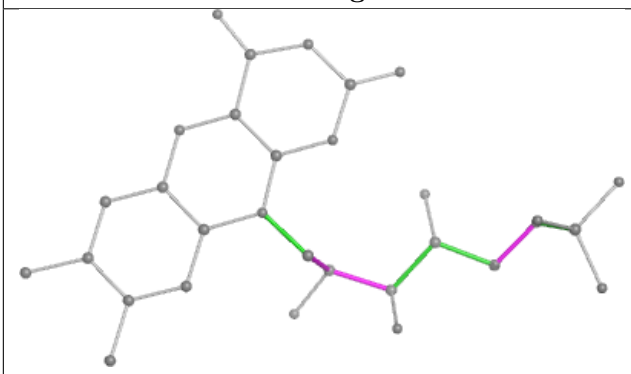
Ligand FNR B 502



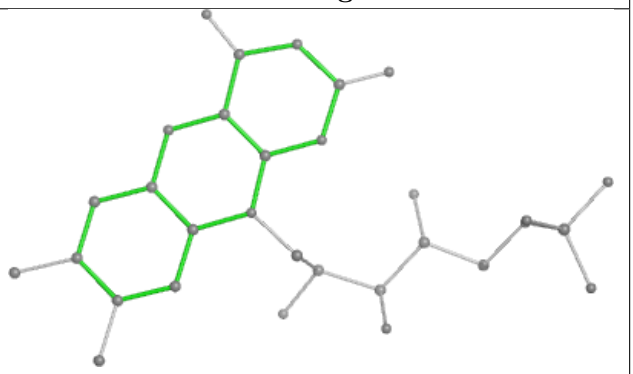
Bond lengths



Bond angles

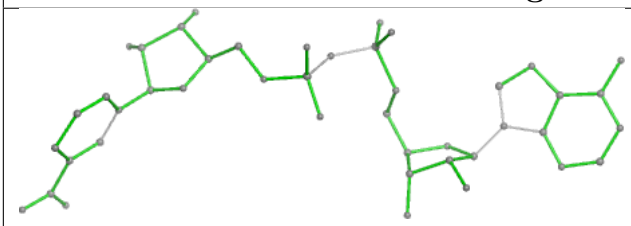


Torsions

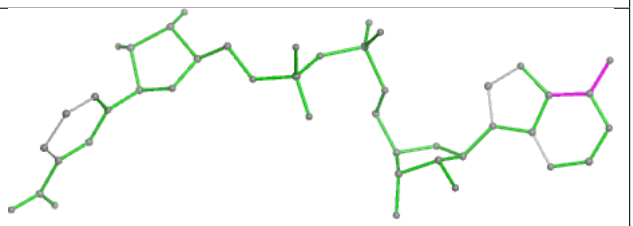


Rings

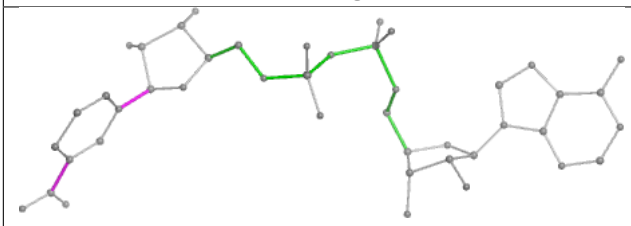
Ligand NAI D 503



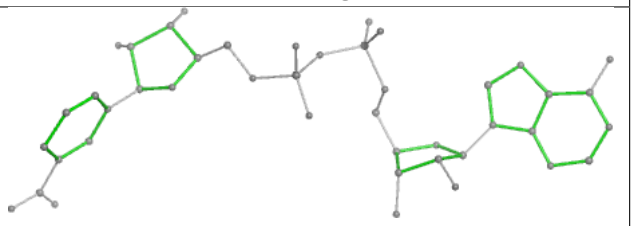
Bond lengths



Bond angles

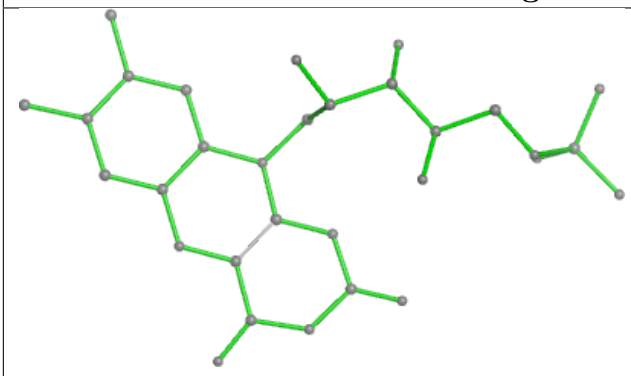


Torsions

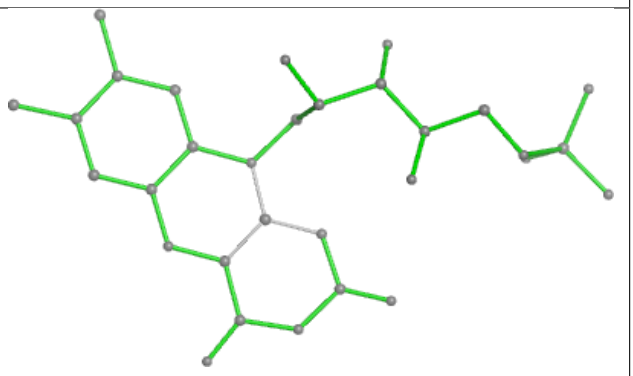


Rings

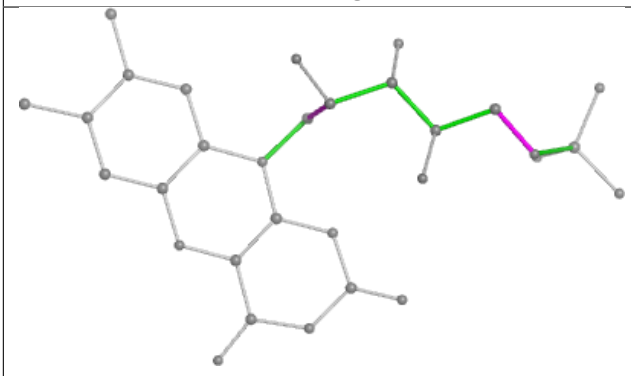
Ligand FNR D 502



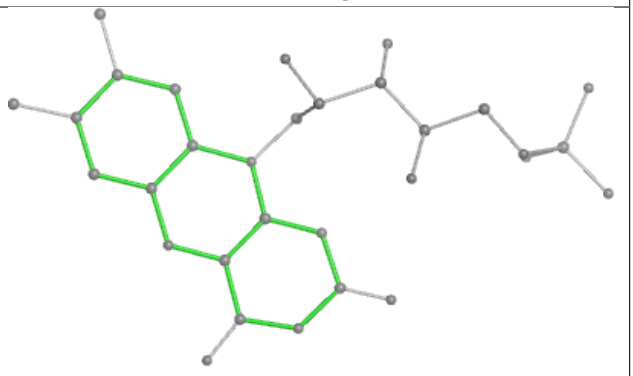
Bond lengths



Bond angles

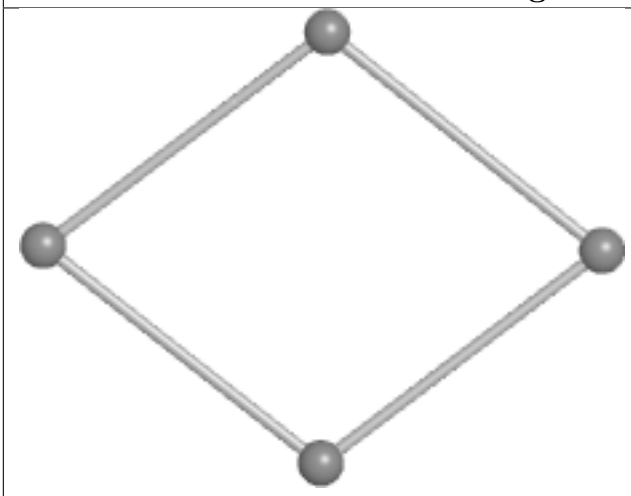


Torsions

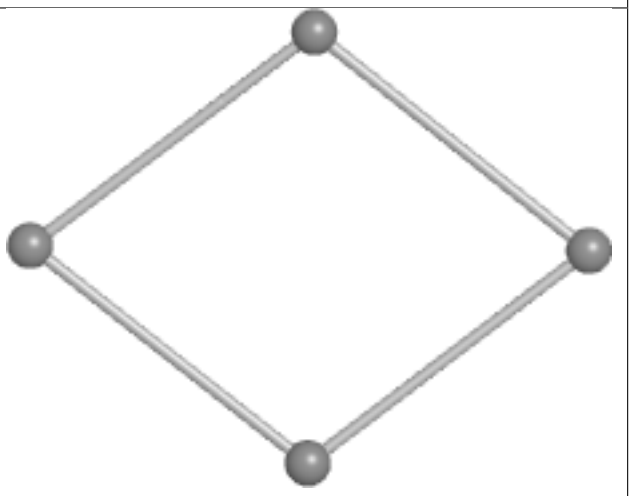


Rings

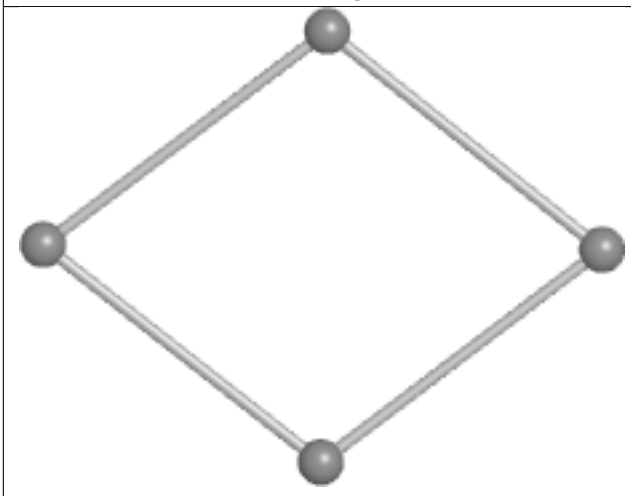
Ligand FES C 201



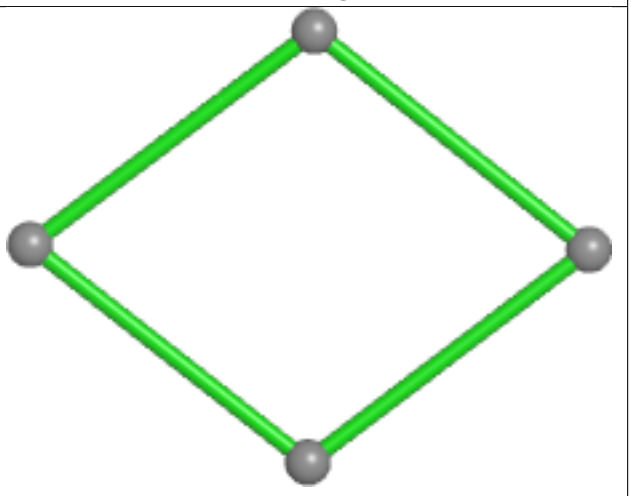
Bond lengths



Bond angles



Torsions



Rings

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, 95^{th} percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å^2)	Q<0.9
1	A	156/160 (97%)	0.22	11 (7%) 16 19	17, 32, 50, 83	0
1	C	156/160 (97%)	0.13	8 (5%) 28 32	16, 29, 50, 79	0
2	B	418/434 (96%)	-0.19	4 (0%) 82 84	14, 23, 39, 65	0
2	D	418/434 (96%)	-0.30	3 (0%) 87 89	13, 22, 35, 68	0
All	All	1148/1188 (96%)	-0.13	26 (2%) 60 64	13, 24, 43, 83	0

The worst 5 of 26 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	5	GLU	5.0
1	A	6	PHE	4.8
1	C	6	PHE	4.7
1	C	5	GLU	3.9
1	C	8	PHE	3.3

6.2 Non-standard residues in protein, DNA, RNA chains

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates

There are no monosaccharides in this entry.

6.4 Ligands

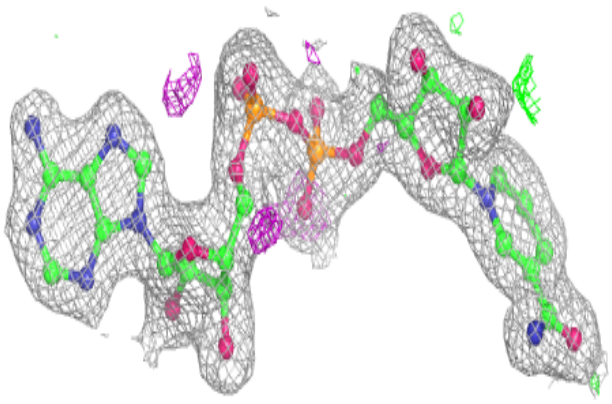
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

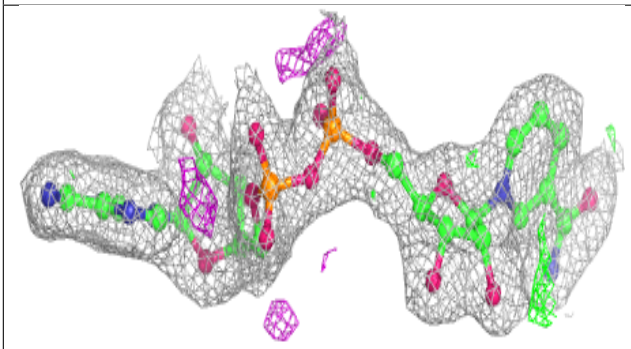
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
5	NA	A	204	1/1	0.73	0.23	52,52,52,52	0
9	GOL	B	504	6/6	0.76	0.27	47,51,54,55	0
5	NA	D	509	1/1	0.82	0.23	54,54,54,54	0
9	GOL	D	504	6/6	0.86	0.18	43,50,51,54	0
5	NA	D	511	1/1	0.87	0.35	55,55,55,55	0
9	GOL	D	505	6/6	0.87	0.20	23,28,34,41	0
4	SO4	A	202	5/5	0.88	0.25	51,58,66,67	0
9	GOL	B	505	6/6	0.88	0.19	27,35,39,42	0
5	NA	D	510	1/1	0.89	0.52	55,55,55,55	0
5	NA	B	507	1/1	0.91	0.33	43,43,43,43	0
5	NA	B	508	1/1	0.92	0.22	55,55,55,55	0
4	SO4	C	203	5/5	0.92	0.27	55,61,75,75	0
4	SO4	C	202	5/5	0.93	0.20	57,57,60,63	0
5	NA	D	507	1/1	0.93	0.32	45,45,45,45	0
4	SO4	A	203	5/5	0.93	0.27	56,56,63,64	0
5	NA	D	508	1/1	0.97	0.25	37,37,37,37	0
8	NAI	D	503	44/44	0.98	0.10	17,20,22,24	0
5	NA	D	506	1/1	0.98	0.07	28,28,28,28	0
7	FNR	B	502	31/31	0.98	0.09	14,16,17,18	0
7	FNR	D	502	31/31	0.98	0.11	15,17,17,18	0
8	NAI	B	503	44/44	0.98	0.09	19,23,26,28	0
3	FES	C	201	4/4	0.99	0.07	16,17,18,18	0
5	NA	B	506	1/1	0.99	0.07	26,26,26,26	0
6	SF4	D	501	8/8	1.00	0.07	16,17,18,18	0
3	FES	A	201	4/4	1.00	0.08	17,17,17,18	0
6	SF4	B	501	8/8	1.00	0.06	17,18,19,19	0

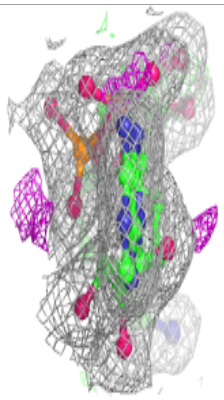
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around NAI D 503:

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

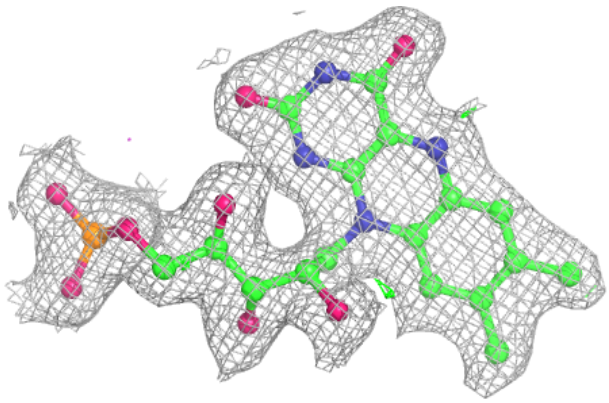


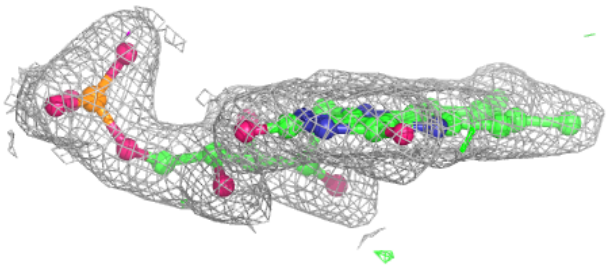


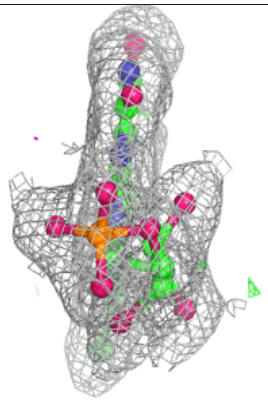


Electron density around FNR B 502:

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

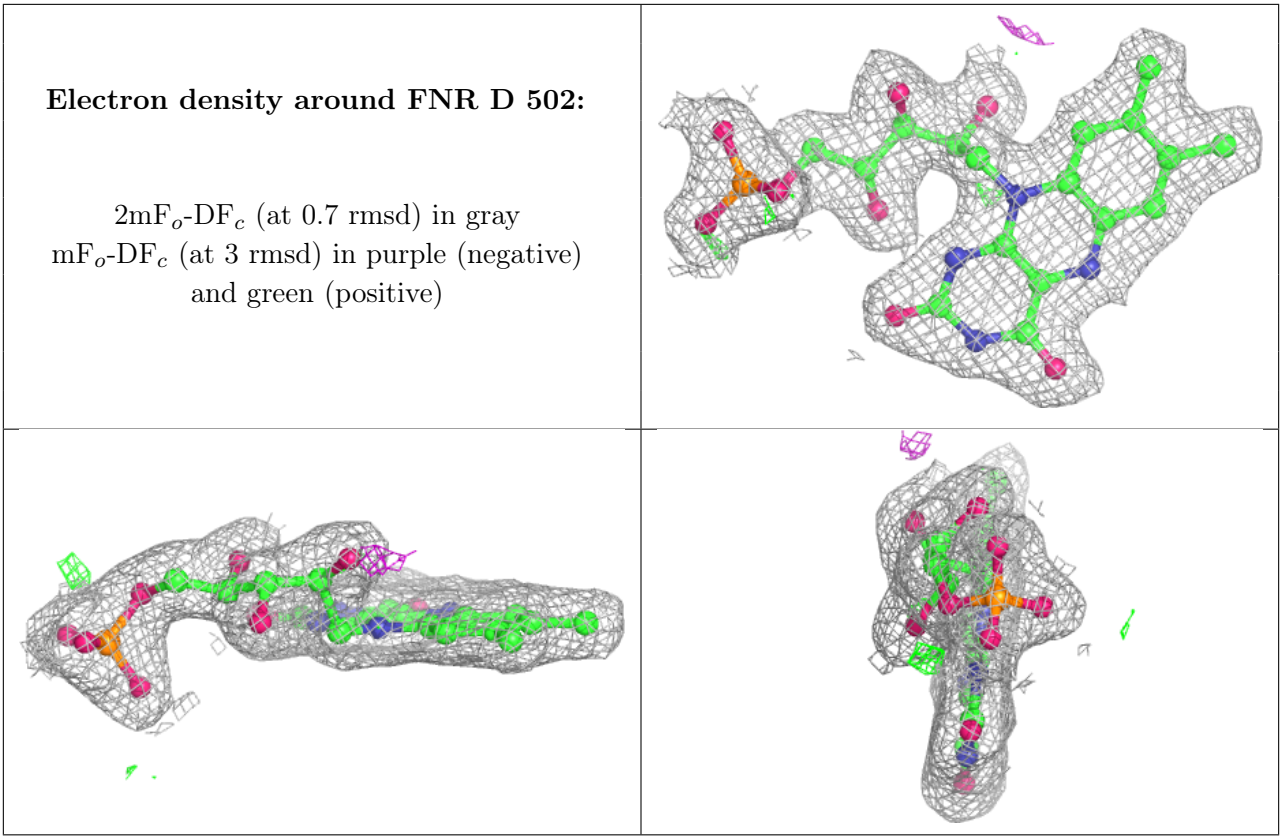






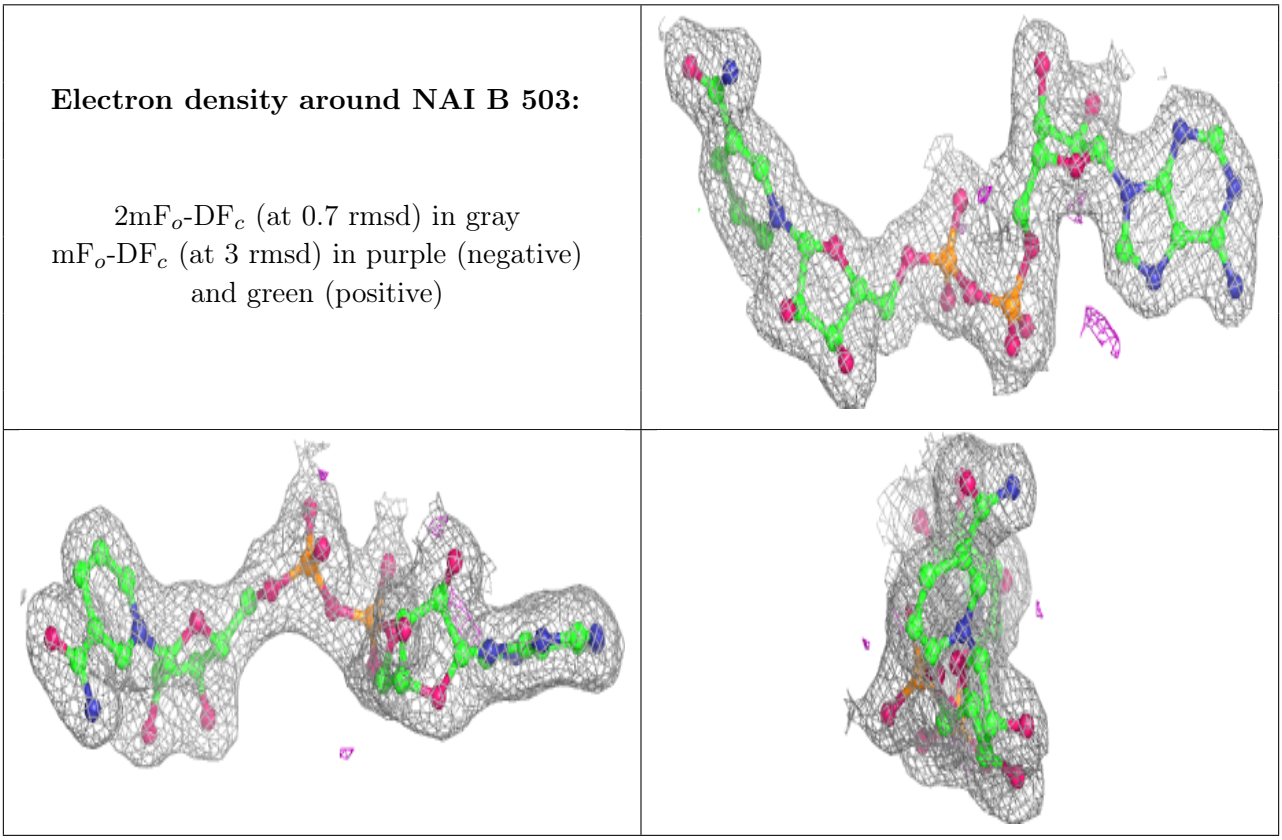
Electron density around FNR D 502:

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



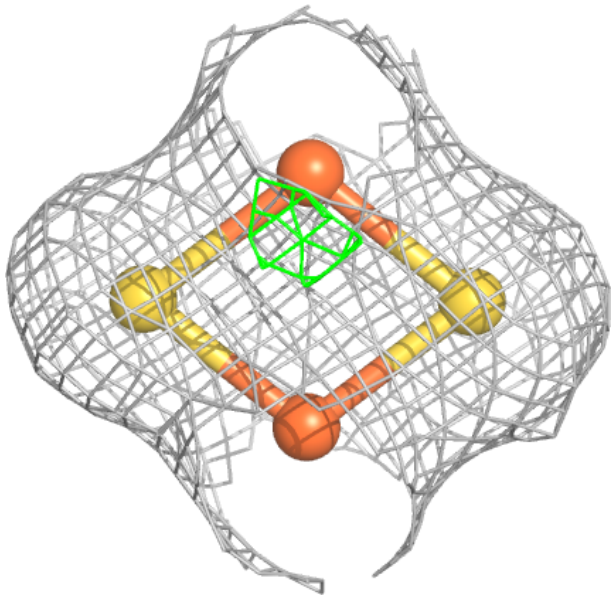
Electron density around NAI B 503:

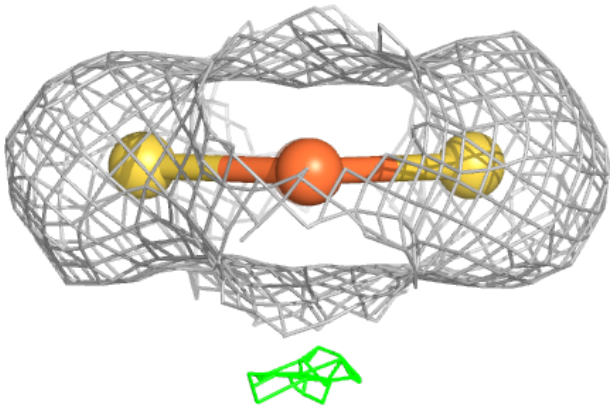
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

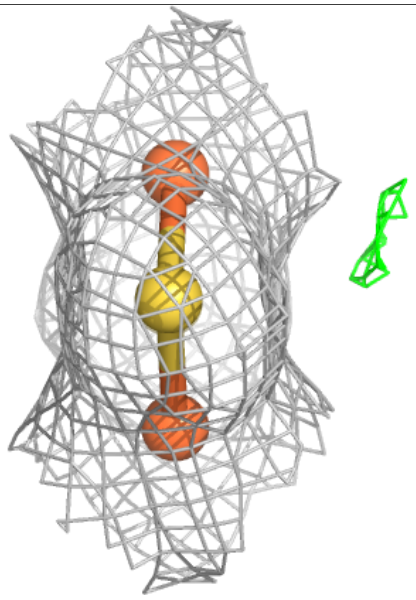


Electron density around FES C 201:

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

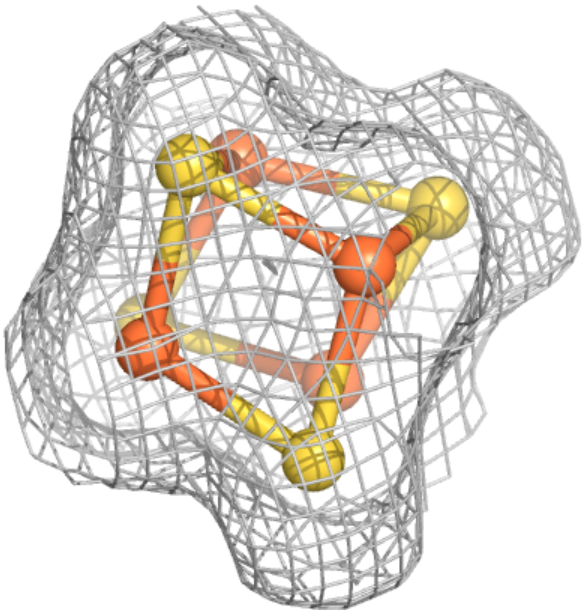


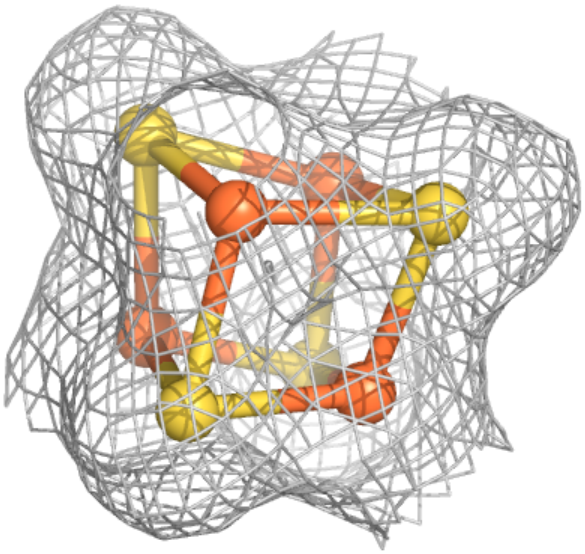


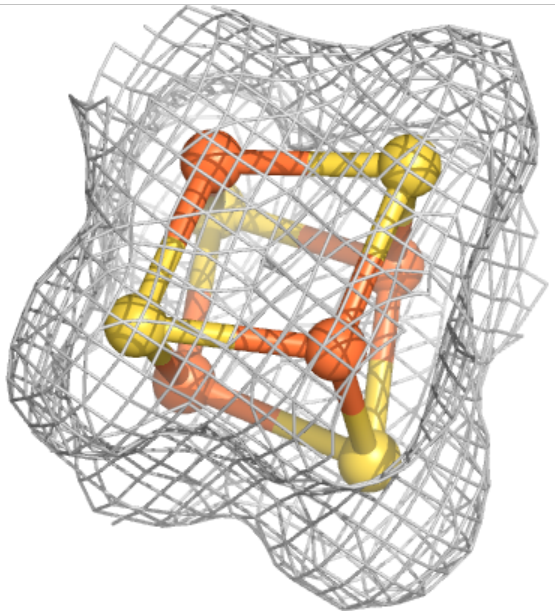


Electron density around SF4 D 501:

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

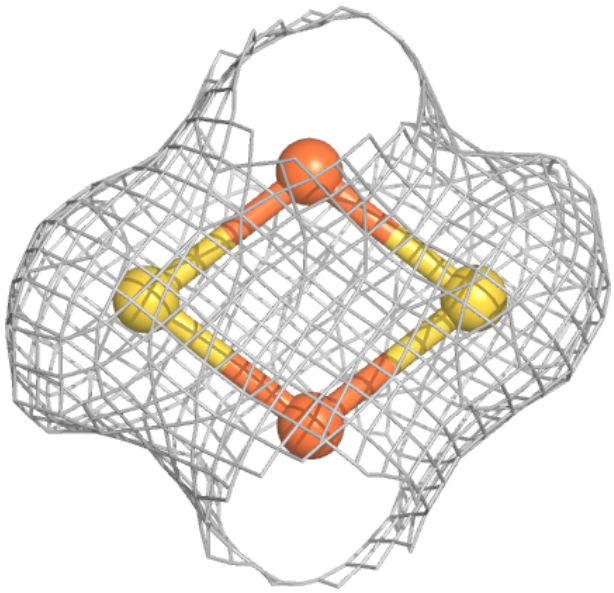


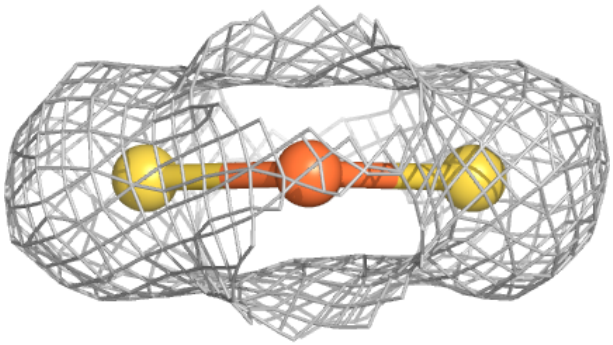


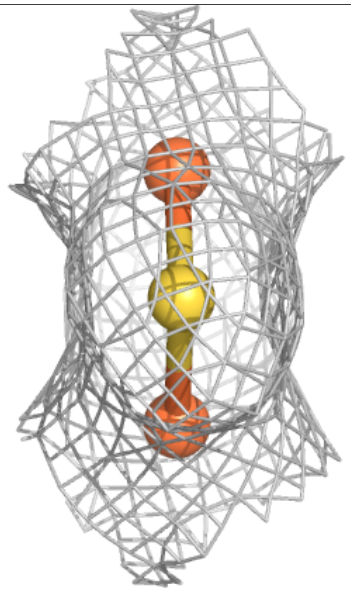


Electron density around FES A 201:

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

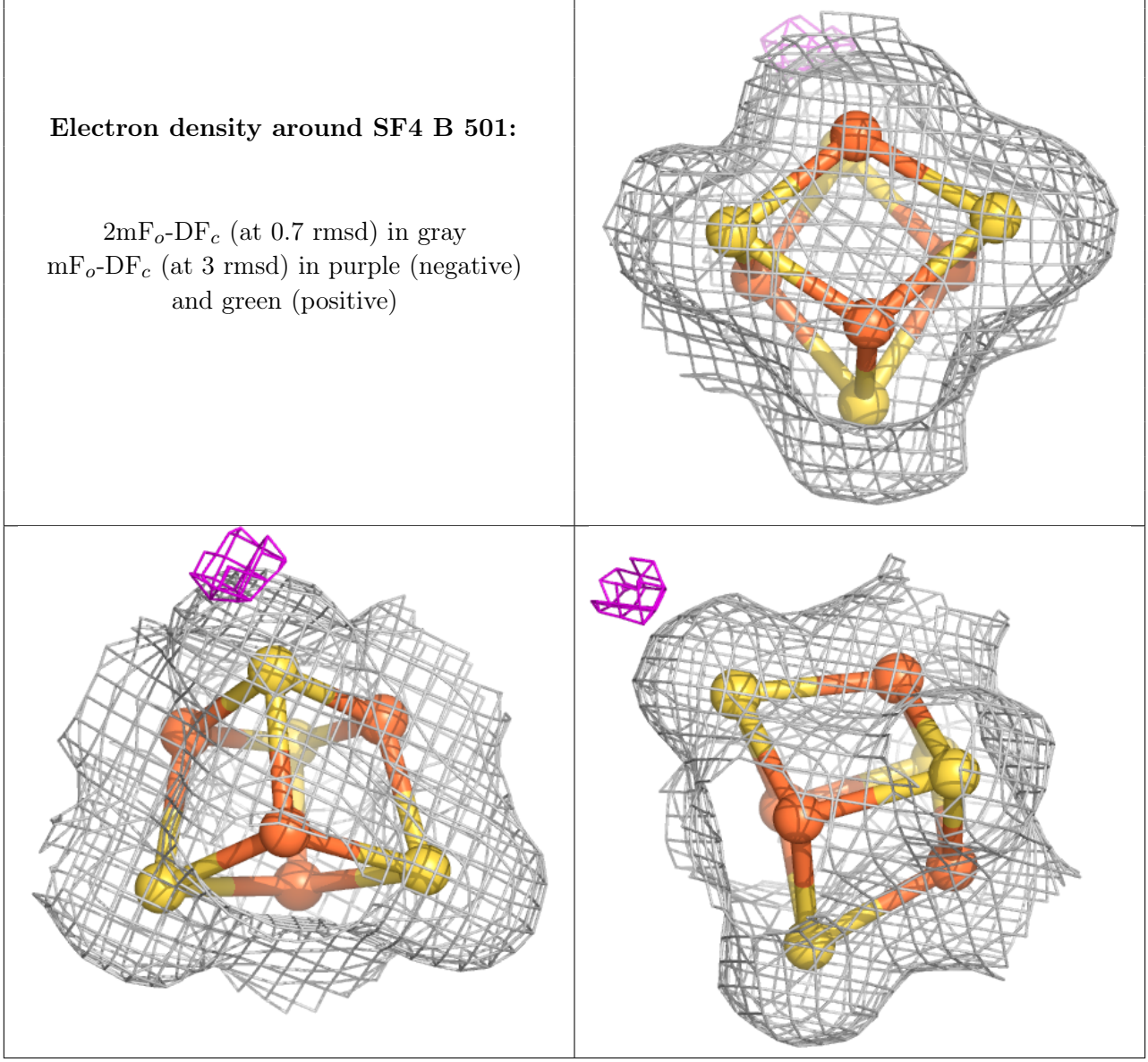






Electron density around SF4 B 501:

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



6.5 Other polymers

There are no such residues in this entry.