Full wwPDB X-ray Structure Validation Report ⓘ

Sep 26, 2023 – 05:19 AM EDT

PDB ID	:	6ASP
Title	:	Structure of Grp94 with methyl 3-chloro-2-(2-(1-(2-ethoxybenzyl)-1 H-imidazol-2-yl)ethyl)-4,6-dihydroxybenzoate, a Grp94-selective inhibitor and promising therapeutic lead for treating myocilin-associated glaucoma
Authors	:	Huard, D.J.E.; Lieberman, R.L.
Deposited on	:	2017-08-25
Resolution	:	2.70 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:

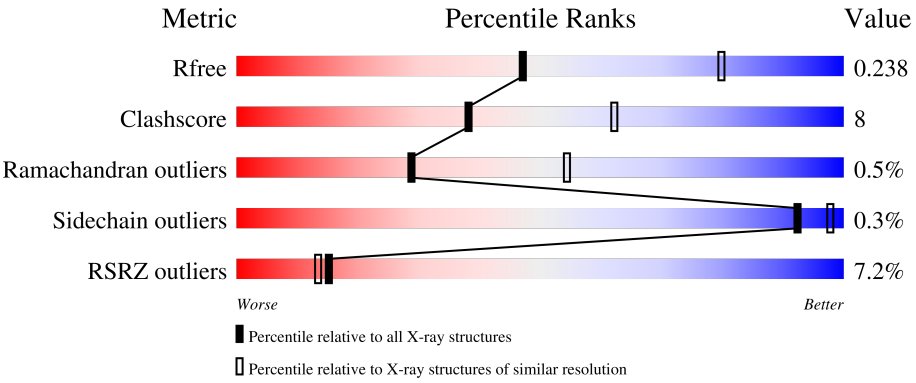
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

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 2.70 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	2808 (2.70-2.70)
Clashscore	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)
RSRZ outliers	127900	2737 (2.70-2.70)

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	233	6% 80% 11% • 8%
1	B	233	8% 78% 15% 7%

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 3579 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.

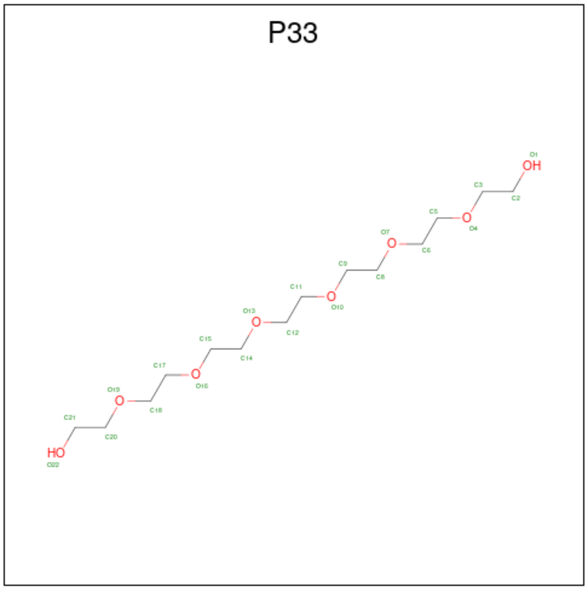
- Molecule 1 is a protein called Endoplasmin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	215	Total	C	N	O	S	0	0	0
			1676	1067	278	325	6			
1	B	217	Total	C	N	O	S	0	0	0
			1702	1083	281	332	6			

There are 10 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	68	SER	-	expression tag	UNP P41148
A	324	GLY	-	linker	UNP P41148
A	325	GLY	-	linker	UNP P41148
A	326	GLY	-	linker	UNP P41148
A	327	GLY	-	linker	UNP P41148
B	68	SER	-	expression tag	UNP P41148
B	324	GLY	-	linker	UNP P41148
B	325	GLY	-	linker	UNP P41148
B	326	GLY	-	linker	UNP P41148
B	327	GLY	-	linker	UNP P41148

- Molecule 2 is 3,6,9,12,15,18-HEXAOXAICOSANE-1,20-DIOL (three-letter code: P33) (formula: $C_{14}H_{30}O_8$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 22 14 8	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 10 6 4	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	A	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0

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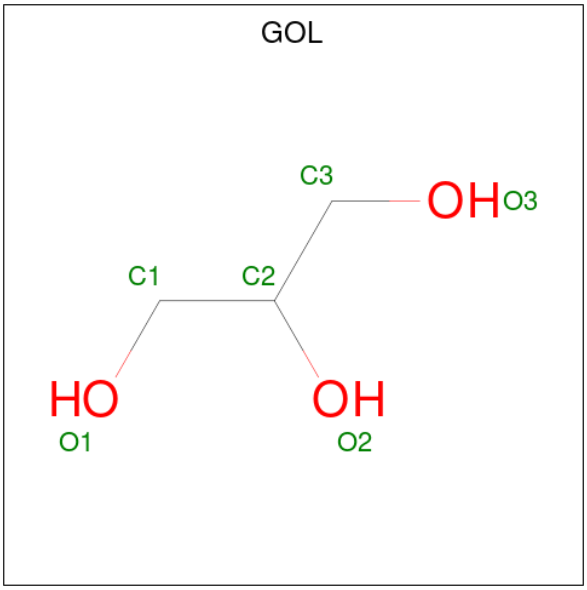
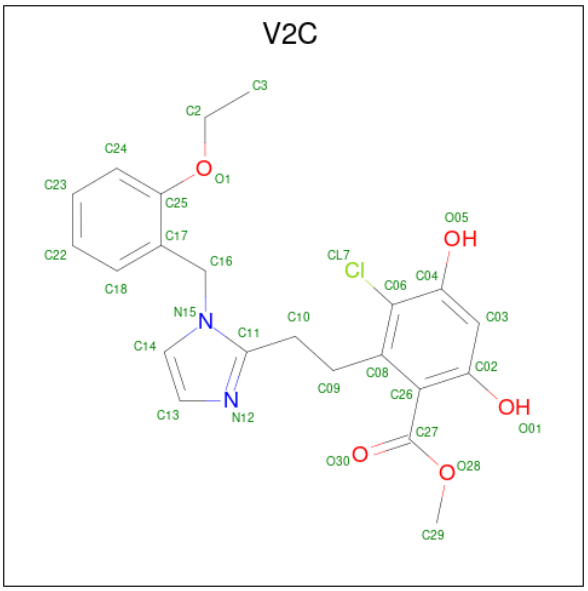
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	B	1	Total C O 10 6 4	0	0
2	B	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0

- Molecule 3 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

- Molecule 4 is methyl 3-chloro-2-(2-(1-(2-ethoxybenzyl)-1 H-imidazol-2-yl)ethyl)-4,6-dihydro xybenzoate (three-letter code: V2C) (formula: $C_{22}H_{23}ClN_2O_5$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	Cl	N	O	0	0
			27	20	1	2	4		
4	B	1	Total	C	Cl	N	O	0	0
			27	20	1	2	4		

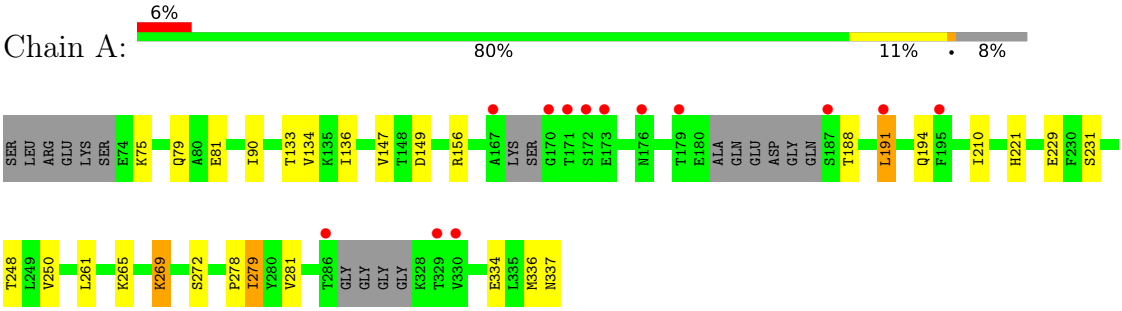
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	17	Total	O	0	0
			17	17		
5	B	20	Total	O	0	0
			20	20		

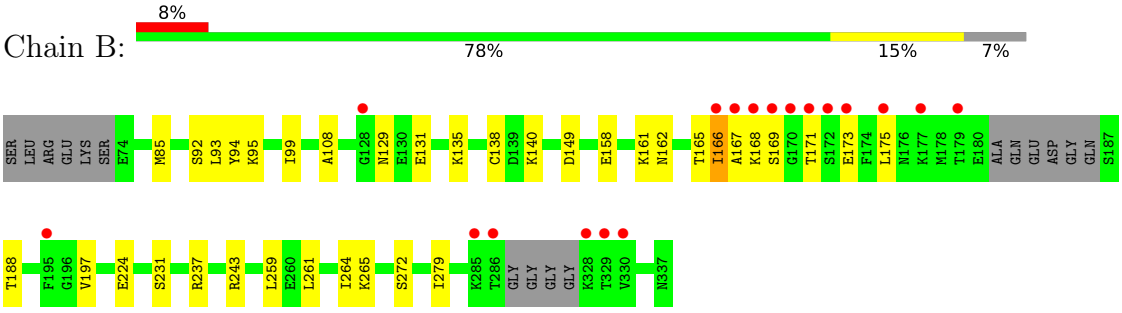
3 Residue-property plots (i)

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: Endoplasmin



- Molecule 1: Endoplasmin



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	65.66Å 84.77Å 96.01Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	38.78 – 2.70 38.78 – 2.70	Depositor EDS
% Data completeness (in resolution range)	99.4 (38.78-2.70) 99.4 (38.78-2.70)	Depositor EDS
R_{merge}	0.13	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	4.36 (at 2.69Å)	Xtriage
Refinement program	PHENIX (1.10.1_2155: ???)	Depositor
R, R_{free}	0.178 , 0.238 0.178 , 0.238	Depositor DCC
R_{free} test set	1527 reflections (10.00%)	wwPDB-VP
Wilson B-factor (Å^2)	41.8	Xtriage
Anisotropy	0.528	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 51.8	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	3579	wwPDB-VP
Average B, all atoms (Å^2)	47.0	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 41.79 % 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 2.2424e-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: V2C, GOL, P33

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	0.47	0/1700	0.71	3/2297 (0.1%)
1	B	0.50	0/1727	0.72	2/2332 (0.1%)
All	All	0.48	0/3427	0.71	5/4629 (0.1%)

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	191	LEU	CA-CB-CG	7.49	132.54	115.30
1	B	95	LYS	CA-CB-CG	6.38	127.44	113.40
1	A	269	LYS	CD-CE-NZ	-5.72	98.54	111.70
1	B	94	TYR	CD1-CE1-CZ	5.42	124.67	119.80
1	A	279	ILE	CG1-CB-CG2	-5.15	100.07	111.40

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1676	0	1652	28	0
1	B	1702	0	1685	24	0
2	A	76	0	86	2	0
2	B	22	0	24	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	A	6	0	8	0	0
3	B	6	0	8	0	0
4	A	27	0	0	2	0
4	B	27	0	0	0	0
5	A	17	0	0	0	0
5	B	20	0	0	0	0
All	All	3579	0	3463	53	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 (53) 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:279:ILE:H	1:A:337:ASN:HD21	1.03	0.99
1:A:279:ILE:N	1:A:337:ASN:HD21	1.69	0.89
1:B:166:ILE:HG23	1:B:167:ALA:H	1.47	0.80
1:B:237:ARG:HH22	2:B:402:P33:H141	1.46	0.79
1:A:134:VAL:HB	1:A:279:ILE:HG12	1.66	0.77
1:A:279:ILE:HB	1:A:337:ASN:ND2	2.00	0.77
1:A:269:LYS:HZ1	1:A:336:MET:HA	1.54	0.73
1:B:85:MET:SD	1:B:197:VAL:HG21	2.37	0.65
1:A:133:THR:HG22	1:A:278:PRO:HG2	1.83	0.59
1:A:265:LYS:NZ	1:A:334:GLU:OE1	2.36	0.58
1:B:140:LYS:HA	1:B:259:LEU:HD13	1.84	0.58
1:B:131:GLU:OE1	1:B:135:LYS:NZ	2.38	0.56
1:B:167:ALA:O	1:B:169:SER:N	2.39	0.56
1:B:161:LYS:O	1:B:165:THR:OG1	2.19	0.54
1:A:269:LYS:NZ	1:A:336:MET:O	2.26	0.53
1:A:191:LEU:HA	1:A:194:GLN:HG3	1.90	0.53
1:B:261:LEU:O	1:B:265:LYS:HG3	2.09	0.52
1:B:166:ILE:HG23	1:B:167:ALA:N	2.21	0.52
1:B:173:GLU:H	1:B:173:GLU:CD	2.10	0.52
1:B:92:SER:HB2	1:B:188:THR:HG21	1.91	0.52
1:A:265:LYS:O	1:A:269:LYS:HG2	2.10	0.51
1:A:269:LYS:NZ	1:A:336:MET:HA	2.25	0.51
1:B:171:THR:O	1:B:175:LEU:HD23	2.10	0.51
1:A:81:GLU:OE2	1:A:81:GLU:N	2.33	0.51
1:A:229:GLU:OE1	2:A:408:P33:H172	2.10	0.50
1:B:224:GLU:OE2	1:B:231:SER:OG	2.30	0.50
1:A:279:ILE:H	1:A:337:ASN:ND2	1.88	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:93:LEU:HD23	1:B:99:ILE:HG21	1.93	0.50
1:A:136:ILE:HD13	1:A:147:VAL:HG22	1.94	0.49
1:A:156:ARG:HG3	1:A:221:HIS:CD2	2.48	0.49
1:B:173:GLU:OE2	1:B:173:GLU:N	2.28	0.48
1:B:129:ASN:O	1:B:243:ARG:NH1	2.37	0.48
1:B:272:SER:HB3	1:B:279:ILE:HD12	1.95	0.48
1:A:269:LYS:HA	1:A:269:LYS:HD3	1.62	0.47
1:A:79:GLN:HG2	1:A:81:GLU:OE2	2.14	0.47
1:A:272:SER:HB2	1:A:279:ILE:HD12	1.97	0.46
1:B:166:ILE:CG2	1:B:167:ALA:H	2.22	0.46
1:A:188:THR:HA	1:A:191:LEU:HD23	1.98	0.46
1:A:90:ILE:HD13	2:A:401:P33:H62	1.98	0.45
1:B:138:CYS:SG	1:B:264:ILE:HG13	2.56	0.45
1:A:281:VAL:HG23	1:A:336:MET:HG3	1.98	0.44
1:A:269:LYS:HZ1	1:A:336:MET:CA	2.28	0.43
1:A:149:ASP:OD2	4:A:415:V2C:O01	2.37	0.42
1:A:261:LEU:O	1:A:265:LYS:HG3	2.19	0.42
1:A:269:LYS:NZ	1:A:336:MET:CA	2.82	0.42
1:B:108:ALA:HB1	1:B:149:ASP:HB3	2.02	0.42
1:B:158:GLU:O	1:B:162:ASN:HB2	2.20	0.42
1:B:237:ARG:CZ	2:B:402:P33:H111	2.51	0.41
4:A:415:V2C:C14	4:A:415:V2C:C18	2.97	0.41
1:A:210:ILE:HB	1:A:248:THR:HB	2.01	0.41
1:A:75:LYS:HD3	1:A:231:SER:HB3	2.03	0.41
1:B:272:SER:CB	1:B:279:ILE:HD12	2.51	0.41
1:B:85:MET:HE2	1:B:85:MET:HB2	1.93	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	207/233 (89%)	198 (96%)	9 (4%)	0	100 100
1	B	211/233 (91%)	198 (94%)	11 (5%)	2 (1%)	17 40
All	All	418/466 (90%)	396 (95%)	20 (5%)	2 (0%)	29 54

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	166	ILE
1	B	168	LYS

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	183/205 (89%)	182 (100%)	1 (0%)	88 96
1	B	187/205 (91%)	187 (100%)	0	100 100
All	All	370/410 (90%)	369 (100%)	1 (0%)	92 98

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	250	VAL

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

Mol	Chain	Res	Type
1	A	273	GLN
1	A	337	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)

21 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	$\#\|Z\| > 2$
2	P33	A	408	-	3,3,21	0.59	0	2,2,20	0.92	0
2	P33	A	412	-	3,3,21	0.61	0	2,2,20	0.84	0
2	P33	A	403	-	9,9,21	0.77	0	8,8,20	0.66	0
2	P33	A	410	-	3,3,21	0.58	0	2,2,20	0.92	0
4	V2C	B	406	-	28,29,32	1.22	2 (7%)	33,40,44	1.64	7 (21%)
2	P33	A	411	-	3,3,21	0.67	0	2,2,20	0.80	0
4	V2C	A	415	-	28,29,32	1.13	4 (14%)	33,40,44	1.87	8 (24%)
2	P33	A	407	-	3,3,21	0.60	0	2,2,20	0.86	0
2	P33	B	401	-	3,3,21	0.59	0	2,2,20	0.92	0
2	P33	A	404	-	3,3,21	0.76	0	2,2,20	0.56	0
2	P33	B	402	-	9,9,21	0.79	0	8,8,20	0.65	0
2	P33	A	413	-	3,3,21	0.66	0	2,2,20	0.74	0
2	P33	A	405	-	3,3,21	0.59	0	2,2,20	0.95	0
2	P33	B	404	-	3,3,21	0.63	0	2,2,20	0.73	0
2	P33	A	401	-	21,21,21	0.76	0	20,20,20	0.65	0
2	P33	A	409	-	3,3,21	0.69	0	2,2,20	0.77	0
2	P33	A	406	-	3,3,21	0.59	0	2,2,20	0.86	0
3	GOL	A	414	-	5,5,5	0.82	0	5,5,5	0.92	0
2	P33	A	402	-	3,3,21	0.70	0	2,2,20	0.81	0
2	P33	B	403	-	3,3,21	0.73	0	2,2,20	0.70	0
3	GOL	B	405	-	5,5,5	1.27	0	5,5,5	0.60	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
2	P33	A	408	-	-	1/1/1/19	-
2	P33	A	412	-	-	1/1/1/19	-
2	P33	A	403	-	-	4/7/7/19	-
2	P33	A	410	-	-	1/1/1/19	-
4	V2C	B	406	-	-	3/15/15/18	0/3/3/3
2	P33	A	411	-	-	0/1/1/19	-
4	V2C	A	415	-	-	8/15/15/18	0/3/3/3
2	P33	A	407	-	-	1/1/1/19	-
2	P33	B	401	-	-	1/1/1/19	-
2	P33	A	404	-	-	1/1/1/19	-
2	P33	B	402	-	-	4/7/7/19	-
2	P33	A	413	-	-	1/1/1/19	-
2	P33	A	405	-	-	0/1/1/19	-
2	P33	B	404	-	-	0/1/1/19	-
2	P33	A	401	-	-	11/19/19/19	-
2	P33	A	409	-	-	1/1/1/19	-
2	P33	A	406	-	-	0/1/1/19	-
3	GOL	A	414	-	-	3/4/4/4	-
2	P33	A	402	-	-	1/1/1/19	-
2	P33	B	403	-	-	1/1/1/19	-
3	GOL	B	405	-	-	4/4/4/4	-

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	406	V2C	C04-C06	-2.83	1.36	1.40
4	A	415	V2C	C11-N12	2.23	1.39	1.34
4	A	415	V2C	C14-N15	2.19	1.42	1.38
4	A	415	V2C	C18-C17	2.09	1.43	1.38
4	B	406	V2C	O28-C29	-2.07	1.40	1.45
4	A	415	V2C	O28-C29	-2.00	1.40	1.45

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	B	406	V2C	C04-C03-C02	-4.31	115.84	120.14
4	A	415	V2C	O28-C27-C26	4.28	122.55	112.27

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	B	406	V2C	C29-O28-C27	4.20	123.93	115.83
4	A	415	V2C	C04-C03-C02	-4.05	116.11	120.14
4	A	415	V2C	C17-C16-N15	3.69	117.95	112.40
4	A	415	V2C	O01-C02-C26	-3.27	115.01	121.14
4	A	415	V2C	O28-C27-O30	-3.22	117.15	123.45
4	A	415	V2C	C03-C02-C26	2.90	124.31	120.93
4	B	406	V2C	O01-C02-C26	-2.82	115.86	121.14
4	A	415	V2C	C10-C11-N12	2.70	128.09	124.22
4	B	406	V2C	C03-C02-C26	2.64	124.00	120.93
4	A	415	V2C	O05-C04-C06	2.37	124.63	117.98
4	B	406	V2C	O28-C27-O30	-2.36	118.83	123.45
4	B	406	V2C	O28-C27-C26	2.26	117.70	112.27
4	B	406	V2C	C03-C04-C06	2.19	121.10	119.20

There are no chirality outliers.

All (47) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	405	GOL	O1-C1-C2-O2
3	B	405	GOL	O1-C1-C2-C3
3	B	405	GOL	C1-C2-C3-O3
4	A	415	V2C	C26-C27-O28-C29
4	B	406	V2C	C26-C27-O28-C29
2	A	401	P33	O19-C20-C21-O22
4	A	415	V2C	O30-C27-O28-C29
2	A	403	P33	O10-C11-C12-O13
2	B	402	P33	O13-C14-C15-O16
2	A	401	P33	O16-C17-C18-O19
3	B	405	GOL	O2-C2-C3-O3
2	A	401	P33	O1-C2-C3-O4
4	B	406	V2C	O30-C27-O28-C29
2	A	401	P33	O7-C8-C9-O10
2	A	403	P33	O7-C8-C9-O10
3	A	414	GOL	C1-C2-C3-O3
2	A	407	P33	O16-C17-C18-O19
2	B	401	P33	O16-C17-C18-O19
2	B	403	P33	O16-C17-C18-O19
2	A	401	P33	O4-C5-C6-O7
2	A	409	P33	O16-C17-C18-O19
2	A	408	P33	O16-C17-C18-O19
2	A	413	P33	O16-C17-C18-O19
4	A	415	V2C	C09-C10-C11-N12

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Mol	Chain	Res	Type	Atoms
2	A	401	P33	C17-C18-O19-C20
2	A	403	P33	C12-C11-O10-C9
4	A	415	V2C	C17-C16-N15-C11
4	A	415	V2C	N15-C16-C17-C18
2	A	401	P33	C14-C15-O16-C17
4	A	415	V2C	N15-C16-C17-C25
2	B	402	P33	C18-C17-O16-C15
2	A	401	P33	C12-C11-O10-C9
4	A	415	V2C	C02-C26-C27-O30
2	A	403	P33	C11-C12-O13-C14
2	A	404	P33	O16-C17-C18-O19
2	A	401	P33	C18-C17-O16-C15
4	A	415	V2C	C02-C26-C27-O28
3	A	414	GOL	O2-C2-C3-O3
2	A	401	P33	C8-C9-O10-C11
2	A	402	P33	O16-C17-C18-O19
2	A	401	P33	C15-C14-O13-C12
2	A	410	P33	O16-C17-C18-O19
2	A	412	P33	O16-C17-C18-O19
3	A	414	GOL	O1-C1-C2-C3
2	B	402	P33	O16-C17-C18-O19
4	B	406	V2C	C02-C26-C27-O30
2	B	402	P33	C11-C12-O13-C14

There are no ring outliers.

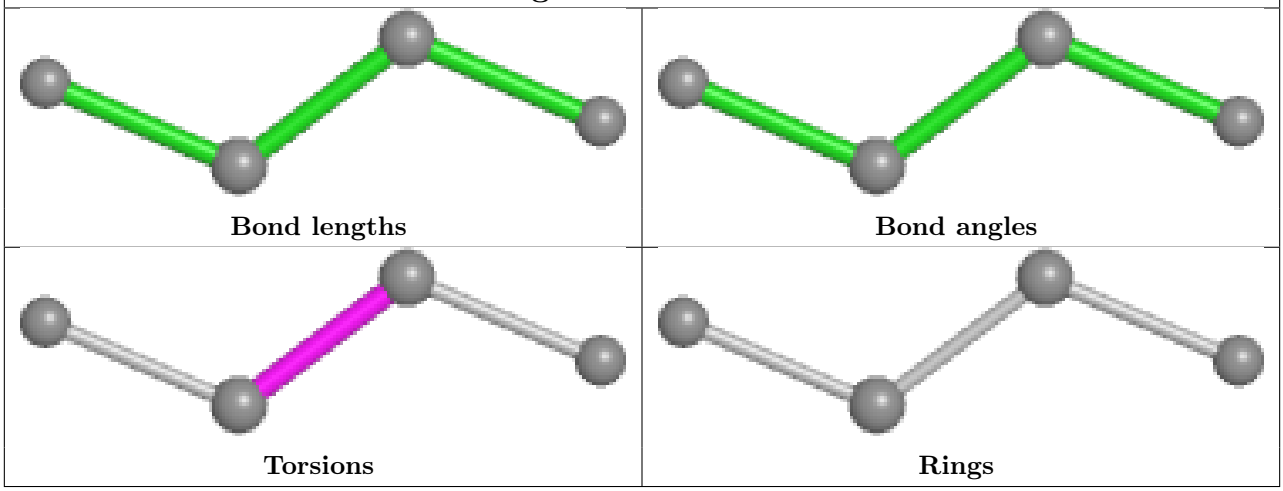
4 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	408	P33	1	0
4	A	415	V2C	2	0
2	B	402	P33	2	0
2	A	401	P33	1	0

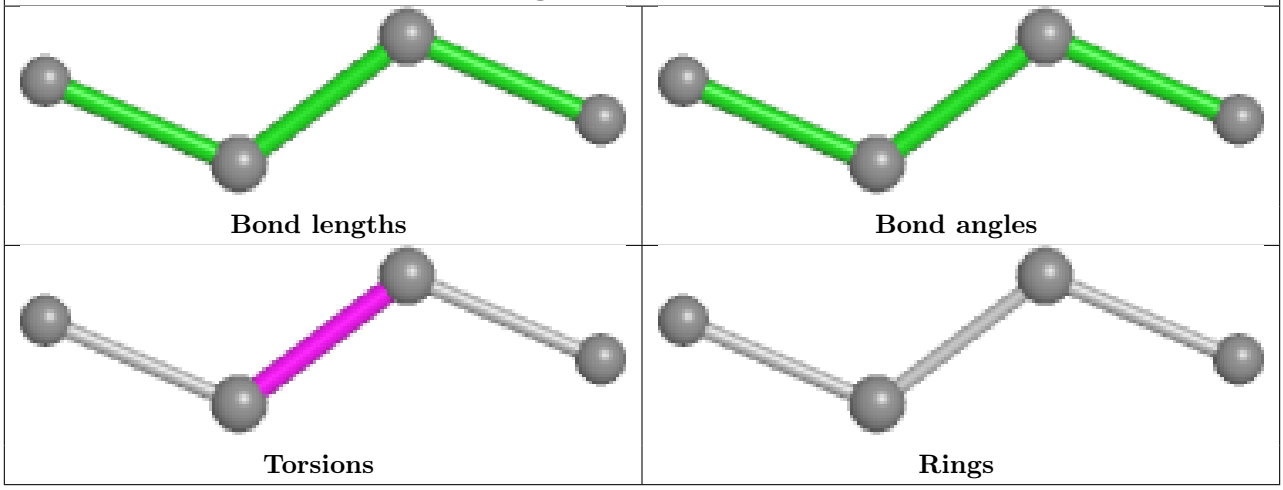
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

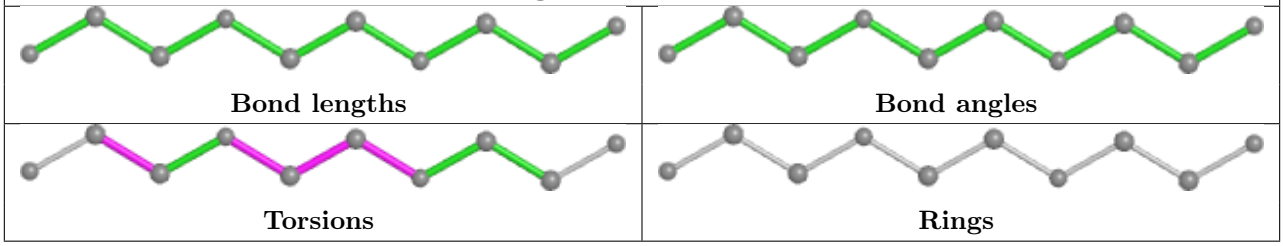
Ligand P33 A 408



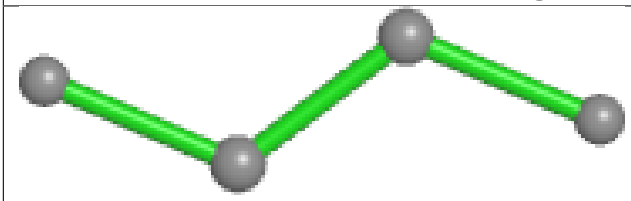
Ligand P33 A 412



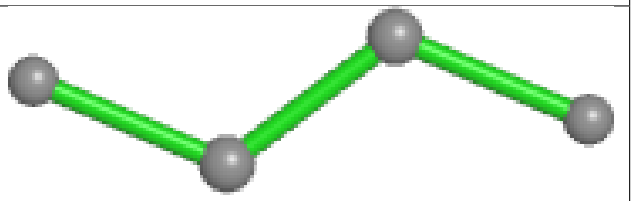
Ligand P33 A 403



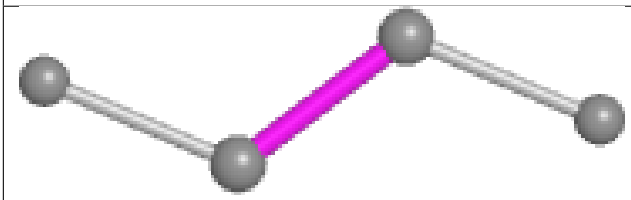
Ligand P33 A 410



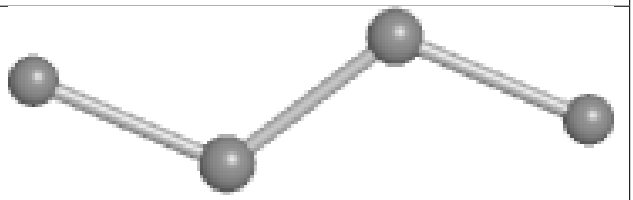
Bond lengths



Bond angles

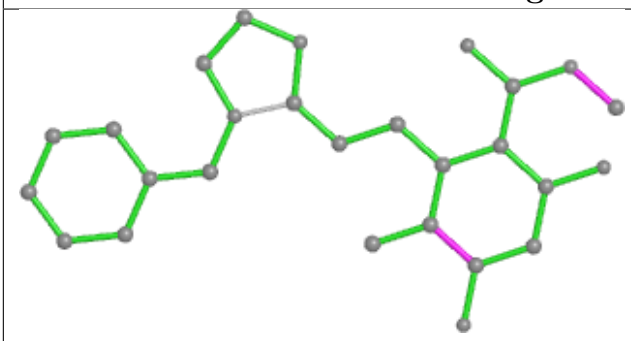


Torsions

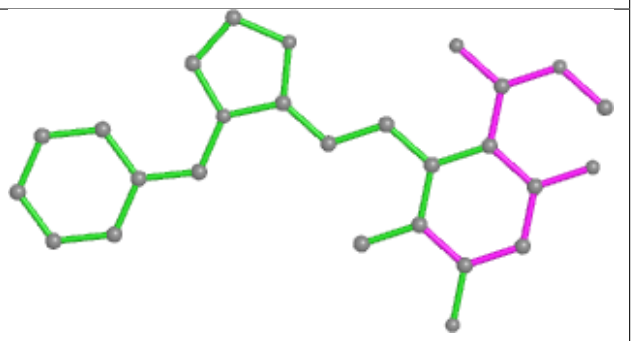


Rings

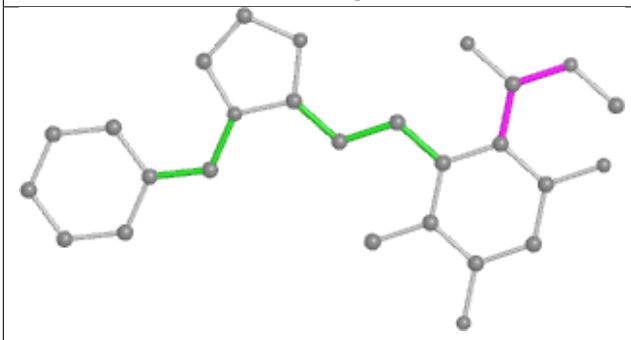
Ligand V2C B 406



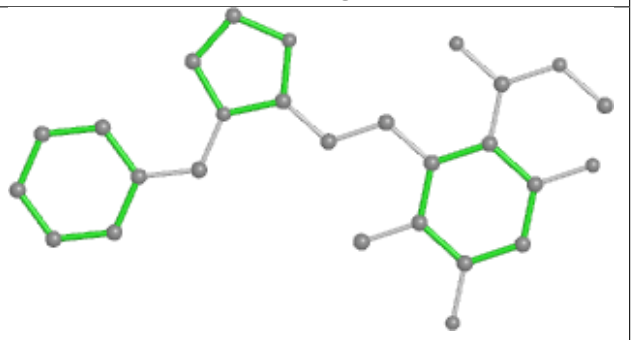
Bond lengths



Bond angles

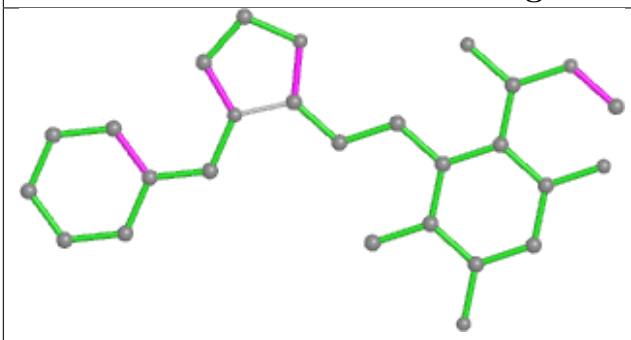


Torsions

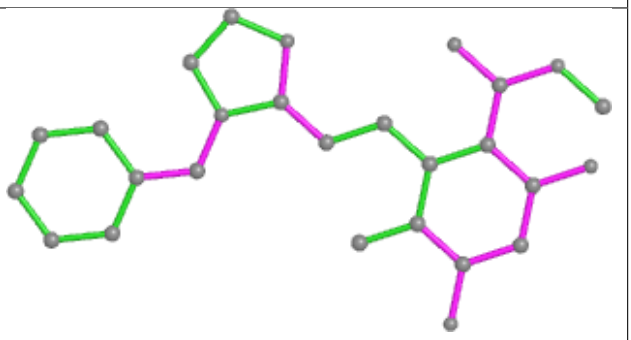


Rings

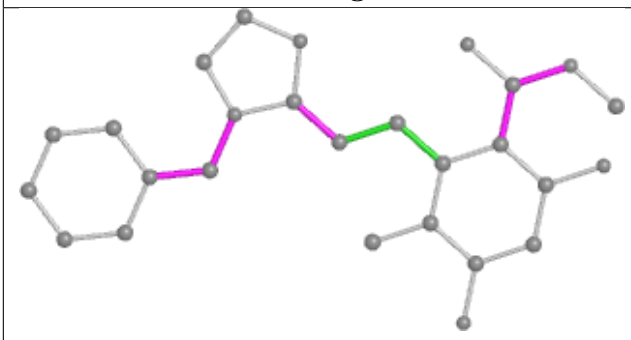
Ligand V2C A 415



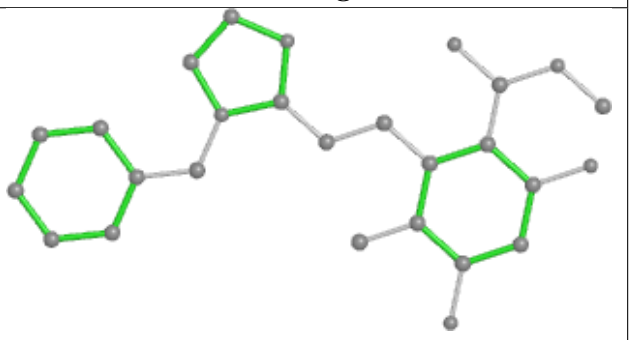
Bond lengths



Bond angles

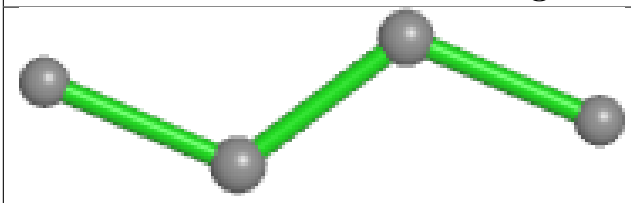


Torsions

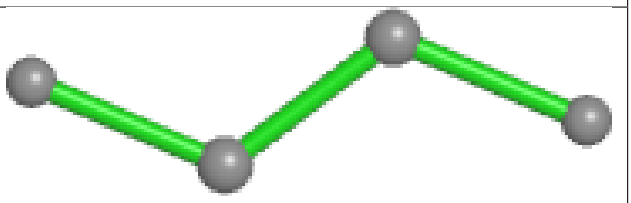


Rings

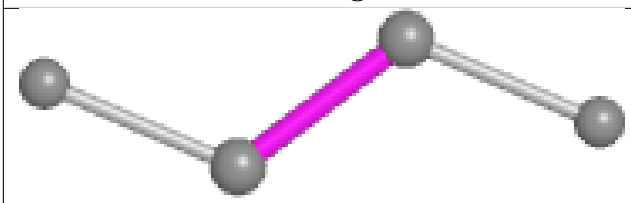
Ligand P33 A 407



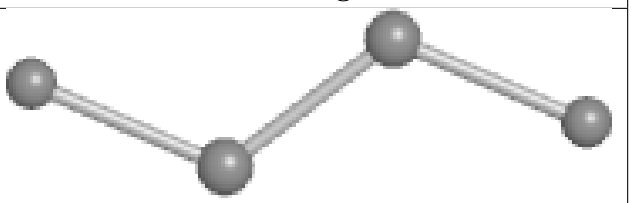
Bond lengths



Bond angles

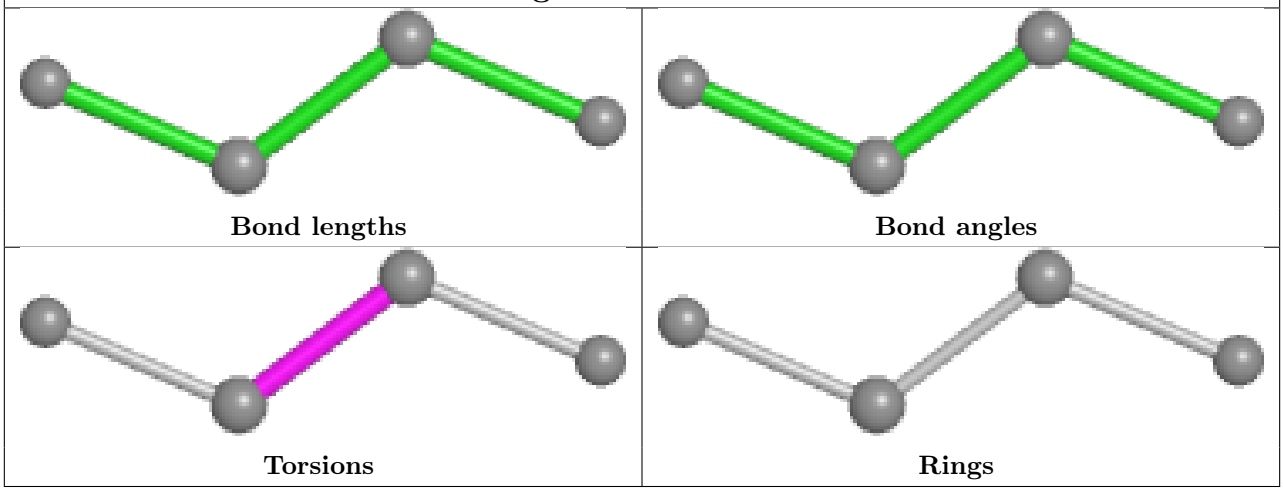


Torsions

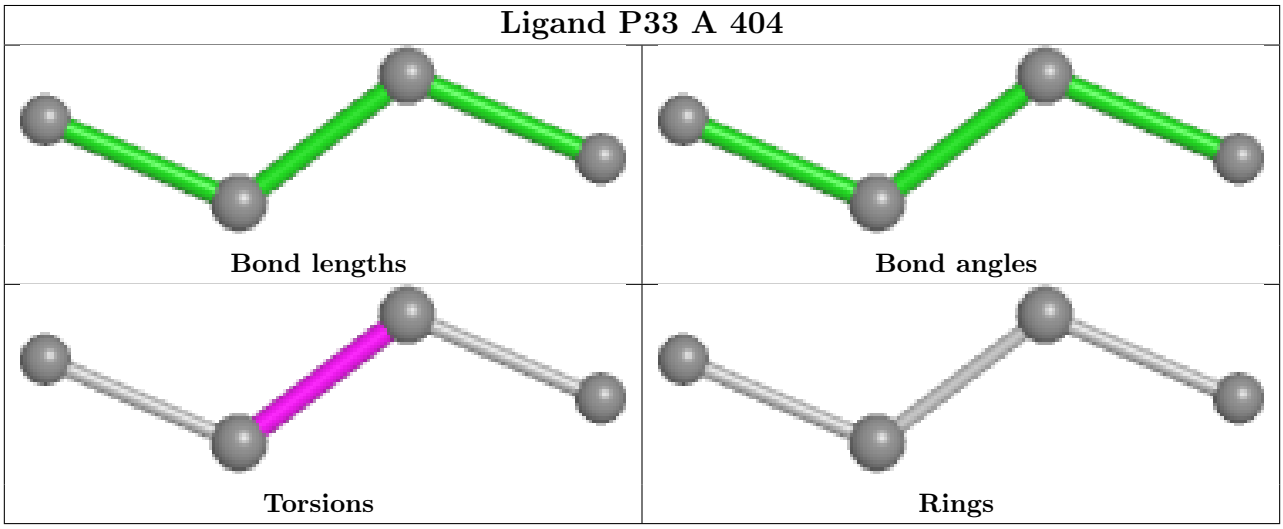


Rings

Ligand P33 B 401



Ligand P33 A 404



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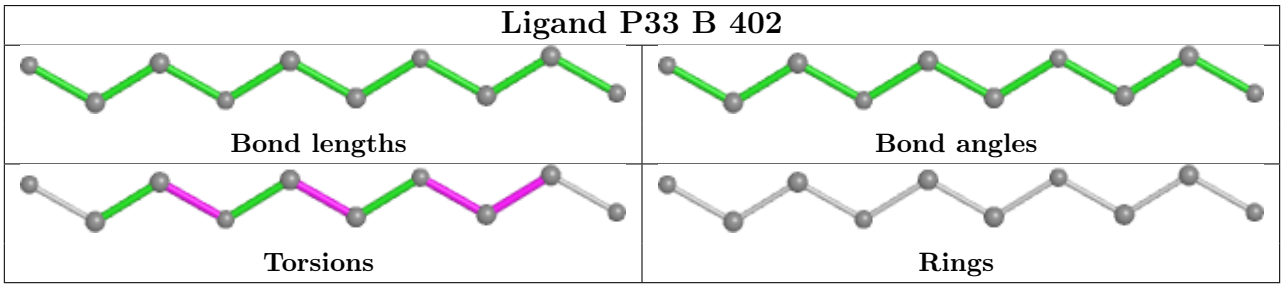
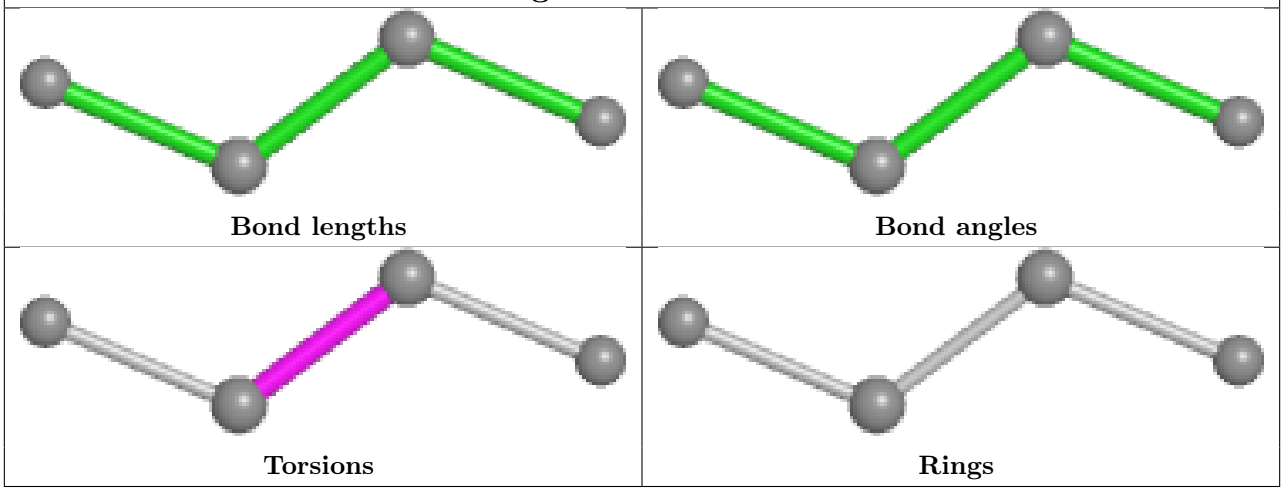


Ligand P33 A 413



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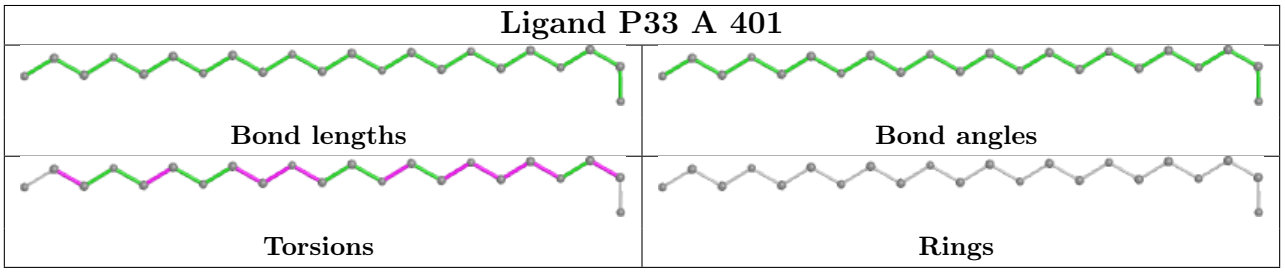
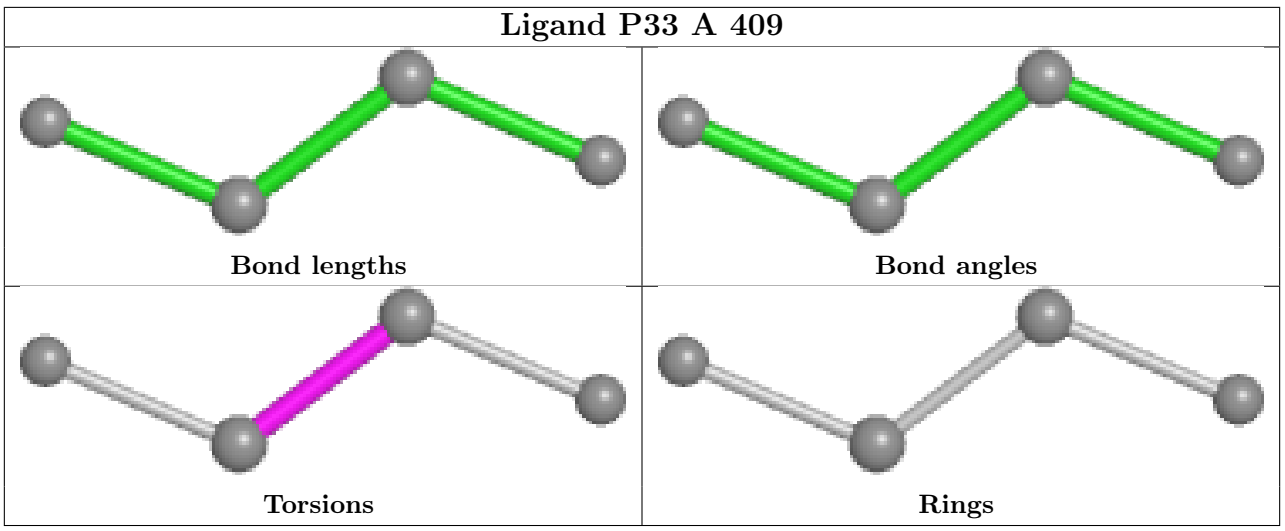
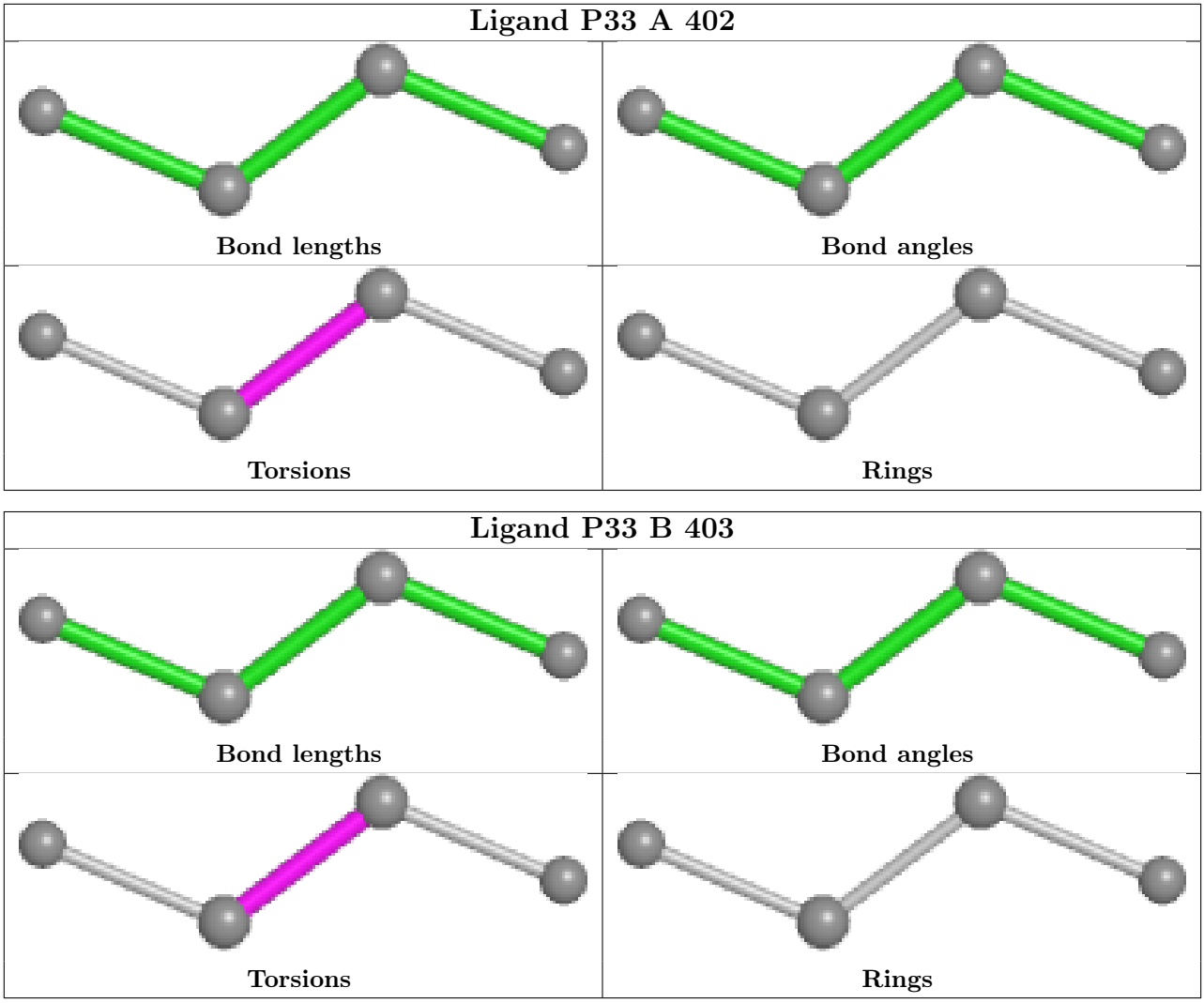


Ligand P33 A 409





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	215/233 (92%)	-0.01	13 (6%) 21 20	20, 40, 99, 116	0
1	B	217/233 (93%)	0.05	18 (8%) 11 9	19, 39, 95, 131	0
All	All	432/466 (92%)	0.02	31 (7%) 15 13	19, 40, 98, 131	0

All (31) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	170	GLY	5.0
1	B	167	ALA	5.0
1	A	172	SER	4.3
1	B	329	THR	3.9
1	B	168	LYS	3.3
1	A	329	THR	3.2
1	A	179	THR	3.1
1	B	330	VAL	3.1
1	B	328	LYS	3.1
1	B	171	THR	2.9
1	B	285	LYS	2.9
1	A	286	THR	2.9
1	B	172	SER	2.8
1	B	173	GLU	2.8
1	B	166	ILE	2.7
1	A	187	SER	2.7
1	A	176	ASN	2.6
1	B	175	LEU	2.5
1	B	169	SER	2.5
1	A	195	PHE	2.5
1	A	171	THR	2.4
1	A	191	LEU	2.3
1	A	170	GLY	2.3
1	B	177	LYS	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	173	GLU	2.2
1	B	195	PHE	2.2
1	B	286	THR	2.1
1	B	179	THR	2.1
1	A	167	ALA	2.0
1	B	128	GLY	2.0
1	A	330	VAL	2.0

6.2 Non-standard residues in protein, DNA, RNA chains (i)

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	P33	A	409	4/22	0.82	0.15	67,68,68,69	0
2	P33	A	413	4/22	0.82	0.19	59,61,62,63	0
2	P33	B	403	4/22	0.88	0.25	49,51,54,58	0
3	GOL	A	414	6/6	0.88	0.21	64,64,65,66	0
2	P33	B	402	10/22	0.90	0.23	53,57,61,61	0
2	P33	A	405	4/22	0.90	0.30	65,65,67,69	0
2	P33	B	404	4/22	0.90	0.18	49,55,56,57	0
2	P33	A	407	4/22	0.90	0.14	55,55,58,62	0
2	P33	A	411	4/22	0.91	0.18	56,60,62,65	0
2	P33	A	403	10/22	0.91	0.21	51,55,60,60	0
2	P33	A	402	4/22	0.91	0.27	52,54,55,56	0
3	GOL	B	405	6/6	0.92	0.19	63,69,71,72	0
2	P33	A	404	4/22	0.93	0.14	64,67,67,69	0
2	P33	A	408	4/22	0.93	0.24	58,58,59,61	0
2	P33	B	401	4/22	0.93	0.18	57,57,59,63	0
2	P33	A	401	22/22	0.93	0.20	35,47,60,62	0

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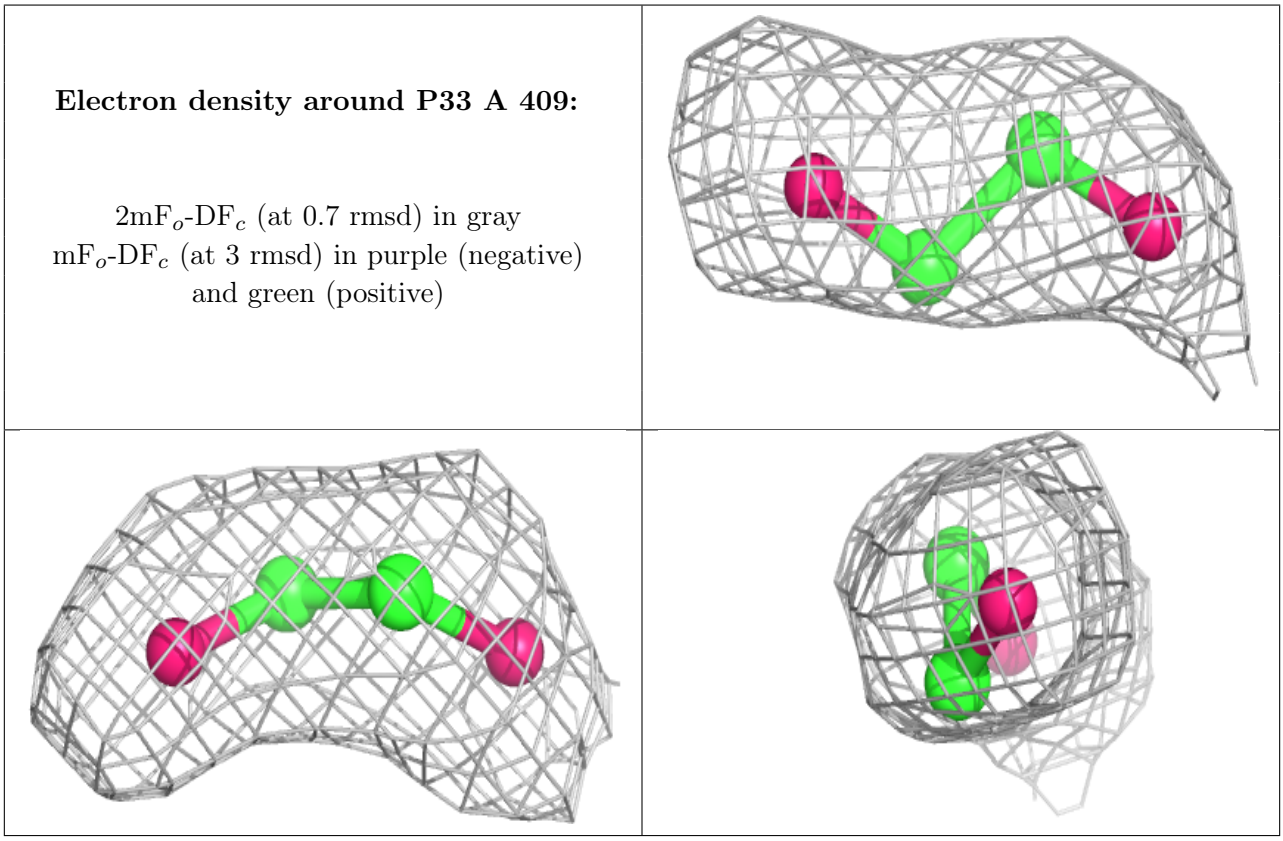
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	V2C	A	415	27/30	0.93	0.22	31,44,82,84	0
2	P33	A	410	4/22	0.94	0.22	54,55,55,59	0
2	P33	A	406	4/22	0.94	0.19	60,60,62,65	0
2	P33	A	412	4/22	0.95	0.25	70,71,72,73	0
4	V2C	B	406	27/30	0.95	0.19	31,45,88,89	0

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.

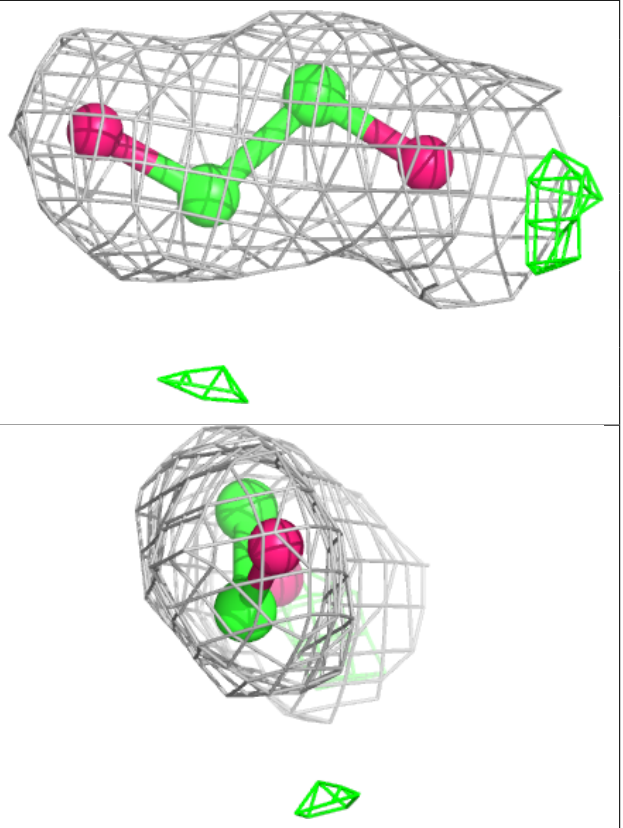
Electron density around P33 A 409:

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



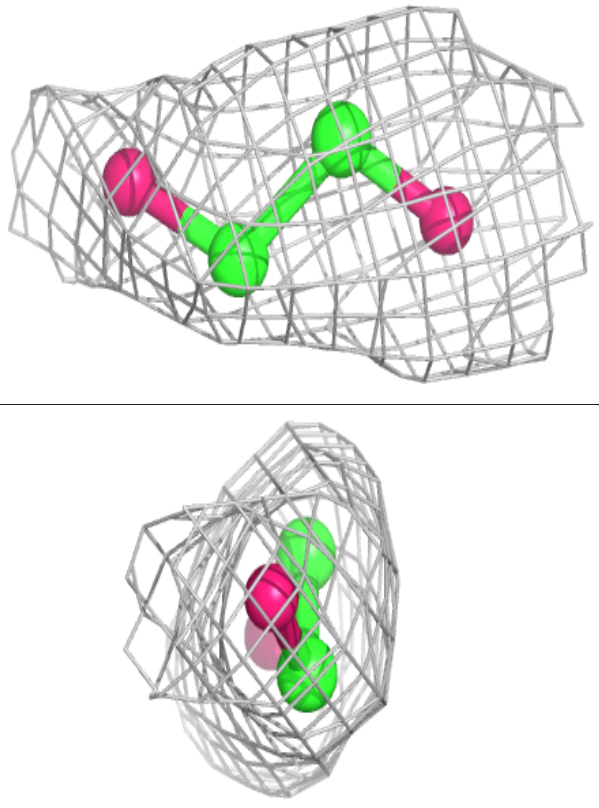
Electron density around P33 A 413:

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



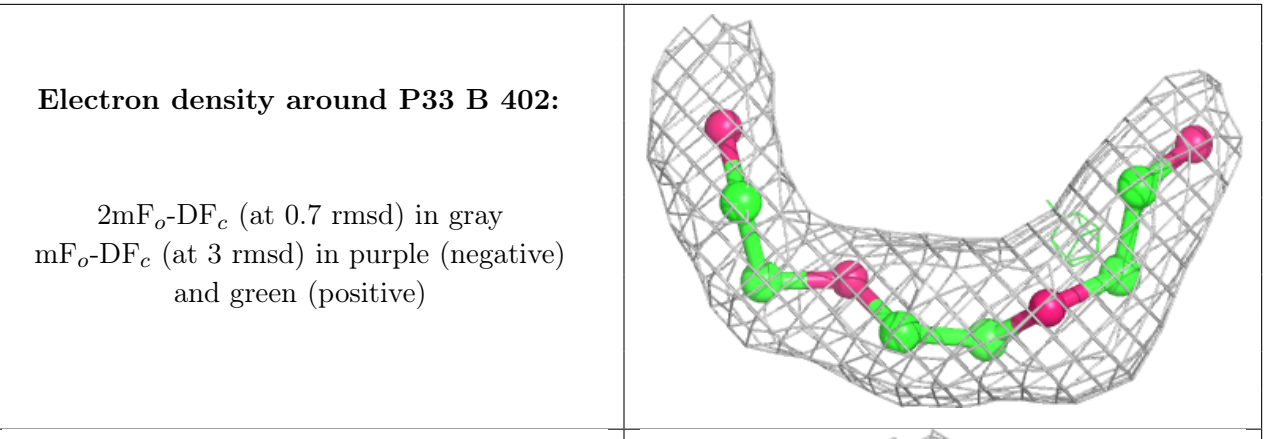
Electron density around P33 B 403:

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



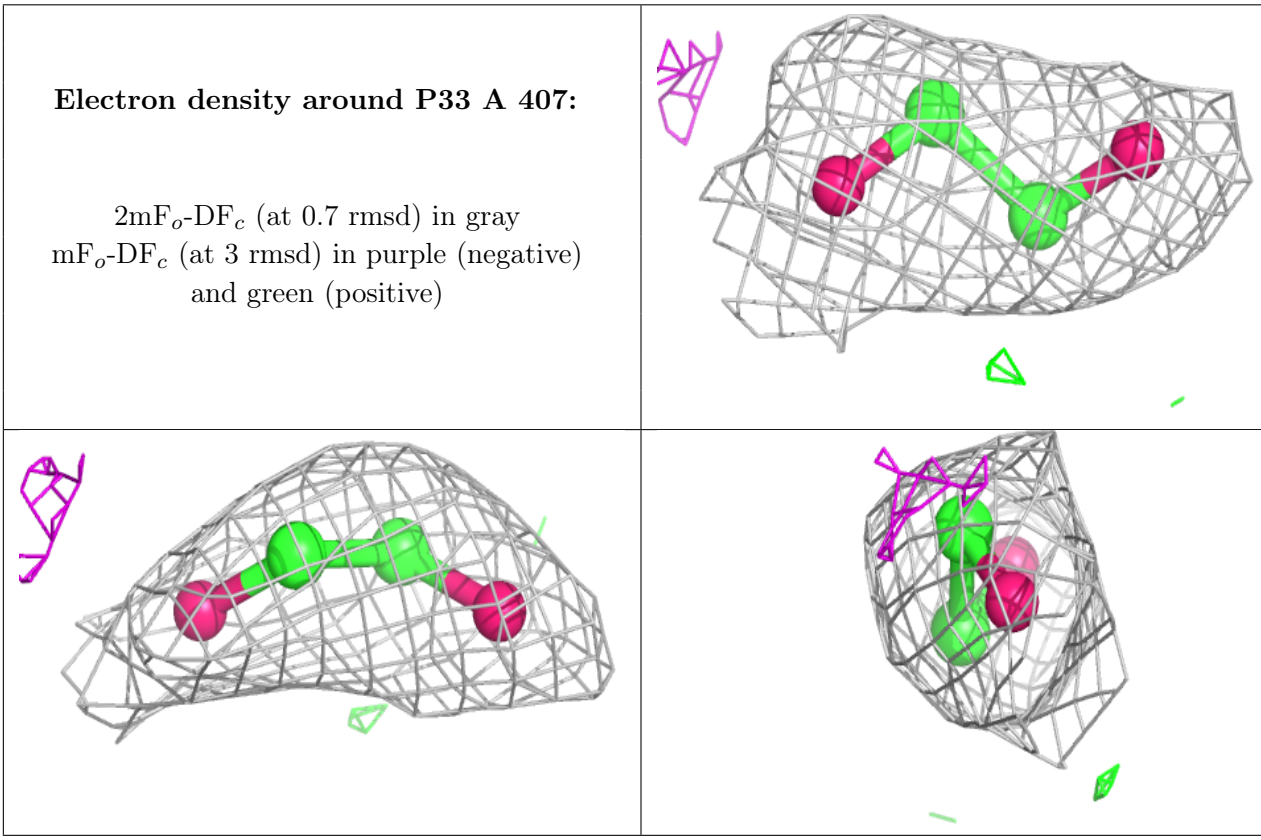
Electron density around P33 B 402:

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



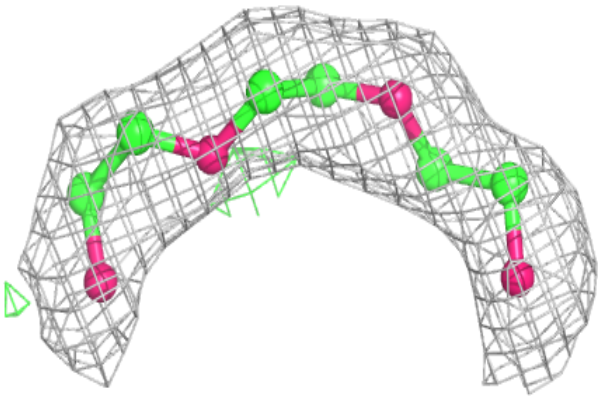
Electron density around P33 A 407:

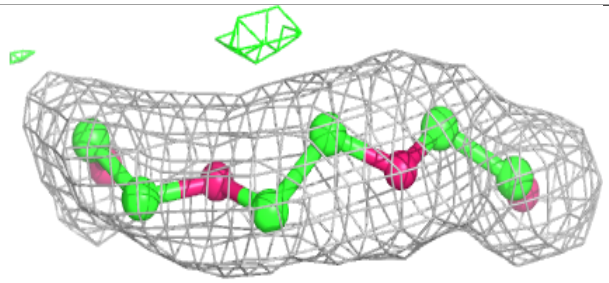
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

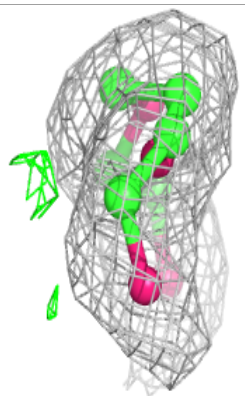


Electron density around P33 A 403:

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

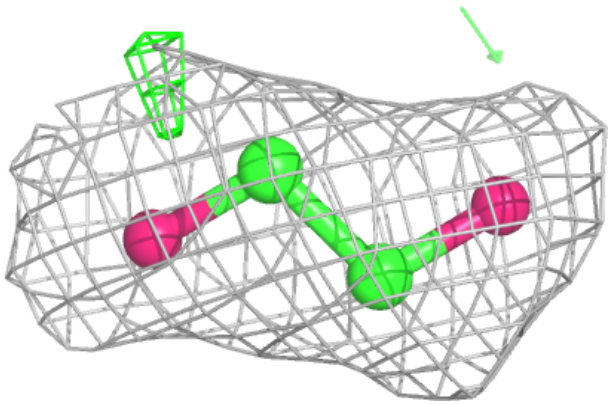


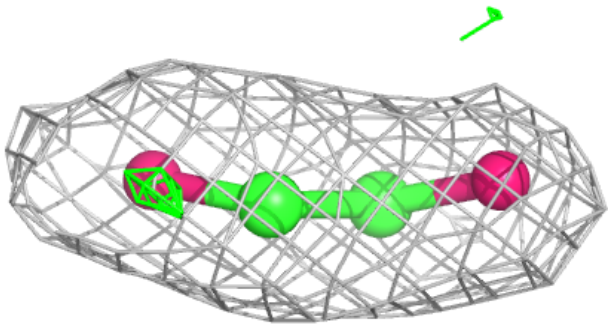


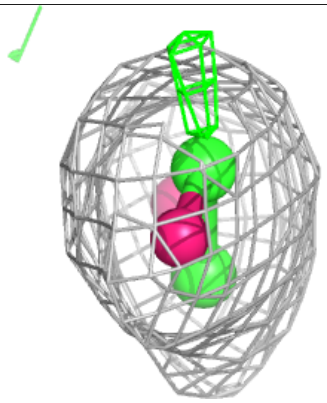


Electron density around P33 A 402:

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

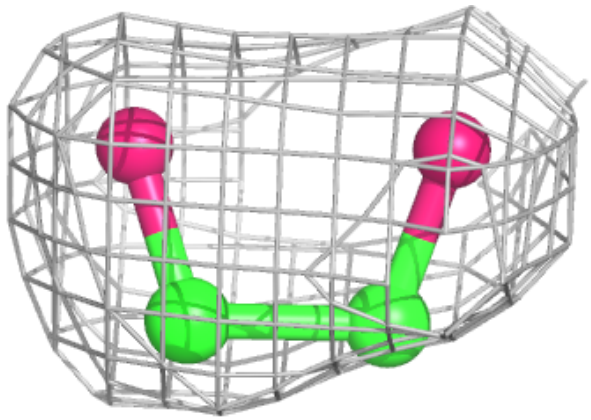


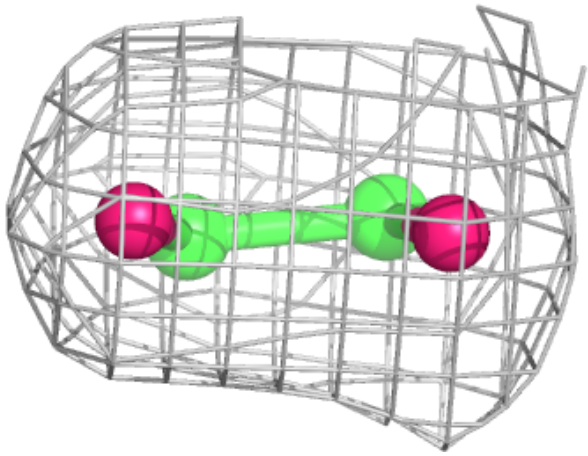


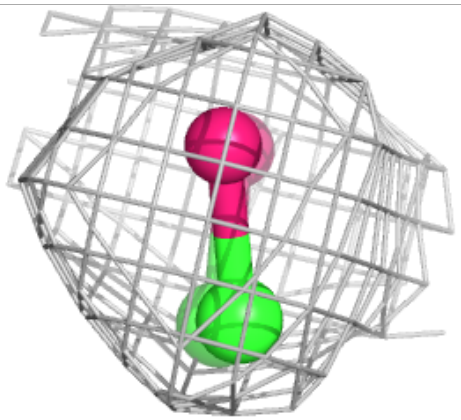


Electron density around P33 A 404:

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

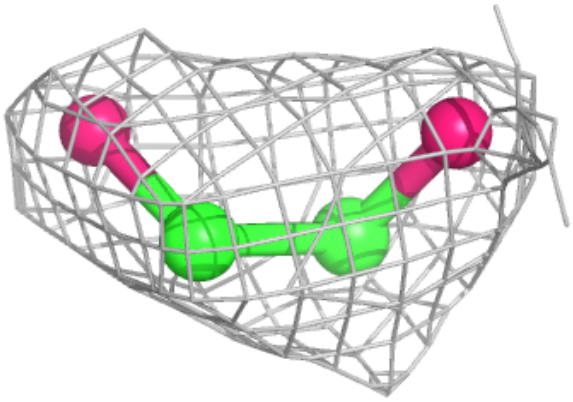


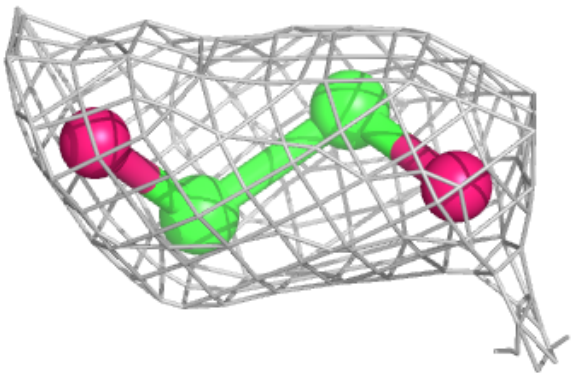


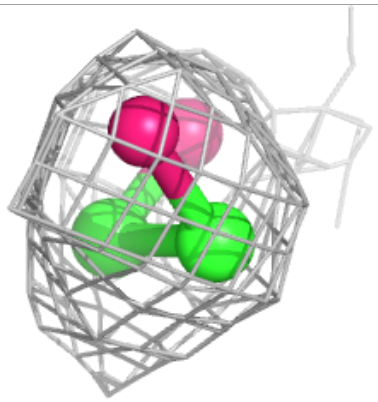


Electron density around P33 A 408:

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

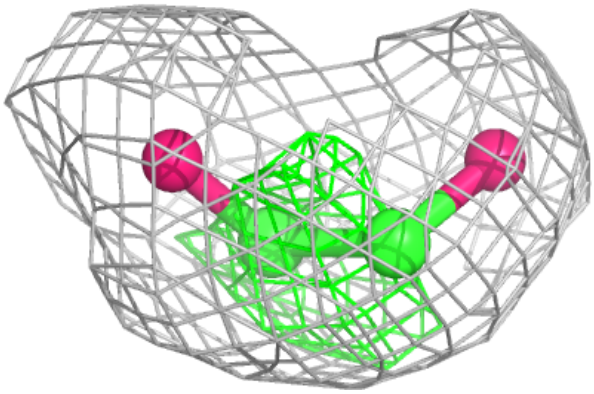


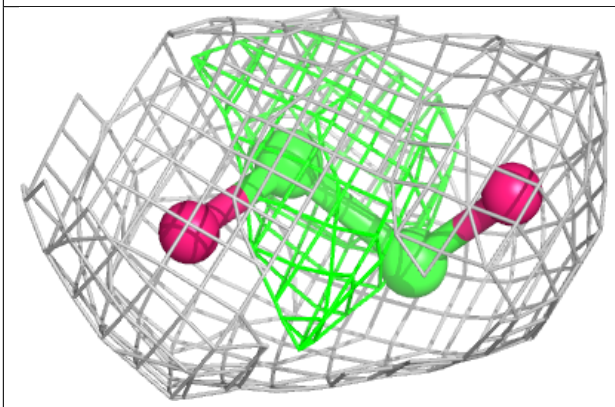


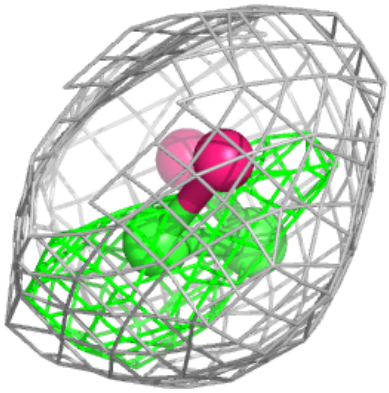


Electron density around P33 B 401:

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

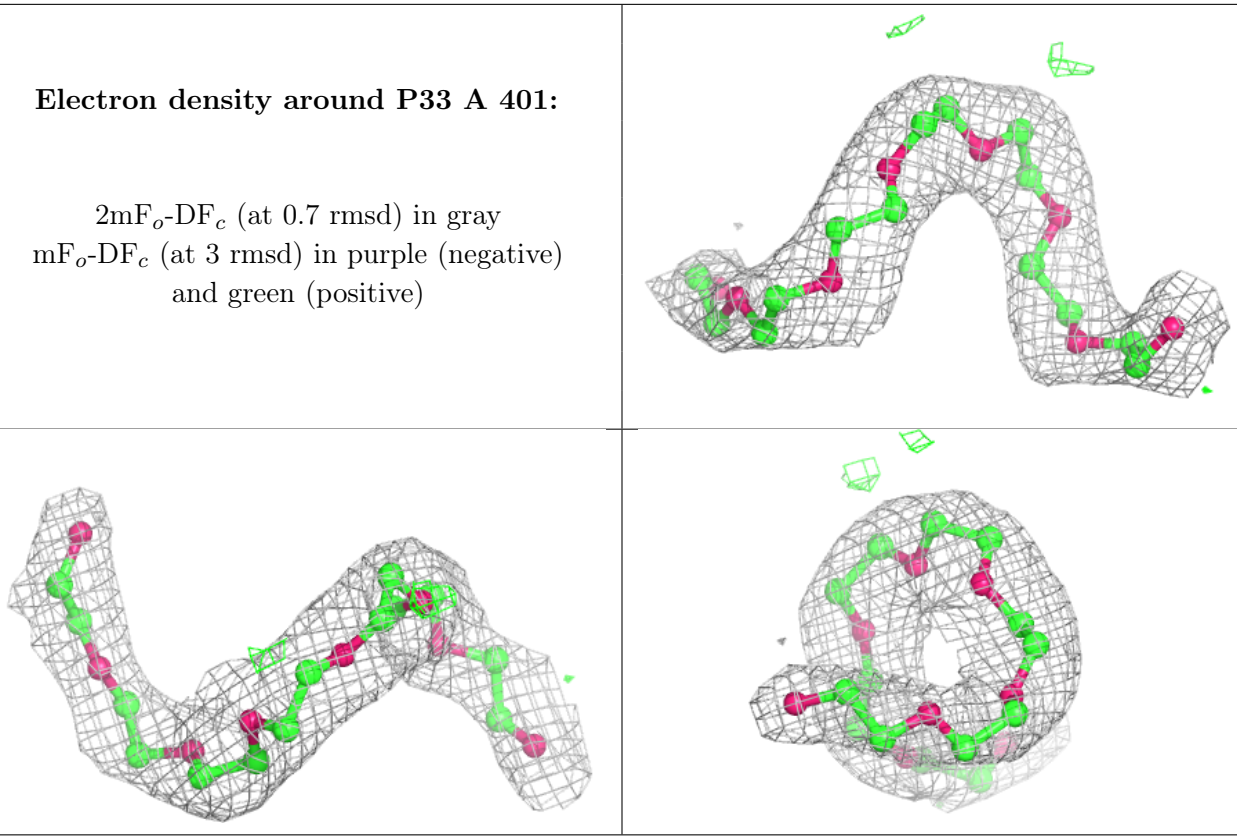






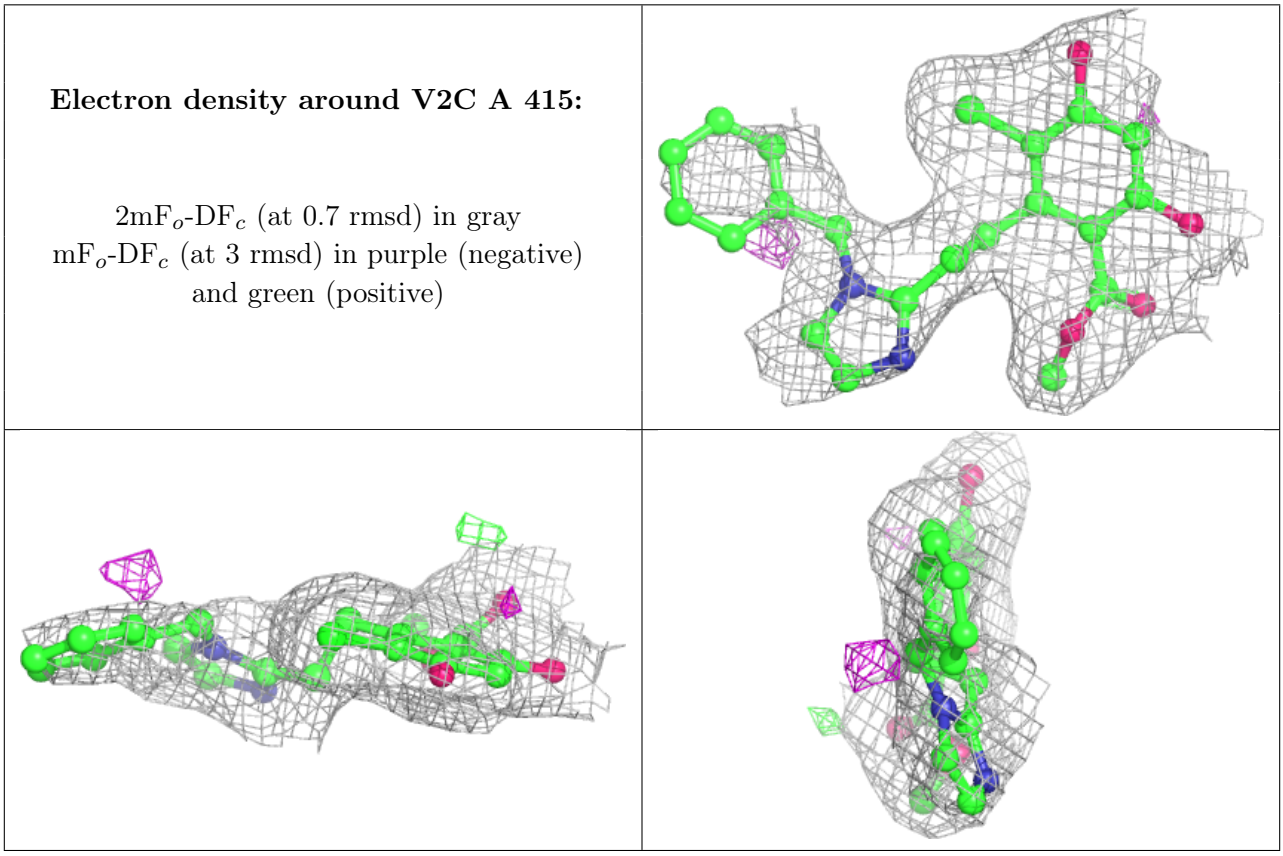
Electron density around P33 A 401:

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



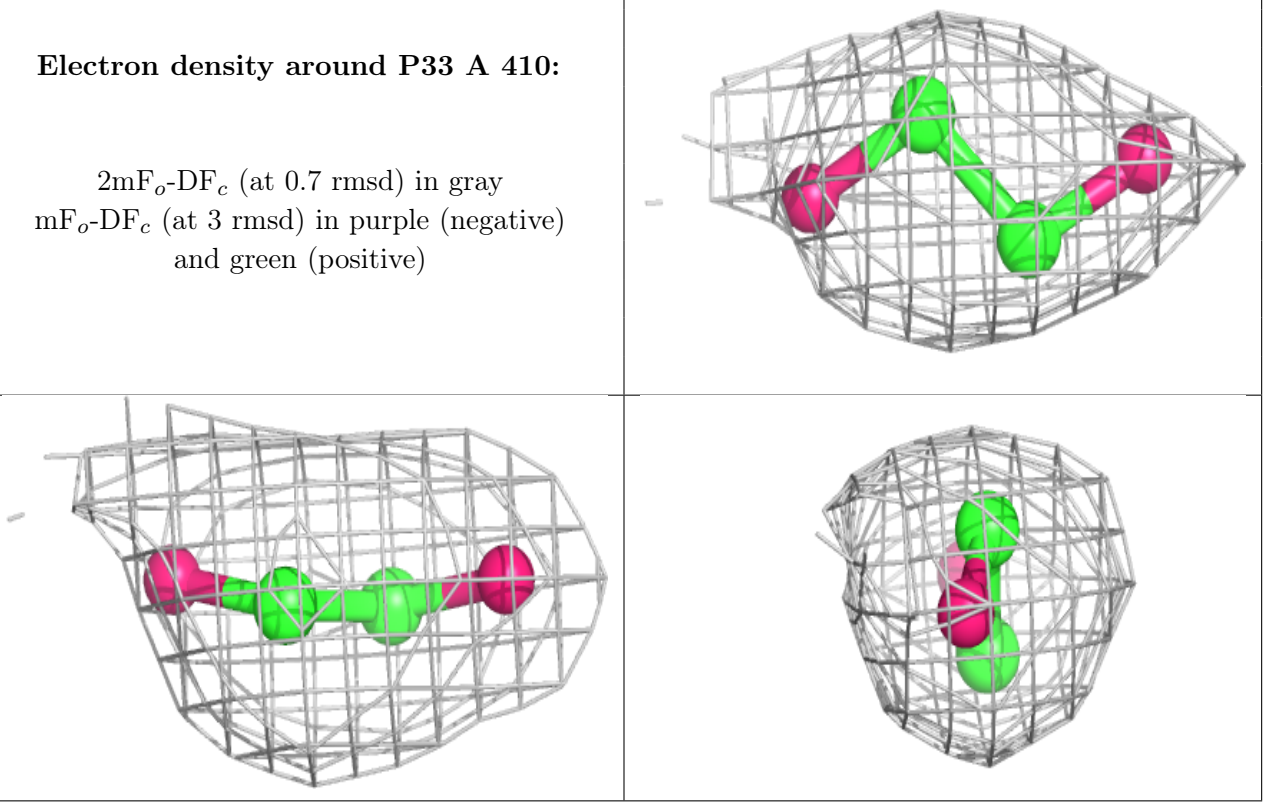
Electron density around V2C A 415:

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



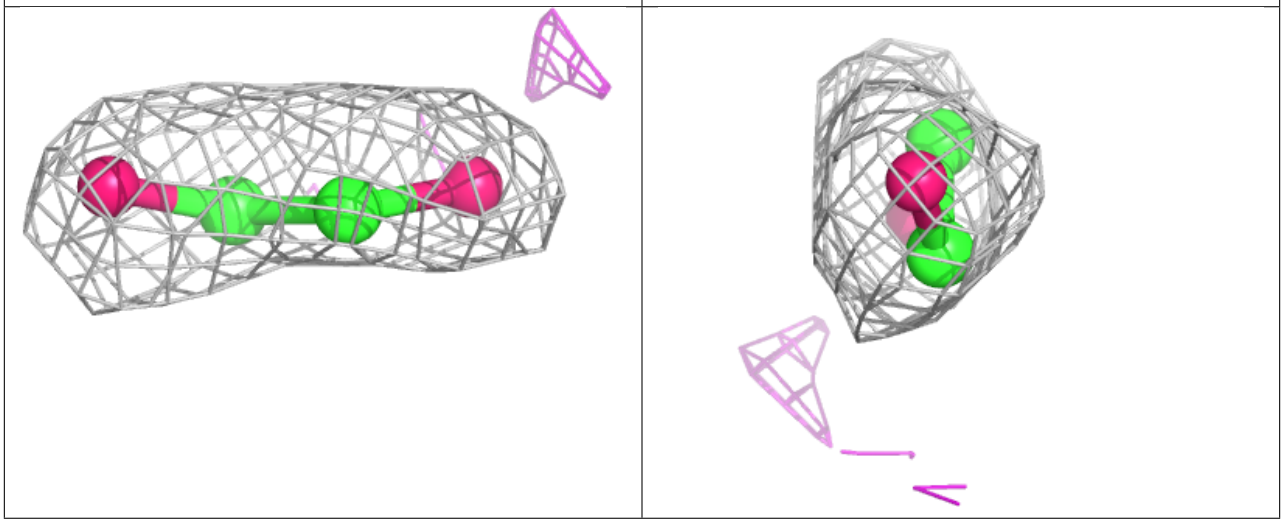
Electron density around P33 A 410:

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



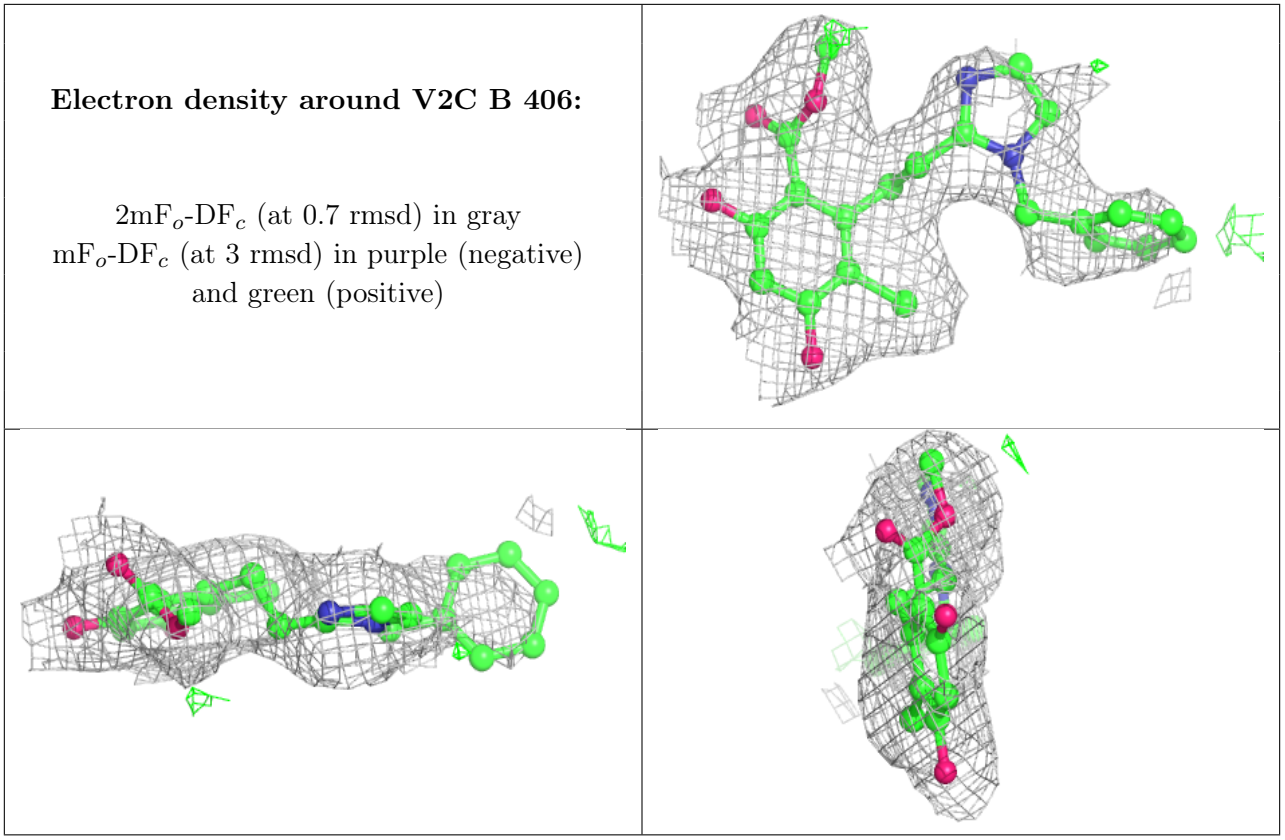
Electron density around P33 A 412:

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



Electron density around V2C B 406:

$2mF_o$-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.