Full wwPDB X-ray Structure Validation Report ⓘ

Jan 25, 2023 – 05:24 AM EST

PDB ID	:	4H41
Title	:	Crystal structure of a putative alpha-L-fucosidase (BT_0435) from Bacteroides thetaiotaomicron VPI-5482 at 1.80 A resolution
Authors	:	Joint Center for Structural Genomics (JCSG)
Deposited on	:	2012-09-14
Resolution	:	1.80 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:

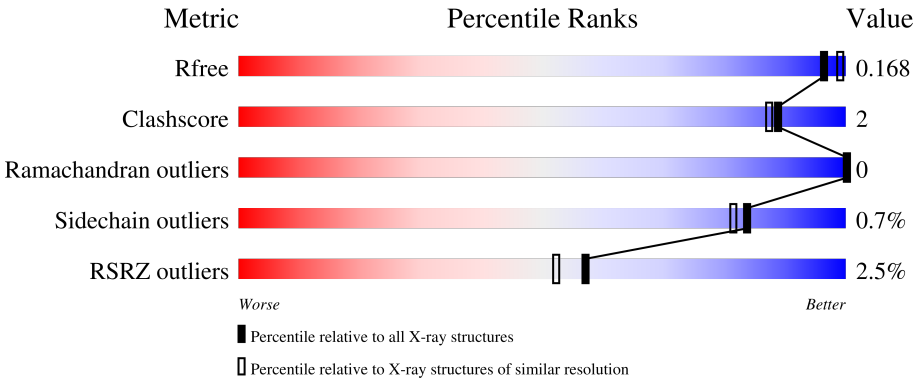
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.31.2
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.31.2

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 1.80 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	5950 (1.80-1.80)
Clashscore	141614	6793 (1.80-1.80)
Ramachandran outliers	138981	6697 (1.80-1.80)
Sidechain outliers	138945	6696 (1.80-1.80)
RSRZ outliers	127900	5850 (1.80-1.80)

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	340	2% 90% · 6%
1	B	340	% 91% · 5%
1	C	340	3% 91% · 6%

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
2	UNL	A	401	-	-	X	-
2	UNL	B	401	-	-	X	-
2	UNL	C	401	-	-	X	-

2 Entry composition (i)

There are 8 unique types of molecules in this entry. The entry contains 16884 atoms, of which 7899 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 putative alpha-L-fucosidase.

Mol	Chain	Residues	Atoms							ZeroOcc	AltConf	Trace
1	A	318	Total	C	H	N	O	S	Se	0	3	0
			5159	1703	2526	430	484	4	12			
1	B	322	Total	C	H	N	O	S	Se	0	2	0
			5220	1720	2558	436	490	4	12			
1	C	321	Total	C	H	N	O	S	Se	0	2	0
			5164	1706	2523	431	486	5	13			

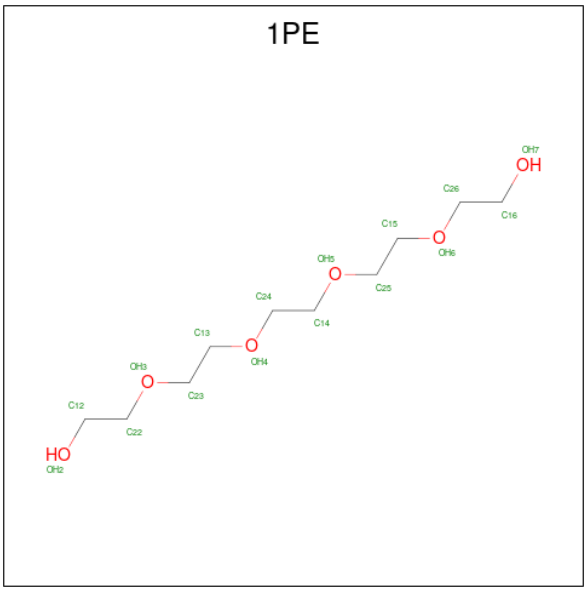
There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	GLY	-	expression tag	UNP Q8AAM9
B	0	GLY	-	expression tag	UNP Q8AAM9
C	0	GLY	-	expression tag	UNP Q8AAM9

- Molecule 2 is UNKNOWN LIGAND (three-letter code: UNL) (formula:).

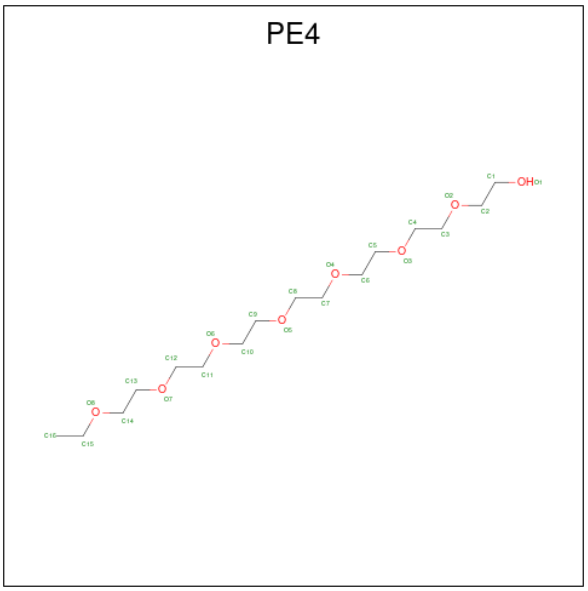
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	O	0	0
			9	9		
2	B	1	Total	O	0	0
			9	9		
2	C	1	Total	O	0	0
			9	9		

- Molecule 3 is PENTAETHYLENE GLYCOL (three-letter code: 1PE) (formula: $C_{10}H_{22}O_6$).



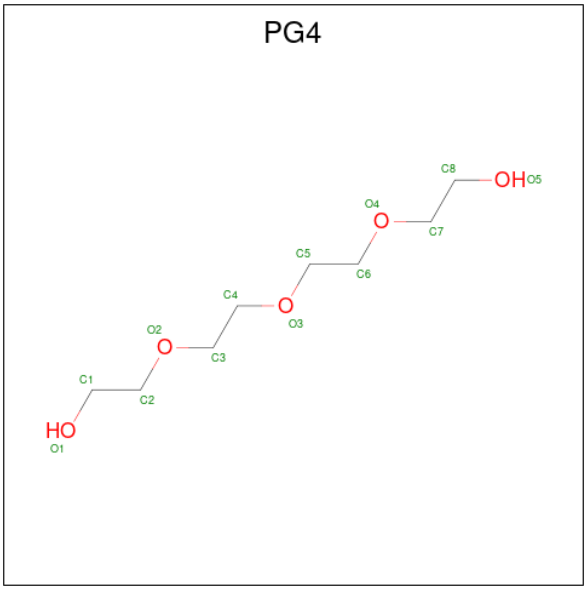
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C H O 17 5 9 3	0	0
3	A	1	Total C H O 23 6 13 4	0	0
3	A	1	Total C H O 20 6 11 3	0	0
3	B	1	Total C H O 30 8 17 5	0	0
3	B	1	Total C H O 23 6 13 4	0	0
3	C	1	Total C H O 24 7 13 4	0	0
3	C	1	Total C H O 31 9 17 5	0	0

- Molecule 4 is 2-{2-[2-(2-{2-[2-(2-ETHOXY-ETHOXY)-ETHOXY]-ETHOXY}-ETHOXY)-ETHOXY]-ETHOXY}-ETHANOL (three-letter code: PE4) (formula: $C_{16}H_{34}O_8$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	H	O	0	0
			52	15	29	8		
4	A	1	Total	C	H	O	0	0
			52	15	29	8		

- Molecule 5 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula: $C_8H_{18}O_5$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	C	H	O	0	0
			31	8	18	5		
5	A	1	Total	C	H	O	0	0
			31	8	18	5		

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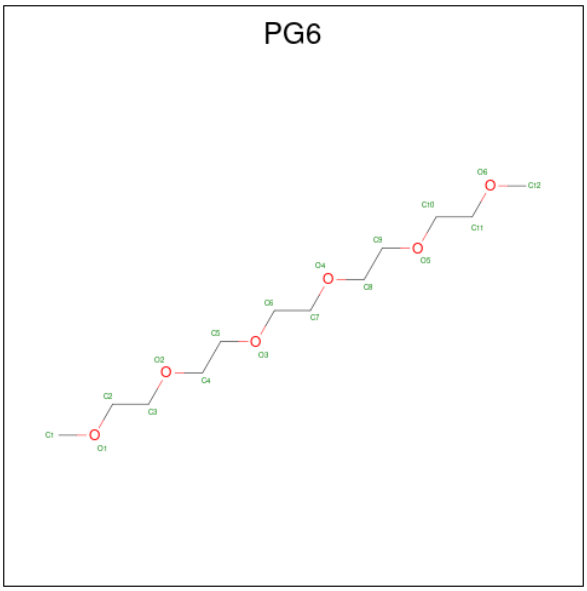
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C H O 31 8 18 5	0	0
5	B	1	Total C H O 31 8 18 5	0	0
5	C	1	Total C H O 31 8 18 5	0	0

- Molecule 6 is 1-(2-METHOXY-ETHOXY)-2-{2-[2-(2-METHOXY-ETHOXY]-ETHOXY}-ETHANE (three-letter code: PG6) (formula: $C_{12}H_{26}O_6$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	B	1	Total C H O 44 12 26 6	0	0
6	B	1	Total C H O 43 12 25 6	0	0

- Molecule 7 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	B	1	Total Na 1 1	0	0

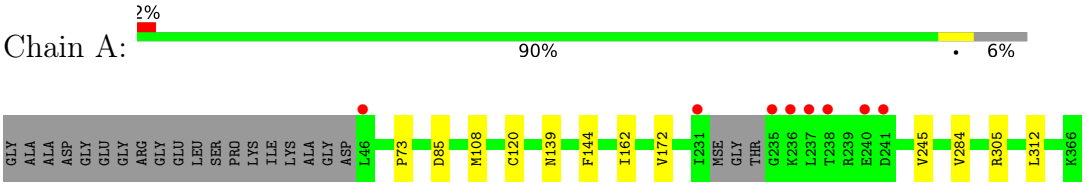
- Molecule 8 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	281	Total O 283 283	0	2
8	B	268	Total O 268 268	0	0
8	C	248	Total O 248 248	0	0

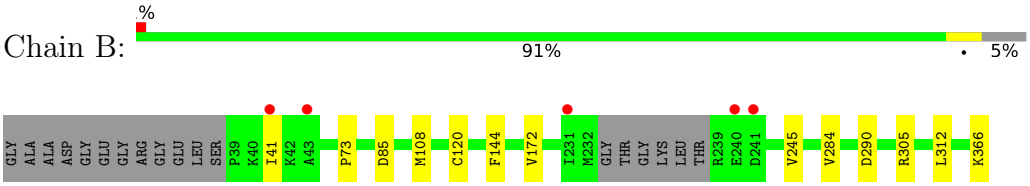
3 Residue-property plots (i)

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.

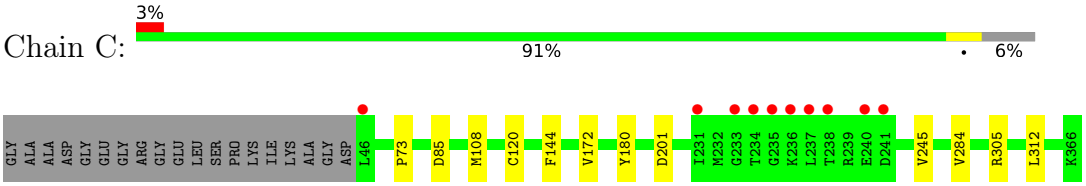
• Molecule 1: putative alpha-L-fucosidase



• Molecule 1: putative alpha-L-fucosidase



• Molecule 1: putative alpha-L-fucosidase



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	53.67Å 125.70Å 80.01Å 90.00° 103.72° 90.00°	Depositor
Resolution (Å)	29.14 – 1.80 29.13 – 1.80	Depositor EDS
% Data completeness (in resolution range)	93.6 (29.14-1.80) 93.8 (29.13-1.80)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.13	Depositor
$< I/\sigma(I) >$ [1]	2.26 (at 1.80Å)	Xtriage
Refinement program	BUSTER-TNT 2.10.0, BUSTER 2.10.0	Depositor
R, R_{free}	0.133 , 0.158 0.147 , 0.168	Depositor DCC
R_{free} test set	4444 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å^2)	17.7	Xtriage
Anisotropy	0.906	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.42 , 61.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	16884	wwPDB-VP
Average B, all atoms (Å^2)	26.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.49% of the height of the origin peak. No significant pseudotranslation is detected.*

[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: PG6, PG4, NA, PE4, UNL, 1PE

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	0/2703	0.64	0/3622
1	B	0.51	0/2729	0.64	0/3651
1	C	0.50	0/2708	0.63	0/3628
All	All	0.51	0/8140	0.64	0/10901

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	C	0	1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	180	TYR	Sidechain

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	2633	2526	2525	7	1
1	B	2662	2558	2557	6	1
1	C	2641	2523	2522	8	0
2	A	9	0	0	5	0
2	B	9	0	0	5	0
2	C	9	0	0	5	0
3	A	27	33	33	0	0
3	B	23	30	30	0	0
3	C	25	30	30	0	0
4	A	46	58	58	1	0
5	A	39	54	54	0	0
5	B	13	18	18	0	0
5	C	13	18	18	0	0
6	B	36	51	51	0	0
7	B	1	0	0	0	0
8	A	283	0	0	0	0
8	B	268	0	0	0	0
8	C	248	0	0	0	0
All	All	8985	7899	7896	30	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 2.

All (30) 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:C:401:UNL:O4	2:C:401:UNL:O1	2.19	0.61
2:A:401:UNL:O7	2:A:401:UNL:O8	2.24	0.55
2:B:401:UNL:O7	2:B:401:UNL:O8	2.25	0.55
1:C:245:VAL:CG1	1:C:284:VAL:HG21	2.37	0.54
2:C:401:UNL:O5	2:C:401:UNL:O6	2.25	0.54
1:C:108:MSE:CE	1:C:120:CYS:HB2	2.40	0.52
1:A:144:PHE:CZ	1:A:172:VAL:HG21	2.46	0.51
2:B:401:UNL:O4	2:B:401:UNL:O5	2.29	0.50
1:A:108:MSE:CE	1:A:120:CYS:HB2	2.43	0.48
2:C:401:UNL:O4	2:C:401:UNL:O5	2.31	0.48
1:B:245:VAL:CG1	1:B:284:VAL:HG21	2.44	0.48
2:A:401:UNL:O3	2:A:401:UNL:O4	2.32	0.48
1:A:245:VAL:CG1	1:A:284:VAL:HG21	2.44	0.47
1:B:108:MSE:CE	1:B:120:CYS:HB2	2.44	0.47
1:C:144:PHE:CZ	1:C:172:VAL:HG21	2.49	0.47
1:A:312:LEU:HD12	1:B:73:PRO:HG2	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:305:ARG:NH2	2:B:401:UNL:O3	2.49	0.46
2:B:401:UNL:O4	2:B:401:UNL:O1	2.33	0.46
1:C:305:ARG:NH2	2:C:401:UNL:O3	2.48	0.46
1:A:305:ARG:NH2	2:A:401:UNL:O3	2.49	0.45
1:B:144:PHE:CZ	1:B:172:VAL:HG21	2.51	0.44
2:A:401:UNL:O4	2:A:401:UNL:O1	2.36	0.44
1:C:245:VAL:HG13	1:C:284:VAL:HG21	1.99	0.44
1:A:162:ILE:HG21	4:A:404:PE4:H51	2.00	0.43
2:B:401:UNL:O4	2:B:401:UNL:O2	2.37	0.43
1:B:312:LEU:HD12	1:C:73:PRO:HG2	2.02	0.42
2:C:401:UNL:O4	2:C:401:UNL:O3	2.38	0.41
2:A:401:UNL:O8	2:A:401:UNL:O9	2.39	0.41
1:C:108:MSE:HE2	1:C:120:CYS:HB2	2.01	0.41
1:A:73:PRO:HG2	1:C:312:LEU:HD12	2.04	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:139:ASN:HD22	1:B:290:ASP:OD1[2_556]	1.58	0.02

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	317/340 (93%)	309 (98%)	8 (2%)	0	100	100
1	B	320/340 (94%)	312 (98%)	8 (2%)	0	100	100
1	C	321/340 (94%)	315 (98%)	6 (2%)	0	100	100
All	All	958/1020 (94%)	936 (98%)	22 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains

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	275/277 (99%)	274 (100%)	1 (0%)	91 89
1	B	278/277 (100%)	275 (99%)	3 (1%)	73 68
1	C	274/277 (99%)	272 (99%)	2 (1%)	84 81
All	All	827/831 (100%)	821 (99%)	6 (1%)	84 81

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	85	ASP
1	B	41	ILE
1	B	85	ASP
1	B	366	LYS
1	C	85	ASP
1	C	201	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 20 ligands modelled in this entry, 3 are unknown and 1 is 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	$\#\|Z\| > 2$
5	PG4	A	407	-	12,12,12	0.19	0	11,11,11	0.32	0
3	1PE	C	402	-	10,10,15	0.22	0	9,9,14	0.24	0
3	1PE	B	406	-	9,9,15	0.19	0	8,8,14	0.43	0
5	PG4	A	408	-	12,12,12	0.23	0	11,11,11	0.36	0
6	PG6	B	403	-	17,17,17	0.32	0	16,16,16	0.59	0
3	1PE	A	402	-	7,7,15	0.20	0	6,6,14	0.14	0
4	PE4	A	404	-	22,22,23	0.27	0	21,21,22	0.42	0
3	1PE	C	403	-	13,13,15	0.21	0	12,12,14	0.26	0
3	1PE	B	402	-	12,12,15	0.19	0	11,11,14	0.38	0
4	PE4	A	405	-	22,22,23	0.41	0	21,21,22	0.51	0
3	1PE	A	406	-	8,8,15	0.18	0	7,7,14	0.32	0
5	PG4	B	407	-	12,12,12	0.24	0	11,11,11	0.31	0
6	PG6	B	404	7	17,17,17	0.16	0	16,16,16	0.36	0
3	1PE	A	403	-	9,9,15	0.16	0	8,8,14	0.17	0
5	PG4	A	409	-	12,12,12	0.28	0	11,11,11	0.30	0
5	PG4	C	404	-	12,12,12	0.15	0	11,11,11	0.21	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
5	PG4	A	407	-	-	3/10/10/10	-
3	1PE	C	402	-	-	2/8/8/13	-
3	1PE	B	406	-	-	3/7/7/13	-
5	PG4	A	408	-	-	2/10/10/10	-
6	PG6	B	403	-	-	7/15/15/15	-
3	1PE	A	402	-	-	1/5/5/13	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	PE4	A	404	-	-	3/20/20/21	-
3	1PE	C	403	-	-	4/11/11/13	-
3	1PE	B	402	-	-	5/10/10/13	-
4	PE4	A	405	-	-	9/20/20/21	-
3	1PE	A	406	-	-	1/6/6/13	-
5	PG4	B	407	-	-	5/10/10/10	-
6	PG6	B	404	7	-	4/15/15/15	-
3	1PE	A	403	-	-	4/7/7/13	-
5	PG4	A	409	-	-	2/10/10/10	-
5	PG4	C	404	-	-	0/10/10/10	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (55) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	405	PE4	O6-C10-C9-O5
3	A	402	1PE	OH6-C15-C25-OH5
5	A	407	PG4	O3-C5-C6-O4
6	B	404	PG6	C3-C2-O1-C1
6	B	403	PG6	O3-C6-C7-O4
3	B	402	1PE	OH5-C14-C24-OH4
3	A	403	1PE	OH7-C16-C26-OH6
6	B	403	PG6	C3-C2-O1-C1
3	B	402	1PE	C14-C24-OH4-C13
4	A	404	PE4	O4-C7-C8-O5
6	B	403	PG6	O1-C2-C3-O2
4	A	405	PE4	O4-C7-C8-O5
6	B	403	PG6	O2-C4-C5-O3
3	A	406	1PE	C14-C24-OH4-C13
5	B	407	PG4	O3-C5-C6-O4
4	A	405	PE4	O1-C1-C2-O2
5	A	408	PG4	C5-C6-O4-C7
6	B	403	PG6	C7-C6-O3-C5
6	B	404	PG6	O3-C6-C7-O4
3	B	402	1PE	C15-C25-OH5-C14
5	A	407	PG4	C8-C7-O4-C6
6	B	404	PG6	C11-C10-O5-C9

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Mol	Chain	Res	Type	Atoms
3	C	403	1PE	C24-C14-OH5-C25
4	A	405	PE4	C12-C11-O6-C10
5	A	409	PG4	C3-C4-O3-C5
4	A	405	PE4	C6-C5-O3-C4
5	B	407	PG4	C5-C6-O4-C7
3	B	402	1PE	C13-C23-OH3-C22
3	C	402	1PE	C16-C26-OH6-C15
6	B	403	PG6	C2-C3-O2-C4
3	B	406	1PE	C16-C26-OH6-C15
5	B	407	PG4	O4-C7-C8-O5
3	A	403	1PE	C25-C15-OH6-C26
4	A	405	PE4	O7-C13-C14-O8
5	B	407	PG4	C4-C3-O2-C2
3	B	406	1PE	OH7-C16-C26-OH6
3	B	402	1PE	OH2-C12-C22-OH3
5	A	408	PG4	C1-C2-O2-C3
3	A	403	1PE	C24-C14-OH5-C25
5	B	407	PG4	C6-C5-O3-C4
4	A	405	PE4	C13-C14-O8-C15
3	B	406	1PE	C25-C15-OH6-C26
4	A	404	PE4	C7-C8-O5-C9
3	C	402	1PE	C24-C14-OH5-C25
6	B	403	PG6	C11-C10-O5-C9
3	C	403	1PE	OH2-C12-C22-OH3
4	A	405	PE4	C8-C7-O4-C6
5	A	407	PG4	C5-C6-O4-C7
3	C	403	1PE	C15-C25-OH5-C14
5	A	409	PG4	C6-C5-O3-C4
3	A	403	1PE	OH6-C15-C25-OH5
4	A	404	PE4	O6-C11-C12-O7
4	A	405	PE4	O6-C11-C12-O7
3	C	403	1PE	C25-C15-OH6-C26
6	B	404	PG6	O5-C10-C11-O6

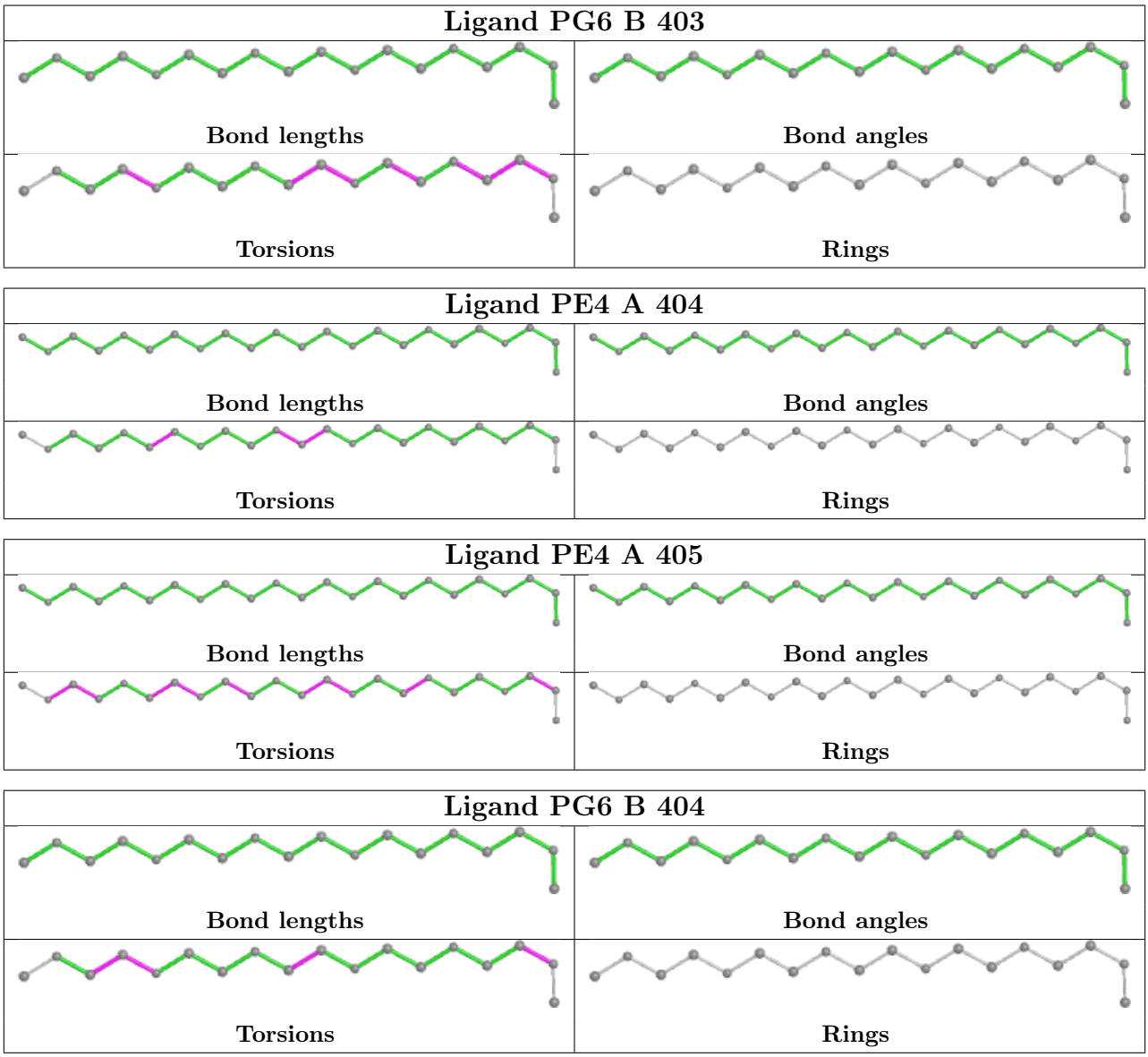
There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	404	PE4	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.



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues

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	306/340 (90%)	-0.46	8 (2%)	56	51	12, 22, 44, 90	0
1	B	309/340 (90%)	-0.44	5 (1%)	72	68	13, 23, 46, 72	0
1	C	308/340 (90%)	-0.37	10 (3%)	47	41	13, 23, 44, 82	0
All	All	923/1020 (90%)	-0.43	23 (2%)	57	52	12, 23, 46, 90	0

All (23) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	237	LEU	8.9
1	C	235	GLY	7.1
1	C	233	GLY	6.9
1	A	235	GLY	6.3
1	C	238	THR	6.3
1	A	237	LEU	5.7
1	A	236	LYS	5.6
1	C	234	THR	5.2
1	A	46	LEU	5.0
1	B	240	GLU	4.8
1	B	231	ILE	4.6
1	A	238	THR	4.6
1	C	236	LYS	4.2
1	A	240	GLU	3.4
1	C	46	LEU	3.0
1	B	241	ASP	2.9
1	C	240	GLU	2.7
1	B	41	ILE	2.6
1	B	43	ALA	2.6
1	C	241	ASP	2.6
1	C	231	ILE	2.5
1	A	231	ILE	2.4
1	A	241	ASP	2.1

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)

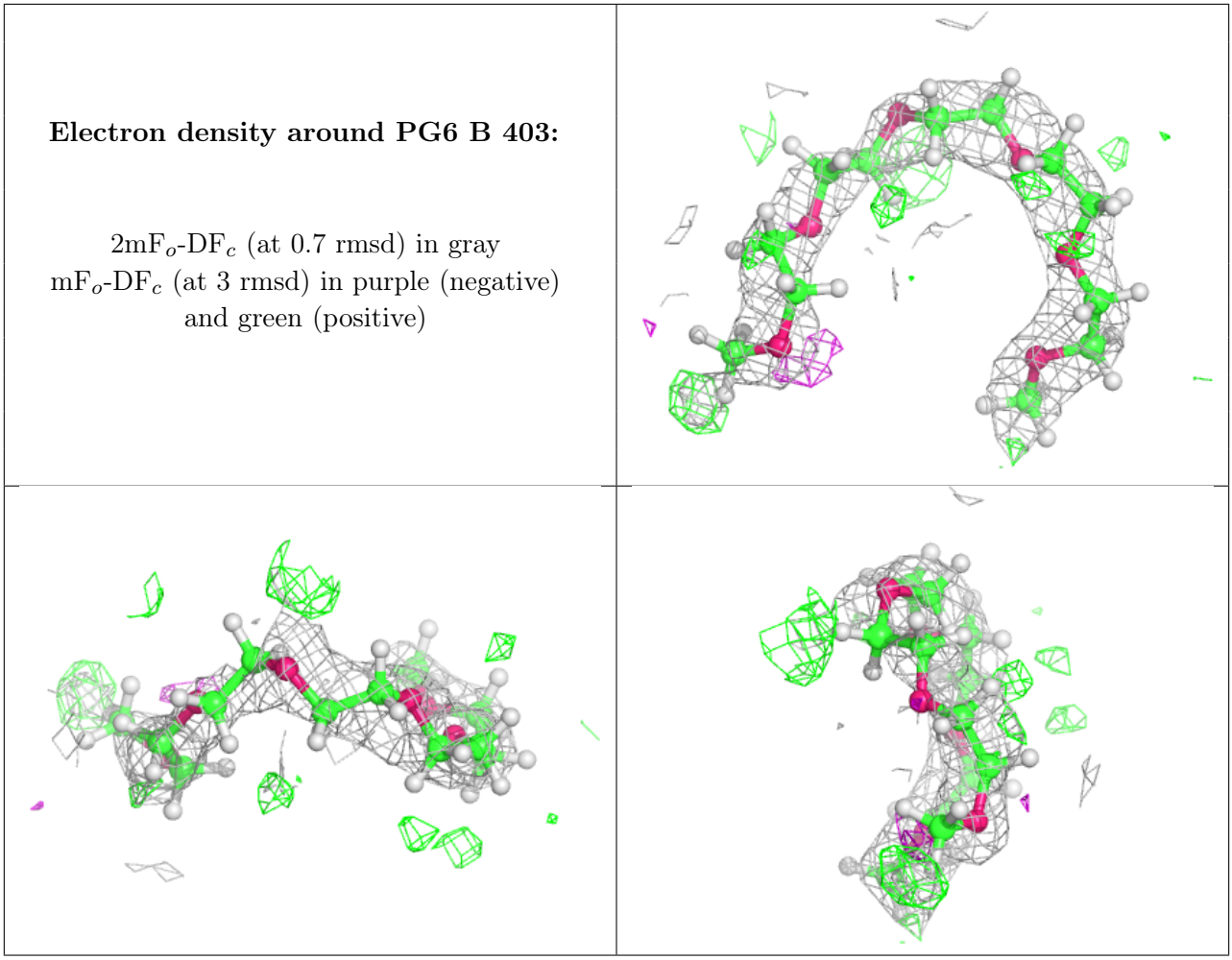
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' 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
5	PG4	B	407	13/13	0.62	0.27	65,68,74,74	0
5	PG4	A	407	13/13	0.68	0.33	65,66,71,73	0
3	1PE	C	403	14/16	0.75	0.27	44,55,73,74	0
3	1PE	B	402	13/16	0.76	0.23	57,67,72,72	0
5	PG4	A	409	13/13	0.77	0.19	48,56,63,64	0
6	PG6	B	403	18/18	0.79	0.19	44,55,64,64	0
5	PG4	C	404	13/13	0.81	0.30	51,57,61,63	0
4	PE4	A	405	23/24	0.81	0.20	23,46,55,57	0
3	1PE	A	402	8/16	0.82	0.17	51,52,57,57	0
3	1PE	A	403	10/16	0.83	0.21	64,72,76,77	0
3	1PE	B	406	10/16	0.84	0.19	42,52,58,63	0
3	1PE	A	406	9/16	0.87	0.14	43,46,53,53	0
5	PG4	A	408	13/13	0.87	0.13	38,48,56,59	0
3	1PE	C	402	11/16	0.88	0.17	39,47,61,63	0
6	PG6	B	404	18/18	0.90	0.26	36,44,61,62	0
2	UNL	A	401	9/-	0.92	0.26	23,36,61,116	0
4	PE4	A	404	23/24	0.93	0.09	28,35,42,45	0
2	UNL	C	401	9/-	0.93	0.33	26,36,49,62	0
2	UNL	B	401	9/-	0.93	0.29	27,36,56,69	0
7	NA	B	405	1/1	0.96	0.10	33,33,33,33	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.

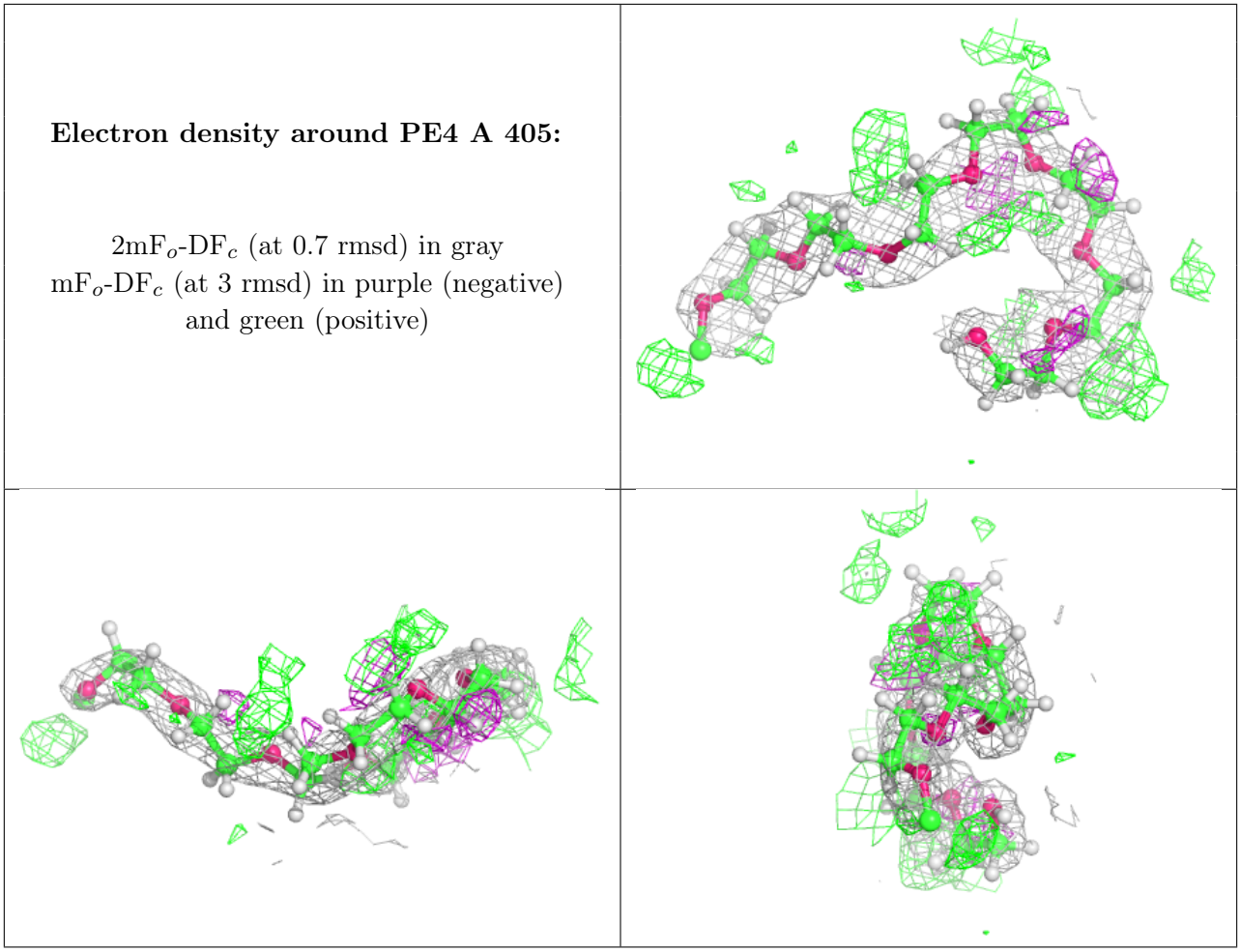
Electron density around PG6 B 403:

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



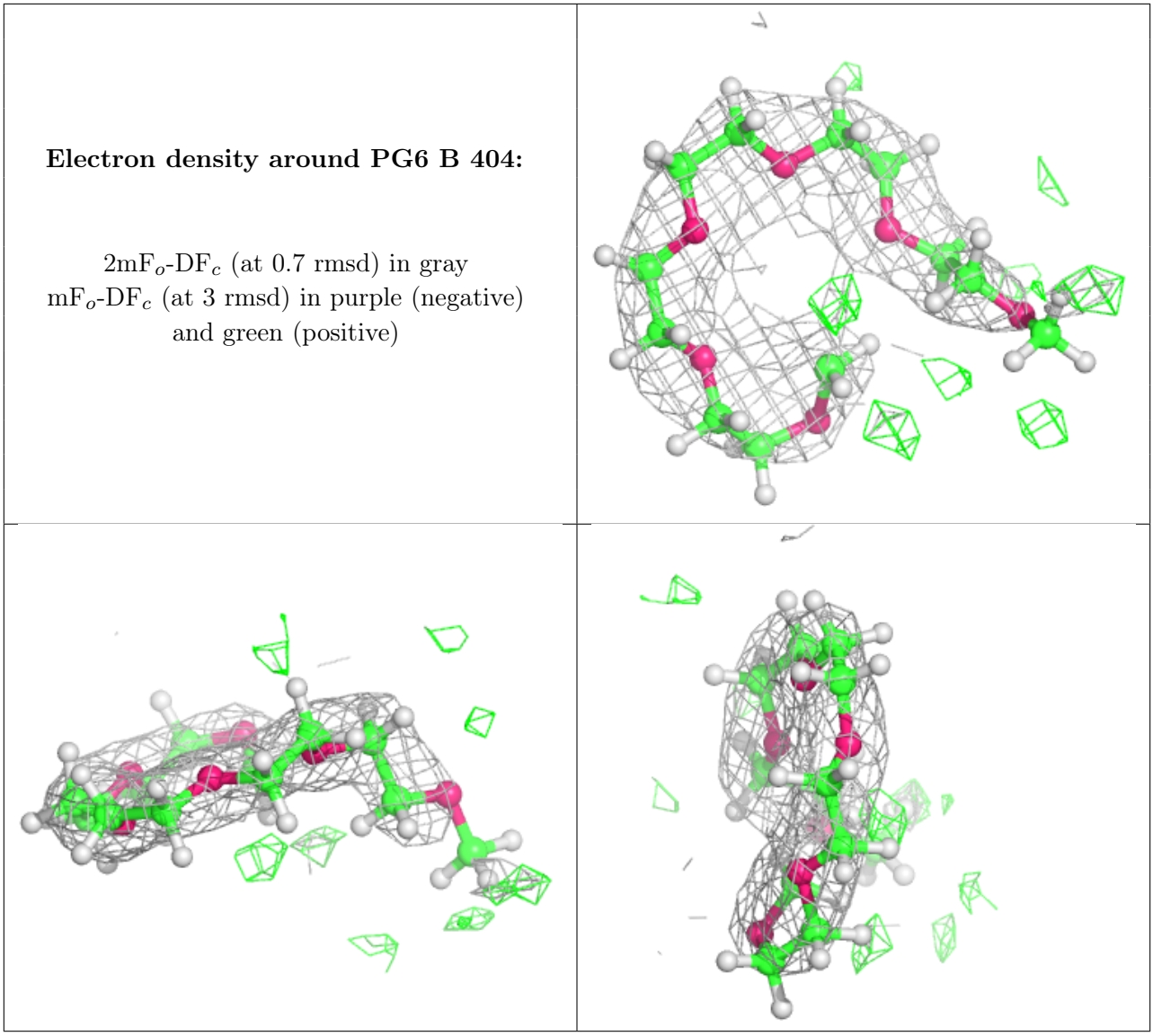
Electron density around PE4 A 405:

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



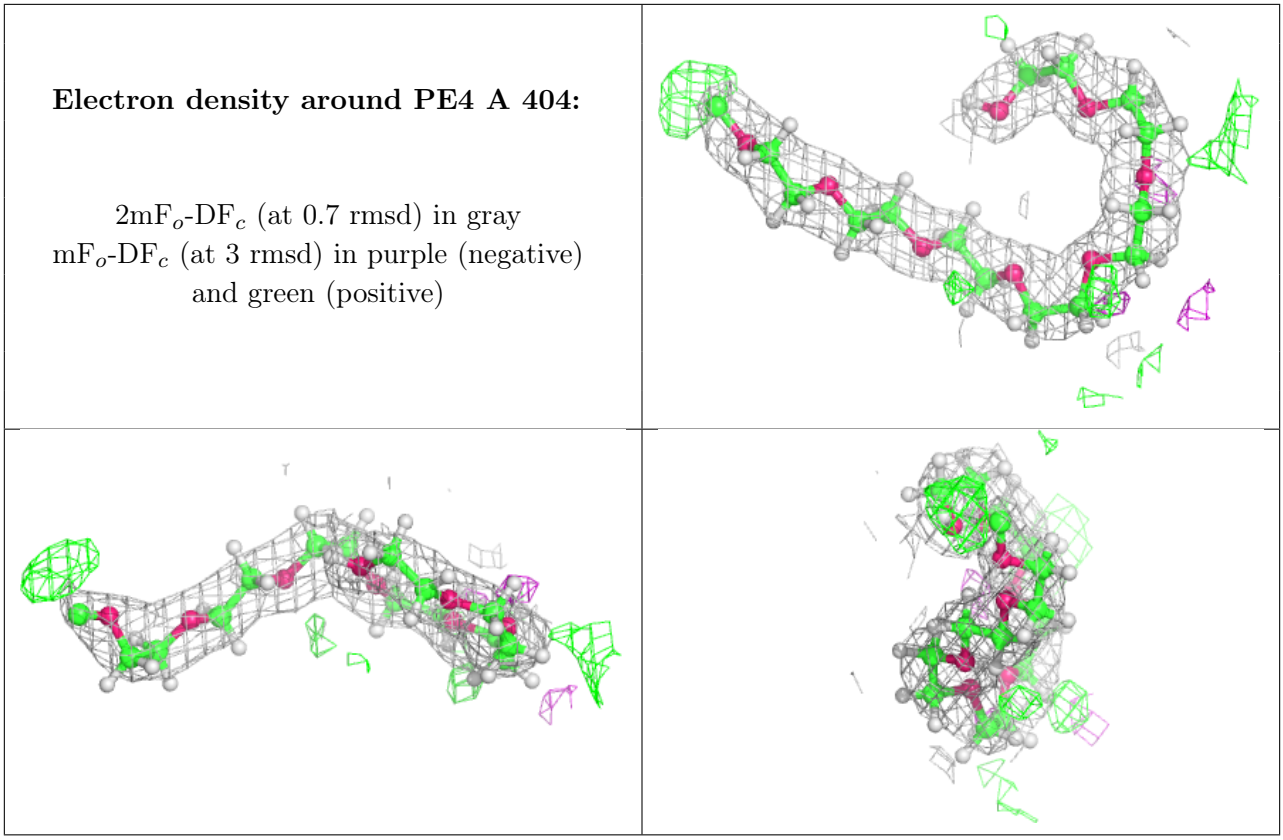
Electron density around PG6 B 404:

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



Electron density around PE4 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)



6.5 Other polymers (i)

There are no such residues in this entry.