Full wwPDB EM Validation Report

Dec 3, 2025 – 04:30 PM JST

PDB ID	:	9UNV / pdb_00009unv
EMDB ID	:	EMD-64364
Title	:	Cryo-EM structure of human organic solute transporter Ost-alpha/beta bound with TLCA
Authors	:	Yang, X.; Xu, E.
Deposited on	:	2025-04-24
Resolution	:	3.12 Å(reported)

This is a Full wwPDB EM 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/EMValidationReportHelp
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:

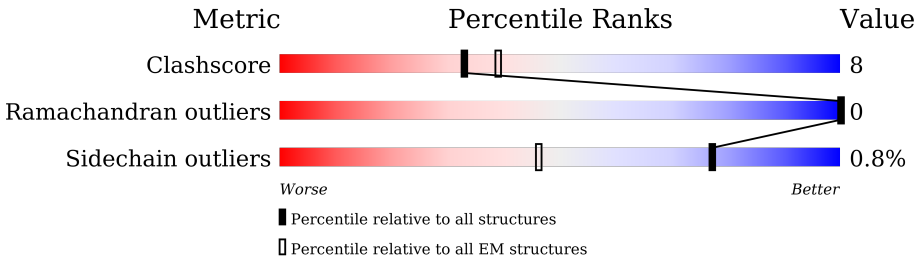
EMDB validation analysis	:	0.0.1.dev129
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.46

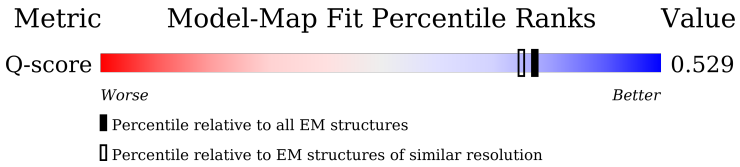
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 3.12 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)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	14478 (2.62 - 3.62)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	351	77% 17% 7%
1	C	351	77% 16% • 7%
2	B	141	26% 6% 67%
2	D	141	26% 6% 67%

2 Entry composition (i)

There are 9 unique types of molecules in this entry. The entry contains 7068 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 Organic solute transporter subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	328	Total 2530	C 1655	N 417	O 434	S 24	0	0
1	C	328	Total 2530	C 1655	N 417	O 434	S 24	0	0

There are 22 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	341	GLY	-	expression tag	UNP Q86UW1
A	342	GLY	-	expression tag	UNP Q86UW1
A	343	SER	-	expression tag	UNP Q86UW1
A	344	ASP	-	expression tag	UNP Q86UW1
A	345	TYR	-	expression tag	UNP Q86UW1
A	346	LYS	-	expression tag	UNP Q86UW1
A	347	ASP	-	expression tag	UNP Q86UW1
A	348	ASP	-	expression tag	UNP Q86UW1
A	349	ASP	-	expression tag	UNP Q86UW1
A	350	ASP	-	expression tag	UNP Q86UW1
A	351	LYS	-	expression tag	UNP Q86UW1
C	341	GLY	-	expression tag	UNP Q86UW1
C	342	GLY	-	expression tag	UNP Q86UW1
C	343	SER	-	expression tag	UNP Q86UW1
C	344	ASP	-	expression tag	UNP Q86UW1
C	345	TYR	-	expression tag	UNP Q86UW1
C	346	LYS	-	expression tag	UNP Q86UW1
C	347	ASP	-	expression tag	UNP Q86UW1
C	348	ASP	-	expression tag	UNP Q86UW1
C	349	ASP	-	expression tag	UNP Q86UW1
C	350	ASP	-	expression tag	UNP Q86UW1
C	351	LYS	-	expression tag	UNP Q86UW1

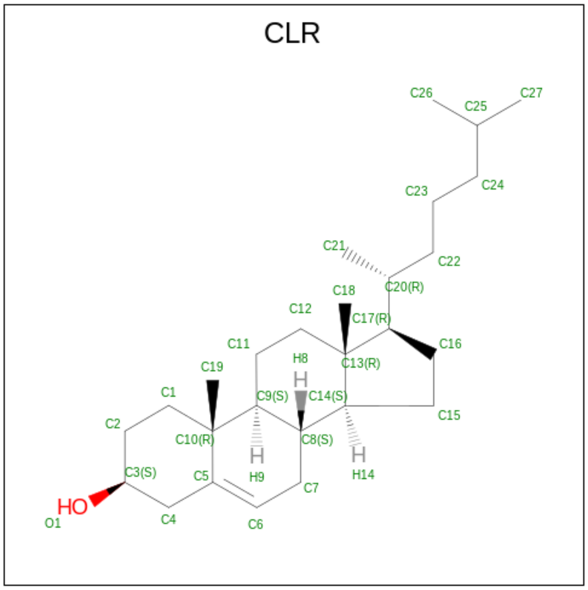
- Molecule 2 is a protein called Organic solute transporter subunit beta.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	46	Total	C	N	O	S	0	0
			364	239	59	64	2		
2	D	46	Total	C	N	O	S	0	0
			364	239	59	64	2		

There are 26 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	129	GLY	-	expression tag	UNP Q86UW2
B	130	GLY	-	expression tag	UNP Q86UW2
B	131	SER	-	expression tag	UNP Q86UW2
B	132	HIS	-	expression tag	UNP Q86UW2
B	133	HIS	-	expression tag	UNP Q86UW2
B	134	HIS	-	expression tag	UNP Q86UW2
B	135	HIS	-	expression tag	UNP Q86UW2
B	136	HIS	-	expression tag	UNP Q86UW2
B	137	HIS	-	expression tag	UNP Q86UW2
B	138	HIS	-	expression tag	UNP Q86UW2
B	139	HIS	-	expression tag	UNP Q86UW2
B	140	HIS	-	expression tag	UNP Q86UW2
B	141	HIS	-	expression tag	UNP Q86UW2
D	129	GLY	-	expression tag	UNP Q86UW2
D	130	GLY	-	expression tag	UNP Q86UW2
D	131	SER	-	expression tag	UNP Q86UW2
D	132	HIS	-	expression tag	UNP Q86UW2
D	133	HIS	-	expression tag	UNP Q86UW2
D	134	HIS	-	expression tag	UNP Q86UW2
D	135	HIS	-	expression tag	UNP Q86UW2
D	136	HIS	-	expression tag	UNP Q86UW2
D	137	HIS	-	expression tag	UNP Q86UW2
D	138	HIS	-	expression tag	UNP Q86UW2
D	139	HIS	-	expression tag	UNP Q86UW2
D	140	HIS	-	expression tag	UNP Q86UW2
D	141	HIS	-	expression tag	UNP Q86UW2

- Molecule 3 is CHOLESTEROL (CCD ID: CLR) (formula: $C_{27}H_{46}O$).



Mol	Chain	Residues	Atoms	AltConf
3	A	1	Total C O 28 27 1	0
3	A	1	Total C O 28 27 1	0
3	A	1	Total C O 28 27 1	0
3	A	1	Total C O 28 27 1	0
3	A	1	Total C O 28 27 1	0
3	A	1	Total C O 28 27 1	0
3	A	1	Total C O 28 27 1	0
3	A	1	Total C O 28 27 1	0
3	A	1	Total C O 28 27 1	0
3	A	1	Total C O 28 27 1	0
3	B	1	Total C O 28 27 1	0
3	B	1	Total C O 28 27 1	0
3	B	1	Total C O 28 27 1	0
3	C	1	Total C O 28 27 1	0

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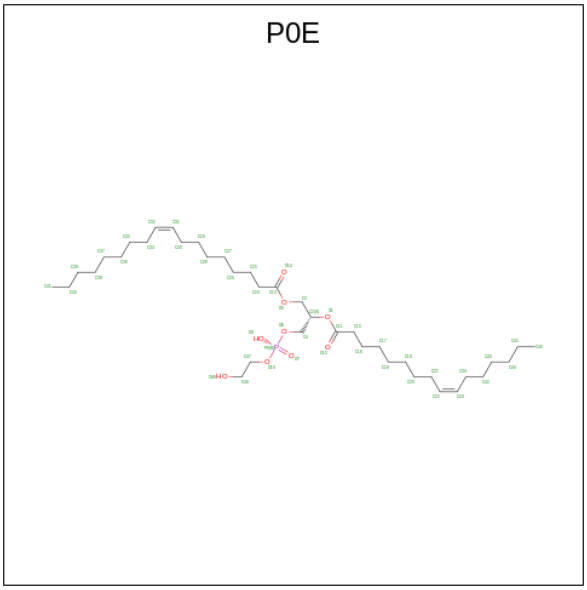
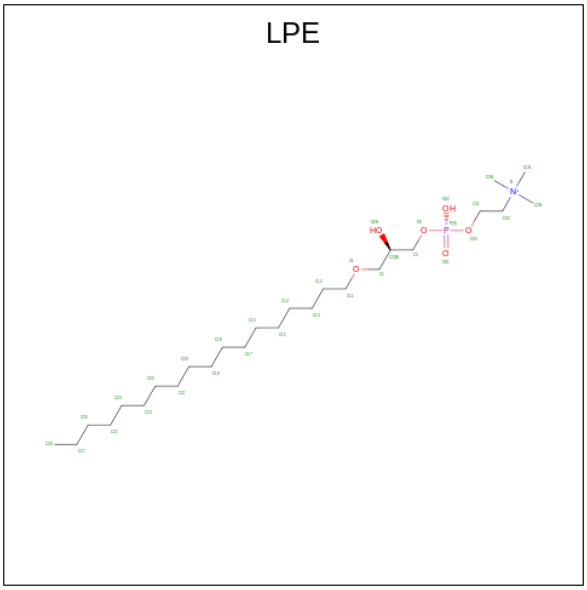
Mol	Chain	Residues	Atoms	AltConf
3	C	1	Total C O 28 27 1	0
3	C	1	Total C O 28 27 1	0
3	C	1	Total C O 28 27 1	0
3	C	1	Total C O 28 27 1	0
3	C	1	Total C O 28 27 1	0
3	C	1	Total C O 28 27 1	0
3	C	1	Total C O 28 27 1	0
3	C	1	Total C O 28 27 1	0
3	C	1	Total C O 28 27 1	0
3	D	1	Total C O 28 27 1	0
3	D	1	Total C O 28 27 1	0
3	D	1	Total C O 28 27 1	0

- Molecule 4 is PHOSPHATIDYL ETHANOL (CCD ID: P0E) (formula: $C_{39}H_{73}O_9P$).



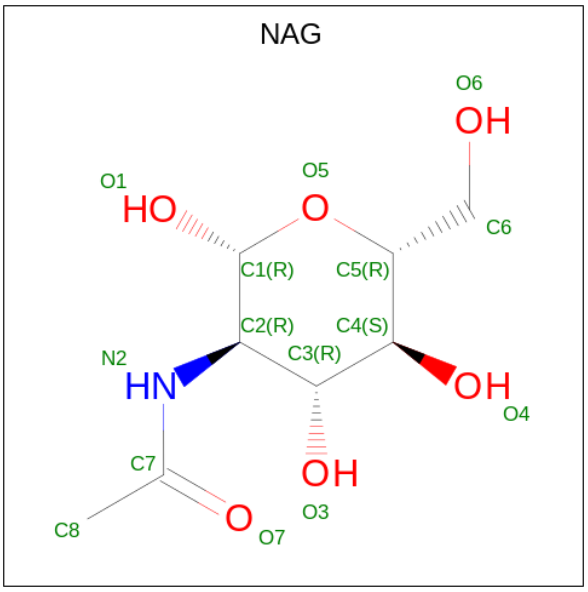
Mol	Chain	Residues	Atoms				AltConf
4	A	1	Total	C	O	P	0
			49	39	9	1	
4	C	1	Total	C	O	P	0
			49	39	9	1	

- Molecule 5 is 1-O-OCTADECYL-SN-GLYCERO-3-PHOSPHOCHOLINE (CCD ID: LPE) (formula: $C_{26}H_{57}NO_6P$).



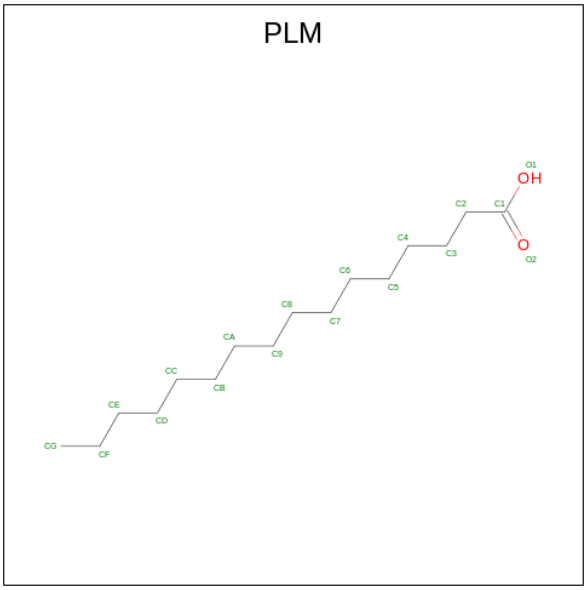
Mol	Chain	Residues	Atoms					AltConf
5	A	1	Total	C	N	O	P	0
			34	26	1	6	1	
5	C	1	Total	C	N	O	P	0
			34	26	1	6	1	

- Molecule 6 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms	AltConf
6	A	1	Total C N O 14 8 1 5	0
6	C	1	Total C N O 14 8 1 5	0

- Molecule 7 is PALMITIC ACID (CCD ID: PLM) (formula: $C_{16}H_{32}O_2$).



Mol	Chain	Residues	Atoms	AltConf
7	A	1	Total C O 9 8 1	0
7	A	1	Total C O 9 8 1	0

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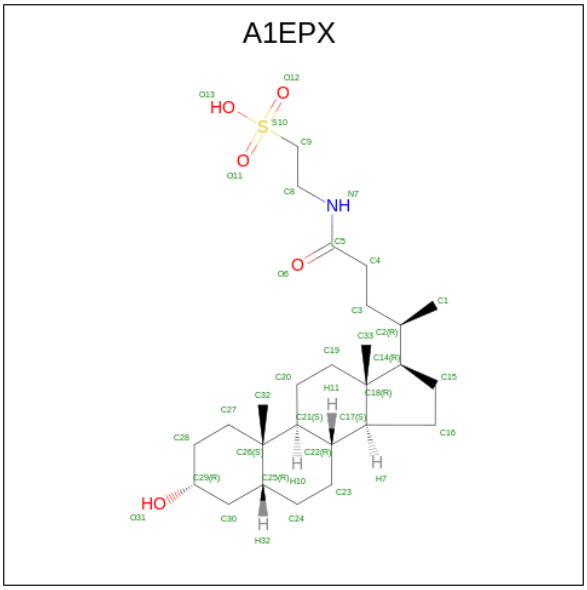
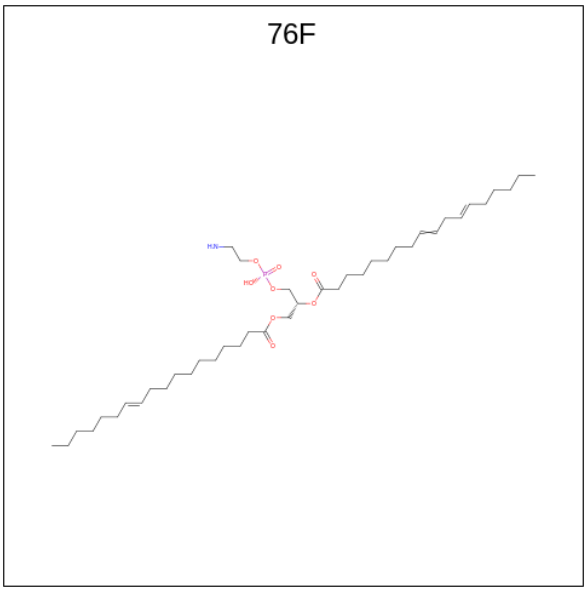
Mol	Chain	Residues	Atoms	AltConf
7	A	1	Total C O 6 5 1	0
7	A	1	Total C O 9 8 1	0
7	A	1	Total C O 7 6 1	0
7	A	1	Total C O 5 4 1	0
7	A	1	Total C O 6 5 1	0
7	C	1	Total C O 9 8 1	0
7	C	1	Total C O 9 8 1	0
7	C	1	Total C O 6 5 1	0
7	C	1	Total C O 9 8 1	0
7	C	1	Total C O 7 6 1	0
7	C	1	Total C O 5 4 1	0
7	C	1	Total C O 6 5 1	0

- Molecule 8 is Taurolithocholic Acid (CCD ID: A1EPX) (formula: $C_{26}H_{45}NO_5S$).



Mol	Chain	Residues	Atoms					AltConf
8	A	1	Total	C	N	O	S	0
			33	26	1	5	1	
8	C	1	Total	C	N	O	S	0
			33	26	1	5	1	

- Molecule 9 is (7E,21R,24S)-27-amino-24-hydroxy-18,24-dioxo-19,23,25-trioxa-24lambda 5 -phosphaheptacos-7-en-21-yl (9Z,12E)-octadeca-9,12-dienoate (CCD ID: 76F) (formula: $C_{41}H_{76}NO_8P$) (labeled as "Ligand of Interest" by depositor).



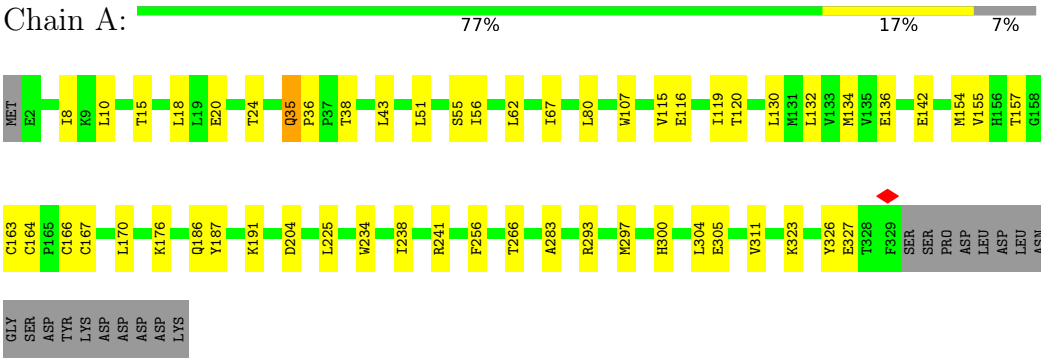
Mol	Chain	Residues	Atoms					AltConf
9	A	1	Total	C	N	O	P	0
			51	41	1	8	1	
9	A	1	Total	C	N	O	P	0
			44	34	1	8	1	
9	C	1	Total	C	N	O	P	0
			51	41	1	8	1	
9	C	1	Total	C	N	O	P	0
			44	34	1	8	1	

3 Residue-property plots

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 atom inclusion in map 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 diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). 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.

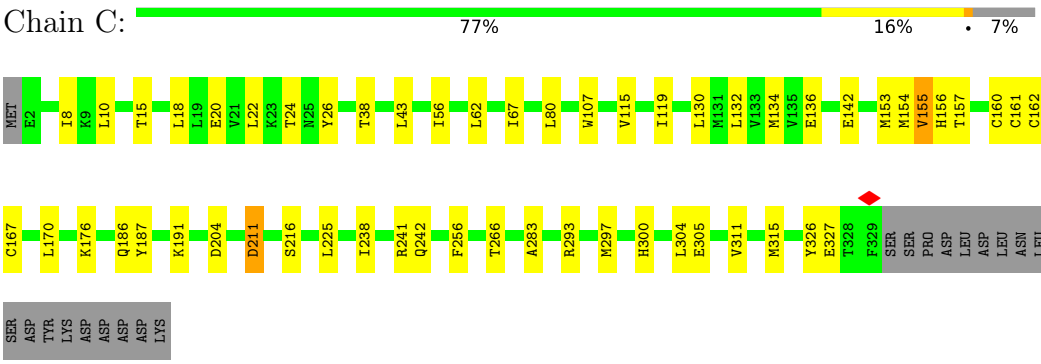
• Molecule 1: Organic solute transporter subunit alpha

Chain A:



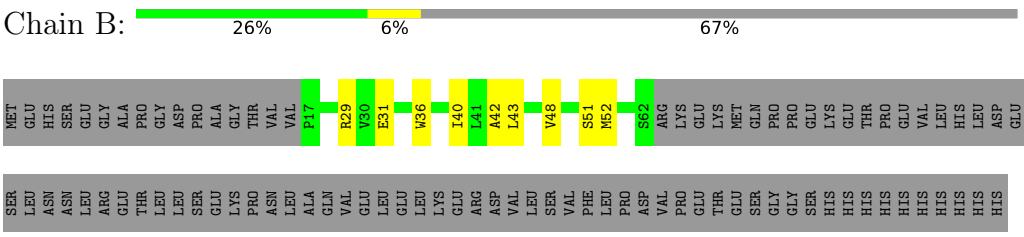
• Molecule 1: Organic solute transporter subunit alpha

Chain C:



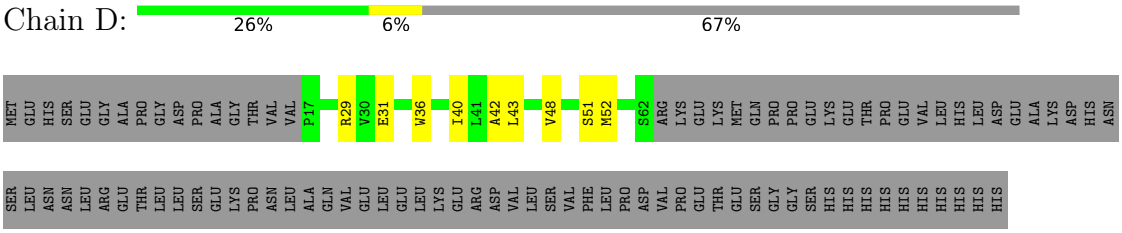
• Molecule 2: Organic solute transporter subunit beta

Chain B:



• Molecule 2: Organic solute transporter subunit beta

Chain D:


26%
6%
67%
MET GLU HIS SER GLU GLY ALA PRO GLY ASP PRO ALA GLY THR VAL VAL P17 R29 V30 E31 W36 I40 L41 A42 L43 V48 S51 M52 S62 ARG LYS GLU LYS MET GLN PRO PRO GLU LYS GLU THR PRO GLU VAL LEU HIS LEU ASP GLU ALA LYS ASP HIS ASN
SER LEU ASN ASN LEU ARG GLU THR LEU LEU SER GLU LYS PRO ASN LEU ALA GLN VAL GLU LEU GLU LEU LYS GLU ARG ASP VAL LEU SER VAL PHE LEU PRO ASP VAL PRO GLU THR GLU SER GLY GLY SER HIS HIS HIS HIS HIS HIS HIS HIS HIS HIS

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	76705	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	50.0	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	1500	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	2.607	Depositor
Minimum map value	-1.760	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.072	Depositor
Recommended contour level	0.24	Depositor
Map size (Å)	233.6, 233.6, 233.6	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.73, 0.73, 0.73	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: PLM, P0E, 76F, A1EPX, LPE, NAG, CLR

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	0.24	0/2586	0.34	0/3522
1	C	0.20	0/2586	0.36	3/3522 (0.1%)
2	B	0.13	0/372	0.20	0/506
2	D	0.13	0/372	0.21	0/506
All	All	0.21	0/5916	0.34	3/8056 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	155	VAL	O-C-N	-8.91	113.25	122.25
1	C	155	VAL	CA-C-N	5.17	131.83	122.62
1	C	155	VAL	C-N-CA	5.17	131.83	122.62

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	2530	0	2644	45	0
1	C	2530	0	2645	49	0
2	B	364	0	372	9	0
2	D	364	0	372	9	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	A	280	0	460	10	0
3	B	84	0	138	6	0
3	C	280	0	460	9	0
3	D	84	0	138	5	0
4	A	49	0	72	1	0
4	C	49	0	72	1	0
5	A	34	0	56	2	0
5	C	34	0	56	2	0
6	A	14	0	13	0	0
6	C	14	0	13	0	0
7	A	51	0	60	11	0
7	C	51	0	60	11	0
8	A	33	0	0	1	0
8	C	33	0	0	1	0
9	A	95	0	0	0	0
9	C	95	0	0	0	0
All	All	7068	0	7631	120	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 (120) 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:162:CYS:SG	7:A:417:PLM:C1	2.15	1.34
1:C:162:CYS:SG	7:C:417:PLM:C1	2.16	1.33
1:C:142:GLU:OE2	1:C:327:GLU:O	1.71	1.07
1:C:167:CYS:SG	7:C:415:PLM:C1	2.49	1.00
1:C:166:CYS:SG	7:C:420:PLM:C1	2.59	0.91
1:C:162:CYS:SG	7:C:417:PLM:O2	2.30	0.90
1:C:160:CYS:SG	7:C:419:PLM:C1	2.60	0.90
1:A:162:CYS:SG	7:A:417:PLM:O2	2.32	0.88
1:C:164:CYS:SG	7:C:414:PLM:C1	2.63	0.86
1:A:164:CYS:SG	7:A:414:PLM:C1	2.68	0.81
1:A:167:CYS:SG	7:A:415:PLM:C1	2.69	0.81
1:A:166:CYS:SG	7:A:420:PLM:C1	2.74	0.76
1:C:153:MET:CE	1:C:238:ILE:HG22	2.16	0.75
1:A:163:CYS:HG	7:A:416:PLM:C1	2.01	0.73
1:C:163:CYS:SG	7:C:416:PLM:C1	2.76	0.72
1:C:211:ASP:OD2	1:C:216:SER:HB2	1.89	0.72
1:A:163:CYS:SG	7:A:416:PLM:C1	2.78	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:170:LEU:HD11	1:A:176:LYS:HD3	1.72	0.70
1:C:170:LEU:HD11	1:C:176:LYS:HD3	1.73	0.69
1:C:170:LEU:HD13	3:C:410:CLR:H72	1.74	0.68
1:C:241:ARG:NH2	8:C:423:A1EPX:O12	2.31	0.64
1:C:153:MET:HE1	1:C:238:ILE:HG22	1.79	0.63
1:C:157:THR:OG1	1:C:241:ARG:NE	2.32	0.62
1:A:170:LEU:HD13	3:A:410:CLR:H72	1.81	0.62
7:A:415:PLM:H71	7:A:418:PLM:H41	1.83	0.61
7:C:415:PLM:H71	7:C:418:PLM:H41	1.83	0.60
1:C:62:LEU:HD22	3:C:407:CLR:H271	1.85	0.59
1:C:160:CYS:HA	7:C:417:PLM:H22	1.85	0.59
1:A:62:LEU:HD22	3:A:407:CLR:H271	1.85	0.58
1:C:157:THR:OG1	1:C:241:ARG:CZ	2.52	0.58
2:D:29:ARG:NH1	2:D:31:GLU:OE1	2.37	0.58
2:B:29:ARG:NH1	2:B:31:GLU:OE1	2.37	0.58
1:A:132:LEU:O	1:A:136:GLU:HG2	2.06	0.56
1:A:304:LEU:HD11	2:B:40:ILE:HG23	1.87	0.56
1:A:142:GLU:OE1	1:A:327:GLU:O	2.24	0.56
1:C:304:LEU:HD11	2:D:40:ILE:HG23	1.88	0.55
1:C:311:VAL:HG21	2:D:51:SER:HB2	1.88	0.55
1:A:160:CYS:HA	7:A:417:PLM:H22	1.88	0.54
1:C:142:GLU:CD	1:C:327:GLU:O	2.50	0.54
1:A:311:VAL:HG21	2:B:51:SER:HB2	1.89	0.54
1:C:132:LEU:O	1:C:136:GLU:HG2	2.07	0.54
2:B:43:LEU:HD11	3:B:201:CLR:H162	1.91	0.52
1:C:153:MET:CE	1:C:238:ILE:CG2	2.87	0.52
1:A:300:HIS:HB3	2:B:40:ILE:HD13	1.91	0.52
3:A:402:CLR:H193	3:C:409:CLR:H8	1.92	0.52
1:A:305:GLU:HG2	4:A:403:P0E:H461	1.92	0.52
1:A:154:MET:SD	1:A:241:ARG:NH1	2.83	0.52
2:D:43:LEU:HD11	3:D:201:CLR:H162	1.91	0.51
7:C:415:PLM:H52	7:C:418:PLM:H21	1.93	0.51
7:A:415:PLM:H52	7:A:418:PLM:H21	1.93	0.51
1:C:191:LYS:HD2	1:C:225:LEU:HD13	1.93	0.51
1:A:161:CYS:SG	7:A:418:PLM:C1	2.99	0.51
1:A:191:LYS:HD2	1:A:225:LEU:HD13	1.93	0.51
3:A:409:CLR:H8	3:C:422:CLR:H193	1.92	0.51
1:C:305:GLU:HG2	4:C:403:P0E:H461	1.92	0.51
1:A:80:LEU:HD12	5:A:404:LPE:H1N1	1.93	0.50
1:C:300:HIS:HB3	2:D:40:ILE:HD13	1.91	0.50
1:C:80:LEU:HD12	5:C:404:LPE:H1N1	1.94	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:155:VAL:HG21	3:C:410:CLR:H191	1.94	0.50
3:C:411:CLR:H272	3:C:412:CLR:H241	1.93	0.50
1:A:15:THR:H	1:A:18:LEU:HD12	1.76	0.49
1:C:130:LEU:HD21	1:C:256:PHE:HD1	1.77	0.49
2:D:48:VAL:O	2:D:52:MET:HG2	2.13	0.49
1:A:186:GLN:HG3	1:A:187:TYR:N	2.26	0.49
1:C:186:GLN:HG3	1:C:187:TYR:N	2.26	0.49
1:A:130:LEU:HD21	1:A:256:PHE:HD1	1.78	0.49
1:A:283:ALA:HB3	2:B:31:GLU:HB2	1.93	0.49
1:C:293:ARG:O	1:C:297:MET:HG3	2.13	0.49
2:B:36:TRP:CE2	2:B:40:ILE:HD11	2.48	0.49
1:C:283:ALA:HB3	2:D:31:GLU:HB2	1.94	0.49
1:C:8:ILE:HG13	1:C:10:LEU:HD21	1.94	0.48
2:B:48:VAL:O	2:B:52:MET:HG2	2.12	0.48
3:C:411:CLR:H181	3:D:201:CLR:H212	1.95	0.48
2:D:36:TRP:CE2	2:D:40:ILE:HD11	2.48	0.48
3:A:411:CLR:H272	3:A:412:CLR:H241	1.94	0.48
1:A:293:ARG:O	1:A:297:MET:HG3	2.13	0.48
3:C:410:CLR:H20	3:C:410:CLR:H242	1.76	0.47
3:A:411:CLR:H181	3:B:201:CLR:H212	1.95	0.47
1:A:20:GLU:O	1:A:24:THR:HG23	2.14	0.47
1:A:157:THR:HG22	1:A:241:ARG:CZ	2.44	0.47
1:C:15:THR:H	1:C:18:LEU:HD12	1.79	0.47
1:C:161:CYS:SG	7:C:418:PLM:C1	3.02	0.47
1:A:159:PRO:HB2	8:A:421:A1EPX:C15	2.45	0.47
1:C:20:GLU:O	1:C:24:THR:HG23	2.15	0.46
1:A:142:GLU:H	1:A:142:GLU:CD	2.23	0.45
1:C:154:MET:HE2	1:C:156:HIS:CE1	2.50	0.45
5:C:404:LPE:H1N2	5:C:404:LPE:H311	1.67	0.45
1:A:35:GLN:HG3	1:A:36:PRO:HD2	1.99	0.45
5:A:404:LPE:H1N2	5:A:404:LPE:H311	1.68	0.45
3:A:406:CLR:H162	3:A:406:CLR:H221	1.81	0.45
1:C:153:MET:HG2	1:C:242:GLN:HG3	1.99	0.45
1:A:204:ASP:HB3	1:C:38:THR:HG23	1.99	0.45
1:A:38:THR:HG23	1:C:204:ASP:HB3	1.99	0.45
1:A:326:TYR:HD1	1:C:326:TYR:CD1	2.36	0.44
2:B:42:ALA:HA	3:B:202:CLR:H42	2.00	0.44
1:C:43:LEU:HD21	1:C:107:TRP:HZ3	1.83	0.44
3:A:401:CLR:H272	3:A:401:CLR:H232	1.79	0.43
1:A:119:ILE:HG22	1:A:266:THR:HG23	2.00	0.43
1:A:234:TRP:O	1:A:238:ILE:HG13	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:323:LYS:HA	1:A:323:LYS:HD3	1.76	0.43
2:D:42:ALA:HA	3:D:202:CLR:H42	2.00	0.43
1:C:170:LEU:CD1	1:C:176:LYS:HD3	2.43	0.43
1:A:56:ILE:HD13	3:B:203:CLR:H241	2.01	0.43
3:B:203:CLR:H222	3:B:203:CLR:H162	1.73	0.43
1:A:43:LEU:HD21	1:A:107:TRP:HZ3	1.83	0.42
1:A:116:GLU:O	1:A:120:THR:HG23	2.19	0.42
3:A:410:CLR:H242	3:A:410:CLR:H20	1.76	0.42
1:C:119:ILE:HG22	1:C:266:THR:HG23	2.01	0.42
1:A:51:LEU:O	1:A:55:SER:OG	2.34	0.41
1:C:56:ILE:HD13	3:D:203:CLR:H241	2.02	0.41
1:C:315:MET:HE3	1:C:315:MET:HB3	1.85	0.41
1:A:8:ILE:HG13	1:A:10:LEU:HD21	2.02	0.41
1:A:130:LEU:O	1:A:134:MET:HG3	2.21	0.41
1:C:67:ILE:HG12	3:C:406:CLR:H151	2.03	0.41
1:C:22:LEU:HA	1:C:26:TYR:HB2	2.03	0.40
3:D:203:CLR:H162	3:D:203:CLR:H222	1.73	0.40
1:A:67:ILE:HG12	3:A:406:CLR:H151	2.04	0.40
3:B:201:CLR:H162	3:B:201:CLR:H222	1.88	0.40
1:C:130:LEU:O	1:C:134:MET:HG3	2.22	0.40
1:A:241:ARG:HA	1:A:241:ARG:HD3	1.92	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 PDB entries followed by that with respect to all EM entries.

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	326/351 (93%)	324 (99%)	2 (1%)	0	100	100
1	C	326/351 (93%)	324 (99%)	2 (1%)	0	100	100
2	B	44/141 (31%)	44 (100%)	0	0	100	100
2	D	44/141 (31%)	44 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
All	All	740/984 (75%)	736 (100%)	4 (0%)	0	100 100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

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	280/306 (92%)	277 (99%)	3 (1%)	70 83
1	C	280/306 (92%)	278 (99%)	2 (1%)	81 90
2	B	40/126 (32%)	40 (100%)	0	100 100
2	D	40/126 (32%)	40 (100%)	0	100 100
All	All	640/864 (74%)	635 (99%)	5 (1%)	77 89

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

Mol	Chain	Res	Type
1	A	35	GLN
1	A	115	VAL
1	A	155	VAL
1	C	115	VAL
1	C	211	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	35	GLN
1	A	298	ASN
1	C	156	HIS
1	C	242	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

52 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	$\#\|Z\| > 2$
7	PLM	C	414	-	8,8,17	0.44	0	7,7,17	0.53	0
4	P0E	C	403	-	48,48,48	0.50	0	51,53,53	0.50	1 (1%)
7	PLM	A	419	1	4,4,17	0.60	0	3,3,17	0.90	0
7	PLM	A	417	-	8,8,17	0.51	0	7,7,17	0.70	0
8	A1EPX	C	423	-	36,36,36	0.13	0	55,56,56	0.33	0
3	CLR	D	201	-	31,31,31	0.37	0	48,48,48	0.49	0
4	P0E	A	403	-	48,48,48	0.50	0	51,53,53	0.50	1 (1%)
3	CLR	A	402	-	31,31,31	0.40	0	48,48,48	0.62	0
3	CLR	D	202	-	31,31,31	0.37	0	48,48,48	0.52	0
3	CLR	C	408	-	31,31,31	0.38	0	48,48,48	0.48	0
6	NAG	C	413	1	14,14,15	0.70	0	17,19,21	0.79	0
7	PLM	A	414	-	8,8,17	0.44	0	7,7,17	0.53	0
7	PLM	C	417	-	8,8,17	0.50	0	7,7,17	0.70	0
8	A1EPX	A	421	-	36,36,36	0.13	0	55,56,56	0.33	0
3	CLR	C	422	-	31,31,31	0.40	0	48,48,48	0.62	0
7	PLM	A	418	-	6,6,17	0.51	0	5,5,17	0.64	0
7	PLM	A	420	-	5,5,17	0.58	0	4,4,17	0.75	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
5	LPE	A	404	-	33,33,33	1.02	0	37,39,39	0.81	1 (2%)
3	CLR	A	410	-	31,31,31	0.41	0	48,48,48	0.98	2 (4%)
7	PLM	A	415	-	8,8,17	0.46	0	7,7,17	0.52	0
3	CLR	D	203	-	31,31,31	0.38	0	48,48,48	0.47	0
7	PLM	C	419	-	4,4,17	0.59	0	3,3,17	0.89	0
7	PLM	C	420	-	5,5,17	0.59	0	4,4,17	0.75	0
3	CLR	C	421	-	31,31,31	0.38	0	48,48,48	0.59	0
9	76F	A	422	-	50,50,50	1.58	7 (14%)	53,55,55	1.56	4 (7%)
9	76F	C	402	-	43,43,50	1.35	4 (9%)	46,48,55	1.43	7 (15%)
3	CLR	A	411	-	31,31,31	0.38	0	48,48,48	0.54	0
3	CLR	B	203	-	31,31,31	0.38	0	48,48,48	0.47	0
6	NAG	A	413	1	14,14,15	0.71	0	17,19,21	0.79	0
7	PLM	C	418	-	6,6,17	0.52	0	5,5,17	0.64	0
9	76F	C	401	-	50,50,50	1.58	7 (14%)	53,55,55	1.57	4 (7%)
3	CLR	C	405	-	31,31,31	0.37	0	48,48,48	0.47	0
3	CLR	A	407	-	31,31,31	0.38	0	48,48,48	0.48	0
3	CLR	A	406	-	31,31,31	0.38	0	48,48,48	0.56	0
3	CLR	C	407	-	31,31,31	0.37	0	48,48,48	0.48	0
3	CLR	A	401	-	31,31,31	0.37	0	48,48,48	0.58	0
3	CLR	C	412	-	31,31,31	0.36	0	48,48,48	0.50	0
3	CLR	A	409	-	31,31,31	0.38	0	48,48,48	0.54	0
7	PLM	A	416	-	5,5,17	0.56	0	4,4,17	0.95	0
3	CLR	C	410	-	31,31,31	0.40	0	48,48,48	0.98	2 (4%)
9	76F	A	423	-	43,43,50	1.35	4 (9%)	46,48,55	1.43	7 (15%)
3	CLR	A	408	-	31,31,31	0.37	0	48,48,48	0.49	0
3	CLR	A	412	-	31,31,31	0.36	0	48,48,48	0.50	0
5	LPE	C	404	-	33,33,33	1.01	0	37,39,39	0.81	1 (2%)
7	PLM	C	415	-	8,8,17	0.46	0	7,7,17	0.52	0
3	CLR	C	406	-	31,31,31	0.37	0	48,48,48	0.56	0
3	CLR	A	405	-	31,31,31	0.37	0	48,48,48	0.47	0
3	CLR	B	202	-	31,31,31	0.36	0	48,48,48	0.52	0
3	CLR	B	201	-	31,31,31	0.37	0	48,48,48	0.49	0
7	PLM	C	416	-	5,5,17	0.56	0	4,4,17	0.95	0
3	CLR	C	411	-	31,31,31	0.38	0	48,48,48	0.54	0
3	CLR	C	409	-	31,31,31	0.38	0	48,48,48	0.54	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
7	PLM	C	414	-	-	2/5/6/15	-
4	P0E	C	403	-	-	13/52/52/52	-
7	PLM	A	419	1	-	1/1/2/15	-
7	PLM	A	417	-	-	3/5/6/15	-
8	A1EPX	C	423	-	-	0/16/74/74	0/4/4/4
3	CLR	D	201	-	-	4/10/68/68	0/4/4/4
4	P0E	A	403	-	-	13/52/52/52	-
3	CLR	A	402	-	-	8/10/68/68	0/4/4/4
3	CLR	D	202	-	-	0/10/68/68	0/4/4/4
3	CLR	C	408	-	-	4/10/68/68	0/4/4/4
6	NAG	C	413	1	-	0/6/23/26	0/1/1/1
7	PLM	A	414	-	-	2/5/6/15	-
7	PLM	C	417	-	-	3/5/6/15	-
8	A1EPX	A	421	-	-	0/16/74/74	0/4/4/4
3	CLR	C	422	-	-	8/10/68/68	0/4/4/4
7	PLM	A	418	-	-	0/3/4/15	-
7	PLM	A	420	-	-	0/2/3/15	-
5	LPE	A	404	-	-	8/34/34/34	-
3	CLR	A	410	-	-	6/10/68/68	0/4/4/4
7	PLM	A	415	-	-	0/5/6/15	-
3	CLR	D	203	-	-	5/10/68/68	0/4/4/4
7	PLM	C	419	-	-	1/1/2/15	-
7	PLM	C	420	-	-	0/2/3/15	-
3	CLR	C	421	-	-	7/10/68/68	0/4/4/4
9	76F	A	422	-	-	23/54/54/54	-
9	76F	C	402	-	-	20/47/47/54	-
3	CLR	A	411	-	-	0/10/68/68	0/4/4/4
3	CLR	B	203	-	-	5/10/68/68	0/4/4/4
6	NAG	A	413	1	-	0/6/23/26	0/1/1/1
7	PLM	C	418	-	-	0/3/4/15	-
9	76F	C	401	-	-	25/54/54/54	-
3	CLR	C	405	-	-	4/10/68/68	0/4/4/4
3	CLR	A	407	-	-	0/10/68/68	0/4/4/4
3	CLR	A	406	-	-	6/10/68/68	0/4/4/4
3	CLR	C	407	-	-	0/10/68/68	0/4/4/4
3	CLR	A	401	-	-	7/10/68/68	0/4/4/4
3	CLR	C	412	-	-	0/10/68/68	0/4/4/4
3	CLR	A	409	-	-	7/10/68/68	0/4/4/4

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
7	PLM	A	416	-	-	0/2/3/15	-
3	CLR	C	410	-	-	6/10/68/68	0/4/4/4
9	76F	A	423	-	-	21/47/47/54	-
3	CLR	A	408	-	-	4/10/68/68	0/4/4/4
3	CLR	A	412	-	-	0/10/68/68	0/4/4/4
5	LPE	C	404	-	-	8/34/34/34	-
7	PLM	C	415	-	-	0/5/6/15	-
3	CLR	C	406	-	-	6/10/68/68	0/4/4/4
3	CLR	A	405	-	-	4/10/68/68	0/4/4/4
3	CLR	B	202	-	-	0/10/68/68	0/4/4/4
3	CLR	B	201	-	-	4/10/68/68	0/4/4/4
7	PLM	C	416	-	-	0/2/3/15	-
3	CLR	C	411	-	-	0/10/68/68	0/4/4/4
3	CLR	C	409	-	-	7/10/68/68	0/4/4/4

All (22) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	C	402	76F	P-O3P	4.37	1.77	1.59
9	A	423	76F	P-O3P	4.36	1.77	1.59
9	C	401	76F	C5-N	-4.06	1.13	1.46
9	A	422	76F	C5-N	-4.04	1.13	1.46
9	C	401	76F	C22-C21	4.02	1.55	1.31
9	A	422	76F	C22-C21	4.01	1.55	1.31
9	A	422	76F	C41-C40	3.98	1.54	1.31
9	C	401	76F	C41-C40	3.98	1.54	1.31
9	C	401	76F	C19-C18	3.89	1.54	1.31
9	A	422	76F	C19-C18	3.88	1.54	1.31
9	A	423	76F	P-O4P	3.40	1.73	1.59
9	C	402	76F	P-O4P	3.38	1.73	1.59
9	C	402	76F	C1-C2	3.32	1.60	1.50
9	A	423	76F	C1-C2	3.32	1.60	1.50
9	A	422	76F	O2-C10	2.79	1.42	1.34
9	C	401	76F	O2-C10	2.76	1.42	1.34
9	C	401	76F	O2-C2	-2.71	1.39	1.46
9	A	422	76F	O2-C2	-2.64	1.40	1.46
9	C	401	76F	O3-C30	2.63	1.41	1.33
9	A	422	76F	O3-C30	2.61	1.41	1.33
9	A	423	76F	C3-C2	2.33	1.57	1.50
9	C	402	76F	C3-C2	2.32	1.57	1.50

All (30) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
9	C	401	76F	C4-C5-N	7.36	179.93	114.45
9	A	422	76F	C4-C5-N	7.22	178.71	114.45
9	C	402	76F	O2-C10-C11	5.89	124.20	111.50
9	A	423	76F	O2-C10-C11	5.84	124.08	111.50
3	A	410	CLR	C13-C17-C20	4.10	125.91	119.49
3	C	410	CLR	C13-C17-C20	4.09	125.90	119.49
9	A	422	76F	O2-C10-C11	4.05	120.23	111.50
9	C	401	76F	O2-C10-C11	4.04	120.21	111.50
9	A	423	76F	O3-C30-C31	3.36	122.44	111.91
9	C	402	76F	O3-C30-C31	3.34	122.39	111.91
9	C	402	76F	O2-C10-O4	-2.81	116.91	123.70
9	A	423	76F	O2-C10-O4	-2.80	116.93	123.70
9	A	423	76F	O2P-P-O1P	2.79	126.05	112.24
9	C	402	76F	O2P-P-O1P	2.79	126.05	112.24
9	A	423	76F	C2-O2-C10	2.66	124.35	117.79
9	C	402	76F	C2-O2-C10	2.62	124.25	117.79
9	A	422	76F	O3-C30-C31	2.50	119.77	111.91
9	C	401	76F	O3-C30-C31	2.49	119.73	111.91
4	A	403	P0E	O9-P8-O7	2.43	124.26	112.24
4	C	403	P0E	O9-P8-O7	2.42	124.20	112.24
9	C	402	76F	C21-C20-C19	2.39	123.80	112.02
9	A	423	76F	C21-C20-C19	2.38	123.72	112.02
9	C	401	76F	O2P-P-O1P	-2.31	100.83	112.24
9	A	422	76F	O2P-P-O1P	-2.29	100.90	112.24
9	A	423	76F	O3-C30-O5	-2.21	118.02	123.59
9	C	402	76F	O3-C30-O5	-2.19	118.06	123.59
5	C	404	LPE	O32-P-O31	-2.16	101.58	112.24
5	A	404	LPE	O32-P-O31	-2.16	101.58	112.24
3	A	410	CLR	C17-C13-C14	-2.07	97.62	100.07
3	C	410	CLR	C17-C13-C14	-2.06	97.63	100.07

There are no chirality outliers.

All (245) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	203	CLR	C13-C17-C20-C21
3	B	203	CLR	C16-C17-C20-C22
3	D	203	CLR	C13-C17-C20-C21
3	D	203	CLR	C16-C17-C20-C22
4	A	403	P0E	C4-O6-P8-O7
4	C	403	P0E	C4-O6-P8-O7

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Mol	Chain	Res	Type	Atoms
5	A	404	LPE	C31-O33-P-O3
5	A	404	LPE	C31-O33-P-O31
5	C	404	LPE	C31-O33-P-O3
5	C	404	LPE	C31-O33-P-O31
7	A	419	PLM	C1-C2-C3-C4
7	C	419	PLM	C1-C2-C3-C4
9	A	422	76F	O4P-C4-C5-N
9	A	422	76F	O4-C10-O2-C2
9	A	422	76F	C1-O3P-P-O1P
9	A	422	76F	C1-O3P-P-O2P
9	A	423	76F	C4-O4P-P-O1P
9	A	423	76F	C4-O4P-P-O2P
9	C	401	76F	O4P-C4-C5-N
9	C	401	76F	O4-C10-O2-C2
9	C	401	76F	C1-O3P-P-O1P
9	C	401	76F	C1-O3P-P-O2P
9	C	402	76F	O4P-C4-C5-N
9	C	402	76F	C4-O4P-P-O3P
4	A	403	P0E	O14-C13-O5-C3
4	C	403	P0E	O14-C13-O5-C3
3	B	203	CLR	C16-C17-C20-C21
3	D	203	CLR	C16-C17-C20-C21
3	B	203	CLR	C13-C17-C20-C22
3	D	203	CLR	C13-C17-C20-C22
9	A	423	76F	O4-C10-O2-C2
9	C	402	76F	O4-C10-O2-C2
4	A	403	P0E	C24-C13-O5-C3
4	C	403	P0E	C24-C13-O5-C3
9	A	422	76F	C11-C10-O2-C2
9	A	423	76F	C11-C10-O2-C2
9	C	401	76F	C11-C10-O2-C2
9	C	402	76F	C11-C10-O2-C2
3	A	402	CLR	C21-C20-C22-C23
3	C	422	CLR	C21-C20-C22-C23
3	A	410	CLR	C13-C17-C20-C22
3	C	410	CLR	C13-C17-C20-C22
9	A	423	76F	C20-C21-C22-C23
9	C	402	76F	C20-C21-C22-C23
3	A	402	CLR	C17-C20-C22-C23
3	C	422	CLR	C17-C20-C22-C23
9	A	423	76F	C2-C1-O3P-P
9	C	402	76F	C2-C1-O3P-P

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Mol	Chain	Res	Type	Atoms
3	A	406	CLR	C17-C20-C22-C23
3	A	409	CLR	C17-C20-C22-C23
3	C	406	CLR	C17-C20-C22-C23
3	C	409	CLR	C17-C20-C22-C23
3	A	409	CLR	C21-C20-C22-C23
3	C	409	CLR	C21-C20-C22-C23
9	A	423	76F	C31-C30-O3-C3
9	C	402	76F	C31-C30-O3-C3
9	C	402	76F	C31-C32-C33-C34
9	A	423	76F	C31-C32-C33-C34
9	A	423	76F	C33-C34-C35-C36
3	A	401	CLR	C22-C23-C24-C25
3	C	421	CLR	C22-C23-C24-C25
9	C	402	76F	C33-C34-C35-C36
3	A	409	CLR	C22-C23-C24-C25
3	C	409	CLR	C22-C23-C24-C25
9	C	402	76F	O5-C30-O3-C3
3	D	203	CLR	C22-C23-C24-C25
3	B	203	CLR	C22-C23-C24-C25
3	A	410	CLR	C16-C17-C20-C21
3	C	410	CLR	C16-C17-C20-C21
3	A	410	CLR	C16-C17-C20-C22
3	C	410	CLR	C16-C17-C20-C22
3	A	402	CLR	C20-C22-C23-C24
3	C	422	CLR	C20-C22-C23-C24
5	A	404	LPE	O2H-C2-C3-O3
9	A	423	76F	O5-C30-O3-C3
4	A	403	P0E	C4-O6-P8-O10
4	C	403	P0E	C4-O6-P8-O10
9	A	422	76F	C1-O3P-P-O4P
9	A	423	76F	C4-O4P-P-O3P
9	C	401	76F	C1-O3P-P-O4P
7	A	414	PLM	C4-C5-C6-C7
7	C	414	PLM	C4-C5-C6-C7
5	C	404	LPE	O2H-C2-C3-O3
7	A	417	PLM	C2-C3-C4-C5
7	C	417	PLM	C2-C3-C4-C5
9	A	423	76F	C35-C36-C37-C38
9	C	402	76F	C35-C36-C37-C38
9	A	423	76F	C17-C18-C19-C20
5	A	404	LPE	C1-C2-C3-O3
5	C	404	LPE	C1-C2-C3-O3

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Mol	Chain	Res	Type	Atoms
7	A	417	PLM	C4-C5-C6-C7
7	C	417	PLM	C4-C5-C6-C7
4	A	403	P0E	C15-C11-O1-C2
9	C	402	76F	C17-C18-C19-C20
4	C	403	P0E	C15-C11-O1-C2
4	A	403	P0E	O12-C11-O1-C2
4	C	403	P0E	O12-C11-O1-C2
9	C	401	76F	C4-O4P-P-O3P
9	A	423	76F	C1-C2-O2-C10
9	C	402	76F	C1-C2-O2-C10
3	B	201	CLR	C13-C17-C20-C22
3	D	201	CLR	C13-C17-C20-C22
3	B	201	CLR	C16-C17-C20-C21
3	D	201	CLR	C16-C17-C20-C21
3	B	201	CLR	C13-C17-C20-C21
3	D	201	CLR	C13-C17-C20-C21
9	A	422	76F	O2-C2-C3-O3
9	C	401	76F	O2-C2-C3-O3
3	A	401	CLR	C23-C24-C25-C26
3	C	421	CLR	C23-C24-C25-C26
3	A	409	CLR	C13-C17-C20-C22
3	C	409	CLR	C13-C17-C20-C22
9	A	422	76F	C20-C21-C22-C23
9	C	401	76F	C20-C21-C22-C23
3	A	406	CLR	C21-C20-C22-C23
3	C	406	CLR	C21-C20-C22-C23
9	C	401	76F	O3-C30-C31-C32
3	D	201	CLR	C16-C17-C20-C22
3	B	201	CLR	C16-C17-C20-C22
9	C	402	76F	O2-C2-C3-O3
3	A	409	CLR	C16-C17-C20-C22
3	C	409	CLR	C16-C17-C20-C22
3	C	408	CLR	C13-C17-C20-C22
3	A	401	CLR	C23-C24-C25-C27
3	C	421	CLR	C23-C24-C25-C27
5	A	404	LPE	C2-C3-O3-P
5	C	404	LPE	C2-C3-O3-P
3	A	401	CLR	C13-C17-C20-C22
3	C	421	CLR	C13-C17-C20-C22
9	A	422	76F	O3-C30-C31-C32
3	A	409	CLR	C13-C17-C20-C21
3	C	409	CLR	C13-C17-C20-C21

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Mol	Chain	Res	Type	Atoms
3	A	408	CLR	C13-C17-C20-C22
3	A	410	CLR	C13-C17-C20-C21
3	C	410	CLR	C13-C17-C20-C21
9	A	423	76F	C1-C2-C3-O3
9	C	402	76F	C1-C2-C3-O3
3	A	401	CLR	C13-C17-C20-C21
3	A	408	CLR	C13-C17-C20-C21
3	C	408	CLR	C13-C17-C20-C21
3	C	421	CLR	C13-C17-C20-C21
9	A	423	76F	O2-C2-C3-O3
3	A	406	CLR	C13-C17-C20-C22
3	C	406	CLR	C13-C17-C20-C22
9	A	423	76F	C16-C17-C18-C19
3	C	405	CLR	C13-C17-C20-C21
3	A	405	CLR	C13-C17-C20-C21
3	A	402	CLR	C23-C24-C25-C26
9	A	422	76F	C2-C1-O3P-P
9	C	401	76F	C2-C1-O3P-P
4	A	403	P0E	C4-O6-P8-O9
4	C	403	P0E	C4-O6-P8-O9
9	C	401	76F	C4-O4P-P-O1P
9	C	402	76F	C4-O4P-P-O2P
3	C	422	CLR	C23-C24-C25-C26
3	C	408	CLR	C16-C17-C20-C22
5	A	404	LPE	C32-C31-O33-P
5	C	404	LPE	C32-C31-O33-P
9	C	401	76F	C24-C25-C26-C27
3	C	409	CLR	C16-C17-C20-C21
9	C	402	76F	C16-C17-C18-C19
3	C	421	CLR	C16-C17-C20-C22
3	A	402	CLR	C22-C23-C24-C25
3	A	409	CLR	C16-C17-C20-C21
3	A	410	CLR	C22-C23-C24-C25
3	C	410	CLR	C22-C23-C24-C25
3	C	406	CLR	C13-C17-C20-C21
7	A	417	PLM	C1-C2-C3-C4
7	C	417	PLM	C1-C2-C3-C4
9	A	422	76F	C1-C2-C3-O3
9	C	401	76F	C1-C2-C3-O3
3	C	422	CLR	C22-C23-C24-C25
3	A	406	CLR	C13-C17-C20-C21
3	A	401	CLR	C16-C17-C20-C22

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Mol	Chain	Res	Type	Atoms
3	A	408	CLR	C16-C17-C20-C22
3	A	405	CLR	C13-C17-C20-C22
3	C	405	CLR	C13-C17-C20-C22
3	C	410	CLR	C20-C22-C23-C24
3	A	410	CLR	C20-C22-C23-C24
3	A	406	CLR	C16-C17-C20-C22
3	C	406	CLR	C16-C17-C20-C22
9	A	422	76F	C24-C25-C26-C27
9	C	401	76F	C30-C31-C32-C33
7	A	414	PLM	C2-C3-C4-C5
7	C	414	PLM	C2-C3-C4-C5
9	A	422	76F	C10-C11-C12-C13
9	C	402	76F	C11-C12-C13-C14
9	A	422	76F	C30-C31-C32-C33
9	A	422	76F	C4-O4P-P-O3P
5	A	404	LPE	C14-C15-C16-C17
5	C	404	LPE	C14-C15-C16-C17
3	A	405	CLR	C16-C17-C20-C22
3	A	402	CLR	C13-C17-C20-C22
3	C	408	CLR	C16-C17-C20-C21
3	C	405	CLR	C16-C17-C20-C22
9	C	401	76F	C10-C11-C12-C13
4	A	403	P0E	C22-C23-C34-C42
4	C	403	P0E	C22-C23-C34-C42
9	A	423	76F	O4P-C4-C5-N
9	A	423	76F	C11-C12-C13-C14
3	C	422	CLR	C13-C17-C20-C22
3	C	421	CLR	C16-C17-C20-C21
3	A	401	CLR	C16-C17-C20-C21
4	A	403	P0E	C20-C21-C22-C23
4	C	403	P0E	C20-C21-C22-C23
9	C	402	76F	C34-C35-C36-C37
9	A	423	76F	C32-C33-C34-C35
3	A	405	CLR	C16-C17-C20-C21
3	A	408	CLR	C16-C17-C20-C21
4	A	403	P0E	C3-C2-O1-C11
4	A	403	P0E	C4-C2-O1-C11
4	C	403	P0E	C4-C2-O1-C11
9	A	422	76F	C31-C30-O3-C3
9	A	422	76F	C40-C41-C42-C43
3	C	405	CLR	C16-C17-C20-C21
9	C	402	76F	C32-C33-C34-C35

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Mol	Chain	Res	Type	Atoms
3	A	402	CLR	C16-C17-C20-C22
3	A	402	CLR	C13-C17-C20-C21
9	A	422	76F	C39-C40-C41-C42
9	A	422	76F	O5-C30-O3-C3
9	C	401	76F	C40-C41-C42-C43
3	C	422	CLR	C13-C17-C20-C21
3	C	422	CLR	C16-C17-C20-C22
5	C	404	LPE	C15-C16-C17-C18
9	A	423	76F	C34-C35-C36-C37
5	A	404	LPE	C15-C16-C17-C18
9	C	401	76F	C32-C33-C34-C35
4	C	403	P0E	C3-C2-O1-C11
9	C	401	76F	O5-C30-C31-C32
9	A	422	76F	C15-C16-C17-C18
9	C	401	76F	C15-C16-C17-C18
4	A	403	P0E	C26-C27-C28-C29
4	C	403	P0E	C26-C27-C28-C29
9	C	401	76F	C31-C30-O3-C3
9	C	401	76F	O5-C30-O3-C3
4	A	403	P0E	C15-C16-C17-C18
9	A	422	76F	C16-C17-C18-C19
4	C	403	P0E	C15-C16-C17-C18
9	C	401	76F	C16-C17-C18-C19
9	A	422	76F	C4-O4P-P-O1P
9	A	422	76F	O5-C30-C31-C32
9	C	401	76F	C5-C4-O4P-P
9	C	401	76F	C31-C32-C33-C34
3	A	406	CLR	C16-C17-C20-C21
3	C	406	CLR	C16-C17-C20-C21

There are no ring outliers.

40 monomers are involved in 56 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	C	414	PLM	1	0
4	C	403	P0E	1	0
7	A	417	PLM	3	0
8	C	423	A1EPX	1	0
3	D	201	CLR	2	0
4	A	403	P0E	1	0
3	A	402	CLR	1	0
3	D	202	CLR	1	0

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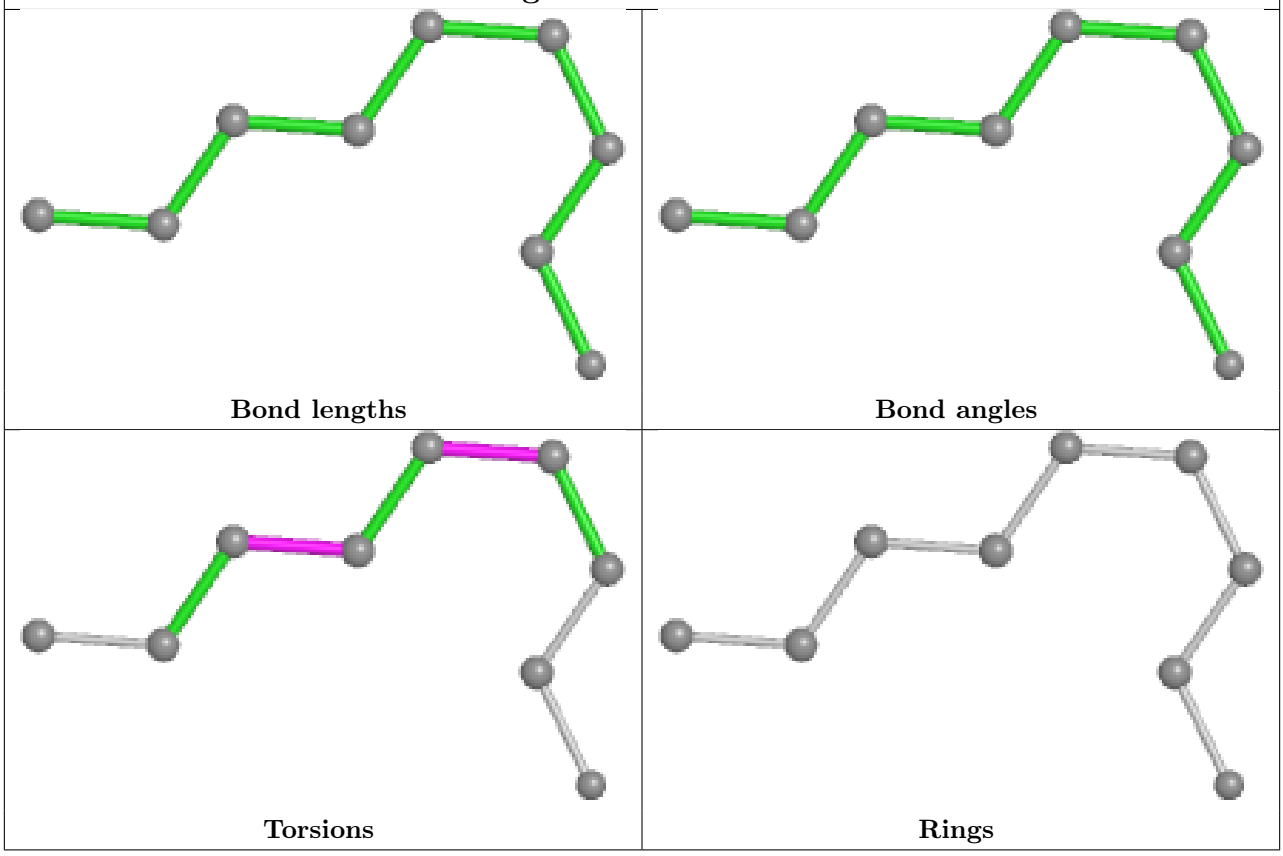
Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	A	414	PLM	1	0
7	C	417	PLM	3	0
8	A	421	A1EPX	1	0
3	C	422	CLR	1	0
7	A	418	PLM	3	0
7	A	420	PLM	1	0
5	A	404	LPE	2	0
3	A	410	CLR	2	0
7	A	415	PLM	3	0
3	D	203	CLR	2	0
7	C	419	PLM	1	0
7	C	420	PLM	1	0
3	A	411	CLR	2	0
3	B	203	CLR	2	0
7	C	418	PLM	3	0
3	A	407	CLR	1	0
3	A	406	CLR	2	0
3	C	407	CLR	1	0
3	A	401	CLR	1	0
3	C	412	CLR	1	0
3	A	409	CLR	1	0
7	A	416	PLM	2	0
3	C	410	CLR	3	0
3	A	412	CLR	1	0
5	C	404	LPE	2	0
7	C	415	PLM	3	0
3	C	406	CLR	1	0
3	B	202	CLR	1	0
3	B	201	CLR	3	0
7	C	416	PLM	1	0
3	C	411	CLR	2	0
3	C	409	CLR	1	0

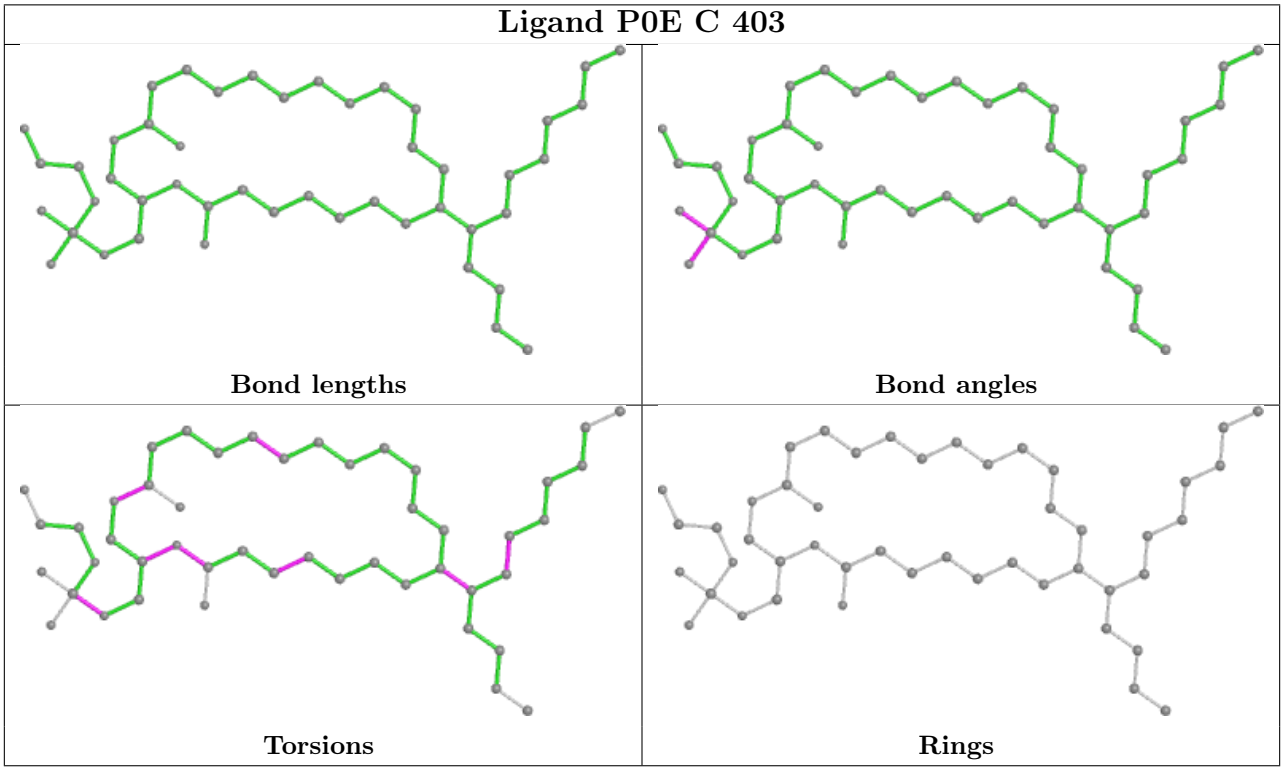
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

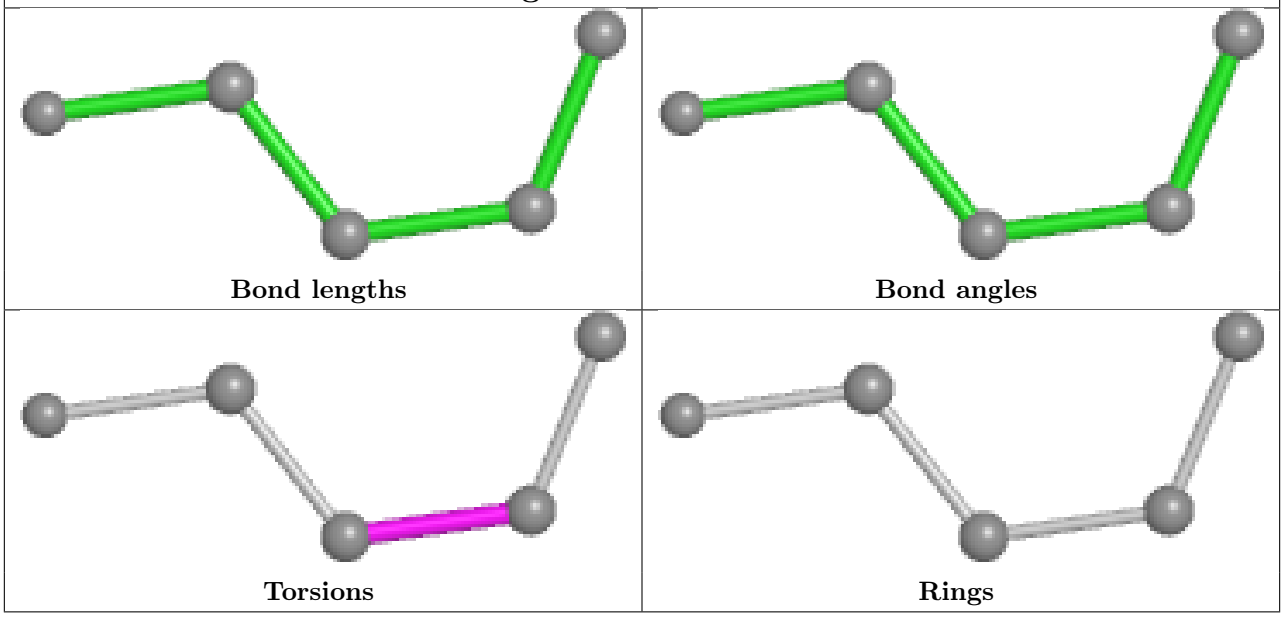
Ligand PLM C 414



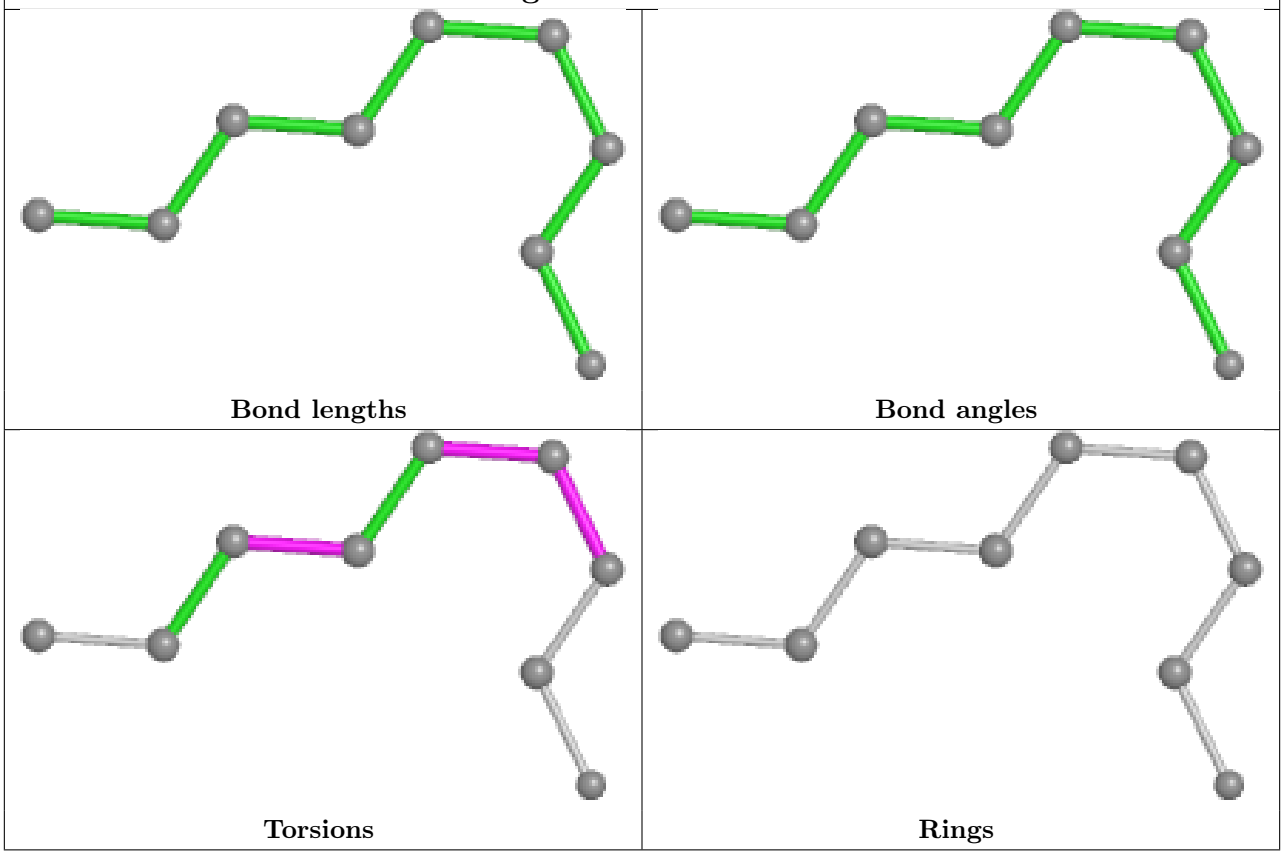
Ligand P0E C 403



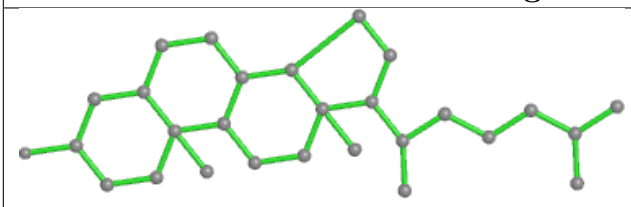
Ligand PLM A 419



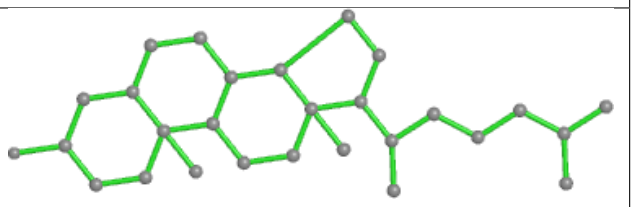
Ligand PLM A 417



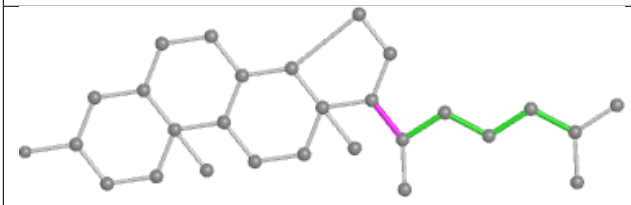
Ligand CLR D 201



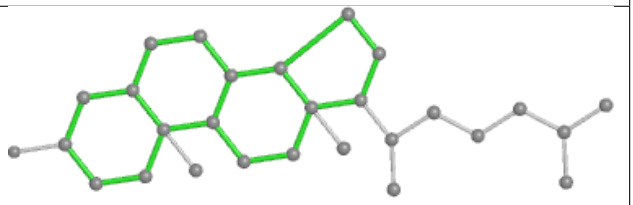
Bond lengths



Bond angles

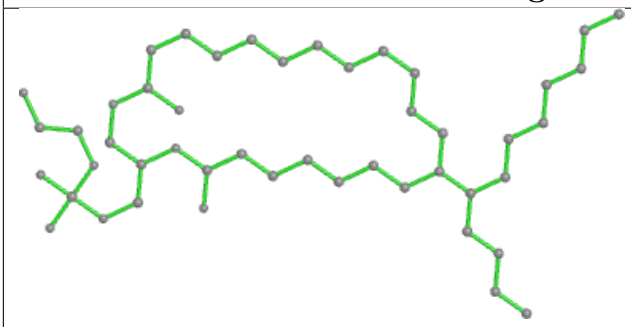


Torsions

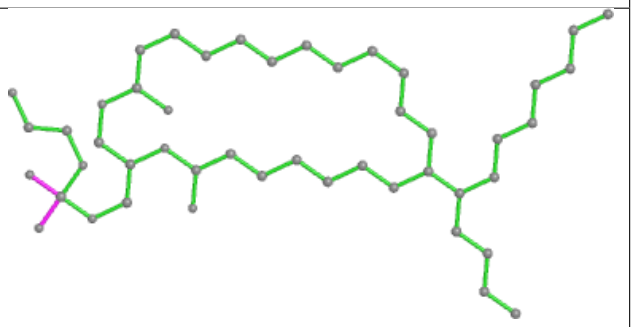


Rings

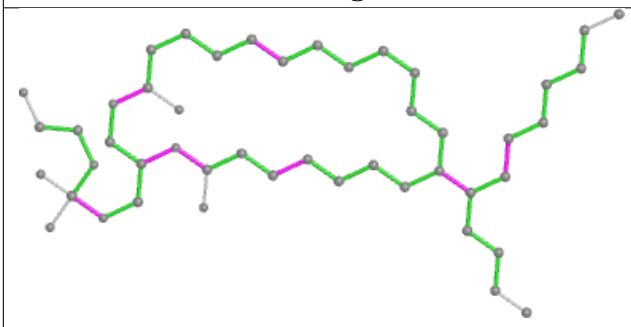
Ligand P0E A 403



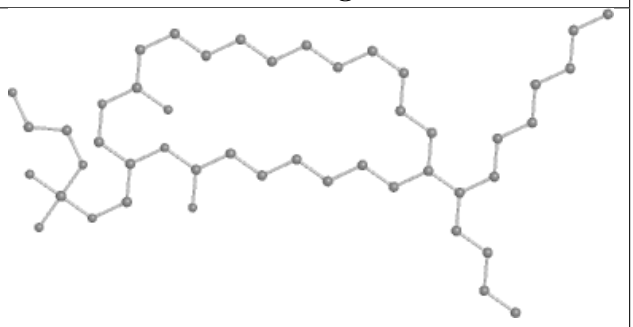
Bond lengths



Bond angles

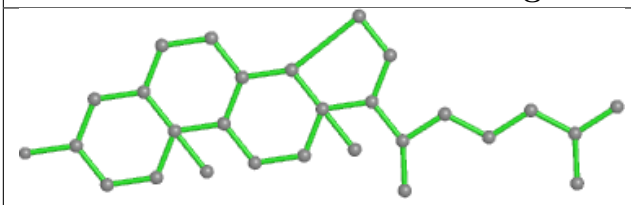


Torsions

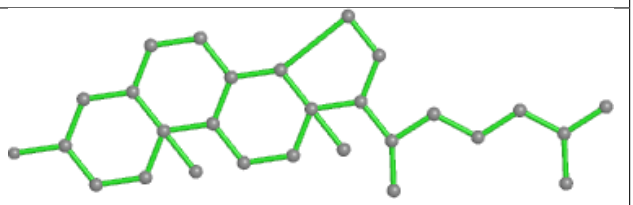


Rings

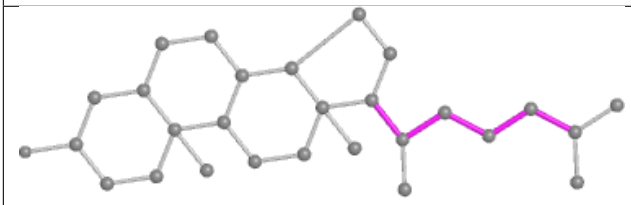
Ligand CLR A 402



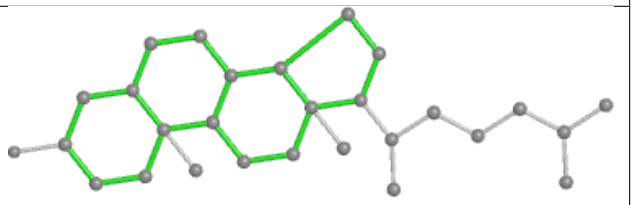
Bond lengths



Bond angles

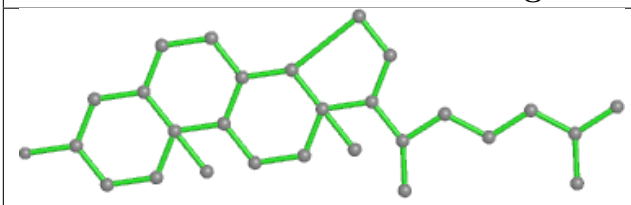


Torsions

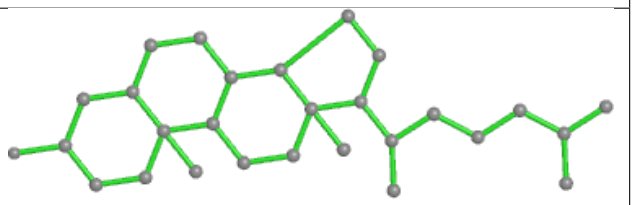


Rings

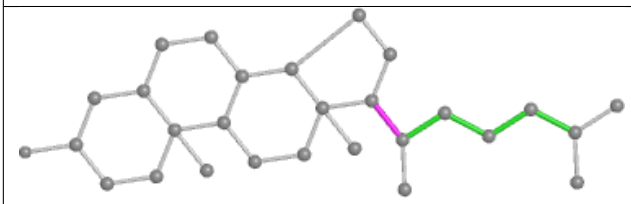
Ligand CLR C 408



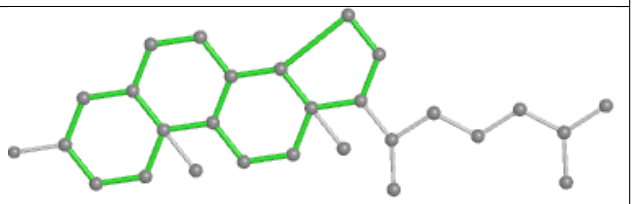
Bond lengths



Bond angles

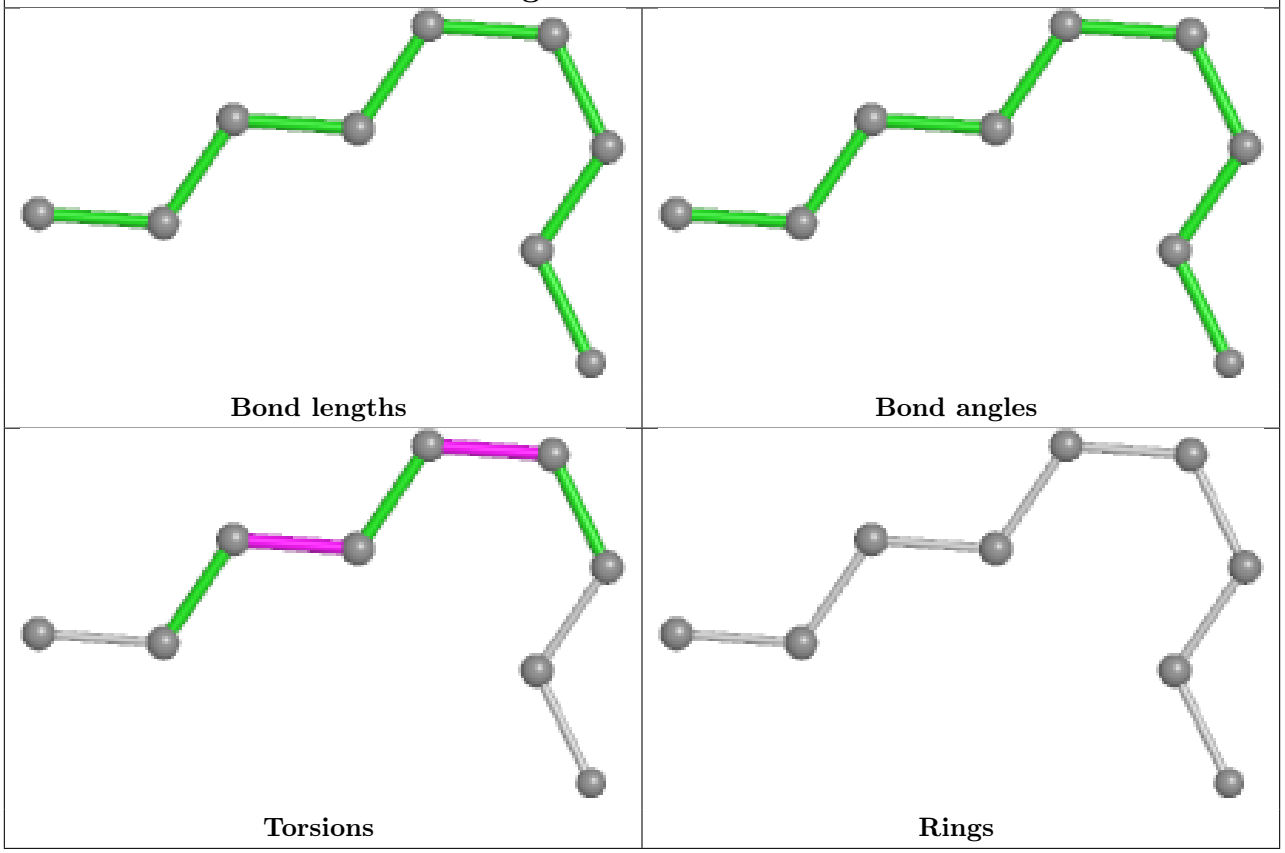


Torsions

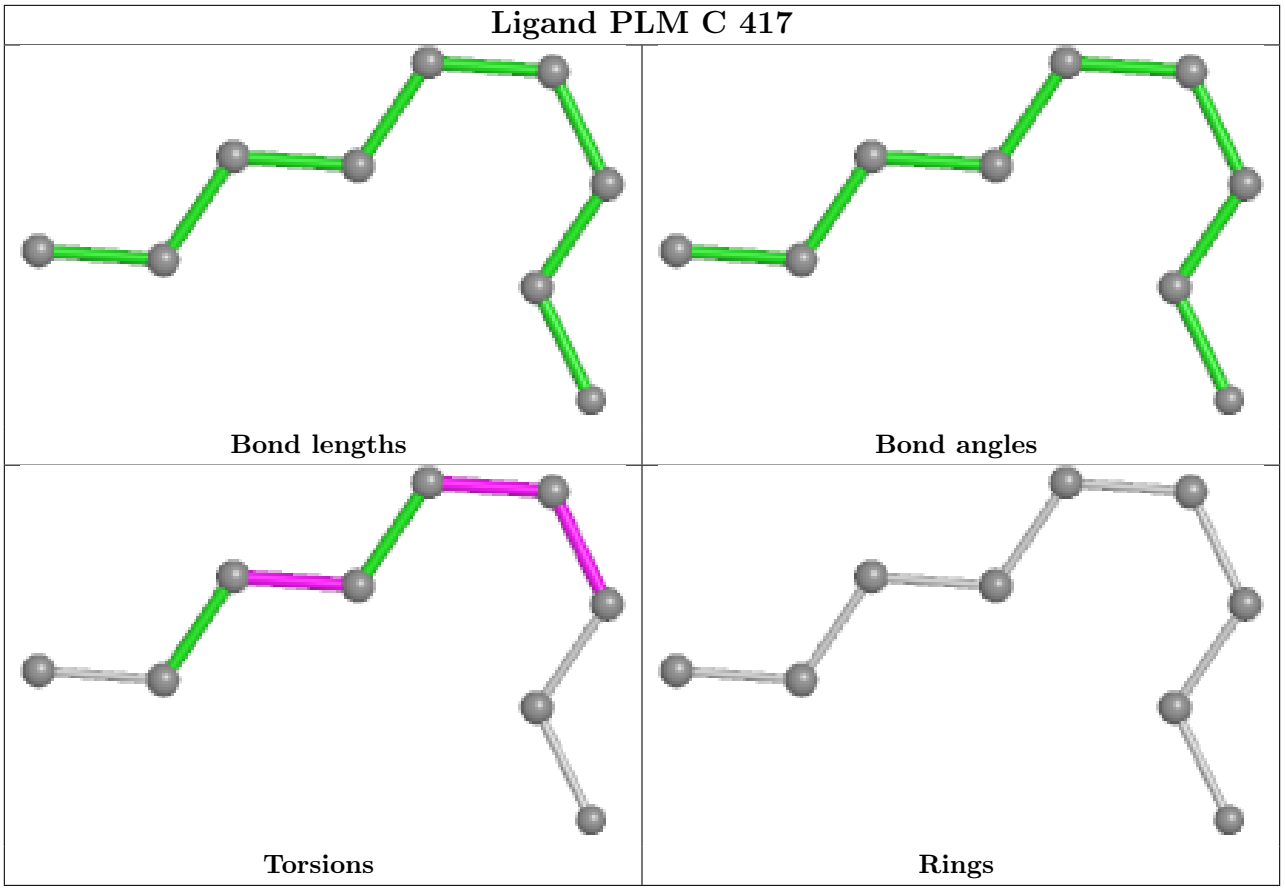


Rings

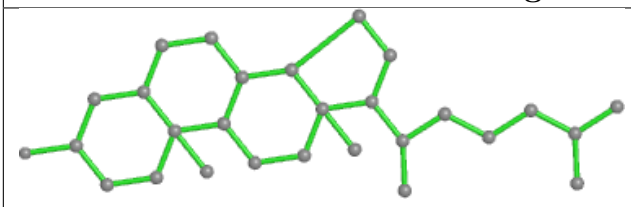
Ligand PLM A 414

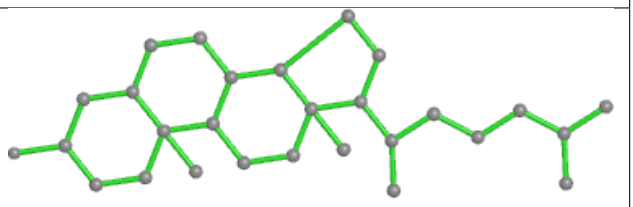


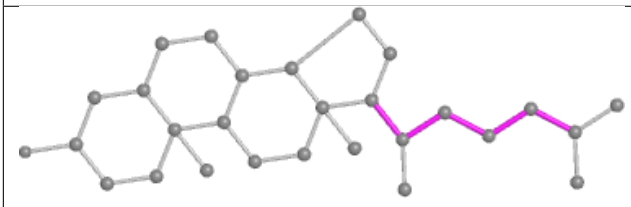
Ligand PLM C 417

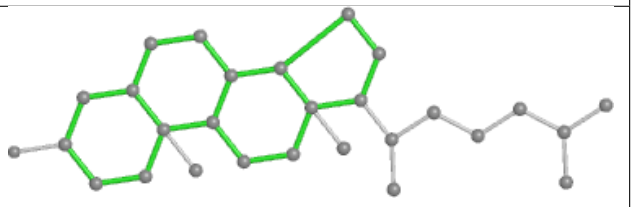


Ligand CLR C 422

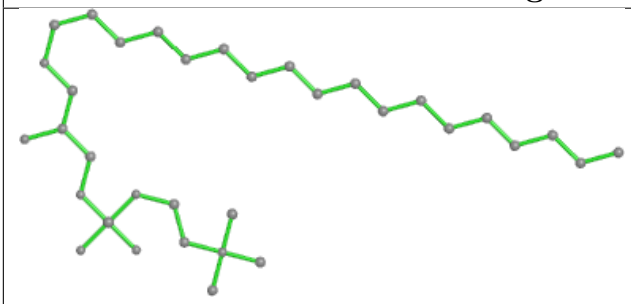

Bond lengths

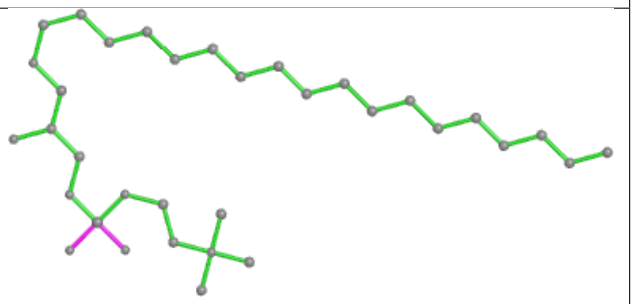

Bond angles

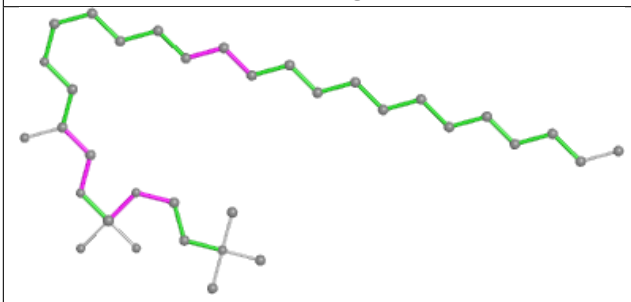

Torsions

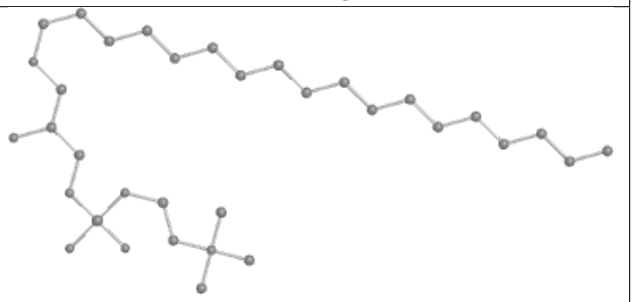

Rings

Ligand LPE A 404

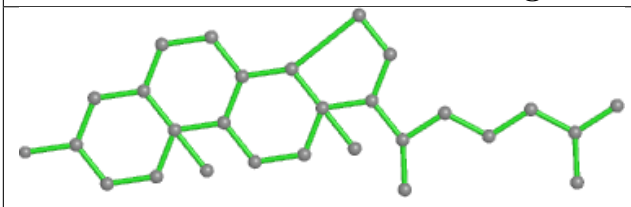

Bond lengths

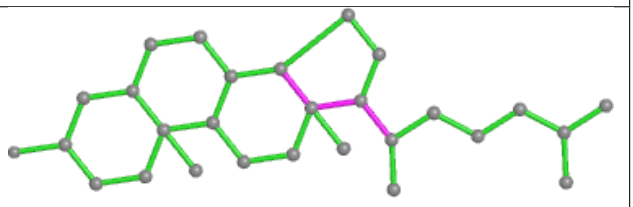

Bond angles

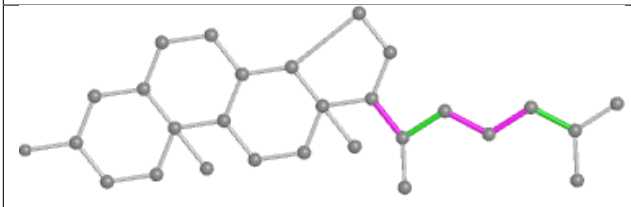

Torsions

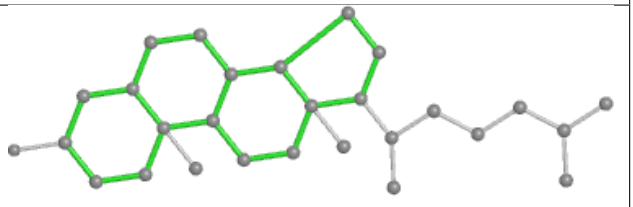

Rings

Ligand CLR A 410

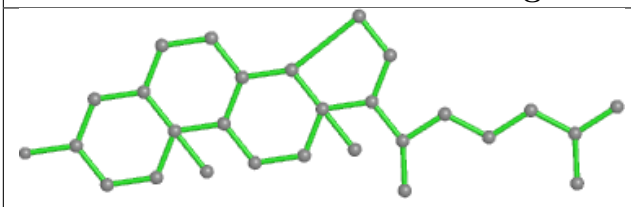

Bond lengths


Bond angles

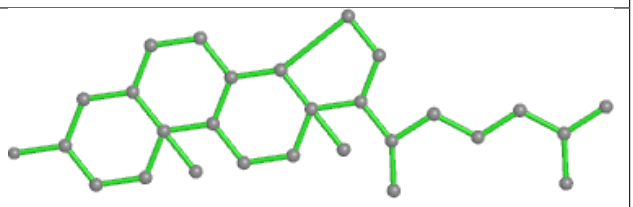

Torsions


Rings

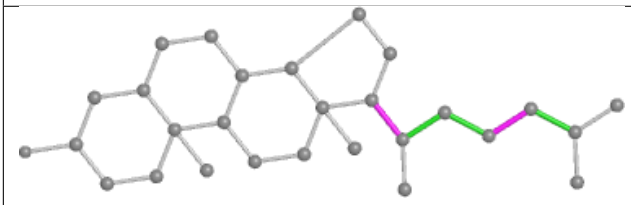
Ligand CLR D 203



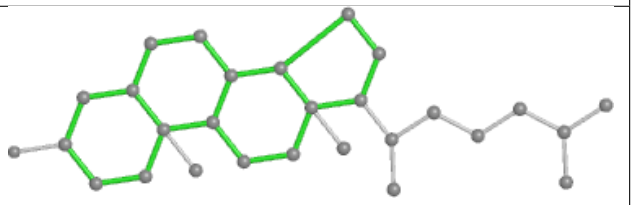
Bond lengths



Bond angles

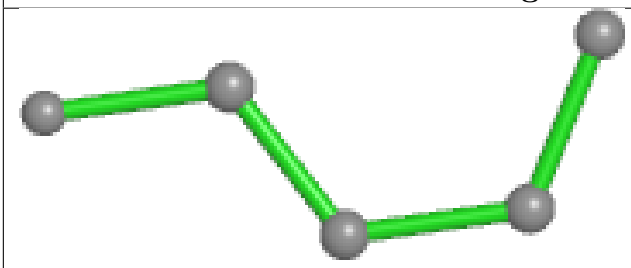


Torsions

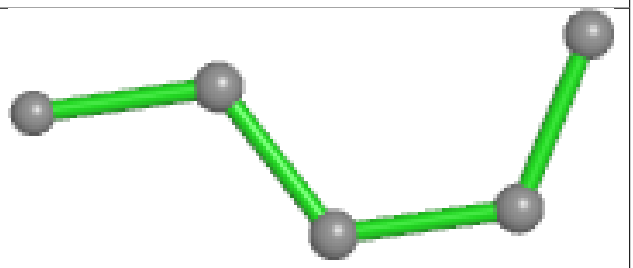


Rings

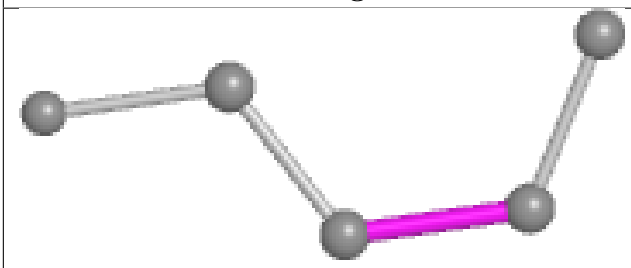
Ligand PLM C 419



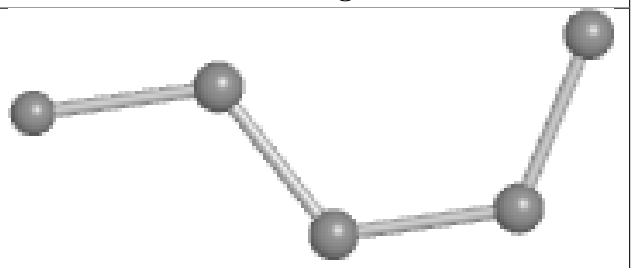
Bond lengths



Bond angles

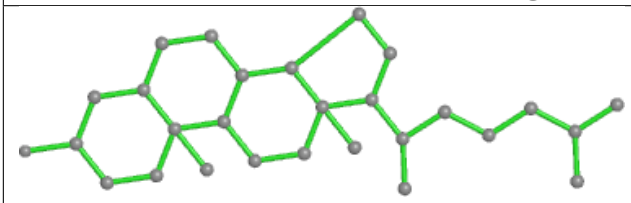


Torsions

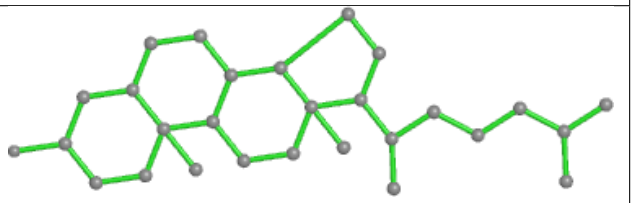


Rings

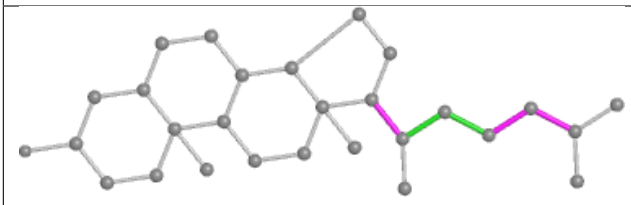
Ligand CLR C 421



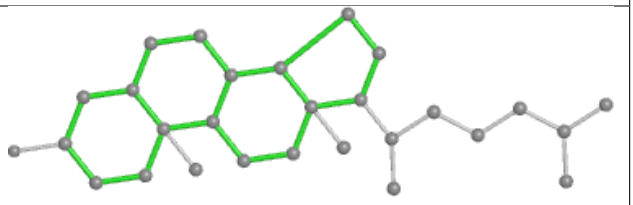
Bond lengths



Bond angles

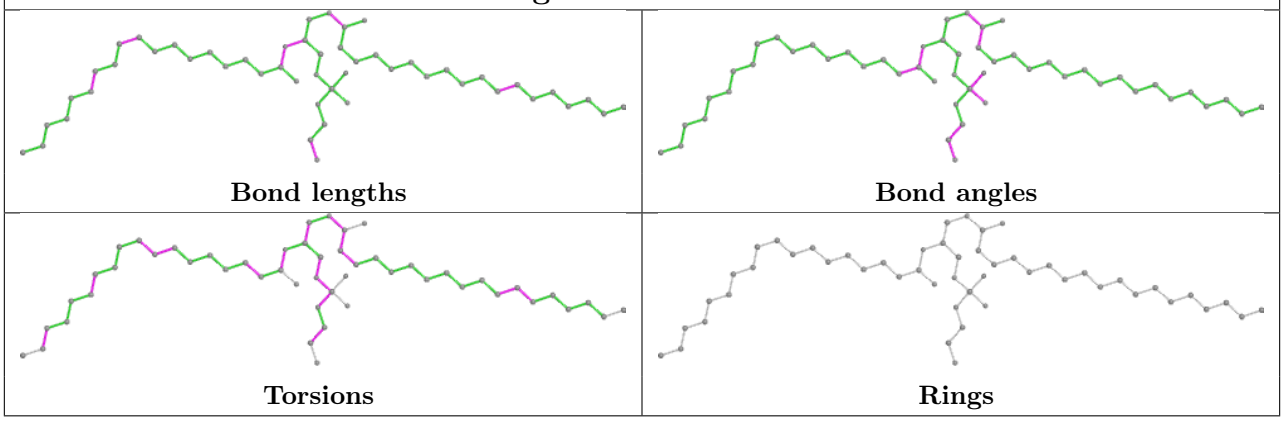


Torsions

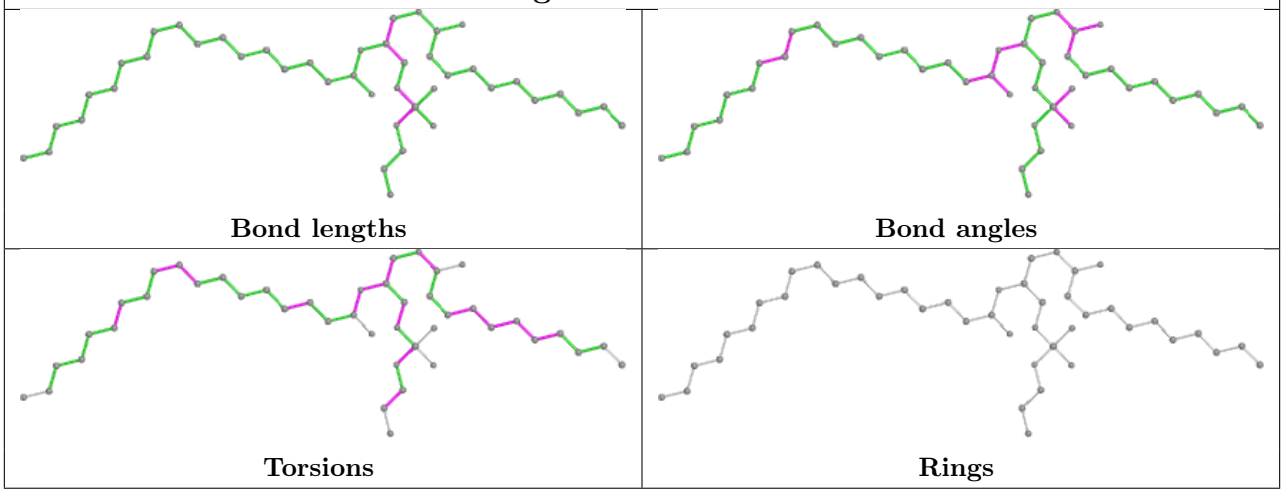


Rings

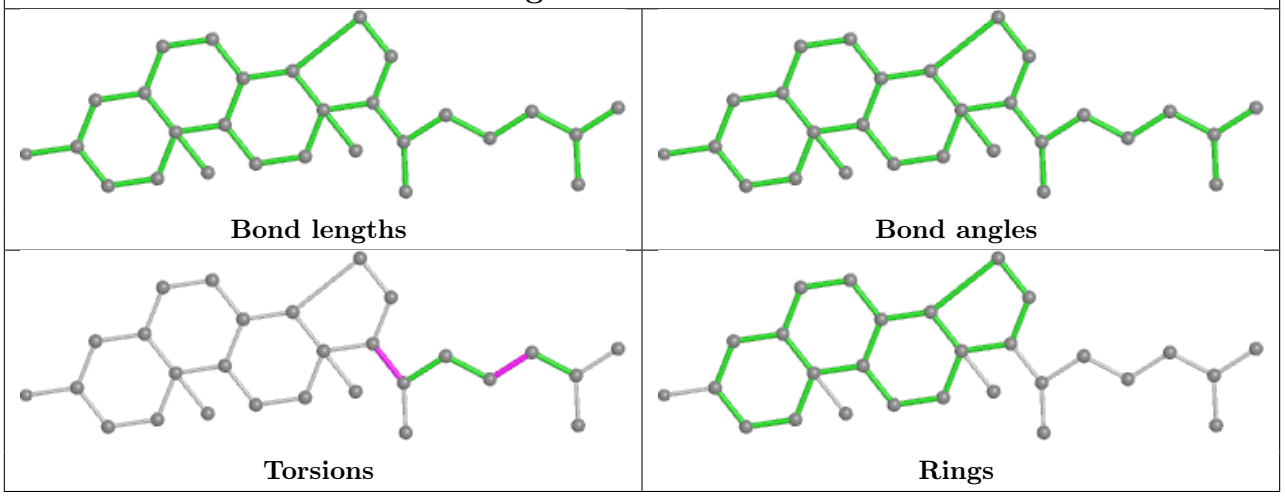
Ligand 76F A 422



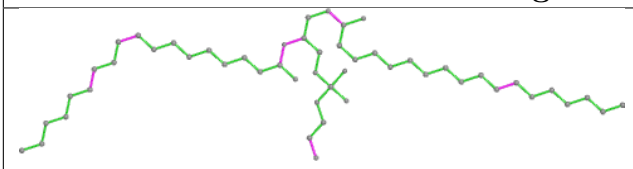
Ligand 76F C 402



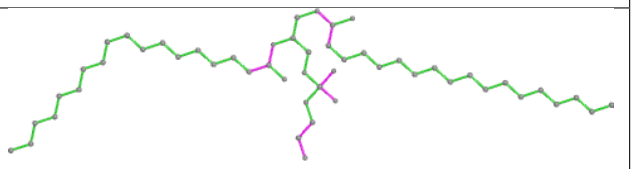
Ligand CLR B 203



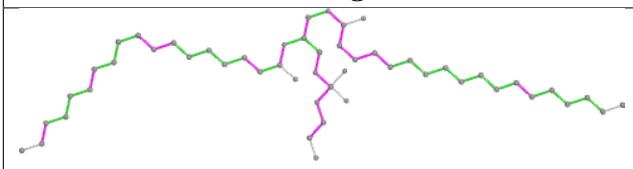
Ligand 76F C 401



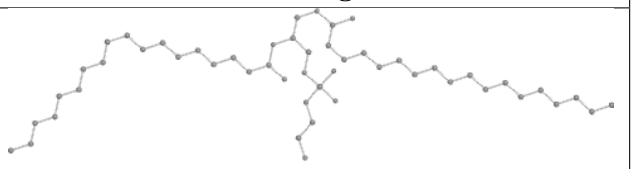
Bond lengths



Bond angles

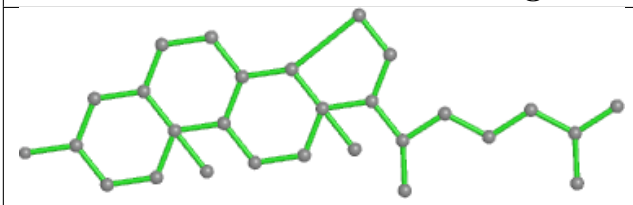


Torsions

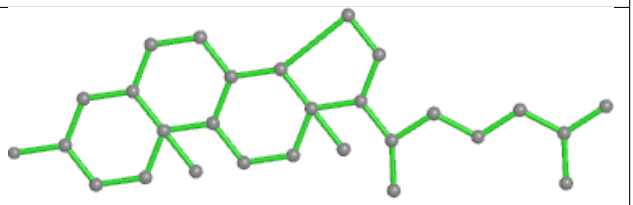


Rings

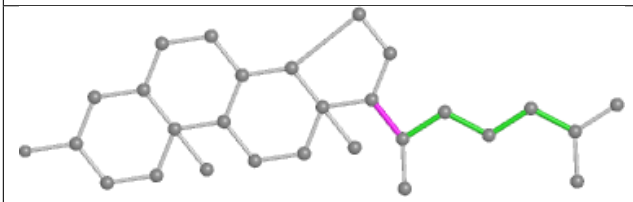
Ligand CLR C 405



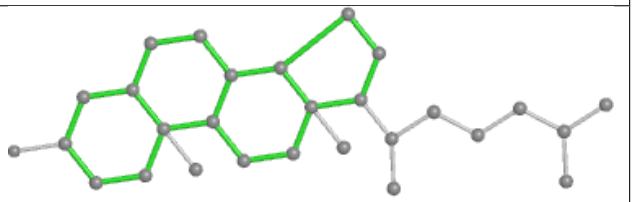
Bond lengths



Bond angles

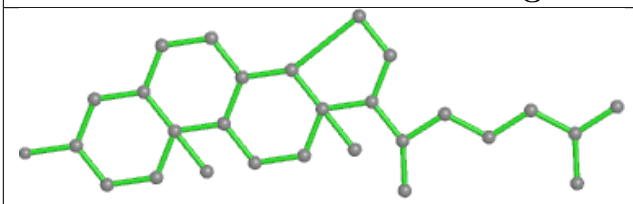


Torsions

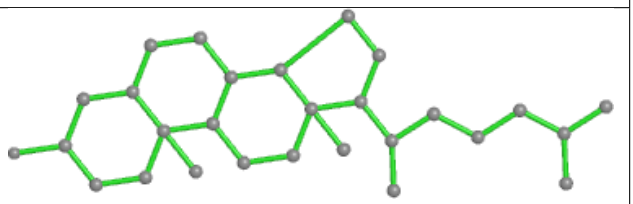


Rings

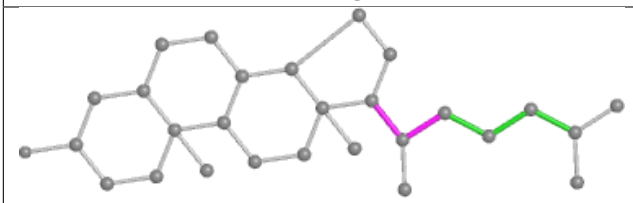
Ligand CLR A 406



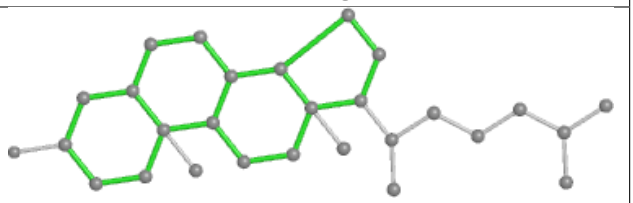
Bond lengths



Bond angles

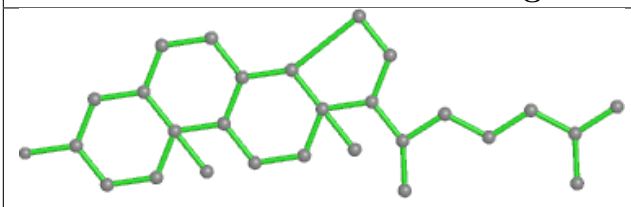


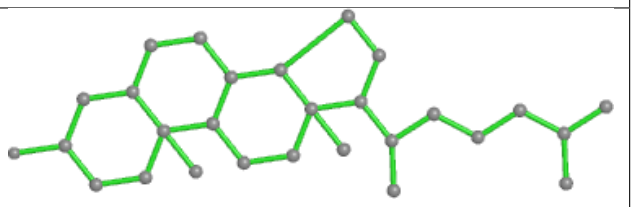
Torsions

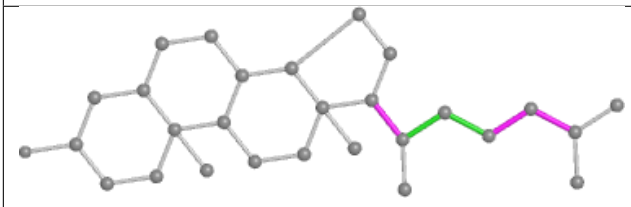


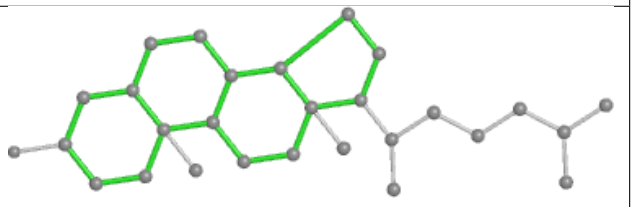
Rings

Ligand CLR A 401

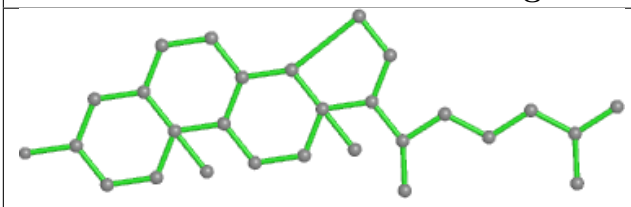

Bond lengths

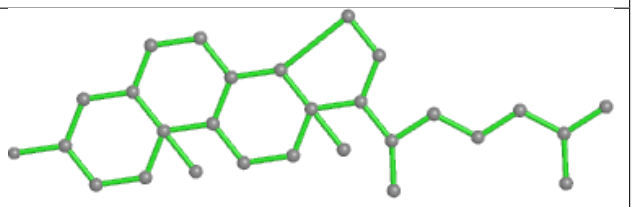

Bond angles

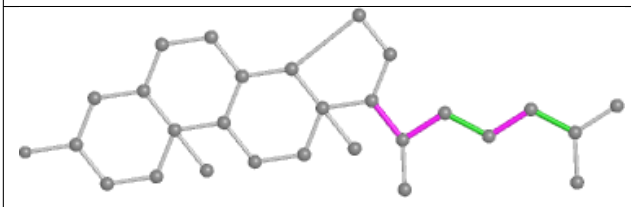

Torsions

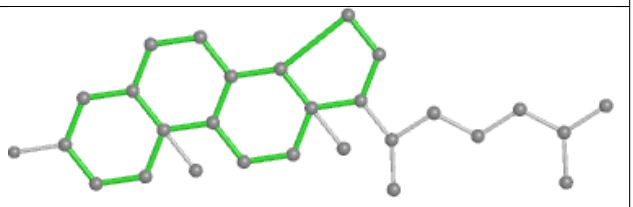

Rings

Ligand CLR A 409

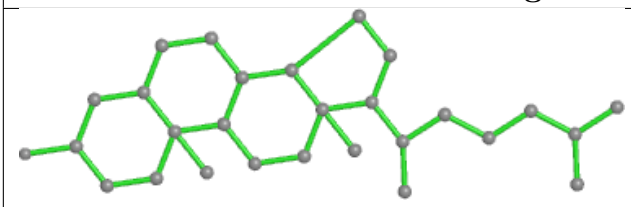

Bond lengths

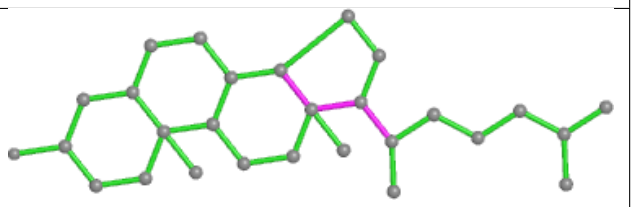

Bond angles

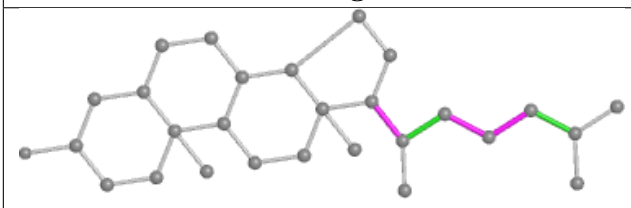

Torsions

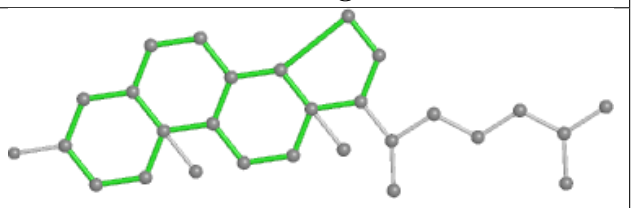

Rings

Ligand CLR C 410

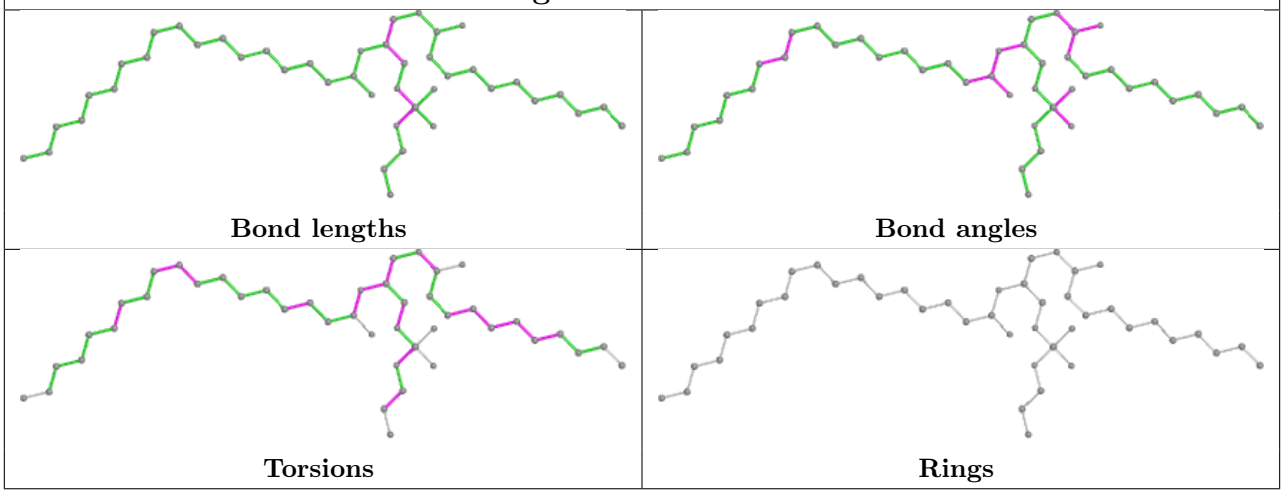

Bond lengths


Bond angles

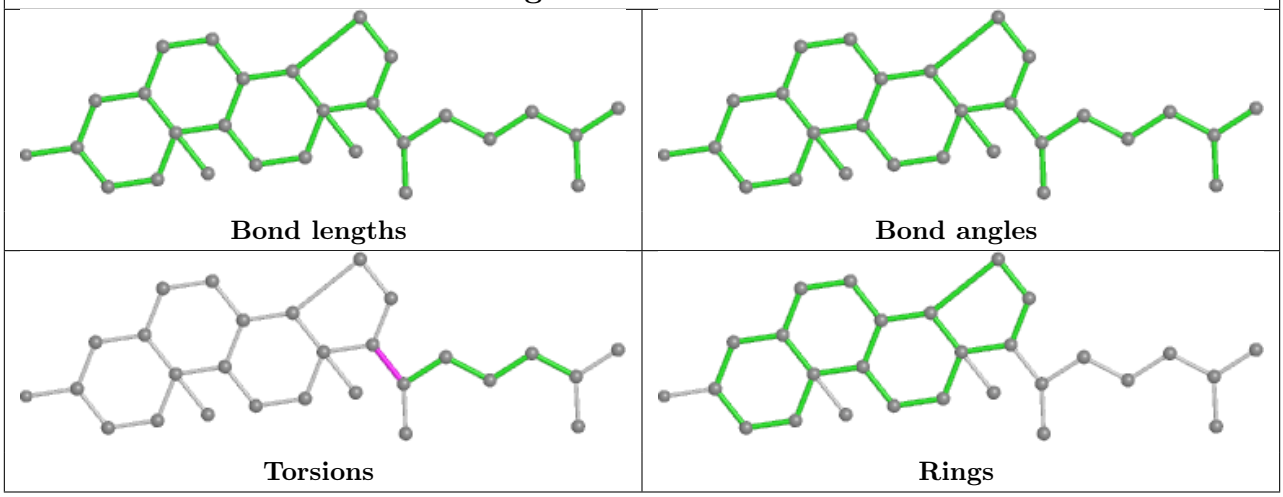

Torsions


Rings

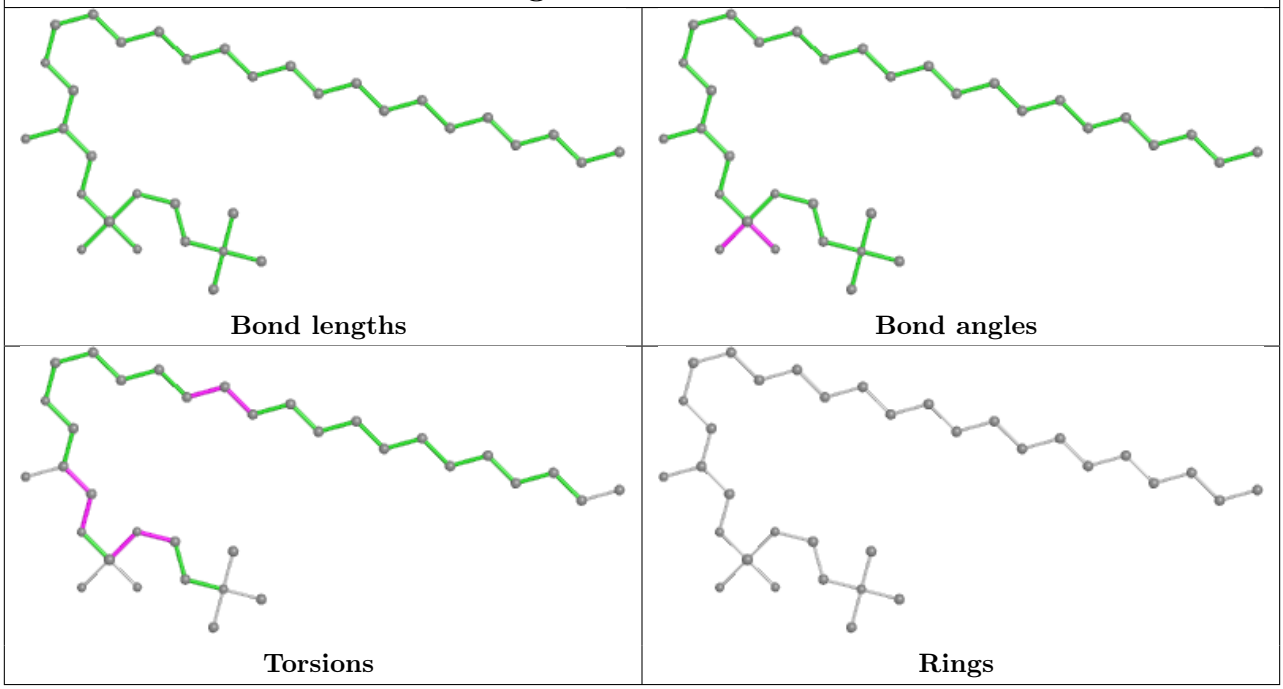
Ligand 76F A 423



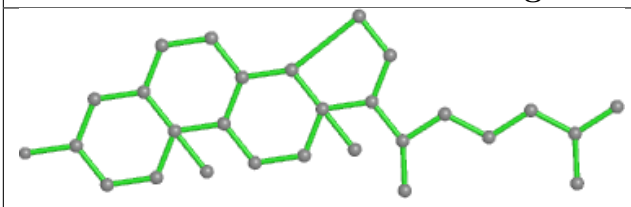
Ligand CLR A 408



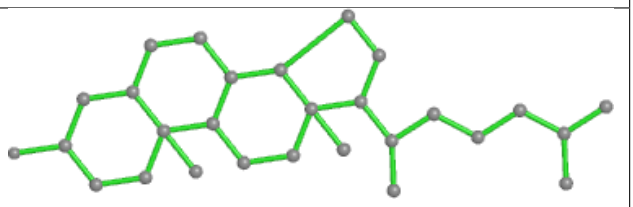
Ligand LPE C 404



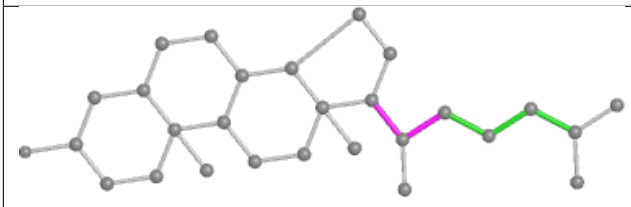
Ligand CLR C 406



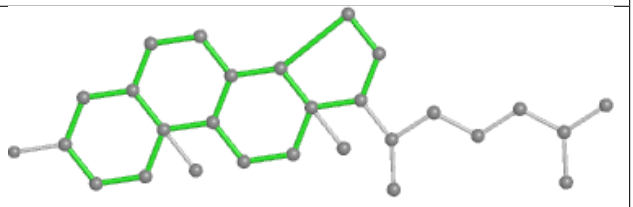
Bond lengths



Bond angles

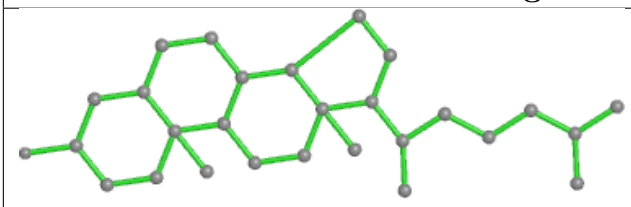


Torsions

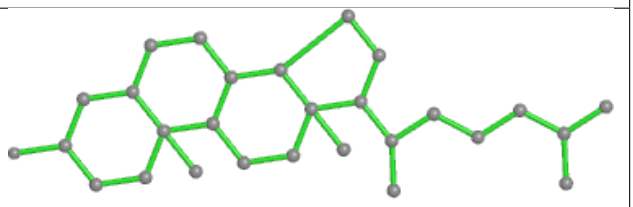


Rings

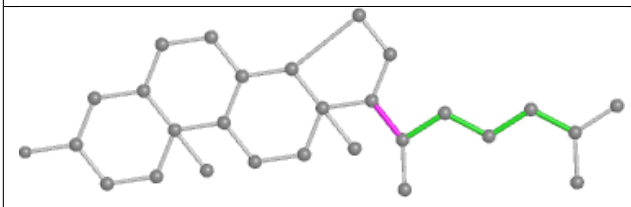
Ligand CLR A 405



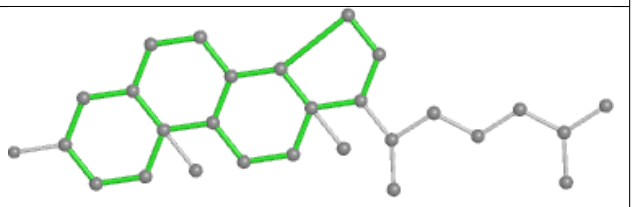
Bond lengths



Bond angles

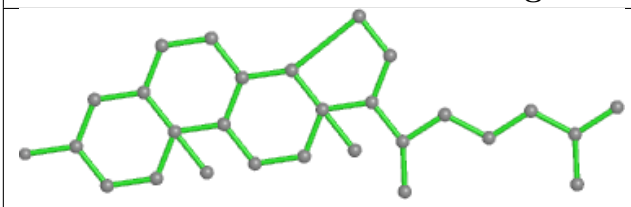


Torsions

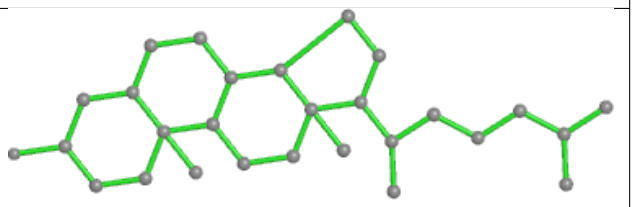


Rings

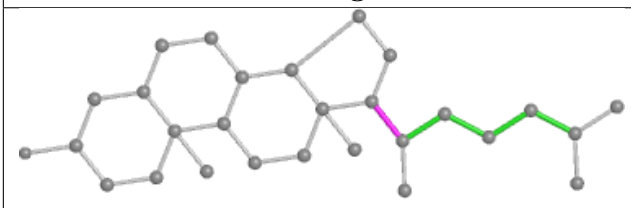
Ligand CLR B 201



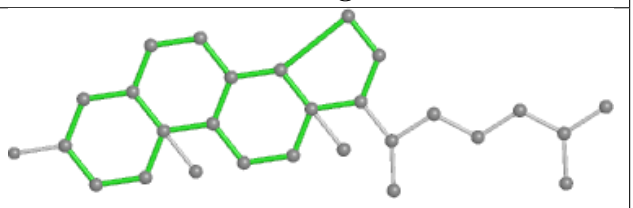
Bond lengths



Bond angles

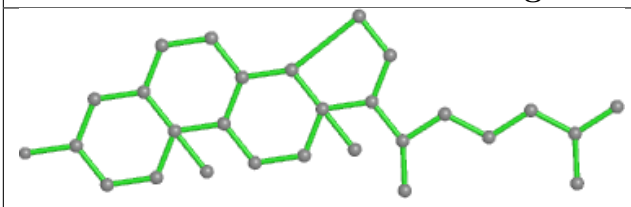


Torsions

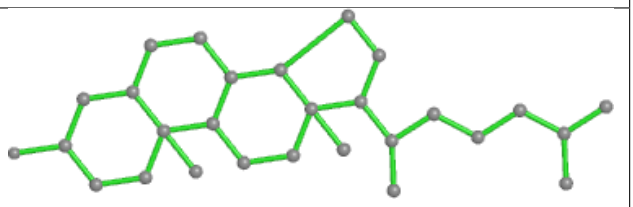


Rings

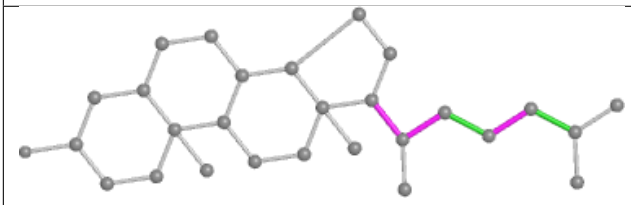
Ligand CLR C 409



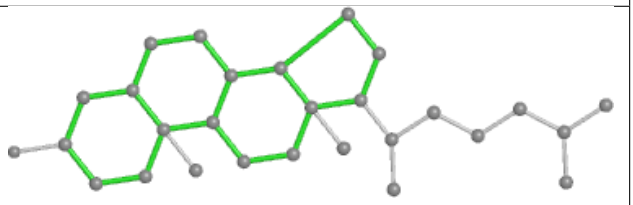
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

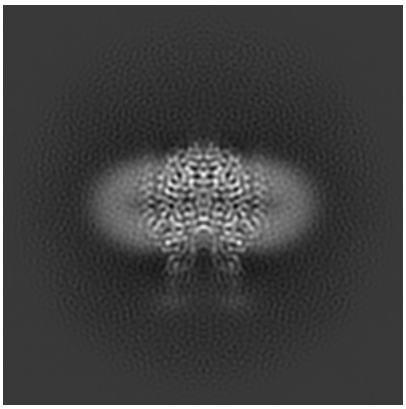
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-64364. These allow visual inspection of the internal detail of the map and identification of artifacts.

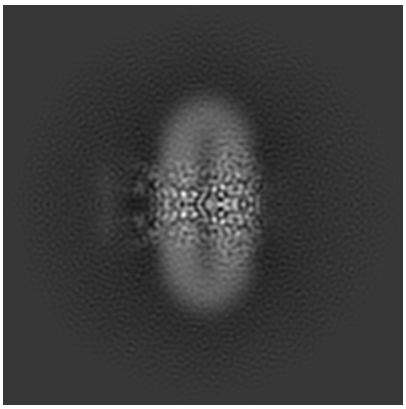
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

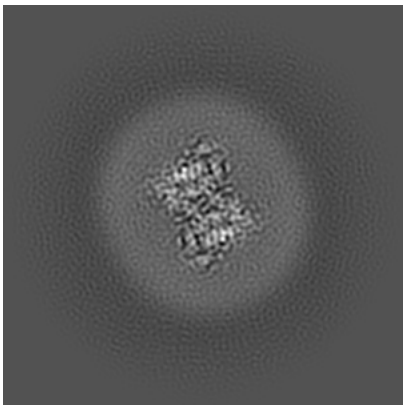
6.1.1 Primary map



X

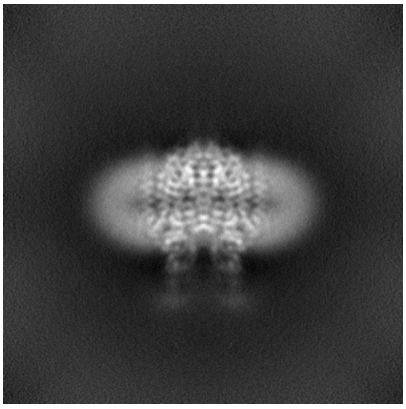


Y

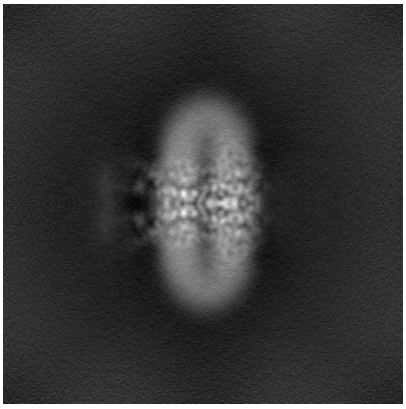


Z

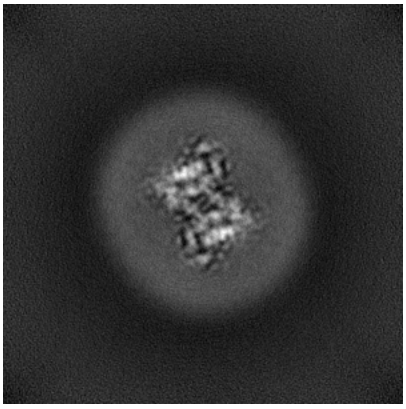
6.1.2 Raw map



X



Y

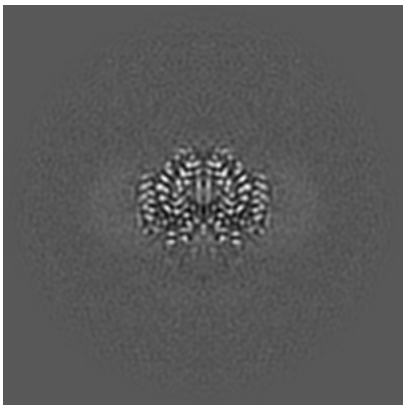


Z

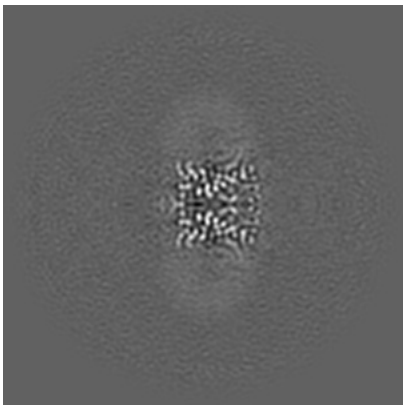
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

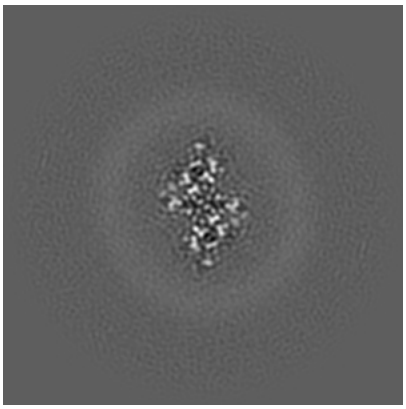
6.2.1 Primary map



X Index: 160

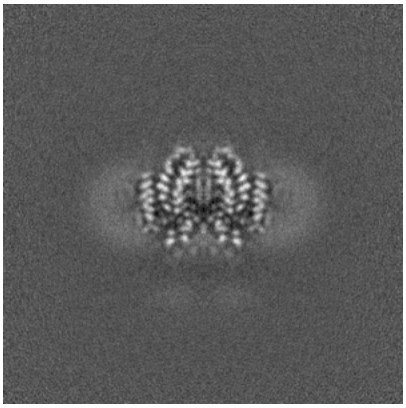


Y Index: 160

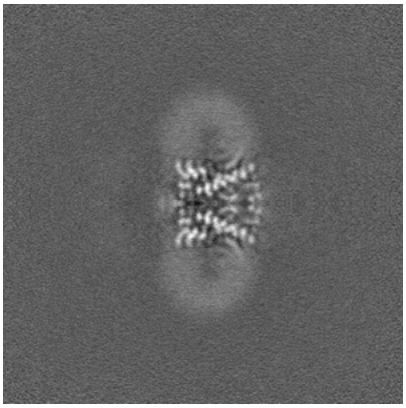


Z Index: 160

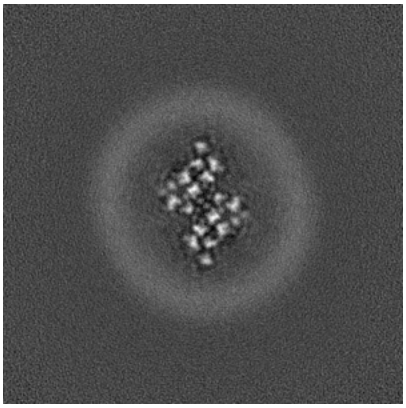
6.2.2 Raw map



X Index: 160



Y Index: 160

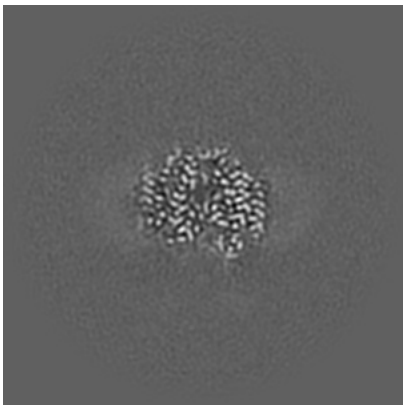


Z Index: 160

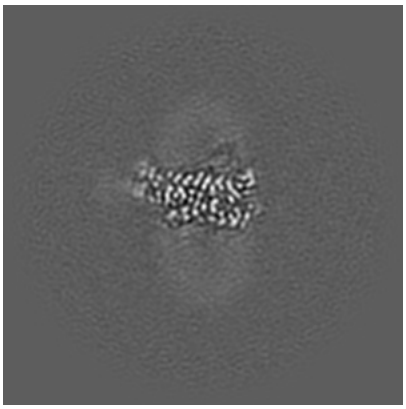
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

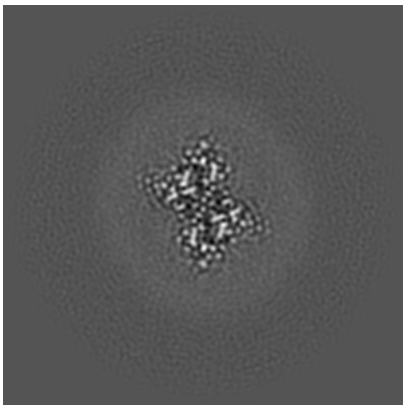
6.3.1 Primary map



X Index: 157

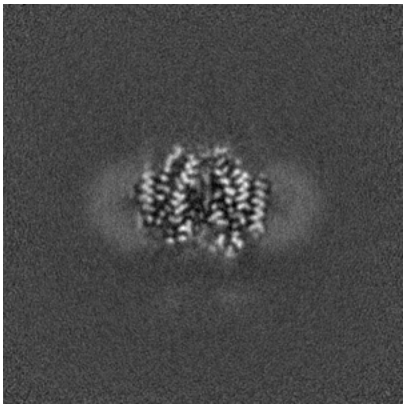


Y Index: 137

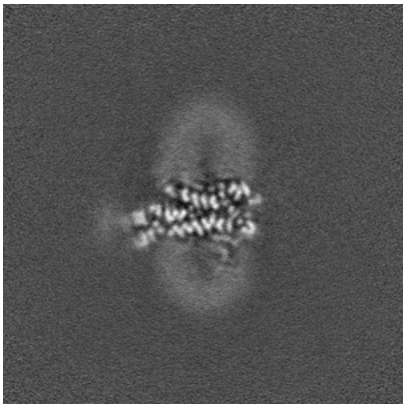


Z Index: 174

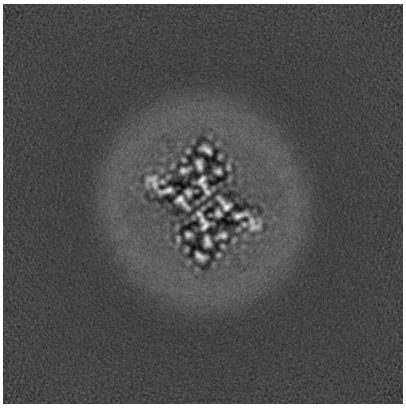
6.3.2 Raw map



X Index: 158



Y Index: 182

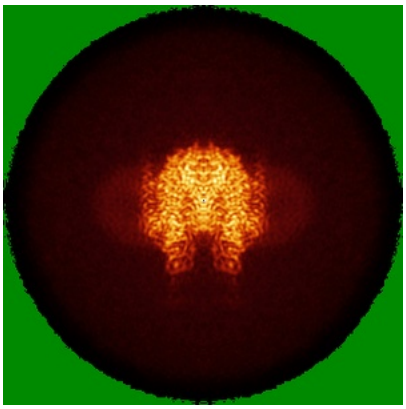


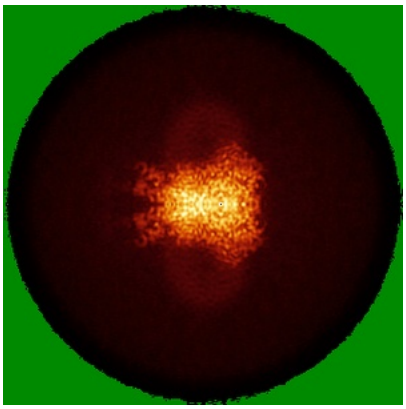
Z Index: 177

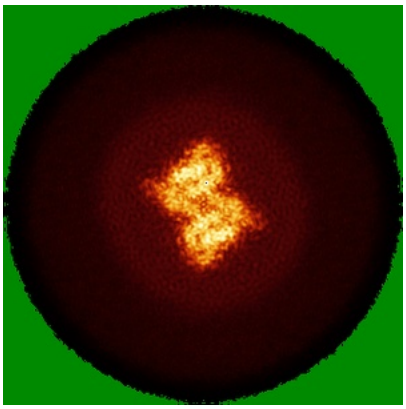
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

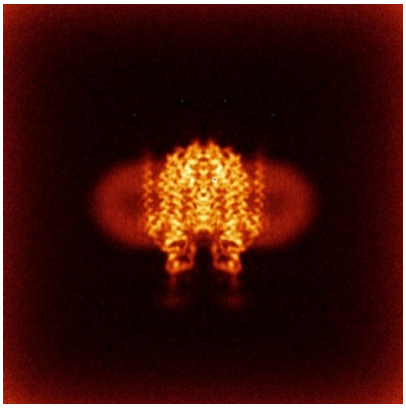
6.4.1 Primary map

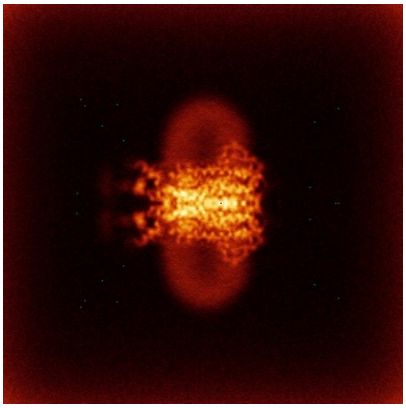

X

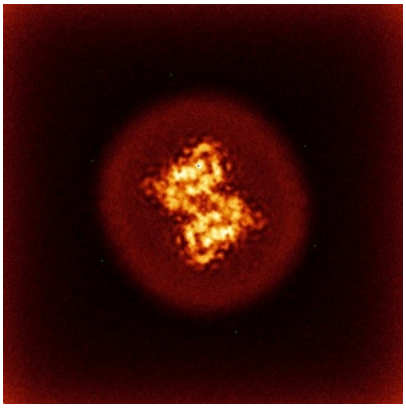

Y


Z

6.4.2 Raw map


X


Y


Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.24. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

X Y Z

These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

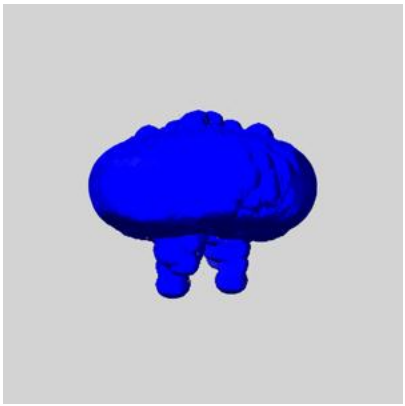
6.6 Mask visualisation

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

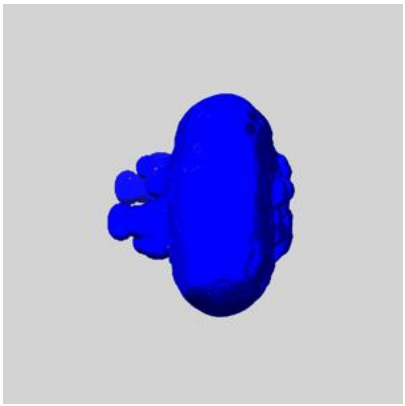
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

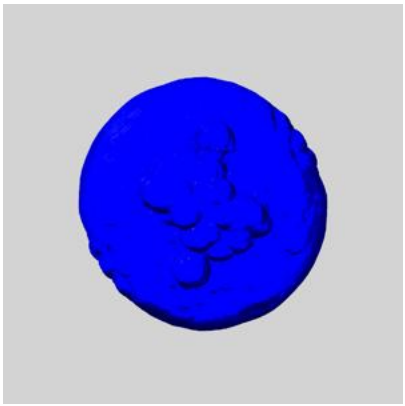
6.6.1 emd_64364_msk_1.map



X



Y

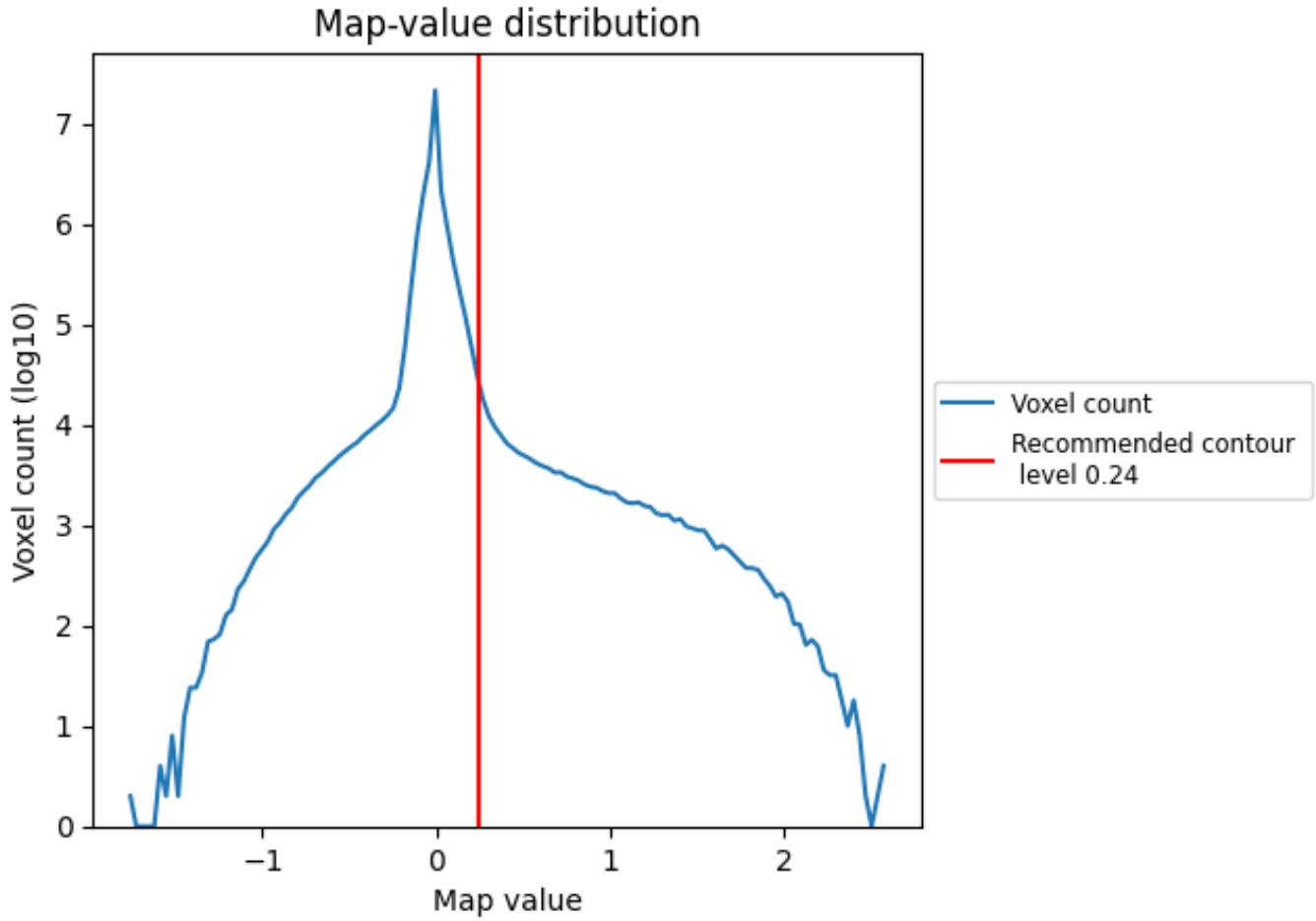


Z

7 Map analysis

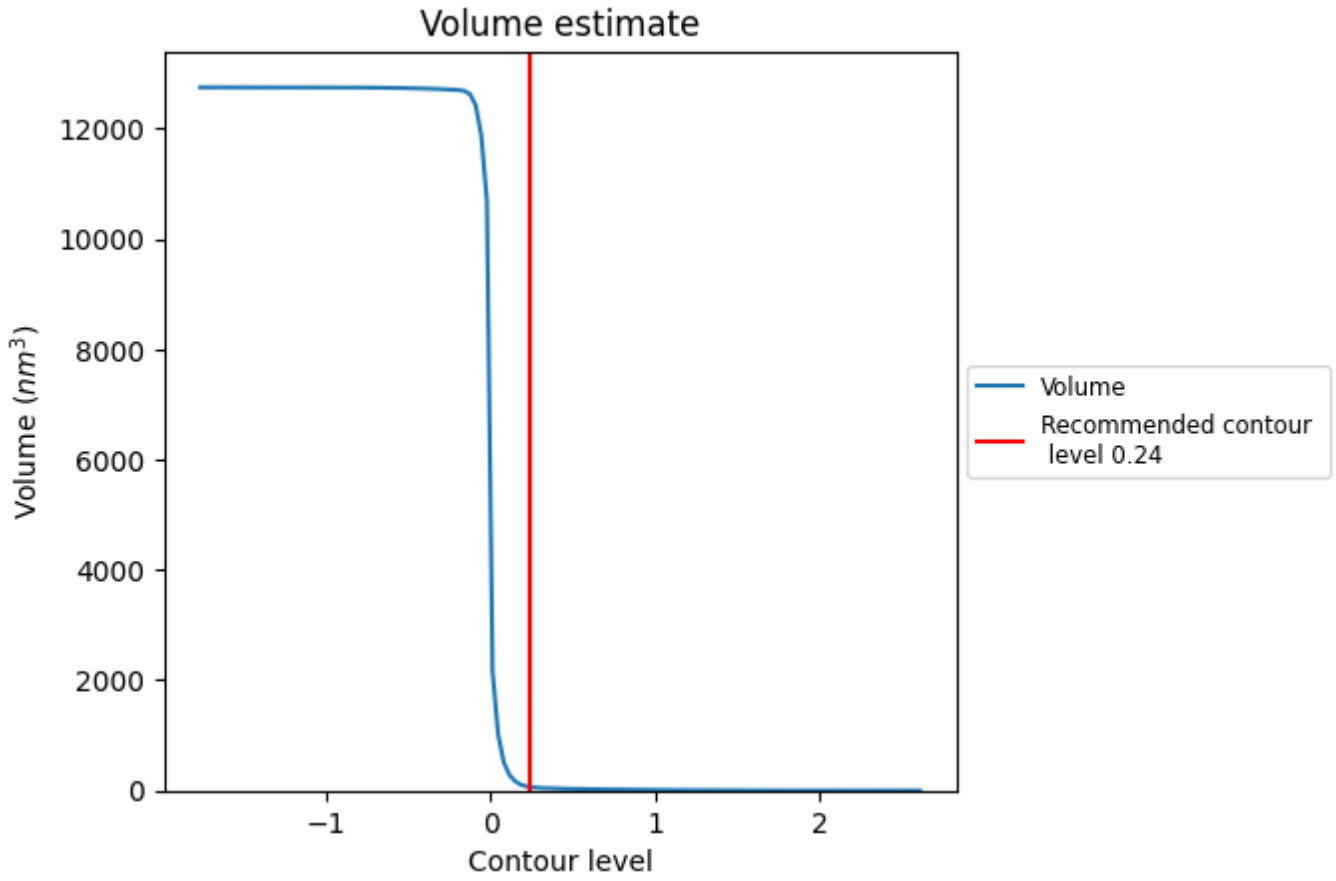
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

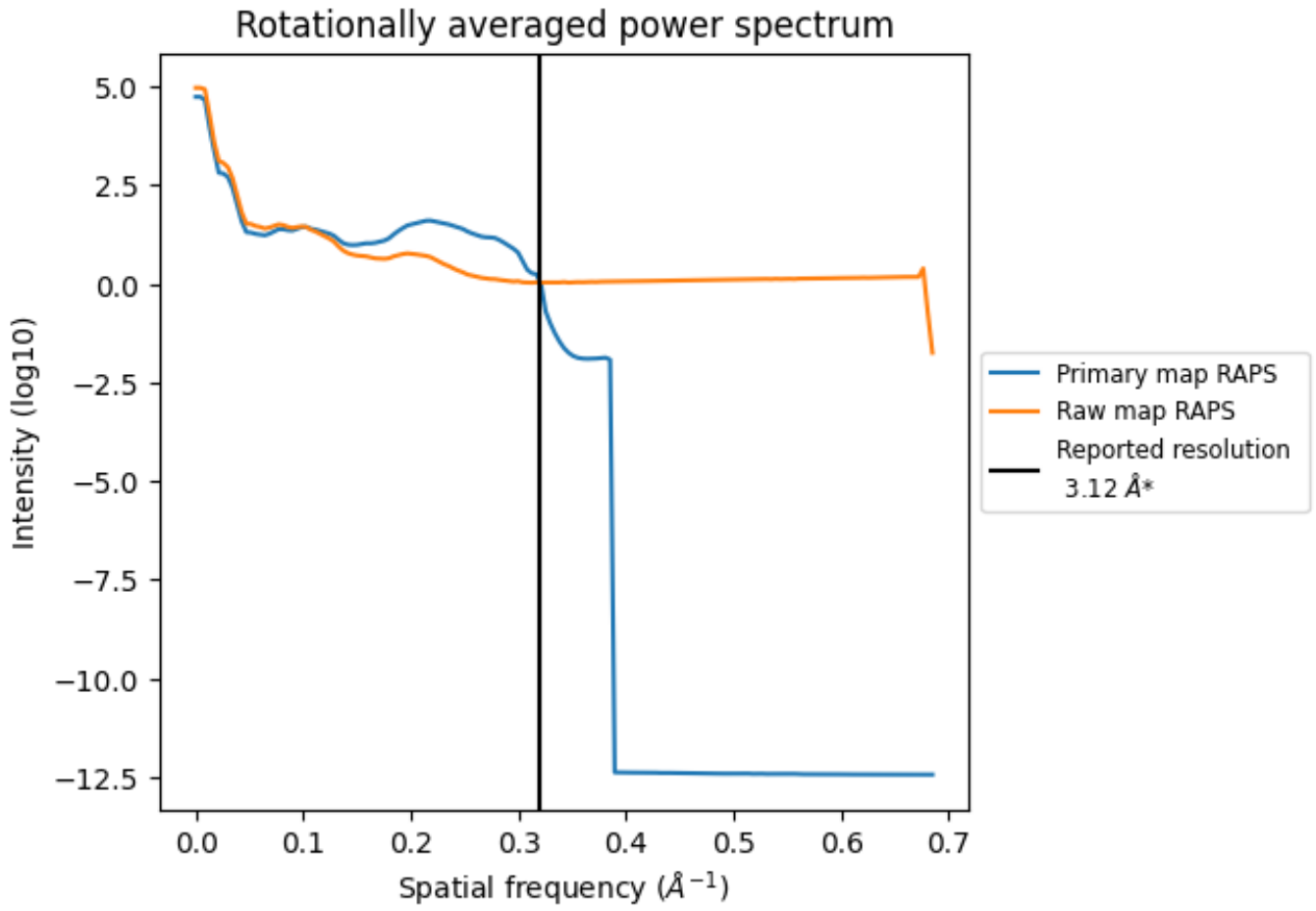
7.2 Volume estimate



The volume at the recommended contour level is 66 nm^3; this corresponds to an approximate mass of 59 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum (i)

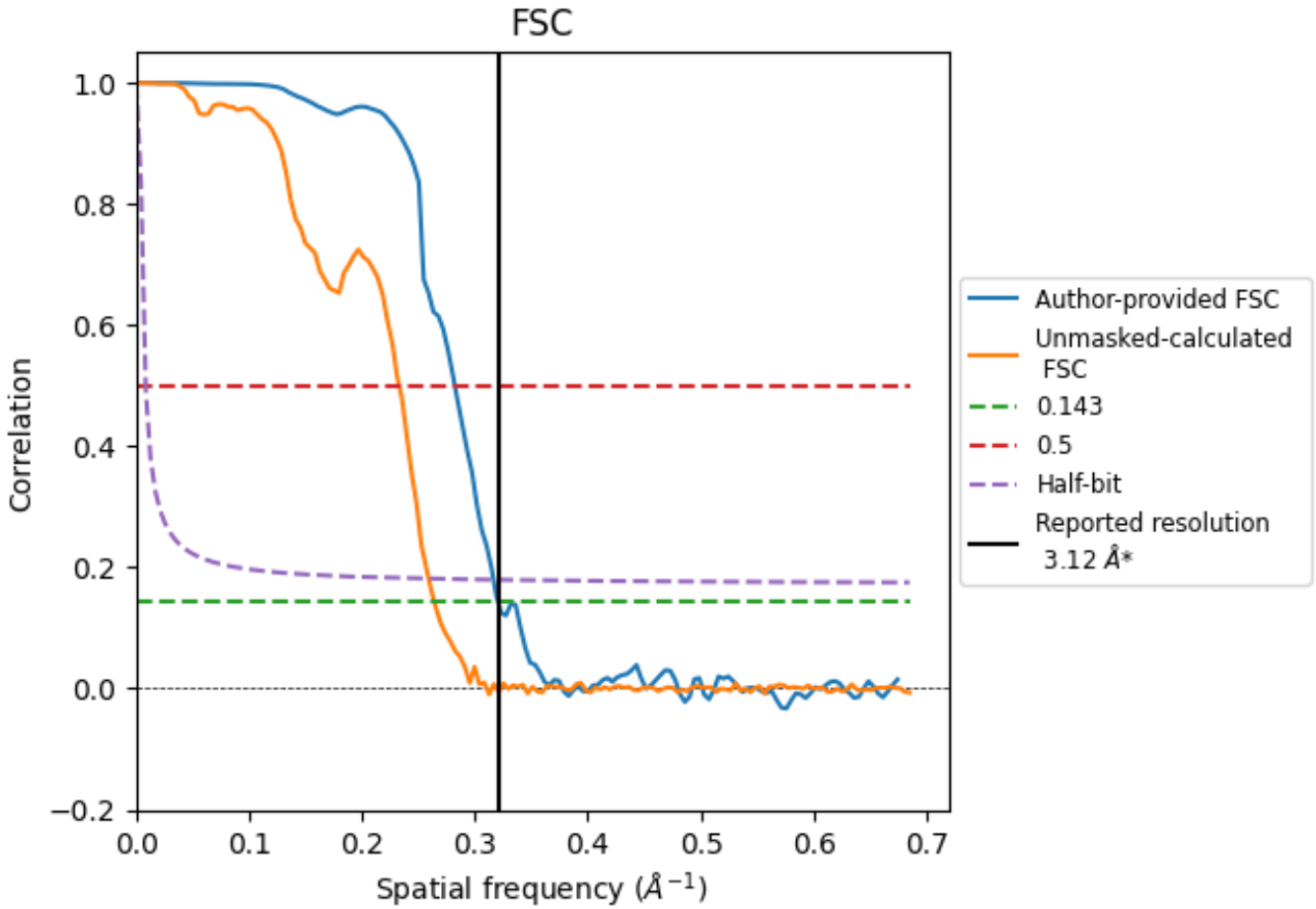


*Reported resolution corresponds to spatial frequency of 0.321 $Å^{-1}$

8 Fourier-Shell correlation

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC



*Reported resolution corresponds to spatial frequency of 0.321 $Å^{-1}$

8.2 Resolution estimates (i)

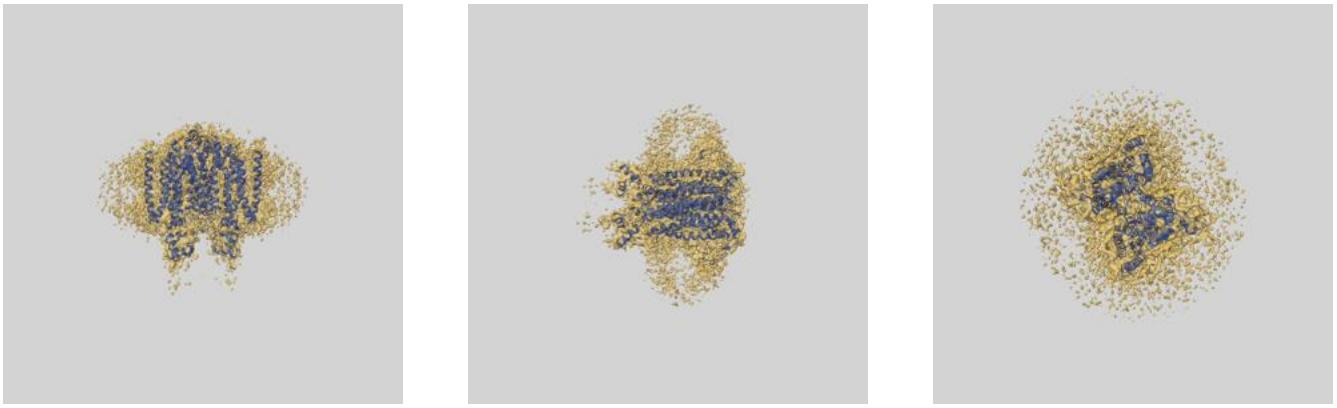
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.12	-	-
Author-provided FSC curve	3.12	3.54	3.16
Unmasked-calculated*	3.79	4.29	3.86

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.79 differs from the reported value 3.12 by more than 10 %

9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-64364 and PDB model 9UNV. Per-residue inclusion information can be found in section 3 on page 11.

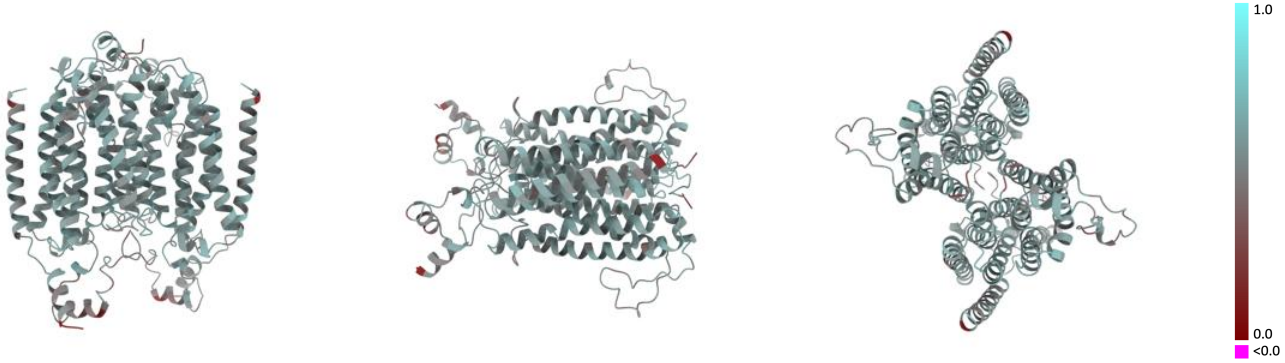
9.1 Map-model overlay



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.24 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

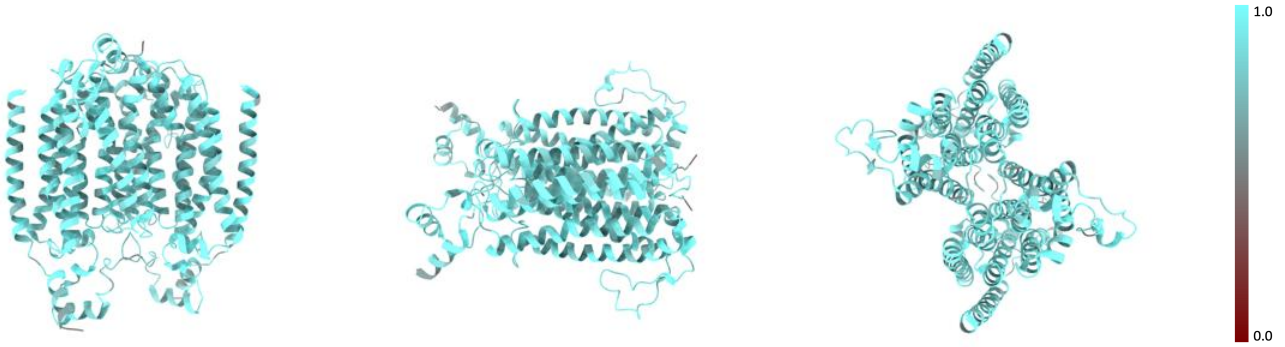
9.2 Q-score mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

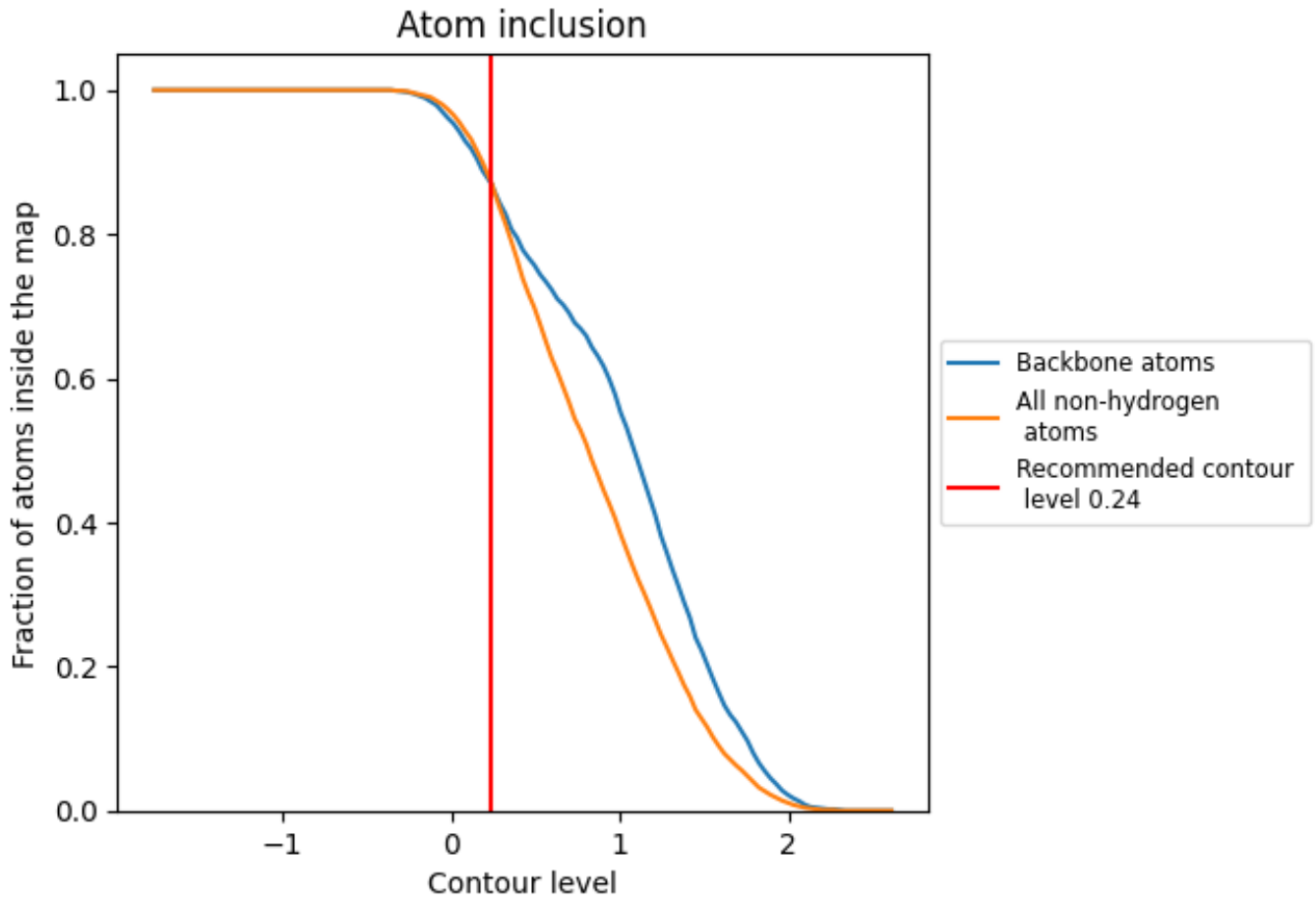
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.24).

9.4 Atom inclusion (i)



At the recommended contour level, 87% of all backbone atoms, 87% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.24) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8700	0.5290
A	0.8750	0.5340
B	0.8370	0.4950
C	0.8730	0.5340
D	0.8370	0.4930