Full wwPDB X-ray Structure Validation Report (i)

Sep 28, 2024 – 08:01 AM EDT

PDB ID	:	5K2A
Title	:	2.5 angstrom A2a adenosine receptor structure with sulfur SAD phasing using XFEL data
Authors	:	Batyuk, A.; Galli, L.; Ishchenko, A.; Han, G.W.; Gati, C.; Popov, P.; Lee, M.-Y.; Stauch, B.; White, T.A.; Barty, A.; Aquila, A.; Hunter, M.S.; Liang, M.; Boutet, S.; Pu, M.; Liu, Z.-J.; Nelson, G.; James, D.; Li, C.; Zhao, Y.; Spence, J.C.H.; Liu, W.; Fromme, P.; Katritch, V.; Weierstall, U.; Stevens, R.C.; Cherezov, V.; GPCR Network (GPCR)
Deposited on	:	2016-05-18
Resolution	:	2.50 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 (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references (i)) were used in the production of this report:

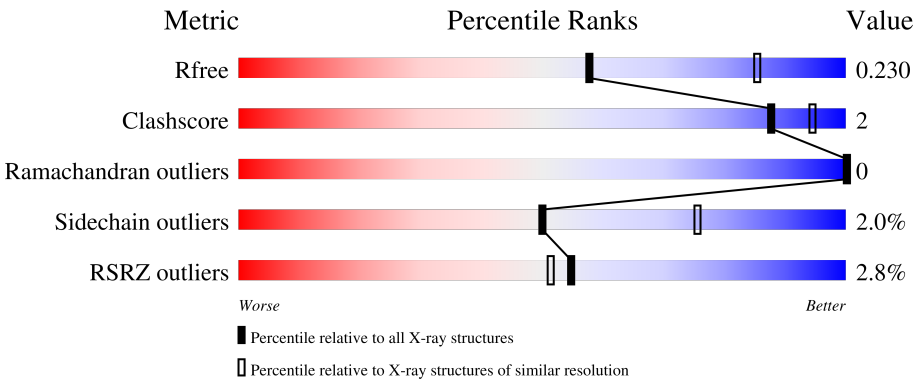
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

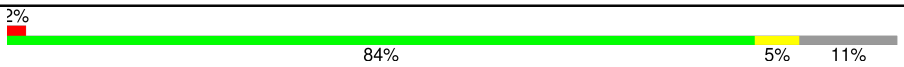
The reported resolution of this entry is 2.50 Å.

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}	164625	5504 (2.50-2.50)
Clashscore	180529	6282 (2.50-2.50)
Ramachandran outliers	177936	6191 (2.50-2.50)
Sidechain outliers	177891	6193 (2.50-2.50)
RSRZ outliers	164620	5504 (2.50-2.50)

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	447	

Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

2 Entry composition (i)

There are 8 unique types of molecules in this entry. The entry contains 3508 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Adenosine receptor A2a/Soluble cytochrome b562 chimera.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	398	3035	1989	496	529	21	0	3	0

There are 39 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-24	MET	-	initiating methionine	UNP P29274
A	-23	LYS	-	expression tag	UNP P29274
A	-22	THR	-	expression tag	UNP P29274
A	-21	ILE	-	expression tag	UNP P29274
A	-20	ILE	-	expression tag	UNP P29274
A	-19	ALA	-	expression tag	UNP P29274
A	-18	LEU	-	expression tag	UNP P29274
A	-17	SER	-	expression tag	UNP P29274
A	-16	TYR	-	expression tag	UNP P29274
A	-15	ILE	-	expression tag	UNP P29274
A	-14	PHE	-	expression tag	UNP P29274
A	-13	CYS	-	expression tag	UNP P29274
A	-12	LEU	-	expression tag	UNP P29274
A	-11	VAL	-	expression tag	UNP P29274
A	-10	PHE	-	expression tag	UNP P29274
A	-9	ALA	-	expression tag	UNP P29274
A	-8	ASP	-	expression tag	UNP P29274
A	-7	TYR	-	expression tag	UNP P29274
A	-6	LYS	-	expression tag	UNP P29274
A	-5	ASP	-	expression tag	UNP P29274
A	-4	ASP	-	expression tag	UNP P29274
A	-3	ASP	-	expression tag	UNP P29274
A	-2	ASP	-	expression tag	UNP P29274
A	-1	GLY	-	expression tag	UNP P29274
A	0	ALA	-	expression tag	UNP P29274
A	1	PRO	-	expression tag	UNP P29274
A	1007	TRP	MET	engineered mutation	UNP P0ABE7

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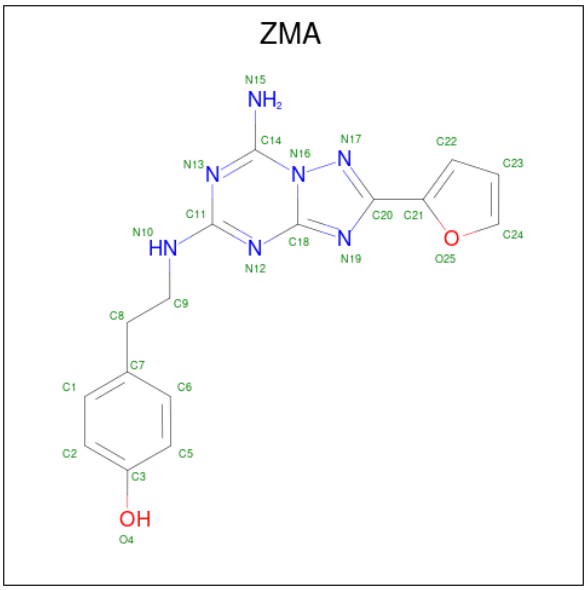
Chain	Residue	Modelled	Actual	Comment	Reference
A	1102	ILE	HIS	engineered mutation	UNP P0ABE7
A	1106	LEU	ARG	engineered mutation	UNP P0ABE7
A	317	HIS	-	expression tag	UNP P29274
A	318	HIS	-	expression tag	UNP P29274
A	319	HIS	-	expression tag	UNP P29274
A	320	HIS	-	expression tag	UNP P29274
A	321	HIS	-	expression tag	UNP P29274
A	322	HIS	-	expression tag	UNP P29274
A	323	HIS	-	expression tag	UNP P29274
A	324	HIS	-	expression tag	UNP P29274
A	325	HIS	-	expression tag	UNP P29274
A	326	HIS	-	expression tag	UNP P29274

- Molecule 2 is 4-{2-[(7-amino-2-furan-2-yl[1,2,4]triazolo[1,5-a][1,3,5]triazin-5-yl)amino]ethyl} phenol (three-letter code: ZMA) (formula: $C_{16}H_{15}N_7O_2$).

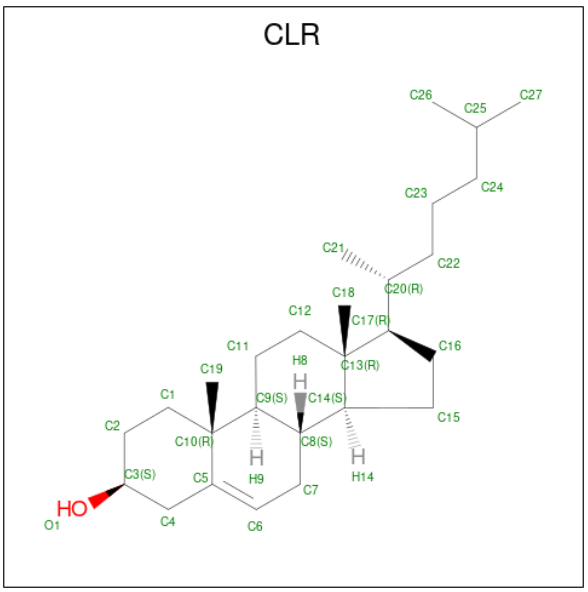


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	A	1	25	16	7	2	0	0

- Molecule 3 is SODIUM ION (three-letter code: NA) (formula: Na).

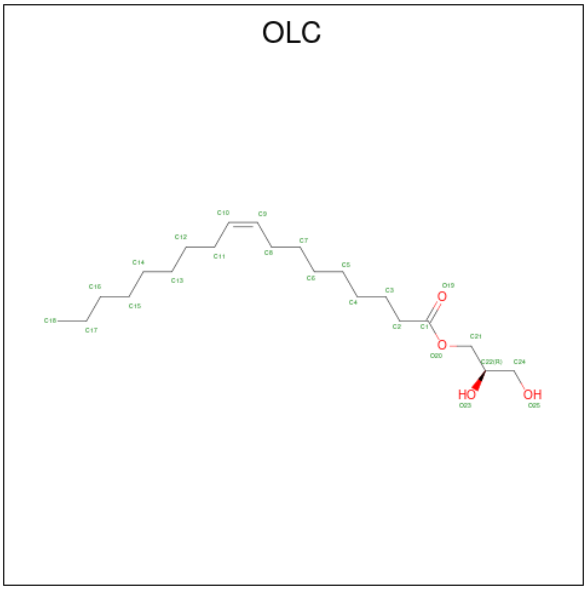
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Na		
3	A	1	1	1	0	0

- Molecule 4 is CHOLESTEROL (three-letter code: CLR) (formula: $C_{27}H_{46}O$).



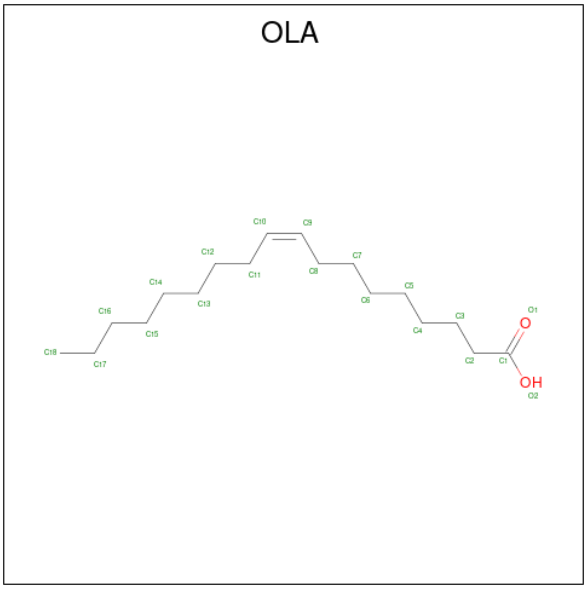
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 28 27 1	0	0
4	A	1	Total C O 28 27 1	0	0
4	A	1	Total C O 28 27 1	0	0

- Molecule 5 is (2R)-2,3-dihydroxypropyl (9Z)-octadec-9-enoate (three-letter code: OLC) (formula: $C_{21}H_{40}O_4$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
5	A	1	18	14	4	0	0
			Total	C	O		
5	A	1	10	6	4	0	0
			Total	C	O		
5	A	1	17	13	4	0	0
			Total	C	O		
5	A	1	16	12	4	0	0
			Total	C	O		
5	A	1	17	13	4	0	0
			Total	C	O		
5	A	1	13	9	4	0	0
			Total	C	O		
5	A	1	12	8	4	0	0
			Total	C	O		
5	A	1	18	14	4	0	0
			Total	C	O		
5	A	1	17	13	4	0	0
			Total	C	O		
5	A	1	16	12	4	0	0

- Molecule 6 is OLEIC ACID (three-letter code: OLA) (formula: $C_{18}H_{34}O_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
6	A	1	12	10	2	0	0
			Total	C	O		
6	A	1	16	14	2	0	0

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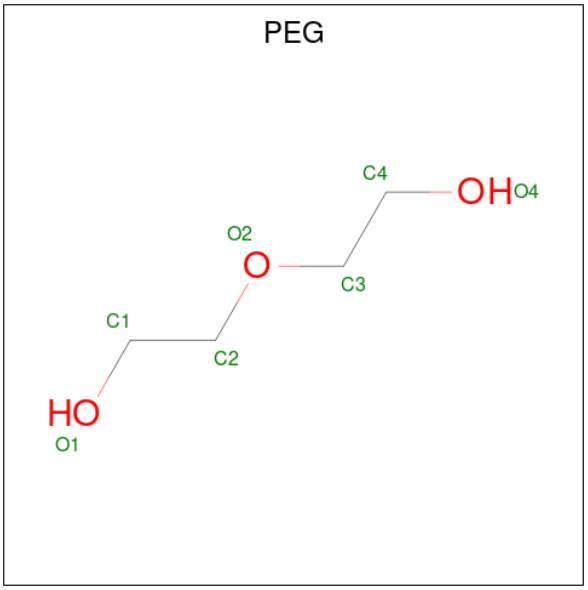
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C O 10 8 2	0	0
6	A	1	Total C O 11 9 2	0	0
6	A	1	Total C O 9 7 2	0	0
6	A	1	Total C O 9 7 2	0	0
6	A	1	Total C O 13 11 2	0	0
6	A	1	Total C 13 13	0	0
6	A	1	Total C O 20 18 2	0	0
6	A	1	Total C O 19 17 2	0	0

- Molecule 7 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: $C_4H_{10}O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total C O 7 4 3	0	0

- Molecule 8 is water.

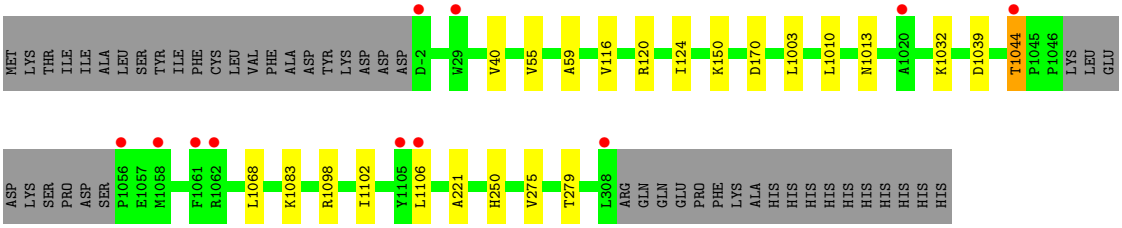
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
8	A	70	70	70	0	0

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: Adenosine receptor A2a/Soluble cytochrome b562 chimera

Chain A:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α, β, γ	40.35Å 180.50Å 142.70Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	23.78 – 2.50 23.78 – 2.50	Depositor EDS
% Data completeness (in resolution range)	100.0 (23.78-2.50) 99.8 (23.78-2.50)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.90 (at 2.50Å)	Xtriage
Refinement program	PHENIX (1.10_2155: ???)	Depositor
R, R_{free}	0.174 , 0.228 0.177 , 0.230	Depositor DCC
R_{free} test set	900 reflections (4.85%)	wwPDB-VP
Wilson B-factor (Å^2)	46.9	Xtriage
Anisotropy	0.207	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 95.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	3508	wwPDB-VP
Average B, all atoms (Å^2)	55.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.23% 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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: OLC, OLA, ZMA, CLR, PEG, NA

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	0/3104	0.37	0/4240

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3035	0	3015	11	0
2	A	25	0	14	1	0
3	A	1	0	0	0	0
4	A	84	0	138	1	0
5	A	154	0	191	1	0
6	A	132	0	180	2	0
7	A	7	0	10	1	0
8	A	70	0	0	0	0
All	All	3508	0	3548	13	0

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

All (13) 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)
5:A:1209:OLC:H4	6:A:1223:OLA:H172	1.79	0.65
1:A:120:ARG:HA	7:A:1225:PEG:H32	1.82	0.62
1:A:250:HIS:CE1	2:A:1201:ZMA:H24	2.35	0.61
1:A:1013:ASN:HD21	1:A:1032:LYS:HB2	1.75	0.51
1:A:1044:THR:HG21	1:A:221:ALA:HB1	1.94	0.49
4:A:1205:CLR:H211	4:A:1205:CLR:H232	1.71	0.45
1:A:150:LYS:NZ	1:A:170:ASP:OD1	2.49	0.45
1:A:275:VAL:O	1:A:279:THR:HG23	2.17	0.45
1:A:124:ILE:HG21	6:A:1220:OLA:H42	1.99	0.44
1:A:40:VAL:HG11	1:A:116:VAL:HG12	2.00	0.44
1:A:1098:ARG:HA	1:A:1102:ILE:HB	2.01	0.43
1:A:55:VAL:HA	1:A:59:ALA:HB3	2.02	0.42
1:A:1068:LEU:HD22	1:A:1102:ILE:HG12	2.03	0.41

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	397/447 (89%)	393 (99%)	4 (1%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	306/374 (82%)	299 (98%)	7 (2%)	45 72

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1003	LEU
1	A	1010	LEU
1	A	1039	ASP
1	A	1044	THR
1	A	1083	LYS
1	A	1106[A]	LEU
1	A	1106[B]	LEU

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

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)

Of 26 ligands modelled in this entry, 1 is monoatomic - leaving 25 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	$\#\|Z\| > 2$
6	OLA	A	1215	-	11,11,19	0.67	0	11,11,19	1.14	0
6	OLA	A	1218	-	10,10,19	0.63	0	10,10,19	1.19	2 (20%)
4	CLR	A	1205	-	31,31,31	0.72	1 (3%)	48,48,48	0.93	2 (4%)
4	CLR	A	1203	-	31,31,31	0.72	1 (3%)	48,48,48	1.00	3 (6%)
5	OLC	A	1212	-	11,11,24	1.34	1 (9%)	12,12,25	1.10	1 (8%)
6	OLA	A	1217	-	9,9,19	0.67	0	9,9,19	1.25	1 (11%)
6	OLA	A	1224	-	18,18,19	0.51	0	18,18,19	0.94	1 (5%)
5	OLC	A	1207	-	9,9,24	1.46	1 (11%)	10,10,25	1.18	1 (10%)
5	OLC	A	1226	-	15,15,24	1.15	1 (6%)	16,16,25	1.16	1 (6%)
2	ZMA	A	1201	-	21,28,28	0.48	0	20,39,39	1.68	4 (20%)
7	PEG	A	1225	-	6,6,6	0.44	0	5,5,5	0.32	0
5	OLC	A	1210	-	16,16,24	1.14	1 (6%)	17,17,25	1.11	2 (11%)
6	OLA	A	1216	-	15,15,19	0.56	0	15,15,19	0.96	1 (6%)
5	OLC	A	1213	-	17,17,24	1.10	1 (5%)	18,18,25	1.45	2 (11%)
5	OLC	A	1209	-	15,15,24	1.16	1 (6%)	16,16,25	1.04	1 (6%)
6	OLA	A	1221	-	12,12,19	0.62	0	12,12,19	1.19	2 (16%)
5	OLC	A	1211	-	12,12,24	1.28	1 (8%)	13,13,25	1.22	2 (15%)
6	OLA	A	1223	-	19,19,19	0.51	0	19,19,19	0.89	1 (5%)
6	OLA	A	1222	-	12,12,19	0.25	0	11,11,19	0.57	0
6	OLA	A	1219	-	8,8,19	0.72	0	8,8,19	1.18	0
5	OLC	A	1214	-	16,16,24	1.17	1 (6%)	17,17,25	1.07	2 (11%)
4	CLR	A	1204	-	31,31,31	0.71	1 (3%)	48,48,48	0.90	2 (4%)
5	OLC	A	1208	-	16,16,24	1.15	1 (6%)	17,17,25	0.92	1 (5%)
5	OLC	A	1206	-	17,17,24	1.10	1 (5%)	18,18,25	1.05	1 (5%)
6	OLA	A	1220	-	8,8,19	0.72	0	8,8,19	1.27	1 (12%)

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
6	OLA	A	1215	-	-	5/9/9/17	-
6	OLA	A	1218	-	-	4/8/8/17	-
4	CLR	A	1205	-	-	0/10/68/68	0/4/4/4
4	CLR	A	1203	-	-	2/10/68/68	0/4/4/4
5	OLC	A	1212	-	-	2/11/11/24	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	OLA	A	1217	-	-	2/7/7/17	-
6	OLA	A	1224	-	-	6/16/16/17	-
5	OLC	A	1207	-	-	0/9/9/24	-
5	OLC	A	1226	-	-	1/15/15/24	-
2	ZMA	A	1201	-	-	0/6/10/10	0/4/4/4
7	PEG	A	1225	-	-	0/4/4/4	-
5	OLC	A	1210	-	-	5/16/16/24	-
6	OLA	A	1216	-	-	6/13/13/17	-
5	OLC	A	1213	-	-	3/17/17/24	-
5	OLC	A	1209	-	-	2/15/15/24	-
6	OLA	A	1221	-	-	4/10/10/17	-
5	OLC	A	1211	-	-	1/12/12/24	-
6	OLA	A	1223	-	-	10/17/17/17	-
6	OLA	A	1222	-	-	6/10/10/17	-
6	OLA	A	1219	-	-	4/6/6/17	-
5	OLC	A	1214	-	-	6/16/16/24	-
4	CLR	A	1204	-	-	1/10/68/68	0/4/4/4
5	OLC	A	1208	-	-	2/16/16/24	-
5	OLC	A	1206	-	-	7/17/17/24	-
6	OLA	A	1220	-	-	3/6/6/17	-

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	1214	OLC	O20-C1	4.38	1.46	1.33
5	A	1208	OLC	O20-C1	4.33	1.46	1.33
5	A	1210	OLC	O20-C1	4.31	1.45	1.33
5	A	1206	OLC	O20-C1	4.31	1.45	1.33
5	A	1209	OLC	O20-C1	4.31	1.45	1.33
5	A	1213	OLC	O20-C1	4.30	1.45	1.33
5	A	1226	OLC	O20-C1	4.26	1.45	1.33
5	A	1211	OLC	O20-C1	4.26	1.45	1.33
5	A	1212	OLC	O20-C1	4.26	1.45	1.33
5	A	1207	OLC	O20-C1	4.24	1.45	1.33
4	A	1205	CLR	C10-C9	-2.14	1.52	1.56
4	A	1204	CLR	C10-C9	-2.09	1.52	1.56
4	A	1203	CLR	C10-C9	-2.09	1.52	1.56

All (34) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	A	1213	OLC	O20-C1-C2	4.11	124.36	111.83
2	A	1201	ZMA	C23-C22-C21	-3.91	103.28	108.39
2	A	1201	ZMA	N12-C11-N13	-3.63	120.31	126.25
5	A	1226	OLC	O20-C1-C2	3.18	121.52	111.83
5	A	1211	OLC	O20-C1-C2	3.07	121.21	111.83
5	A	1210	OLC	O20-C1-C2	3.05	121.14	111.83
5	A	1213	OLC	O20-C1-O19	-2.95	116.26	123.63
5	A	1214	OLC	O20-C1-C2	2.91	120.72	111.83
5	A	1206	OLC	O20-C1-C2	2.89	120.66	111.83
5	A	1209	OLC	O20-C1-C2	2.84	120.50	111.83
5	A	1207	OLC	O20-C1-C2	2.83	119.75	111.15
2	A	1201	ZMA	N15-C14-N13	2.79	121.14	117.22
5	A	1212	OLC	O20-C1-C2	2.70	120.08	111.83
4	A	1203	CLR	C7-C8-C9	2.49	112.60	109.72
4	A	1203	CLR	C4-C5-C10	2.39	119.48	116.42
4	A	1205	CLR	C4-C5-C10	2.27	119.33	116.42
4	A	1204	CLR	C4-C5-C10	2.25	119.31	116.42
5	A	1208	OLC	O20-C1-C2	2.22	118.60	111.83
4	A	1204	CLR	C7-C8-C9	2.15	112.20	109.72
6	A	1217	OLA	O2-C1-C2	2.12	120.70	114.00
6	A	1216	OLA	O2-C1-C2	2.11	120.67	114.00
5	A	1214	OLC	O20-C1-O19	-2.11	118.35	123.63
6	A	1218	OLA	O2-C1-C2	2.11	120.65	114.00
6	A	1220	OLA	O2-C1-C2	2.10	120.63	114.00
6	A	1223	OLA	O2-C1-C2	2.08	120.58	114.00
6	A	1224	OLA	O2-C1-C2	2.07	120.54	114.00
6	A	1221	OLA	O2-C1-C2	2.07	120.53	114.00
4	A	1203	CLR	C13-C17-C20	-2.05	116.33	119.50
4	A	1205	CLR	C13-C17-C20	-2.04	116.35	119.50
5	A	1211	OLC	O20-C1-O19	-2.03	118.55	123.63
2	A	1201	ZMA	C9-N10-C11	-2.02	120.31	123.82
6	A	1221	OLA	C3-C2-C1	-2.01	109.25	114.51
6	A	1218	OLA	C3-C2-C1	-2.01	109.27	114.51
5	A	1210	OLC	O20-C1-O19	-2.00	118.62	123.63

There are no chirality outliers.

All (82) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	1206	OLC	O20-C21-C22-C24
5	A	1206	OLC	O20-C21-C22-O23
5	A	1210	OLC	O20-C21-C22-O23
5	A	1212	OLC	O20-C21-C22-O23

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Mol	Chain	Res	Type	Atoms
4	A	1203	CLR	C21-C20-C22-C23
6	A	1217	OLA	C1-C2-C3-C4
4	A	1204	CLR	C21-C20-C22-C23
6	A	1216	OLA	C1-C2-C3-C4
6	A	1220	OLA	C1-C2-C3-C4
6	A	1223	OLA	C1-C2-C3-C4
6	A	1219	OLA	C1-C2-C3-C4
6	A	1218	OLA	C1-C2-C3-C4
5	A	1210	OLC	O20-C21-C22-C24
5	A	1212	OLC	O20-C21-C22-C24
5	A	1210	OLC	C1-C2-C3-C4
6	A	1219	OLA	C3-C4-C5-C6
6	A	1221	OLA	C5-C6-C7-C8
6	A	1221	OLA	C3-C4-C5-C6
6	A	1223	OLA	C2-C3-C4-C5
6	A	1223	OLA	C5-C6-C7-C8
6	A	1222	OLA	C4-C5-C6-C7
5	A	1206	OLC	C2-C1-O20-C21
6	A	1224	OLA	C4-C5-C6-C7
6	A	1218	OLA	C4-C5-C6-C7
6	A	1215	OLA	C5-C6-C7-C8
6	A	1223	OLA	C11-C12-C13-C14
6	A	1224	OLA	C11-C12-C13-C14
6	A	1222	OLA	C10-C11-C12-C13
6	A	1224	OLA	C3-C4-C5-C6
6	A	1223	OLA	C6-C7-C8-C9
5	A	1214	OLC	C5-C6-C7-C8
6	A	1215	OLA	C4-C5-C6-C7
6	A	1223	OLA	C3-C4-C5-C6
5	A	1214	OLC	C2-C1-O20-C21
5	A	1206	OLC	O19-C1-O20-C21
6	A	1216	OLA	C10-C11-C12-C13
6	A	1218	OLA	C5-C6-C7-C8
6	A	1217	OLA	C4-C5-C6-C7
6	A	1218	OLA	C3-C4-C5-C6
6	A	1221	OLA	C4-C5-C6-C7
6	A	1215	OLA	C3-C4-C5-C6
5	A	1206	OLC	C4-C5-C6-C7
6	A	1222	OLA	C11-C12-C13-C14
5	A	1206	OLC	C6-C7-C8-C9
5	A	1213	OLC	C4-C5-C6-C7
6	A	1224	OLA	C12-C13-C14-C15

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Mol	Chain	Res	Type	Atoms
6	A	1220	OLA	C4-C5-C6-C7
6	A	1224	OLA	C14-C15-C16-C17
5	A	1214	OLC	O19-C1-O20-C21
6	A	1223	OLA	C4-C5-C6-C7
6	A	1216	OLA	C3-C4-C5-C6
5	A	1214	OLC	C6-C7-C8-C9
6	A	1220	OLA	C3-C4-C5-C6
6	A	1216	OLA	C5-C6-C7-C8
5	A	1226	OLC	C5-C6-C7-C8
6	A	1223	OLA	C7-C8-C9-C10
5	A	1213	OLC	C3-C4-C5-C6
5	A	1208	OLC	O20-C21-C22-C24
5	A	1209	OLC	O20-C21-C22-C24
5	A	1208	OLC	C7-C8-C9-C10
6	A	1216	OLA	C4-C5-C6-C7
6	A	1222	OLA	C5-C6-C7-C8
5	A	1210	OLC	C2-C3-C4-C5
6	A	1219	OLA	C4-C5-C6-C7
5	A	1206	OLC	C5-C6-C7-C8
6	A	1223	OLA	O1-C1-C2-C3
5	A	1211	OLC	O20-C21-C22-C24
6	A	1223	OLA	O2-C1-C2-C3
6	A	1222	OLA	C7-C8-C9-C10
6	A	1216	OLA	C2-C3-C4-C5
5	A	1210	OLC	C7-C8-C9-C10
6	A	1224	OLA	C9-C10-C11-C12
5	A	1213	OLC	O20-C1-C2-C3
5	A	1209	OLC	O20-C21-C22-O23
6	A	1215	OLA	O1-C1-C2-C3
6	A	1222	OLA	C3-C4-C5-C6
6	A	1221	OLA	O2-C1-C2-C3
5	A	1214	OLC	C2-C3-C4-C5
6	A	1219	OLA	C2-C3-C4-C5
6	A	1215	OLA	O2-C1-C2-C3
4	A	1203	CLR	C13-C17-C20-C21
5	A	1214	OLC	C3-C4-C5-C6

There are no ring outliers.

6 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	1205	CLR	1	0

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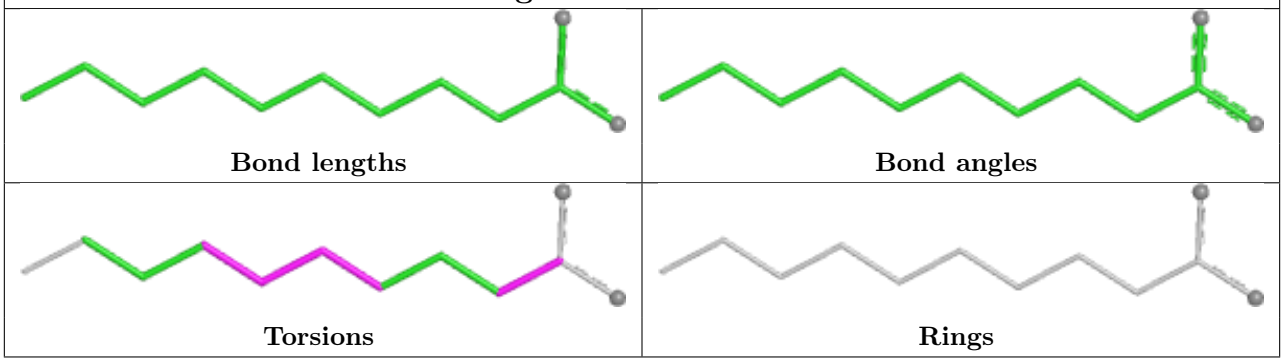
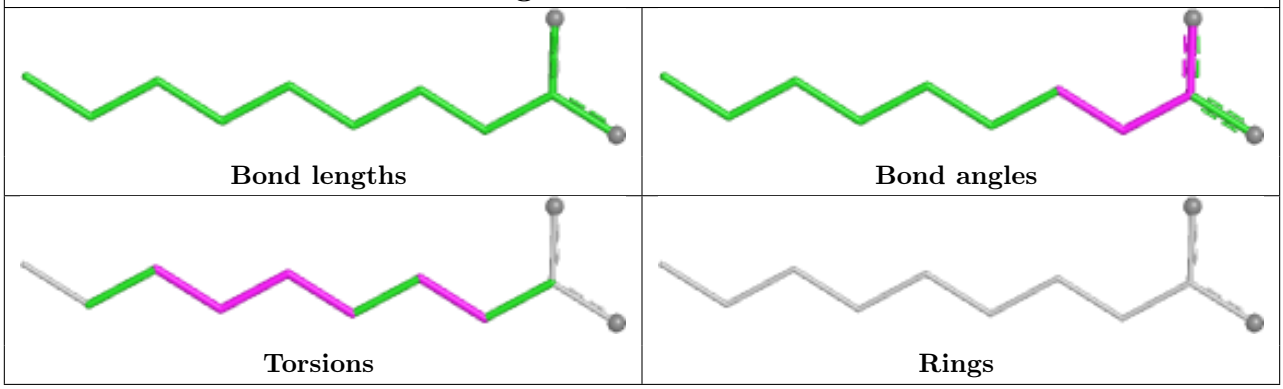
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1201	ZMA	1	0
7	A	1225	PEG	1	0
5	A	1209	OLC	1	0
6	A	1223	OLA	1	0
6	A	1220	OLA	1	0

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.

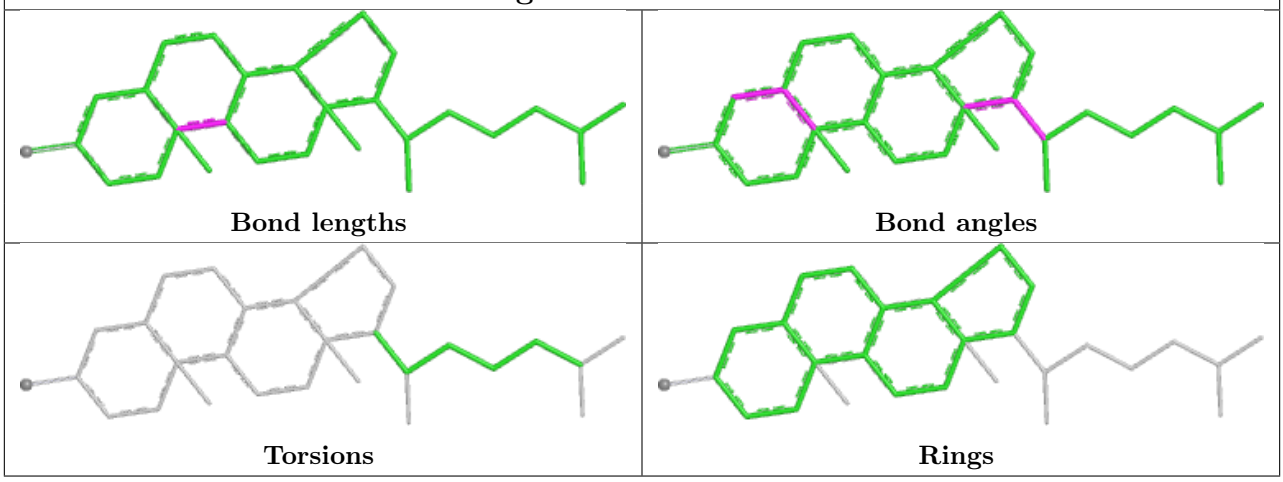
Ligand OLA A 1215



Ligand OLA A 1218



Ligand CLR A 1205



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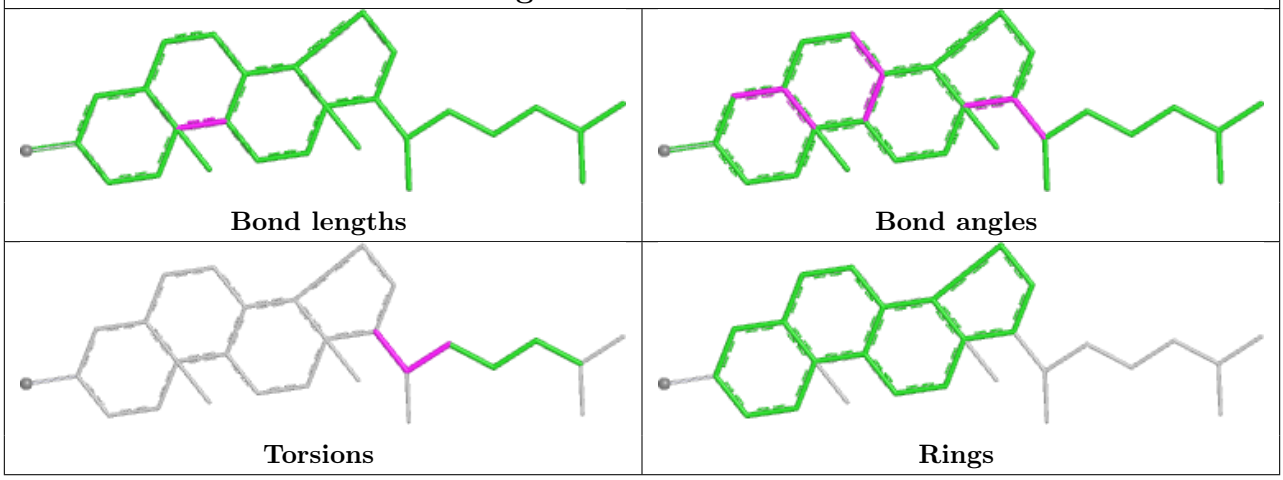
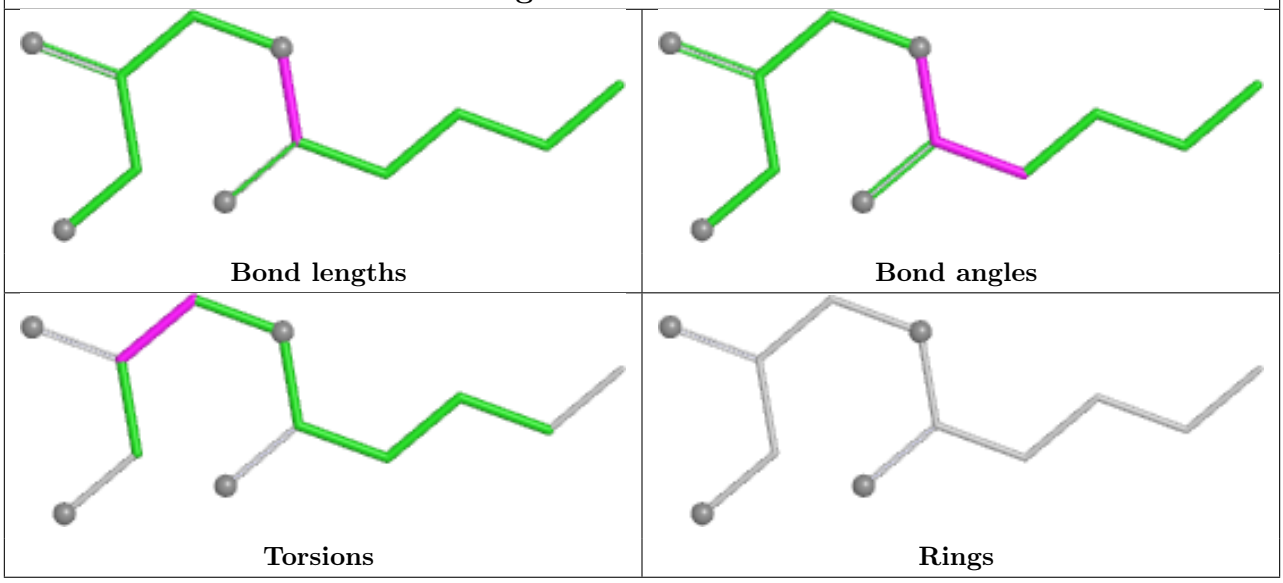


Ligand OLC A 1212



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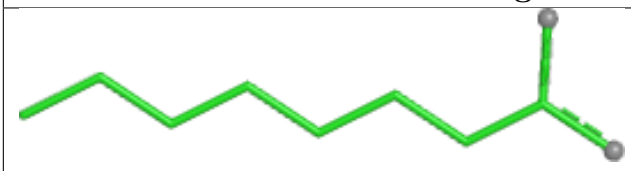
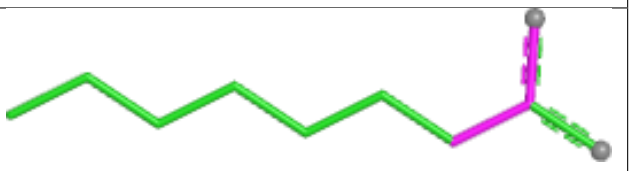
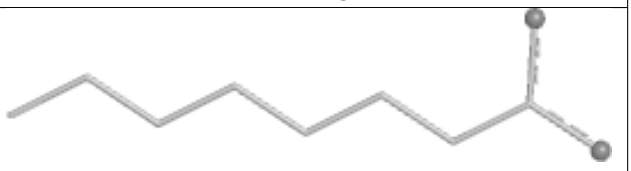
 Bond lengths	 Bond angles
Torsions	 Rings

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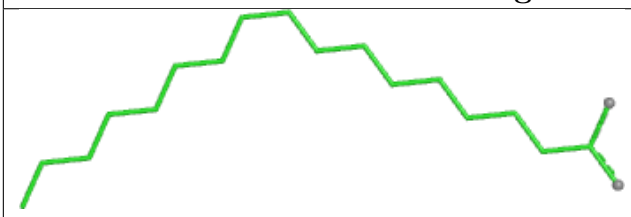
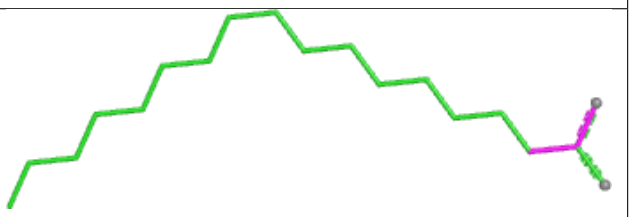
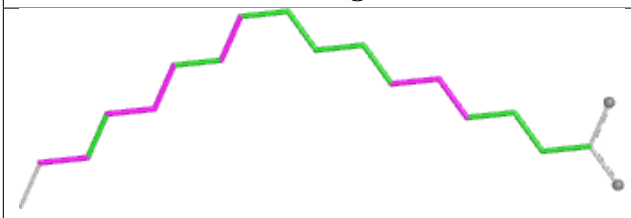
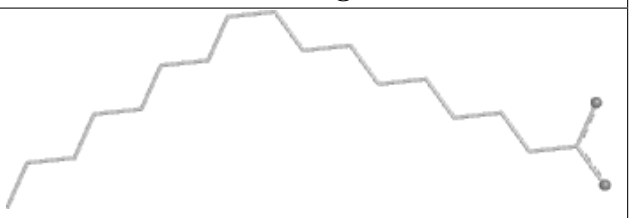
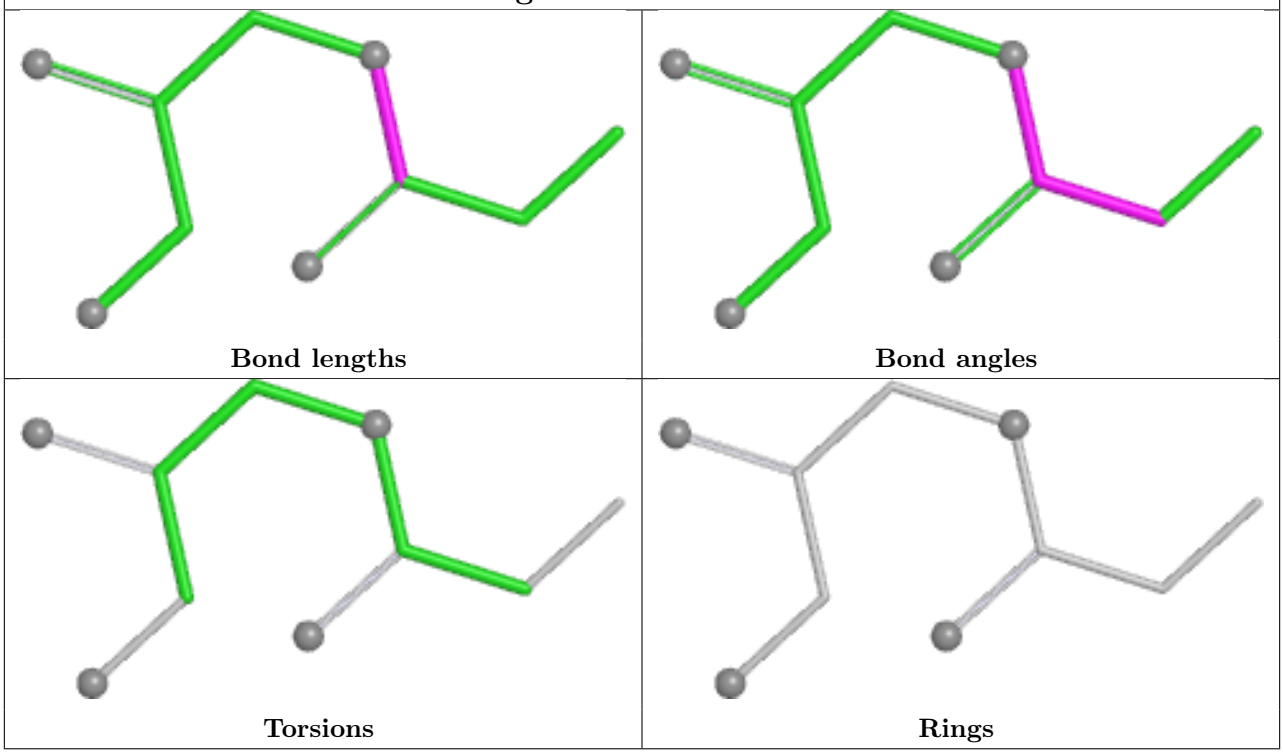
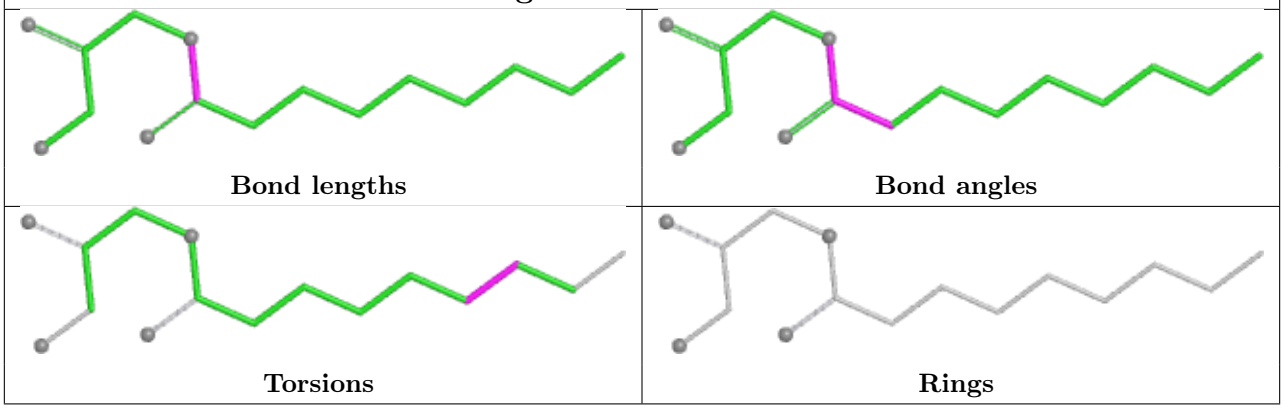
 Bond lengths	 Bond angles
 Torsions	 Rings

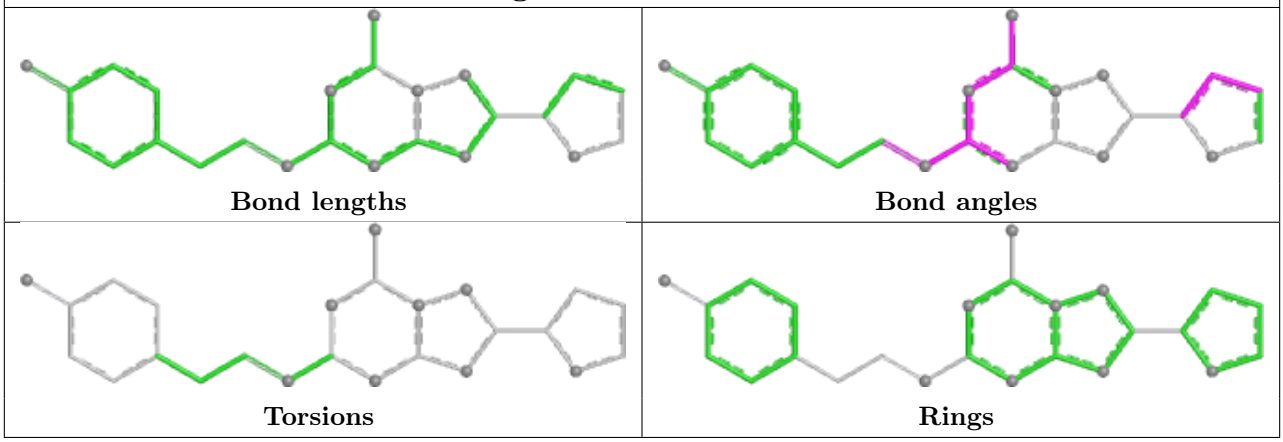
Ligand OLC A 1207



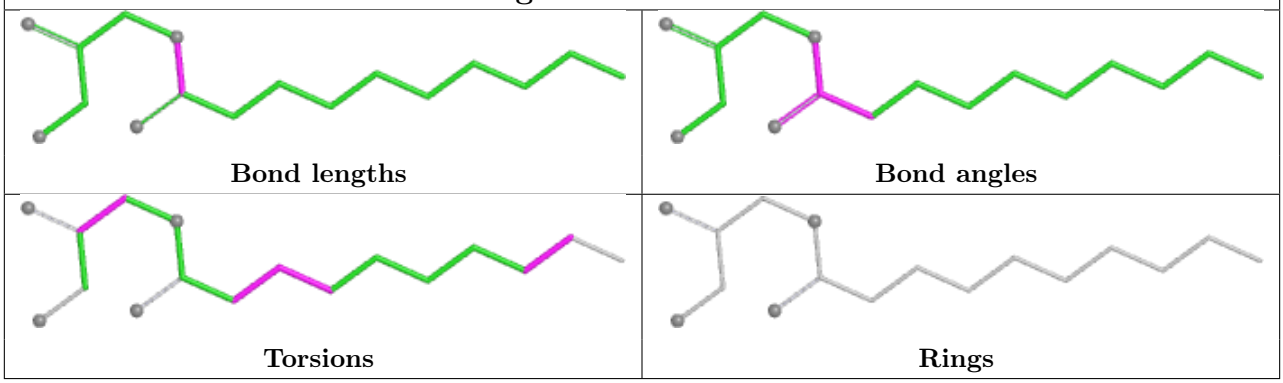
Ligand OLC A 1226



Ligand ZMA A 1201



Ligand OLC A 1210



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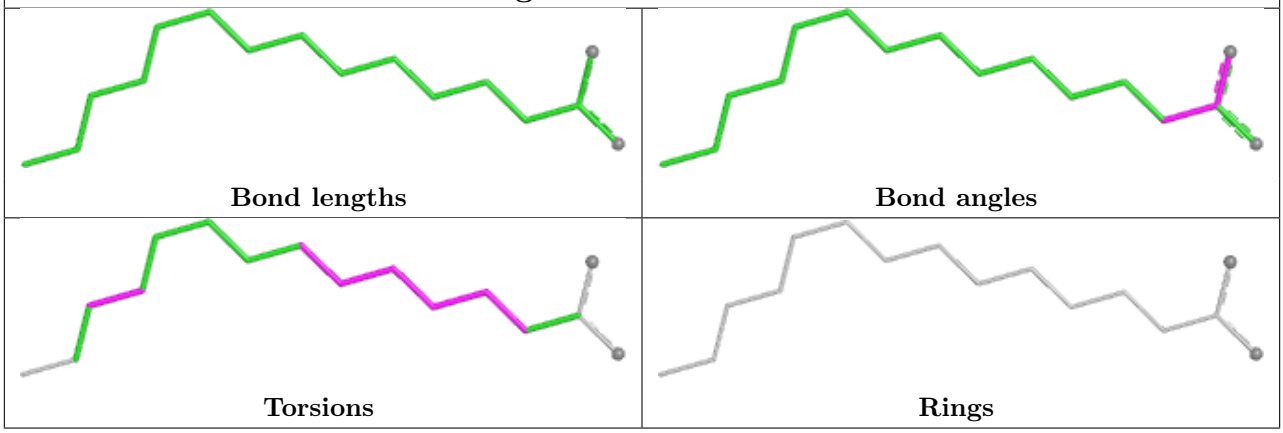
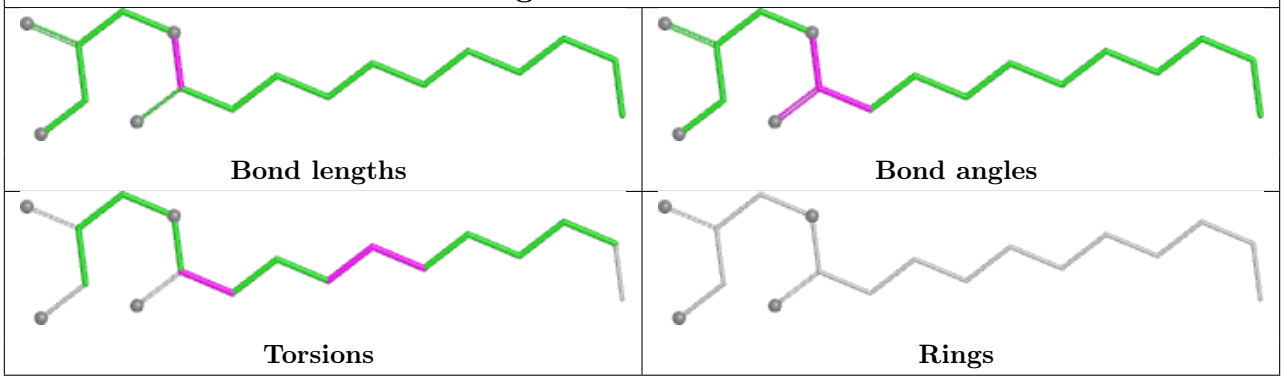
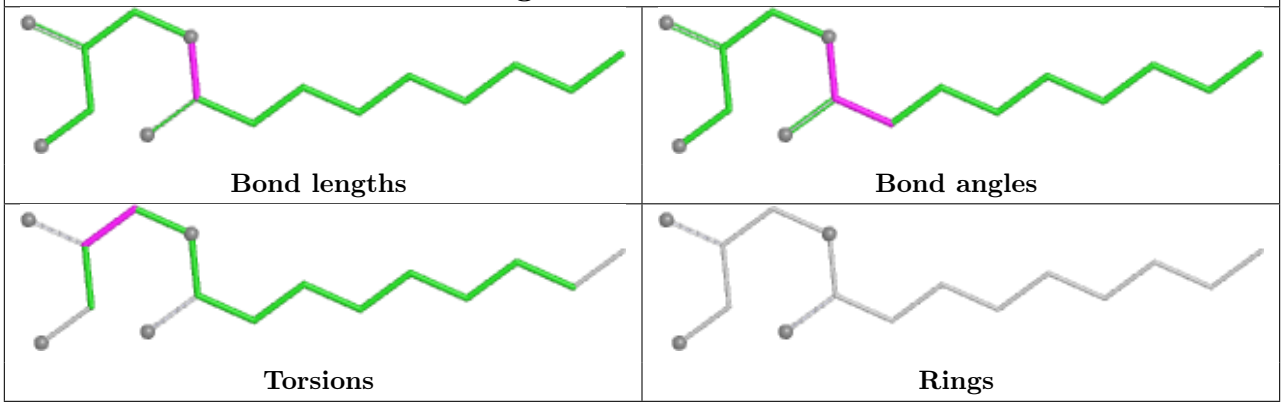


Ligand OLC A 1213



Ligand OLC A 1209



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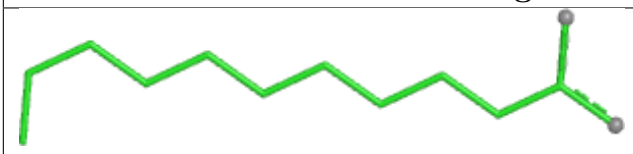
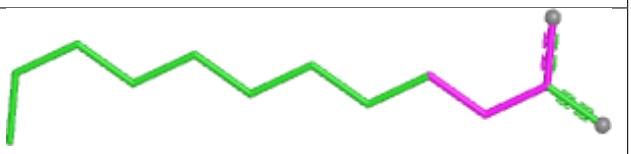
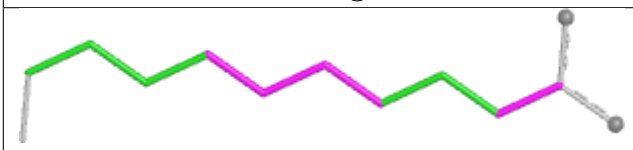


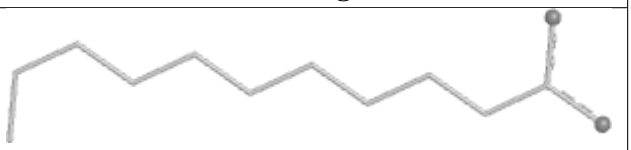
Bond lengths



Bond angles

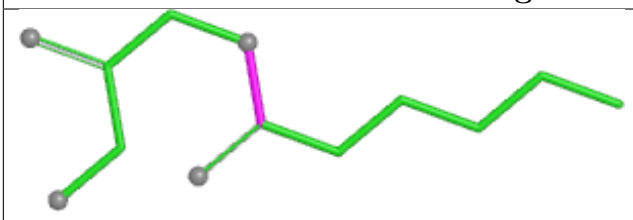


Torsions

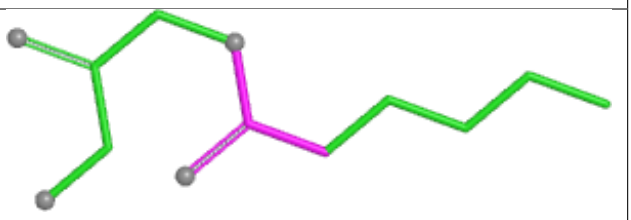


Rings

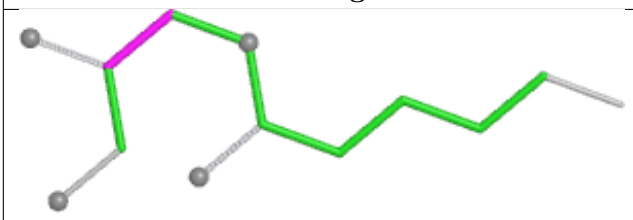
Ligand OLC A 1211



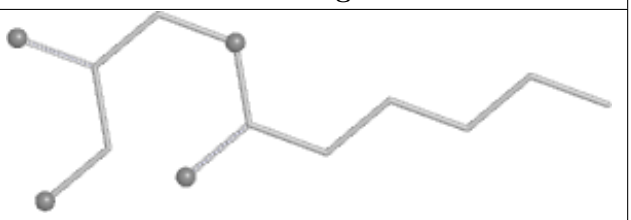
Bond lengths



Bond angles

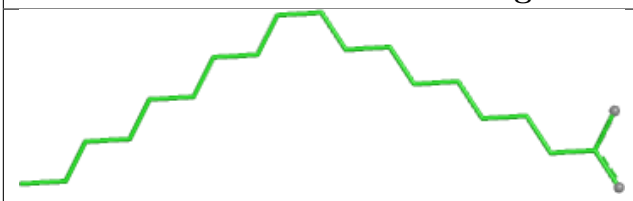


Torsions

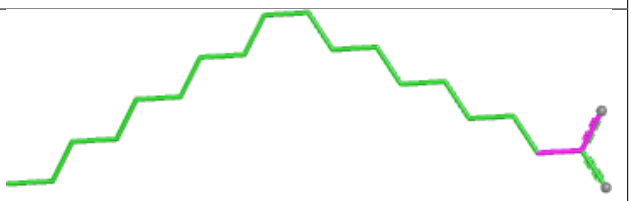


Rings

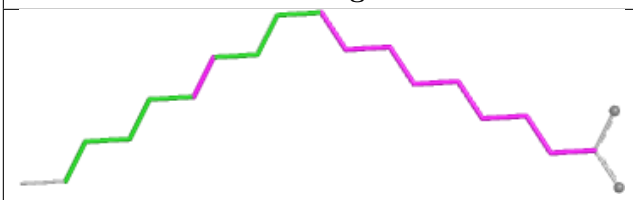
Ligand OLA A 1223



Bond lengths



Bond angles



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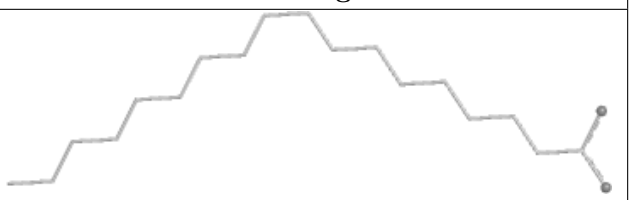
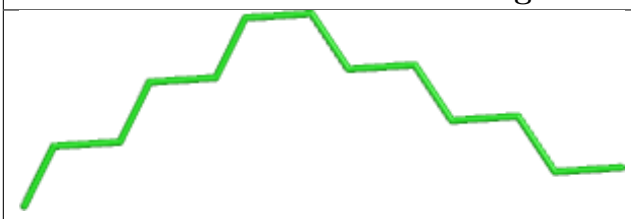
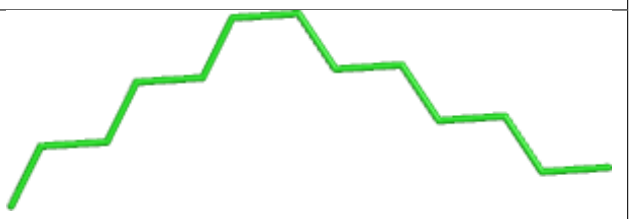


Rings

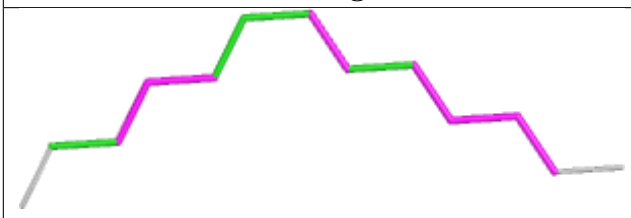
Ligand OLA A 1222



Bond lengths



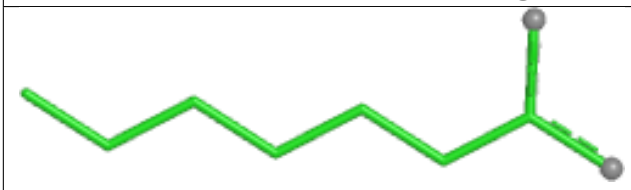
Bond angles



Torsions

Rings

Ligand OLA A 1219



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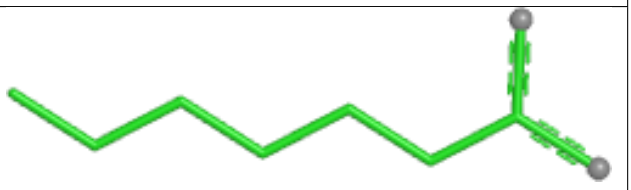
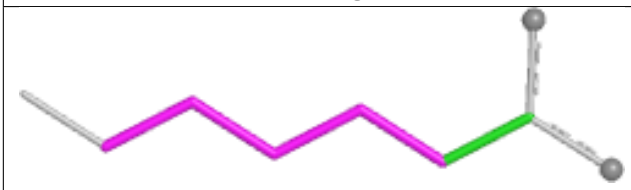
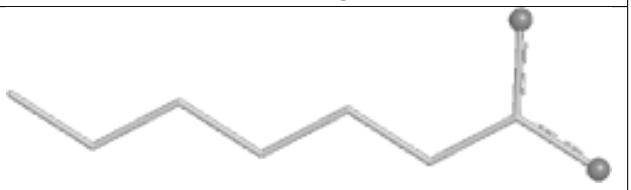


Bond angles

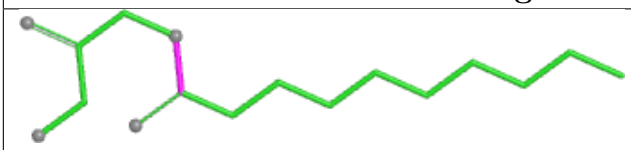


Torsions

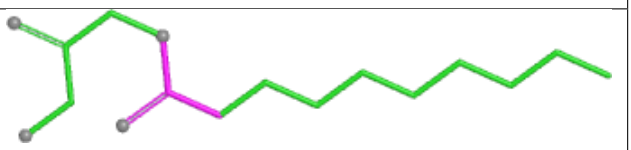


Rings

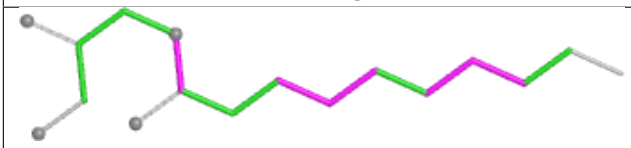
Ligand OLC A 1214



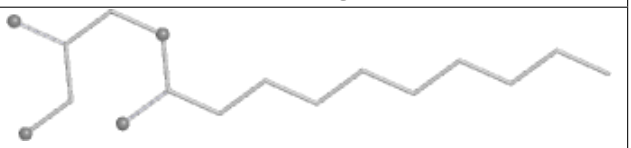
Bond lengths



Bond angles

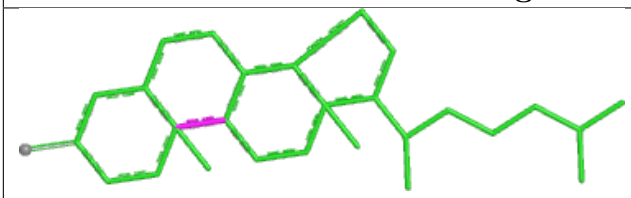


Torsions

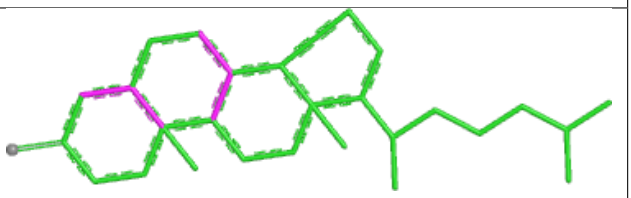


Rings

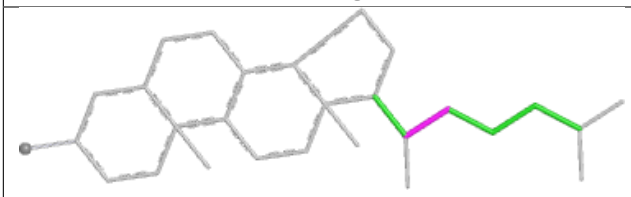
Ligand CLR A 1204



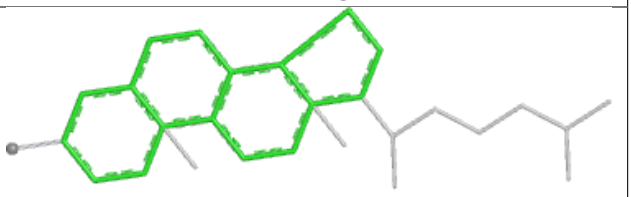
Bond lengths



Bond angles

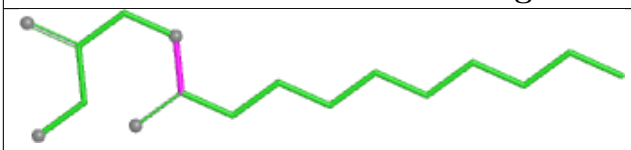


Torsions



Rings

Ligand OLC A 1208



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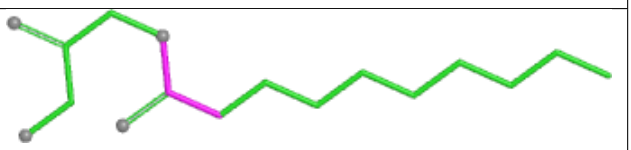
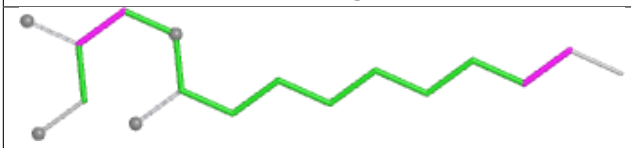


Bond angles



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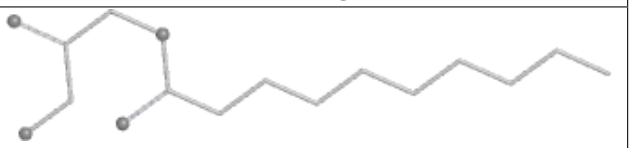
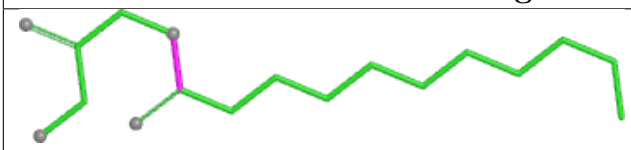
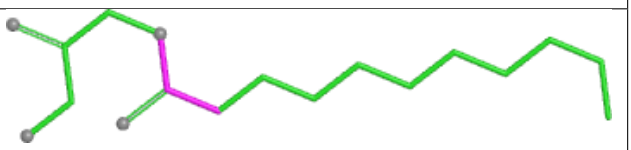


Rings

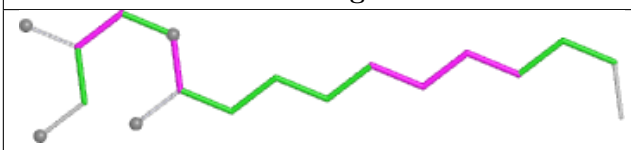
Ligand OLC A 1206



Bond lengths



Bond angles



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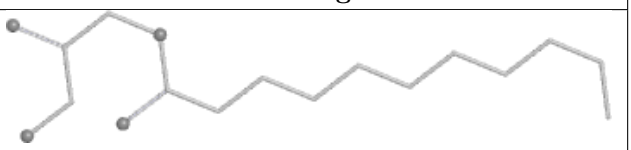
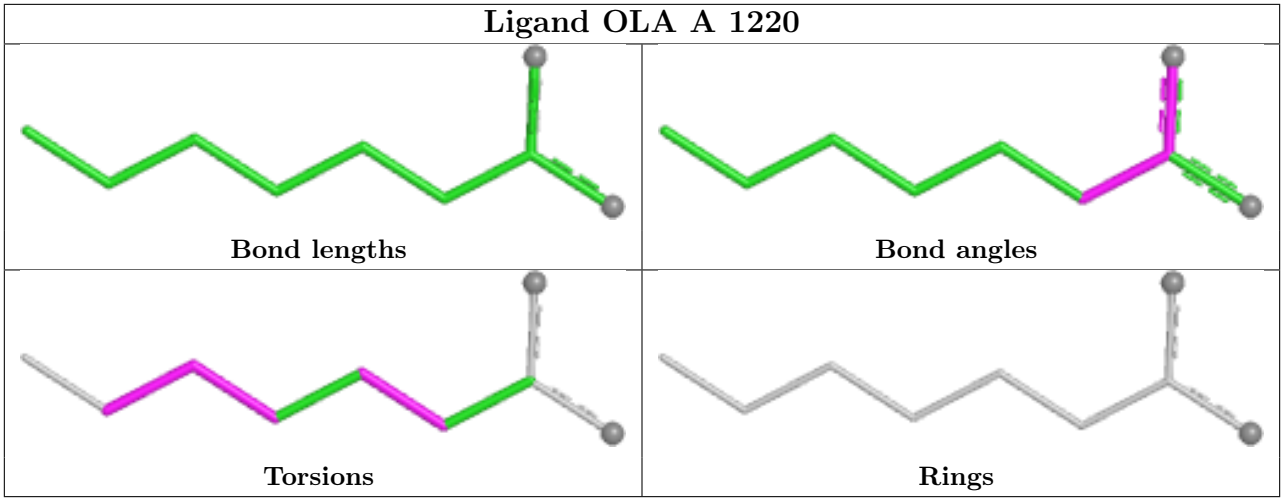


Rings



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å^2)	Q<0.9
1	A	398/447 (89%)	-0.21	11 (2%) 55 51	26, 44, 100, 155	3 (0%)

All (11) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1106[A]	LEU	4.2
1	A	-2	ASP	3.4
1	A	29[A]	TRP	3.2
1	A	1105	TYR	3.1
1	A	1044	THR	3.1
1	A	1058	MET	2.8
1	A	1020	ALA	2.5
1	A	1056	PRO	2.5
1	A	1061	PHE	2.3
1	A	1062	ARG	2.1
1	A	308	LEU	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,

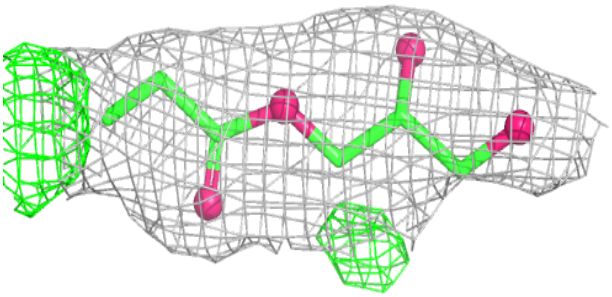
median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

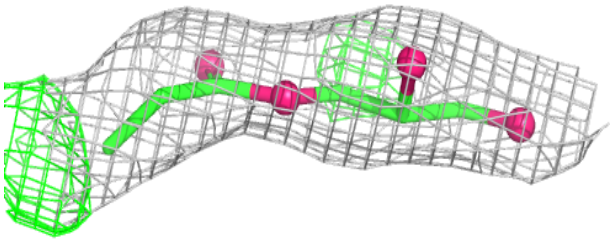
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
5	OLC	A	1207	10/25	0.64	0.14	60,82,96,104	0
6	OLA	A	1223	20/20	0.71	0.16	47,69,82,97	0
6	OLA	A	1221	13/20	0.75	0.12	65,75,102,109	0
5	OLC	A	1210	17/25	0.78	0.15	40,65,76,92	0
6	OLA	A	1222	13/20	0.80	0.14	50,60,83,84	0
6	OLA	A	1218	11/20	0.80	0.14	64,80,88,90	0
6	OLA	A	1215	12/20	0.81	0.14	59,70,98,100	0
5	OLC	A	1213	18/25	0.81	0.14	49,71,82,98	0
6	OLA	A	1219	9/20	0.81	0.13	57,68,74,76	0
5	OLC	A	1212	12/25	0.83	0.10	68,93,100,104	0
6	OLA	A	1224	19/20	0.84	0.15	55,77,92,96	0
7	PEG	A	1225	7/7	0.84	0.10	70,77,80,85	0
5	OLC	A	1209	16/25	0.85	0.15	50,69,84,93	0
5	OLC	A	1226	16/25	0.85	0.12	37,55,80,82	0
5	OLC	A	1214	17/25	0.86	0.14	49,63,83,88	0
5	OLC	A	1208	17/25	0.86	0.13	55,74,97,97	0
5	OLC	A	1206	18/25	0.87	0.13	47,68,86,88	0
6	OLA	A	1217	10/20	0.87	0.10	53,65,81,83	0
5	OLC	A	1211	13/25	0.87	0.12	50,70,74,79	0
6	OLA	A	1220	9/20	0.88	0.11	42,47,61,76	0
6	OLA	A	1216	16/20	0.89	0.11	41,67,90,93	0
4	CLR	A	1203	28/28	0.91	0.09	41,48,68,73	0
4	CLR	A	1205	28/28	0.93	0.09	39,46,66,89	0
3	NA	A	1202	1/1	0.93	0.08	42,42,42,42	0
4	CLR	A	1204	28/28	0.94	0.09	37,52,69,77	0
2	ZMA	A	1201	25/25	0.95	0.08	27,30,52,66	0

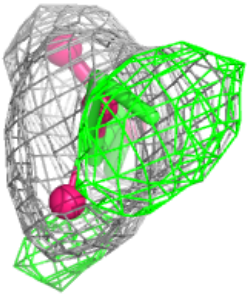
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around OLC A 1207:

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

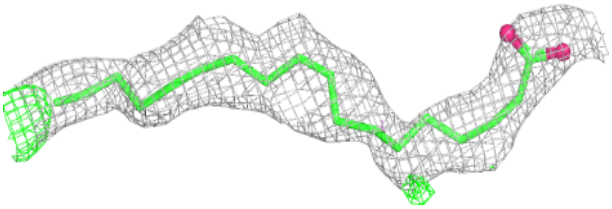


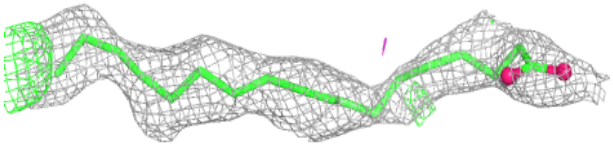


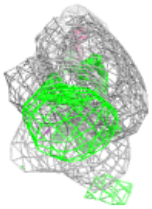


Electron density around OLA A 1223:

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

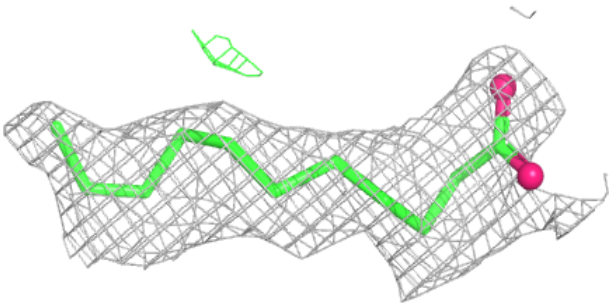


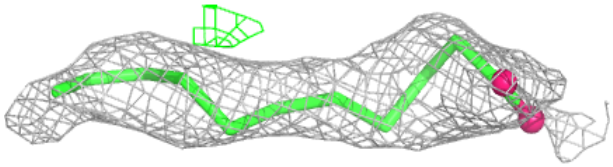


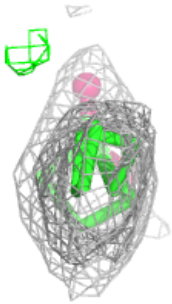


Electron density around OLA A 1221:

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

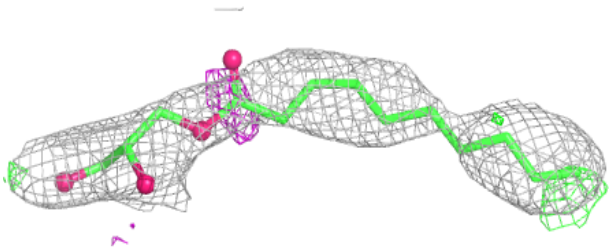


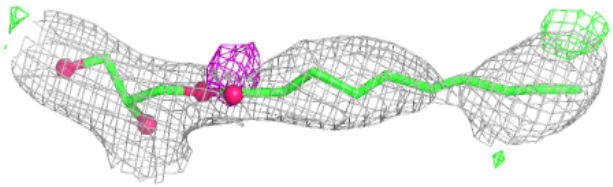


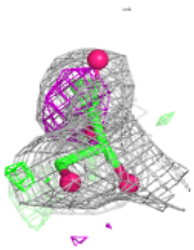


Electron density around OLC A 1210:

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

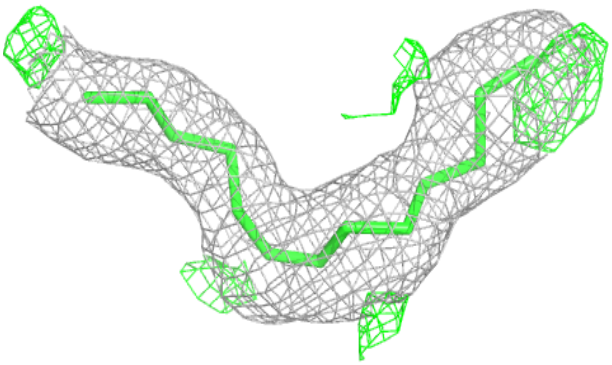


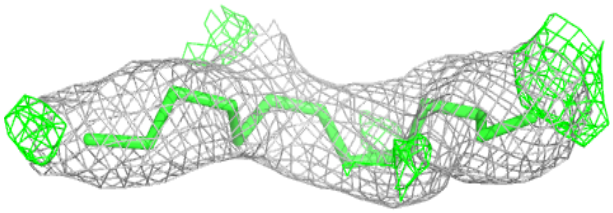


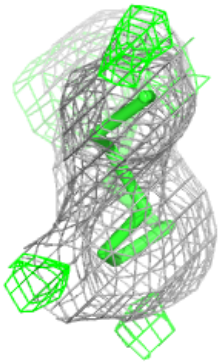


Electron density around OLA A 1222:

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

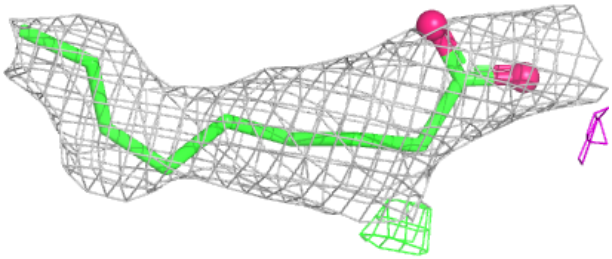


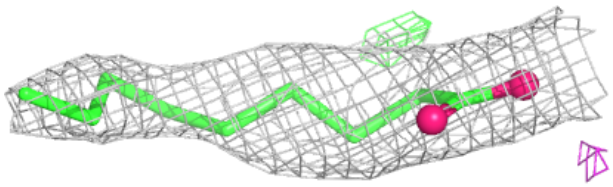


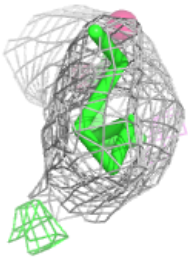


Electron density around OLA A 1218:

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

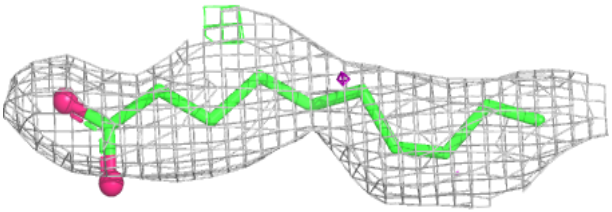


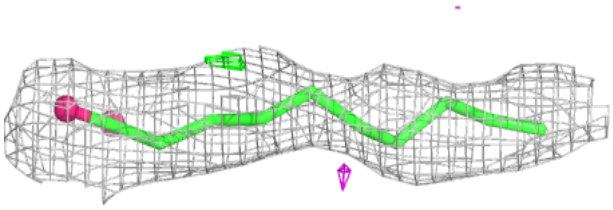


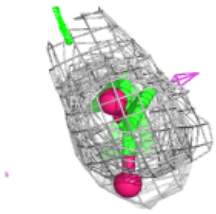


Electron density around OLA A 1215:

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

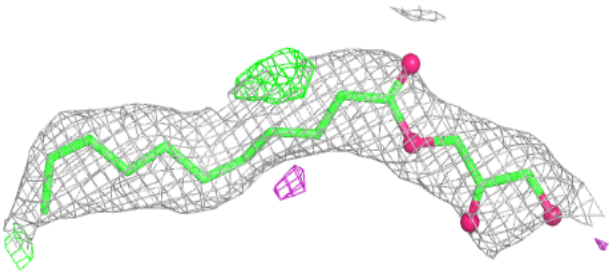


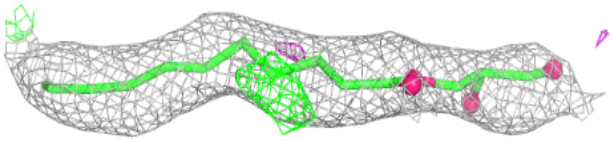


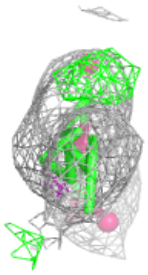


Electron density around OLC A 1213:

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

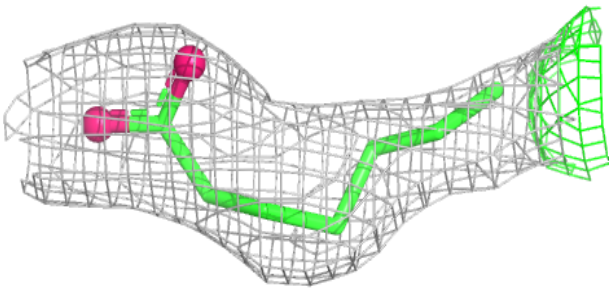


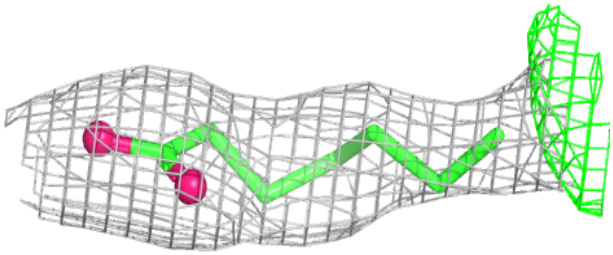


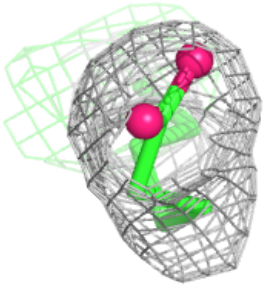


Electron density around OLA A 1219:

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

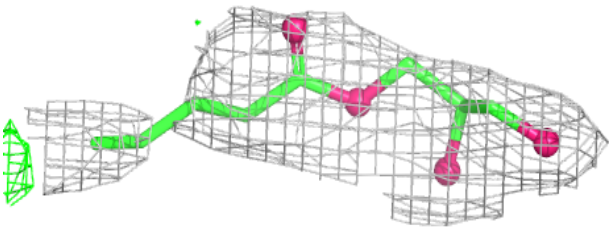


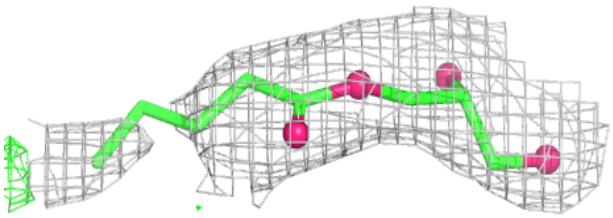


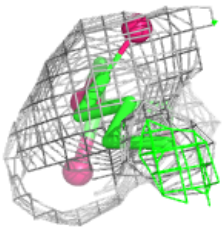


Electron density around OLC A 1212:

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

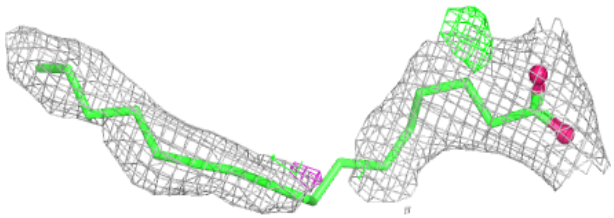


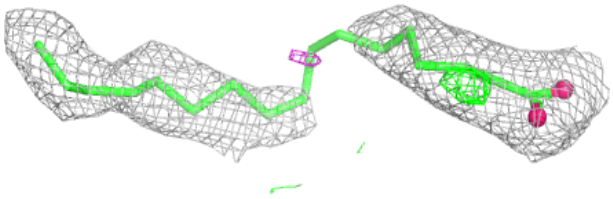


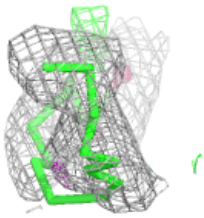


Electron density around OLA A 1224:

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

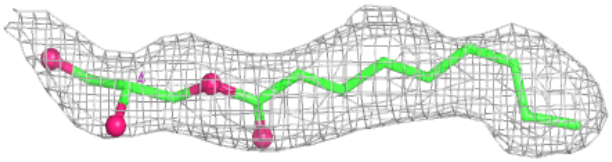


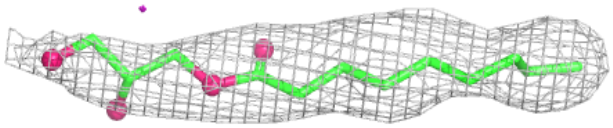


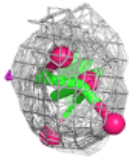


Electron density around OLC A 1209:

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

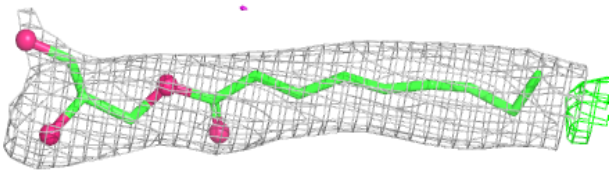


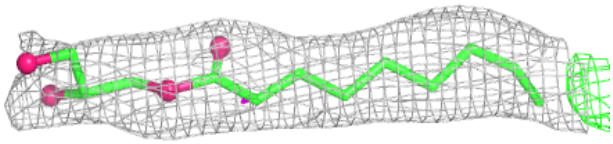


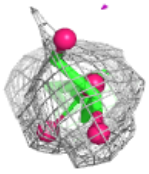


Electron density around OLC A 1226:

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

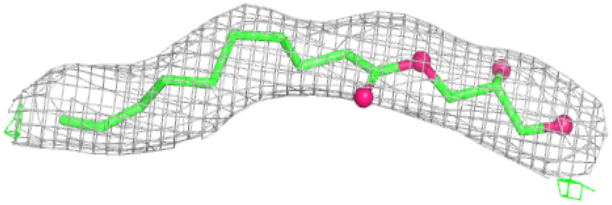


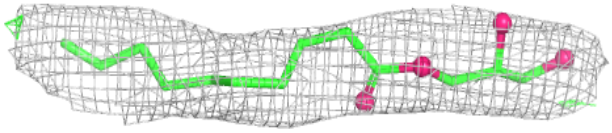


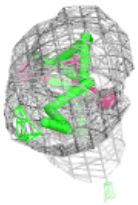


Electron density around OLC A 1214:

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

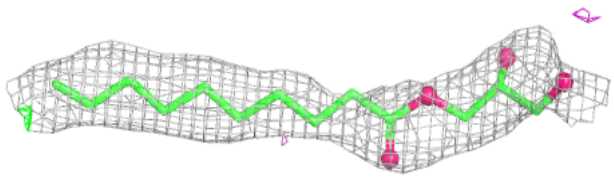


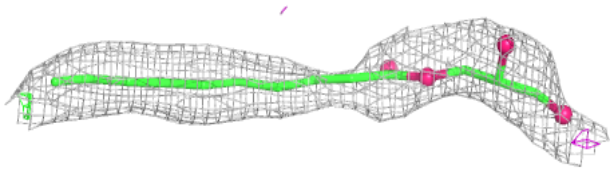


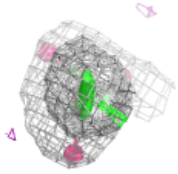


Electron density around OLC A 1208:

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

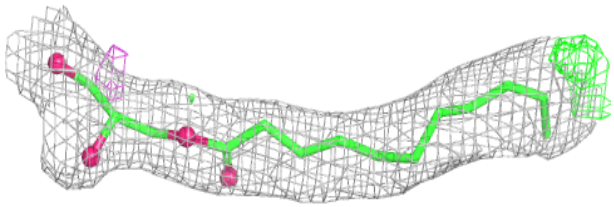


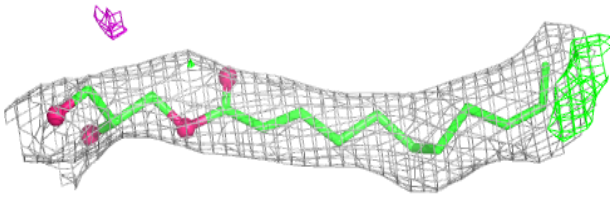


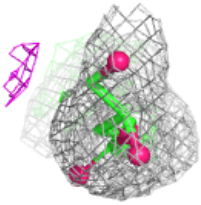


Electron density around OLC A 1206:

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

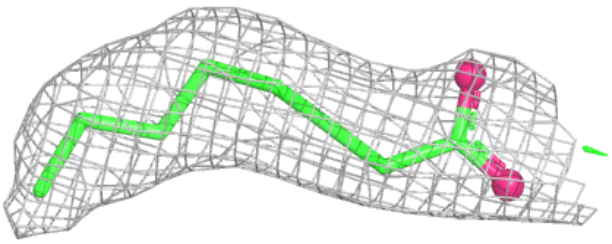


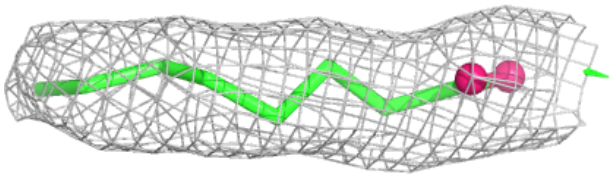


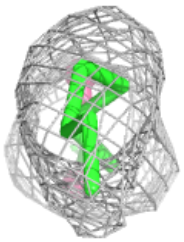


Electron density around OLA A 1217:

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

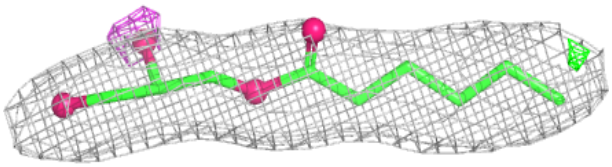


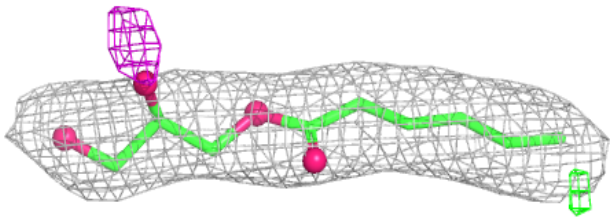


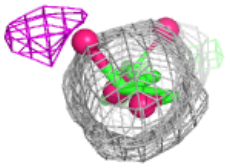


Electron density around OLC A 1211:

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

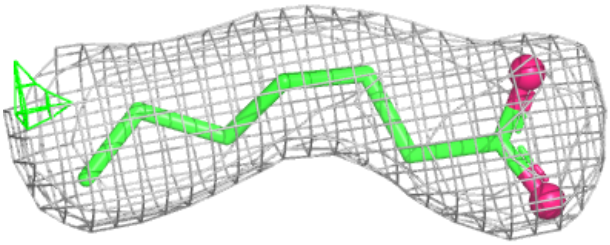


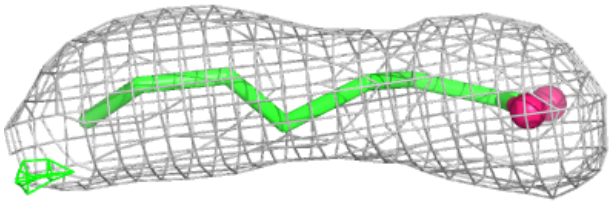


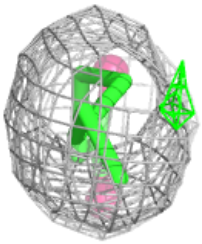


Electron density around OLA A 1220:

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

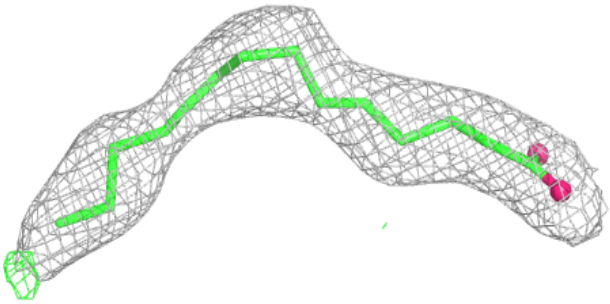


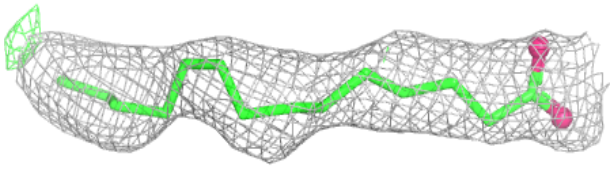


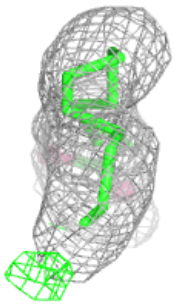


Electron density around OLA A 1216:

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

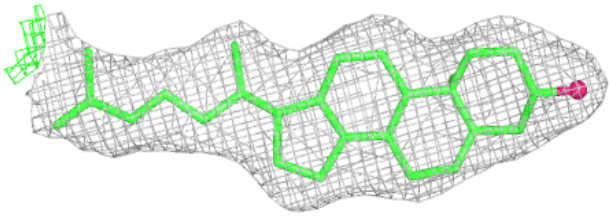


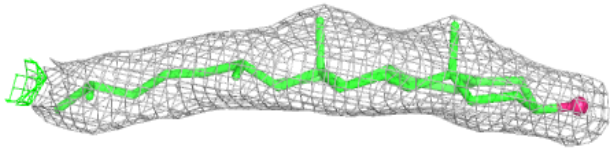


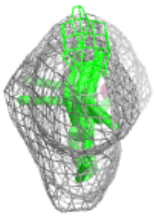


Electron density around CLR A 1203:

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

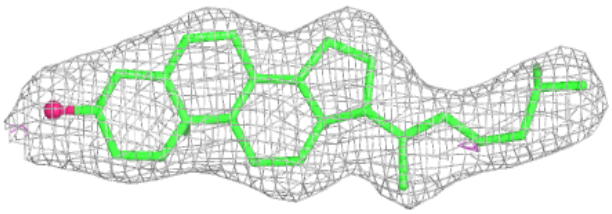


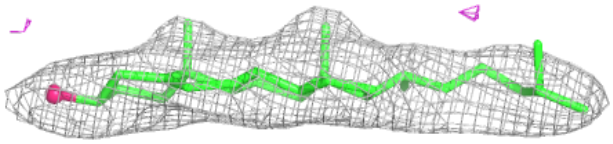


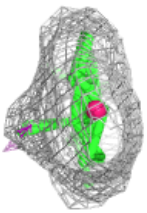


Electron density around CLR A 1205:

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

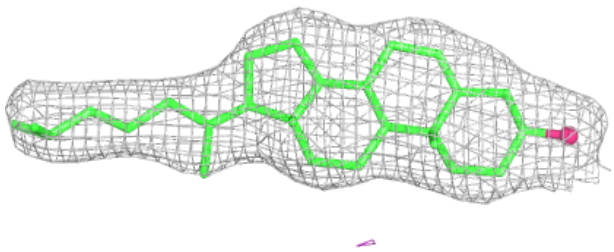


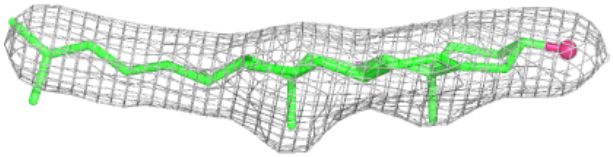


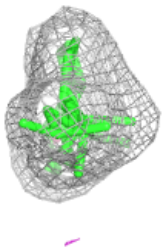


Electron density around CLR A 1204:

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

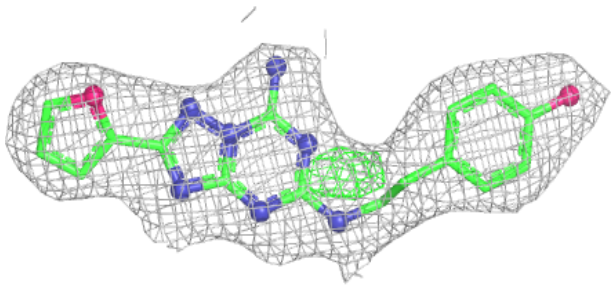


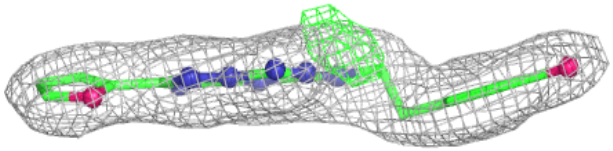


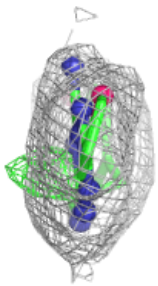


Electron density around ZMA A 1201:

$2mF_o$-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.