



# wwPDB X-ray Structure Validation Summary Report ⓘ

May 17, 2020 – 06:25 am BST

PDB ID : 3SYS  
Title : Improved crystal structure of Pseudomonas aeruginosa OccK1 (OpdK)  
Authors : van den Berg, B.; Eren, E.  
Deposited on : 2011-07-18  
Resolution : 1.65 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.11  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.11

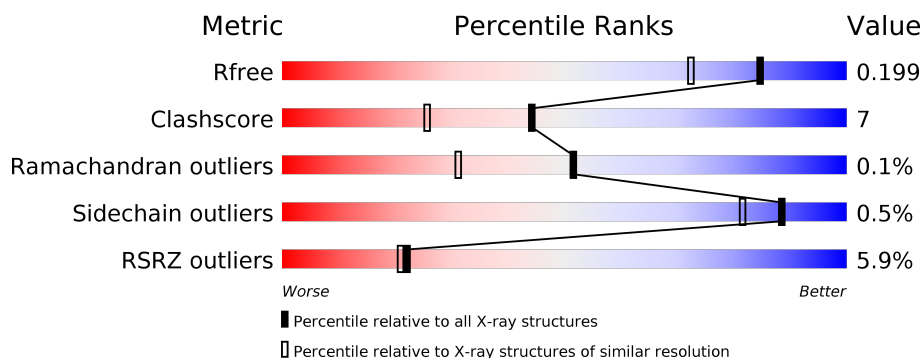
# 1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 1.65 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	1827 (1.66-1.66)
Clashscore	141614	1931 (1.66-1.66)
Ramachandran outliers	138981	1891 (1.66-1.66)
Sidechain outliers	138945	1891 (1.66-1.66)
RSRZ outliers	127900	1791 (1.66-1.66)

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 on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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  $\leq 5\%$ . 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	398	<div> <div>6%</div> <div> <div></div> <div>85%</div> <div>9%</div> <div>6%</div> </div> </div>
1	B	398	<div> <div>5%</div> <div> <div></div> <div>86%</div> <div>8%</div> <div>6%</div> </div> </div>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	C8E	B	413	-	-	-	X

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 6853 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 Vanillate porin OpdK.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	374	Total	C	N	O	S	16	2	0
			2937	1854	524	553	6			
1	B	374	Total	C	N	O	S	23	1	0
			2937	1853	526	553	5			

There are 16 discrepancies between the modelled and reference sequences:

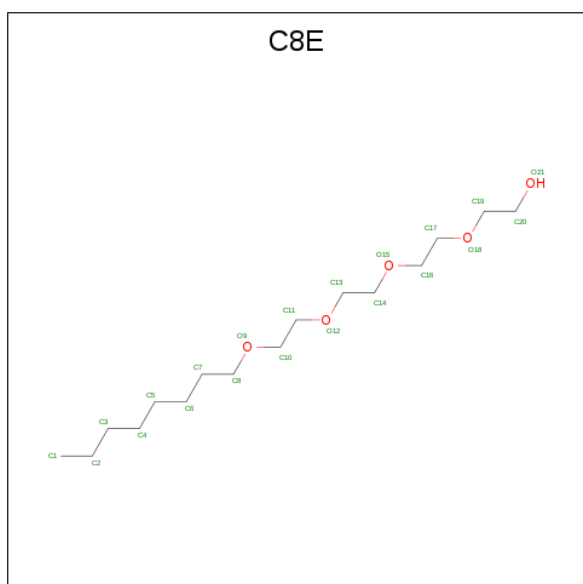
Chain	Residue	Modelled	Actual	Comment	Reference
A	391	GLY	-	EXPRESSION TAG	UNP Q9HUR5
A	392	GLY	-	EXPRESSION TAG	UNP Q9HUR5
A	393	HIS	-	EXPRESSION TAG	UNP Q9HUR5
A	394	HIS	-	EXPRESSION TAG	UNP Q9HUR5
A	395	HIS	-	EXPRESSION TAG	UNP Q9HUR5
A	396	HIS	-	EXPRESSION TAG	UNP Q9HUR5
A	397	HIS	-	EXPRESSION TAG	UNP Q9HUR5
A	398	HIS	-	EXPRESSION TAG	UNP Q9HUR5
B	391	GLY	-	EXPRESSION TAG	UNP Q9HUR5
B	392	GLY	-	EXPRESSION TAG	UNP Q9HUR5
B	393	HIS	-	EXPRESSION TAG	UNP Q9HUR5
B	394	HIS	-	EXPRESSION TAG	UNP Q9HUR5
B	395	HIS	-	EXPRESSION TAG	UNP Q9HUR5
B	396	HIS	-	EXPRESSION TAG	UNP Q9HUR5
B	397	HIS	-	EXPRESSION TAG	UNP Q9HUR5
B	398	HIS	-	EXPRESSION TAG	UNP Q9HUR5

- Molecule 2 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>).



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

- Molecule 3 is (HYDROXYETHYLOXY)TRI(ETHYLOXY)OCTANE (three-letter code: C8E) (formula:  $C_{16}H_{34}O_5$ ).



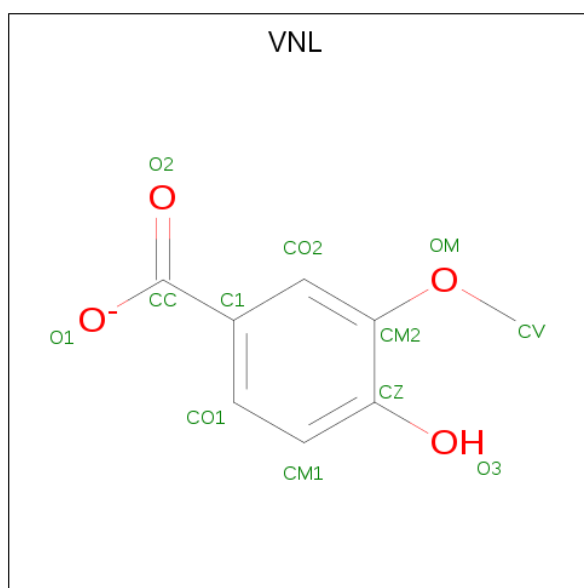
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 9 8 1	0	0
3	A	1	Total C 7 7	0	0
3	A	1	Total C 6 6	0	0
3	A	1	Total C O 9 6 3	0	0
3	A	1	Total C O 14 12 2	0	0
3	A	1	Total C O 16 12 4	0	0
3	A	1	Total C O 5 3 2	0	0
3	A	1	Total C O 9 8 1	0	0
3	A	1	Total C O 7 4 3	0	0
3	A	1	Total C O 9 6 3	0	0
3	A	1	Total C O 6 4 2	0	0
3	A	1	Total C O 9 6 3	0	0
3	A	1	Total C O 9 8 1	0	0
3	A	1	Total C O 15 10 5	0	0
3	B	1	Total C 7 7	0	0
3	B	1	Total C 5 5	0	0
3	B	1	Total C O 11 9 2	0	0
3	B	1	Total C 6 6	0	0
3	B	1	Total C O 12 8 4	0	0
3	B	1	Total C O 8 5 3	0	0
3	B	1	Total C 7 7	0	0
3	B	1	Total C O 10 6 4	0	0

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	B	1	Total C O 11 10 1	0	0
3	B	1	Total C 6 6	0	0
3	B	1	Total C O 14 12 2	0	0
3	B	1	Total C O 5 3 2	0	0
3	B	1	Total C 4 4	0	0
3	B	1	Total C 7 7	0	0
3	B	1	Total C 5 5	0	0

- Molecule 4 is 4-HYDROXY-3-METHOXYBENZOATE (three-letter code: VNL) (formula:  $C_8H_7O_4$ ).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 12 8 4	0	0
4	A	1	Total C O 12 8 4	0	0
4	B	1	Total C O 12 8 4	0	0
4	B	1	Total C O 12 8 4	0	0

- Molecule 5 is water.

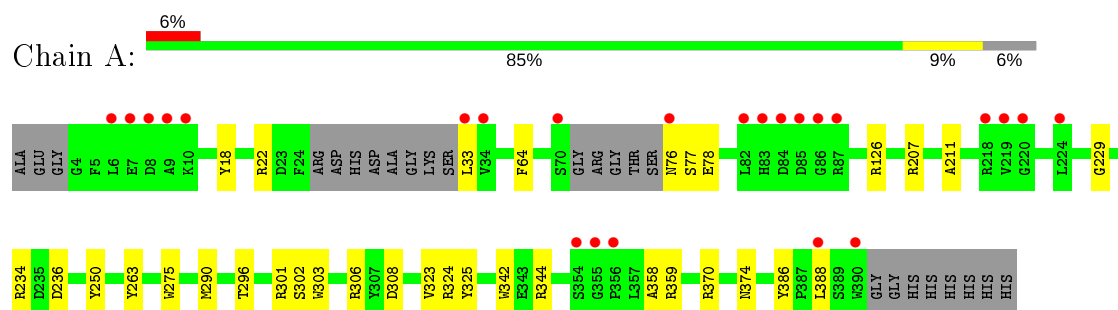
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	345	Total 345	O 345	0	0
5	B	322	Total 322	O 322	0	0



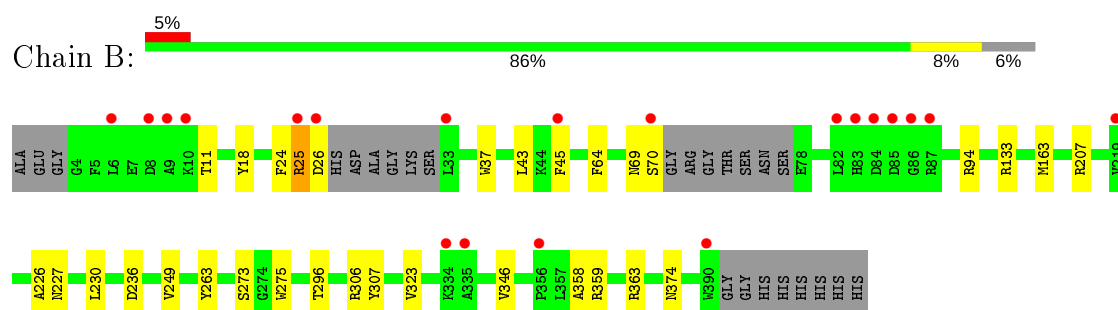
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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: Vanillate porin OpdK



#### • Molecule 1: Vanillate porin OpdK



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	82.14Å 96.84Å 121.56Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.91 – 1.65 37.81 – 1.65	Depositor EDS
% Data completeness (in resolution range)	96.7 (19.91-1.65) 96.2 (37.81-1.65)	Depositor EDS
$R_{merge}$	0.06	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.87 (at 1.65Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.6.4_486)	Depositor
R, $R_{free}$	0.181 , 0.201 0.177 , 0.199	Depositor DCC
$R_{free}$ test set	2000 reflections (1.71%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	18.6	Xtriage
Anisotropy	0.221	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.42 , 65.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	6853	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	26.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 34.39 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 6.8729e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: VNL, C8E, EDO

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	0.33	0/3011	0.53	0/4072
1	B	0.33	0/3008	0.53	0/4068
All	All	0.33	0/6019	0.53	0/8140

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

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	2937	0	2812	45	0
1	B	2937	0	2809	32	0
2	A	4	0	6	0	0
2	B	12	0	18	1	0
3	A	130	0	183	18	0
3	B	118	0	179	11	0
4	A	24	0	14	0	0
4	B	24	0	13	0	0
5	A	345	0	0	5	0
5	B	322	0	0	6	0
All	All	6853	0	6034	80	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 7.

The worst 5 of 80 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:303:TRP:HD1	3:A:413:C8E:H201	1.21	1.04
1:A:303:TRP:CD1	3:A:413:C8E:H201	2.04	0.93
1:A:301:ARG:HD3	3:A:413:C8E:H161	1.55	0.89
1:A:301:ARG:HG2	3:A:413:C8E:H191	1.54	0.88
1:A:76:ASN:ND2	1:A:126:ARG:HH21	1.75	0.85

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	370/398 (93%)	361 (98%)	9 (2%)	0	100	100
1	B	369/398 (93%)	359 (97%)	9 (2%)	1 (0%)	41	22
All	All	739/796 (93%)	720 (97%)	18 (2%)	1 (0%)	51	31

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	25	ARG

### 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	301/315 (96%)	300 (100%)	1 (0%)	92	88
1	B	300/315 (95%)	298 (99%)	2 (1%)	84	73
All	All	601/630 (95%)	598 (100%)	3 (0%)	88	81

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	18	TYR
1	B	18	TYR
1	B	70	SER

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	76	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

37 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	$\# Z  > 2$
3	C8E	B	408	-	6,6,20	0.28	0	5,5,19	0.38	0
3	C8E	B	410	-	10,10,20	0.33	0	9,9,19	0.48	0
3	C8E	B	407	-	7,7,20	0.36	0	6,6,19	0.17	0
4	VNL	B	418	-	10,12,12	0.64	0	13,16,16	1.30	1 (7%)
3	C8E	A	413	-	14,14,20	0.47	0	13,13,19	0.20	0
3	C8E	B	406	-	11,11,20	0.46	0	10,10,19	0.29	0
3	C8E	B	412	-	13,13,20	0.38	0	12,12,19	0.32	0
3	C8E	A	412	-	8,8,20	0.25	0	7,7,19	0.52	0
3	C8E	B	405	-	5,5,20	0.25	0	4,4,19	0.37	0
3	C8E	A	411	-	8,8,20	0.46	0	7,7,19	0.26	0
3	C8E	A	409	-	8,8,20	0.45	0	7,7,19	0.23	0
3	C8E	A	406	-	4,4,20	0.34	0	3,3,19	0.38	0
4	VNL	A	415	-	10,12,12	0.77	0	13,16,16	1.41	2 (15%)
2	EDO	A	399	-	3,3,3	0.44	0	2,2,2	0.34	0
3	C8E	B	409	-	9,9,20	0.40	0	8,8,19	0.24	0
3	C8E	B	411	-	5,5,20	0.28	0	4,4,19	0.39	0
3	C8E	A	403	-	8,8,20	0.38	0	7,7,19	0.19	0
4	VNL	A	414	-	10,12,12	1.05	1 (10%)	13,16,16	1.43	1 (7%)
3	C8E	A	408	-	6,6,20	0.38	0	5,5,19	0.30	0
3	C8E	A	402	-	5,5,20	0.28	0	4,4,19	0.39	0
2	EDO	B	400	-	3,3,3	0.47	0	2,2,2	0.34	0
3	C8E	B	403	-	4,4,20	0.26	0	3,3,19	0.41	0
3	C8E	A	407	-	8,8,20	0.25	0	7,7,19	0.42	0
3	C8E	B	414	-	3,3,20	0.35	0	2,2,19	0.63	0
3	C8E	B	413	-	4,4,20	0.33	0	3,3,19	0.28	0
3	C8E	A	400	-	8,8,20	0.22	0	7,7,19	0.56	0
3	C8E	B	415	-	6,6,20	0.27	0	5,5,19	0.45	0
3	C8E	A	401	-	6,6,20	0.27	0	5,5,19	0.43	0
3	C8E	B	416	-	4,4,20	0.29	0	3,3,19	0.37	0
3	C8E	A	405	-	14,14,20	0.37	0	12,12,19	0.34	0
2	EDO	B	401	-	3,3,3	0.46	0	2,2,2	0.33	0
2	EDO	B	399	-	3,3,3	0.53	0	2,2,2	0.26	0
3	C8E	B	402	-	6,6,20	0.26	0	5,5,19	0.45	0
3	C8E	A	404	-	13,13,20	0.37	0	12,12,19	0.43	0
3	C8E	A	410	-	5,5,20	0.44	0	4,4,19	0.35	0
4	VNL	B	417	-	10,12,12	0.97	1 (10%)	13,16,16	1.56	3 (23%)
3	C8E	B	404	-	10,10,20	0.30	0	9,9,19	0.59	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
3	C8E	B	408	-	-	4/4/4/18	-
3	C8E	B	410	-	-	6/8/8/18	-
3	C8E	B	407	-	-	4/5/5/18	-
4	VNL	B	418	-	-	0/2/6/6	0/1/1/1
3	C8E	A	413	-	-	7/12/12/18	-
3	C8E	B	406	-	-	4/9/9/18	-
3	C8E	B	412	-	-	7/11/11/18	-
3	C8E	A	412	-	-	5/6/6/18	-
3	C8E	B	405	-	-	2/3/3/18	-
3	C8E	A	411	-	-	4/6/6/18	-
3	C8E	A	409	-	-	5/6/6/18	-
3	C8E	A	406	-	-	2/2/2/18	-
4	VNL	A	415	-	-	0/2/6/6	0/1/1/1
2	EDO	A	399	-	-	0/1/1/1	-
3	C8E	B	409	-	-	6/7/7/18	-
3	C8E	B	411	-	-	2/3/3/18	-
3	C8E	A	403	-	-	6/6/6/18	-
4	VNL	A	414	-	-	0/2/6/6	0/1/1/1
3	C8E	A	408	-	-	2/4/4/18	-
3	C8E	A	402	-	-	3/3/3/18	-
2	EDO	B	400	-	-	0/1/1/1	-
3	C8E	B	403	-	-	2/2/2/18	-
3	C8E	A	407	-	-	4/6/6/18	-
3	C8E	B	414	-	-	0/1/1/18	-
3	C8E	B	413	-	-	0/2/2/18	-
3	C8E	A	400	-	-	5/6/6/18	-
3	C8E	B	415	-	-	4/4/4/18	-
3	C8E	A	401	-	-	3/4/4/18	-
3	C8E	B	416	-	-	2/2/2/18	-
3	C8E	A	405	-	-	6/10/10/18	-
2	EDO	B	401	-	-	0/1/1/1	-
2	EDO	B	399	-	-	1/1/1/1	-
3	C8E	B	402	-	-	3/4/4/18	-
3	C8E	A	404	-	-	7/11/11/18	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	C8E	A	410	-	-	3/3/3/18	-
4	VNL	B	417	-	-	0/2/6/6	0/1/1/1
3	C8E	B	404	-	-	4/8/8/18	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	414	VNL	C1-CC	2.79	1.50	1.47
4	B	417	VNL	C1-CC	2.52	1.49	1.47

The worst 5 of 7 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	415	VNL	OM-CM2-CZ	3.65	119.85	114.57
4	B	417	VNL	OM-CM2-CZ	3.58	119.75	114.57
4	A	414	VNL	OM-CM2-CZ	3.47	119.59	114.57
4	B	418	VNL	OM-CM2-CZ	3.05	118.98	114.57
4	B	417	VNL	CV-OM-CM2	3.01	122.08	117.53

There are no chirality outliers.

5 of 113 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	403	C8E	O12-C13-C14-O15
3	A	411	C8E	O15-C16-C17-O18
3	A	413	C8E	O12-C13-C14-O15
3	A	413	C8E	O18-C19-C20-O21
3	A	406	C8E	O18-C19-C20-O21

There are no ring outliers.

11 monomers are involved in 30 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	410	C8E	2	0
3	B	407	C8E	1	0
3	A	413	C8E	7	0
3	A	412	C8E	7	0
3	A	402	C8E	4	0
3	A	407	C8E	1	0
3	B	413	C8E	6	0

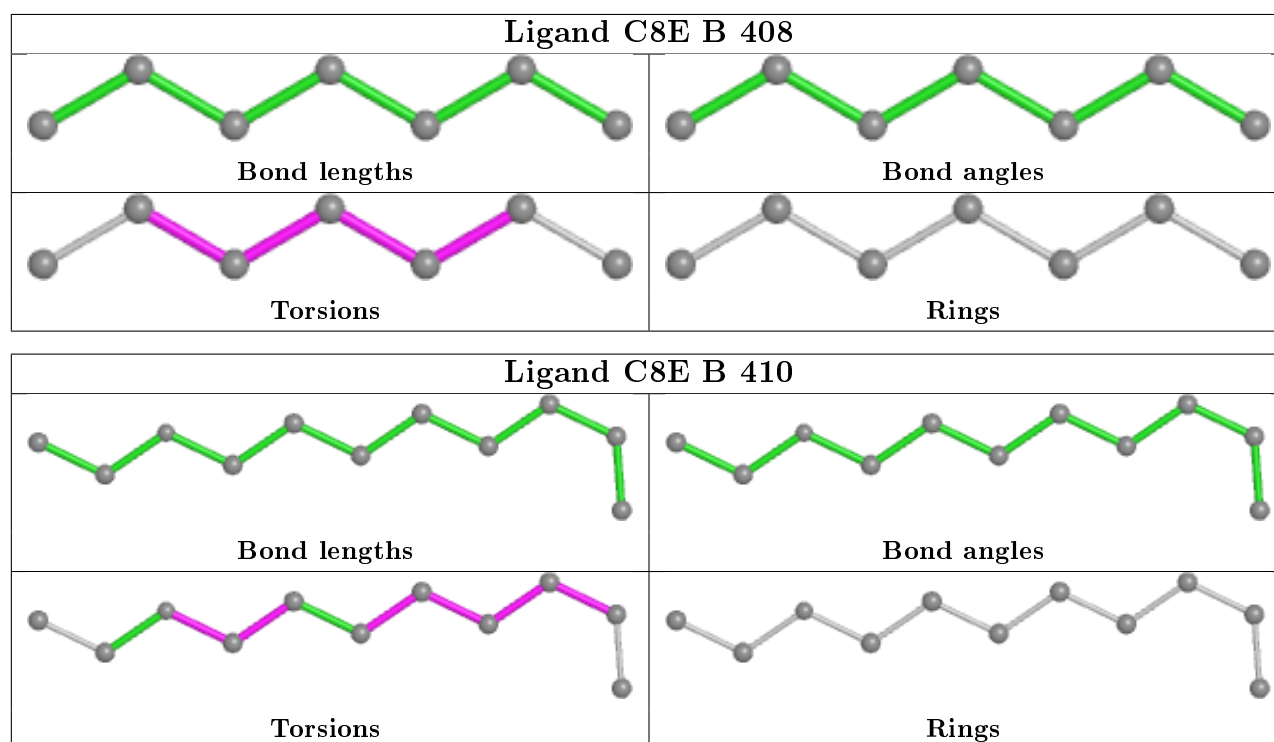
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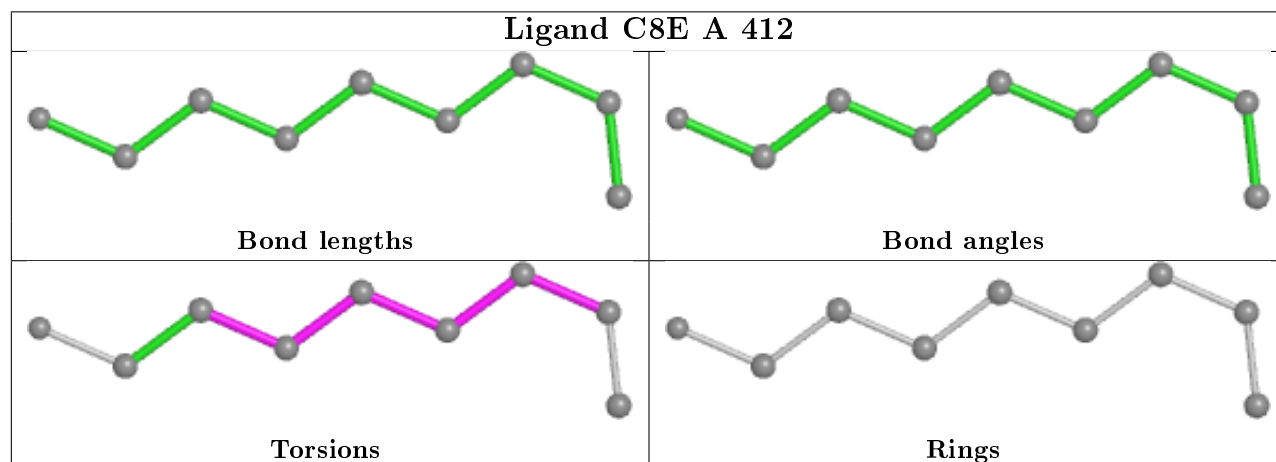
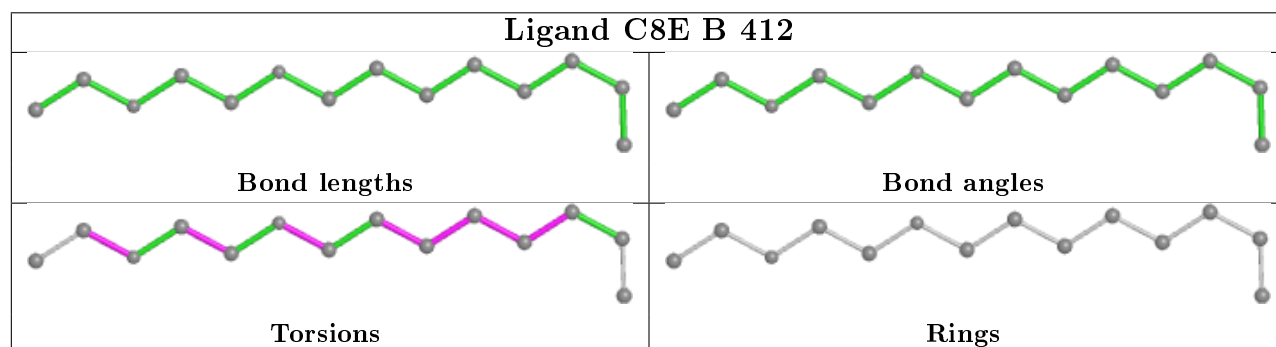
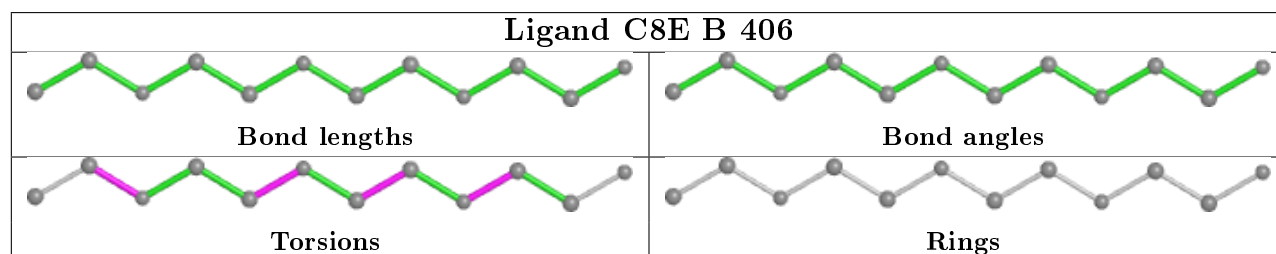
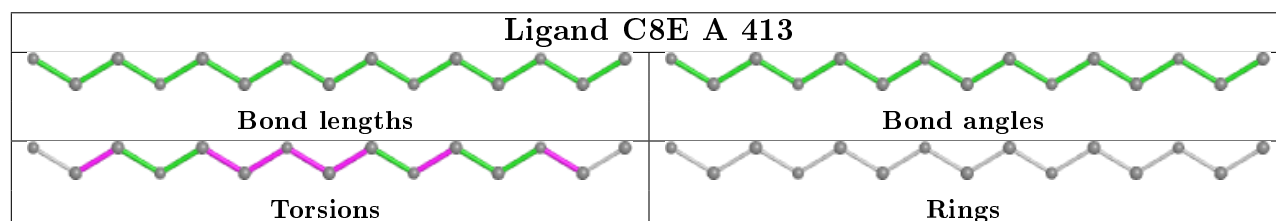
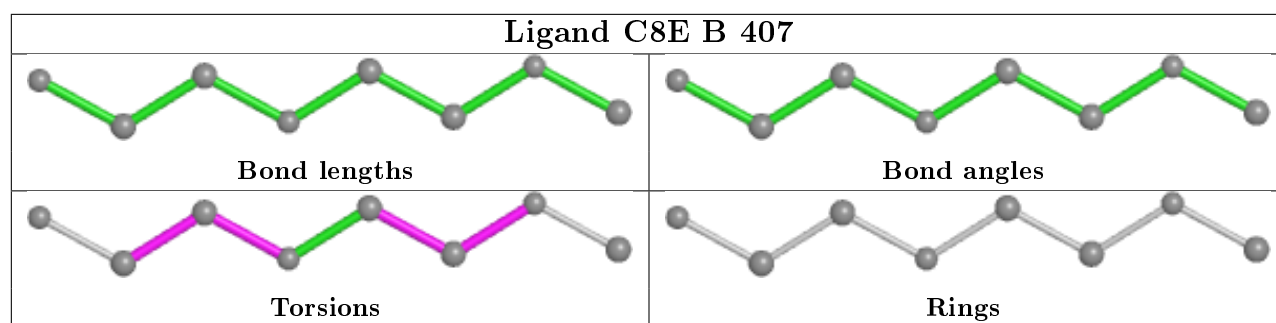


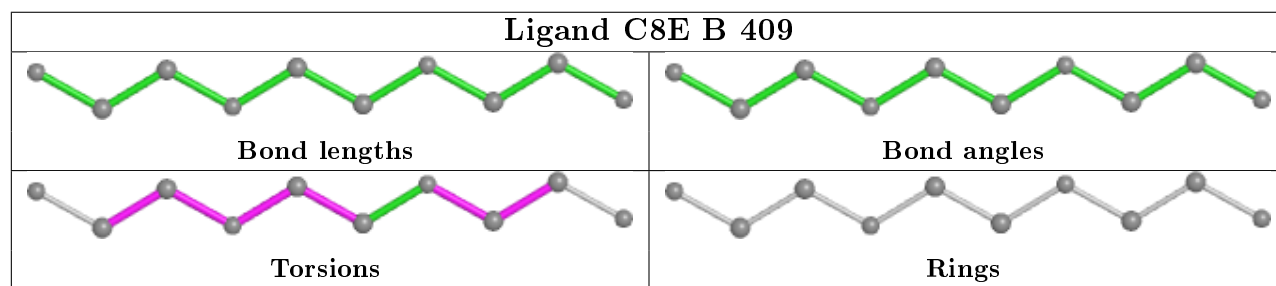
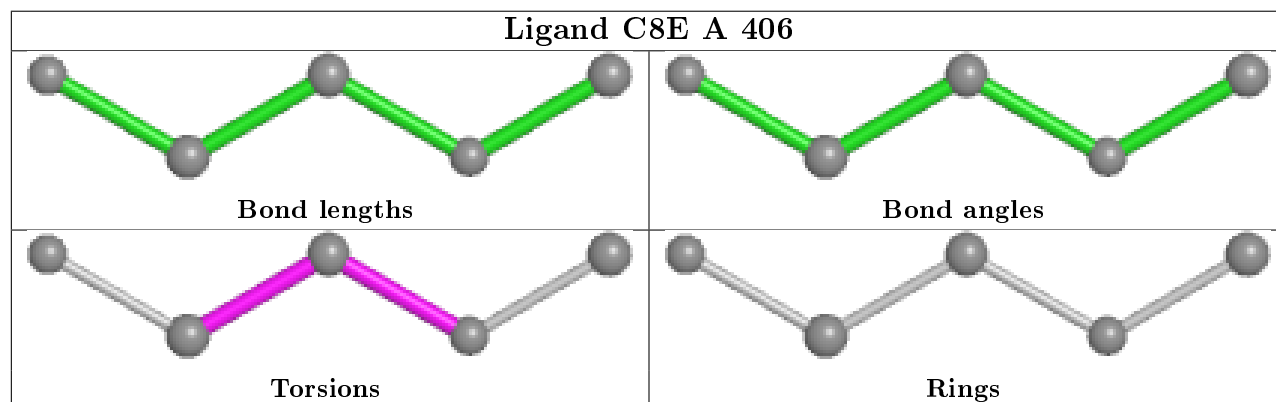
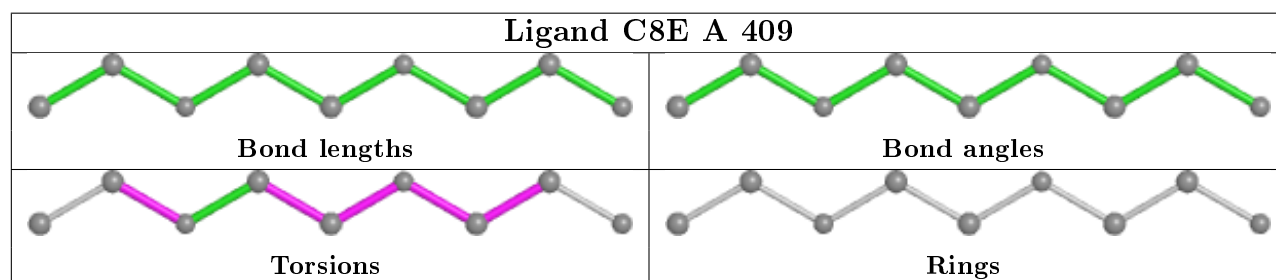
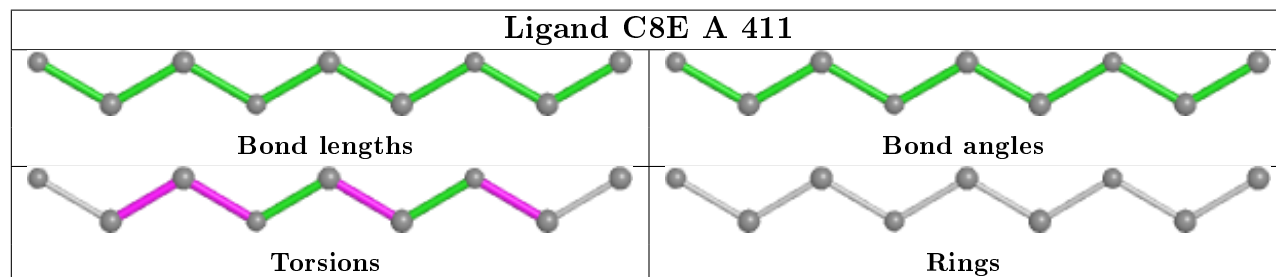
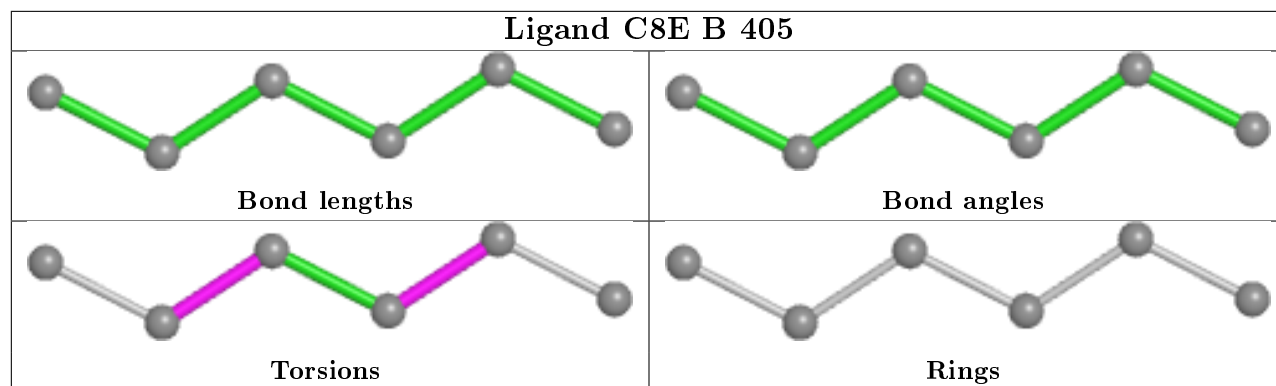
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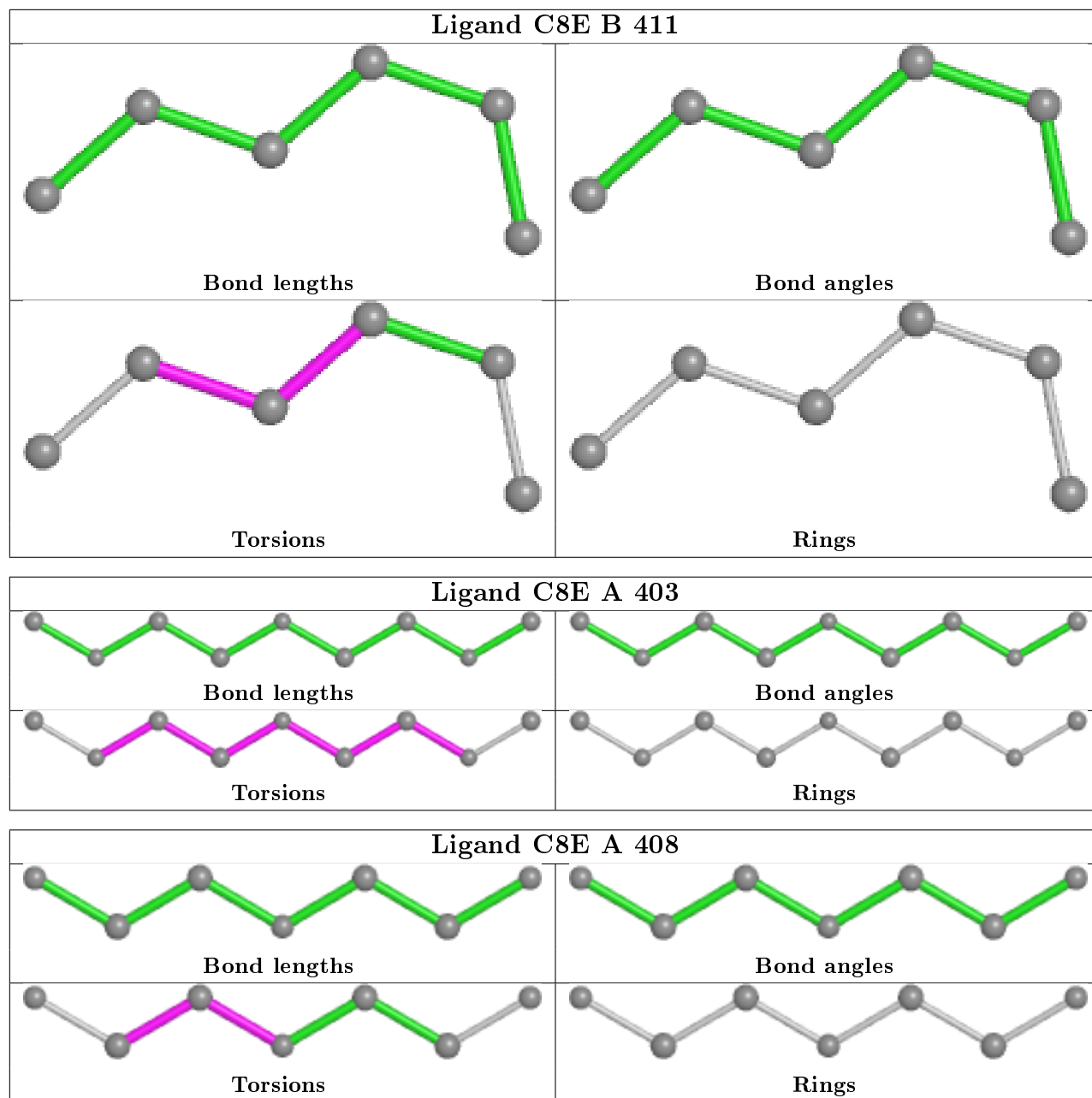
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	400	C8E	1	0
3	B	415	C8E	1	0
2	B	399	EDO	1	0
3	B	404	C8E	1	0

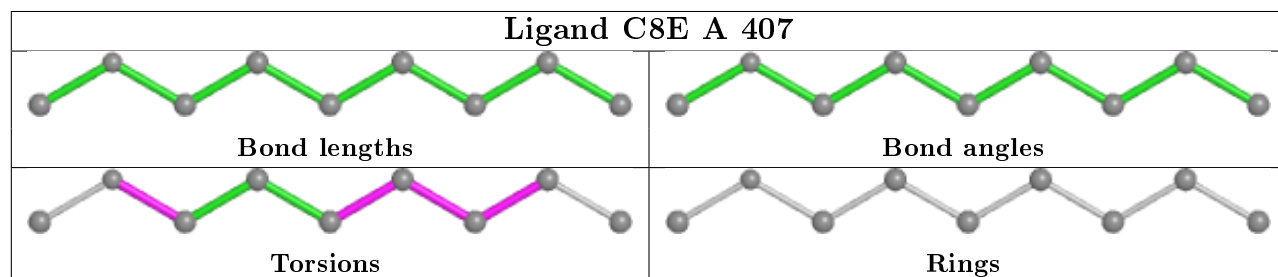
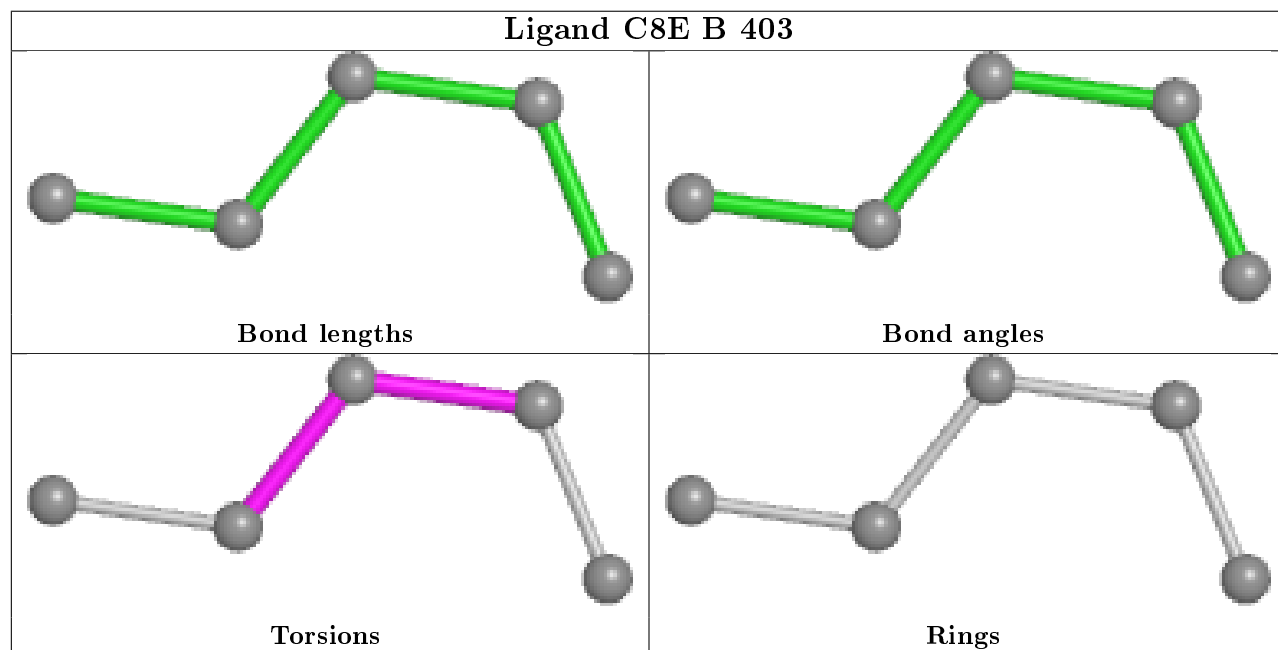
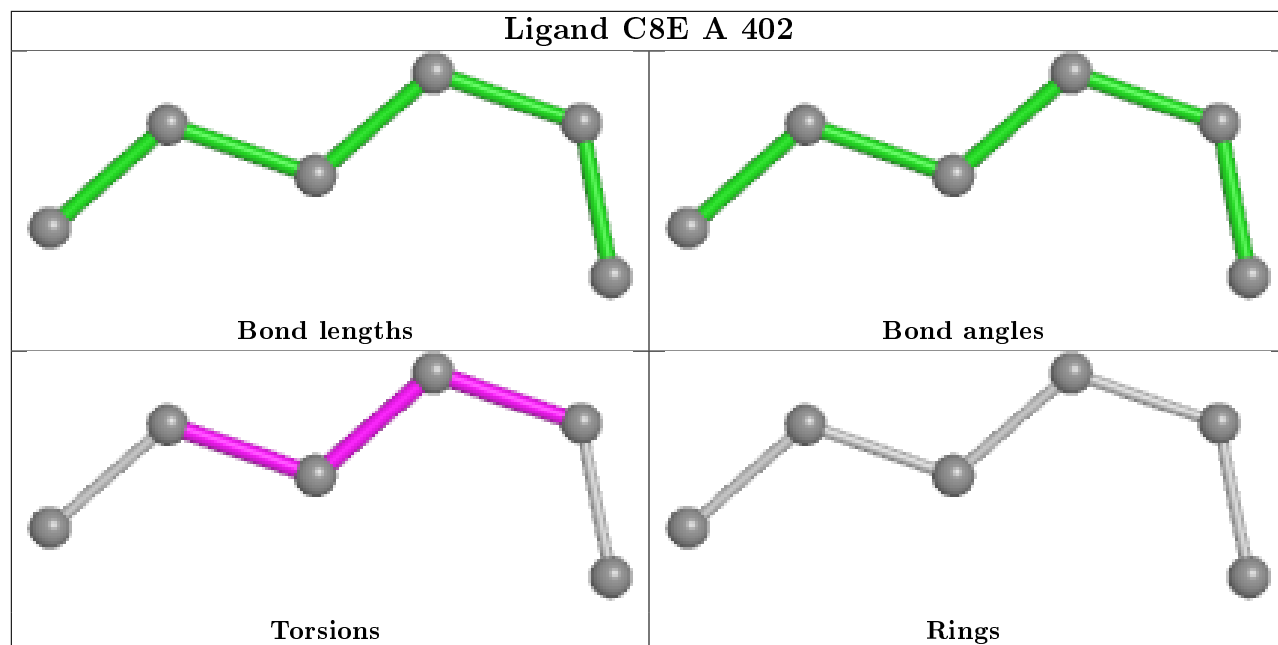
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

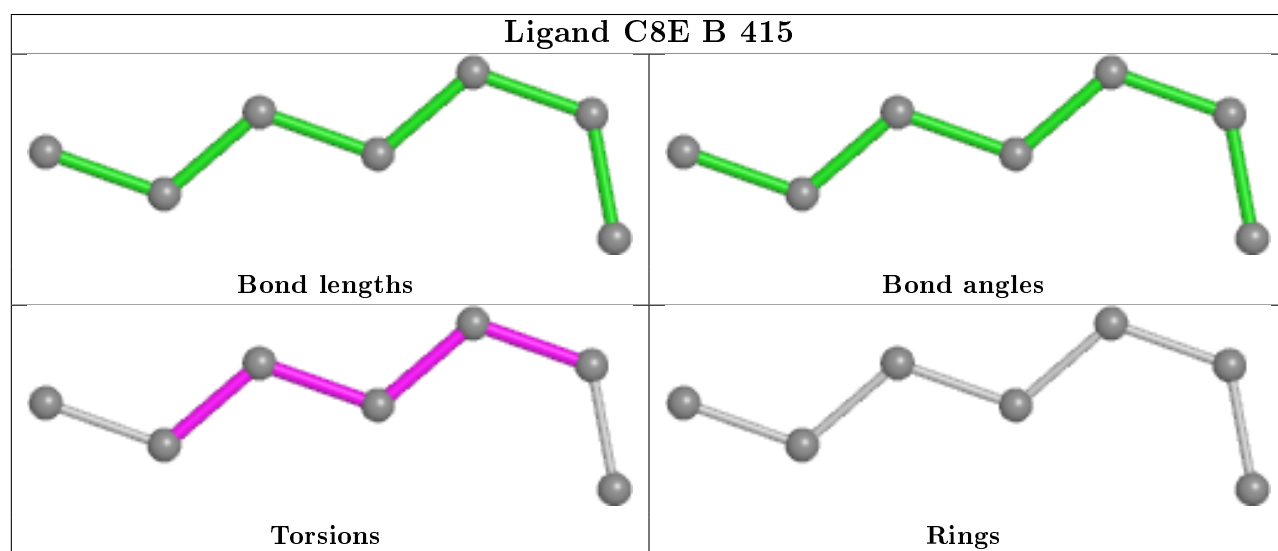
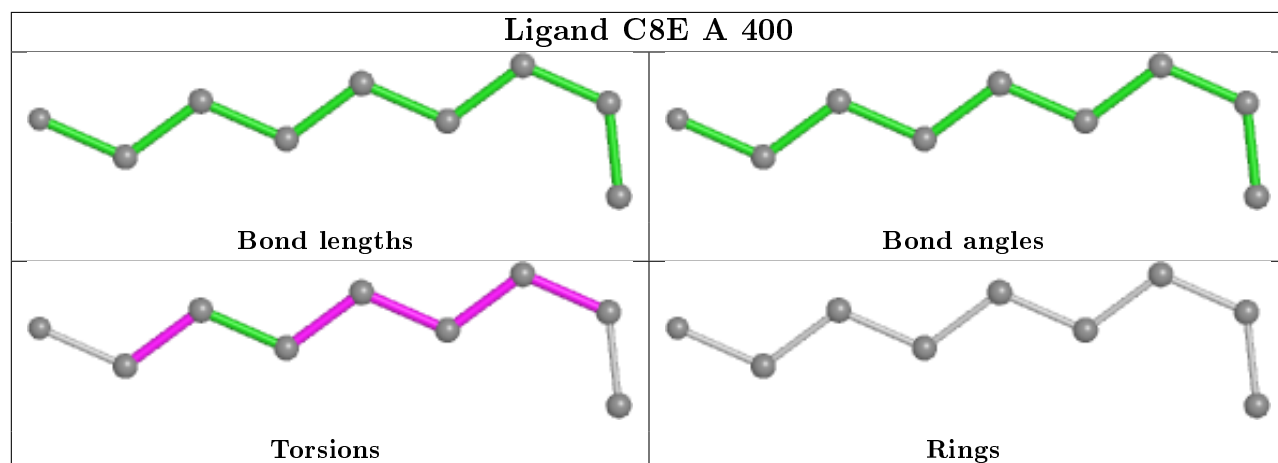
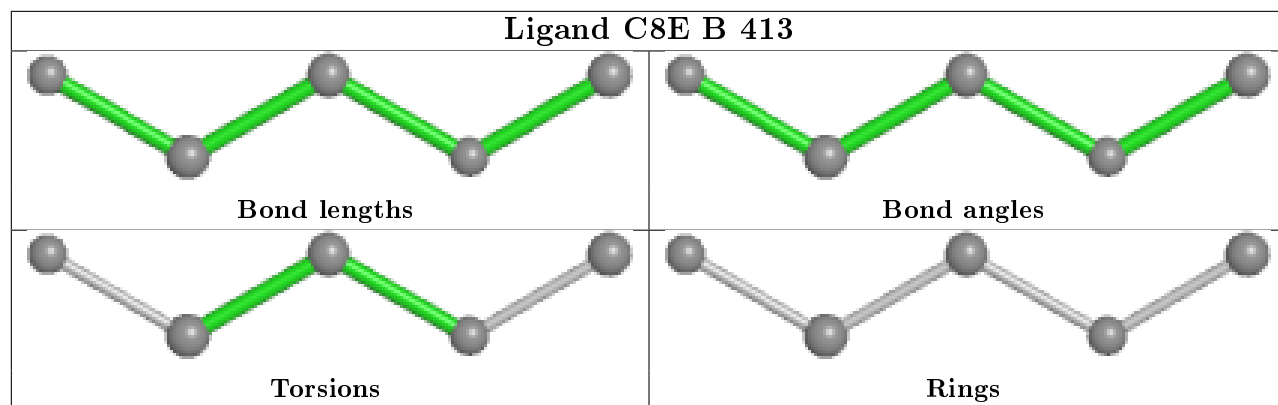


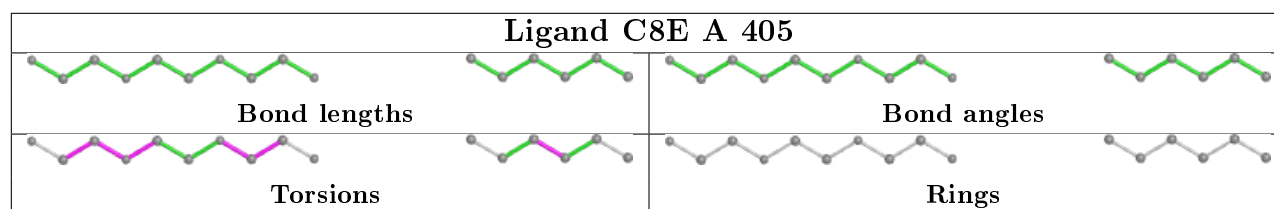
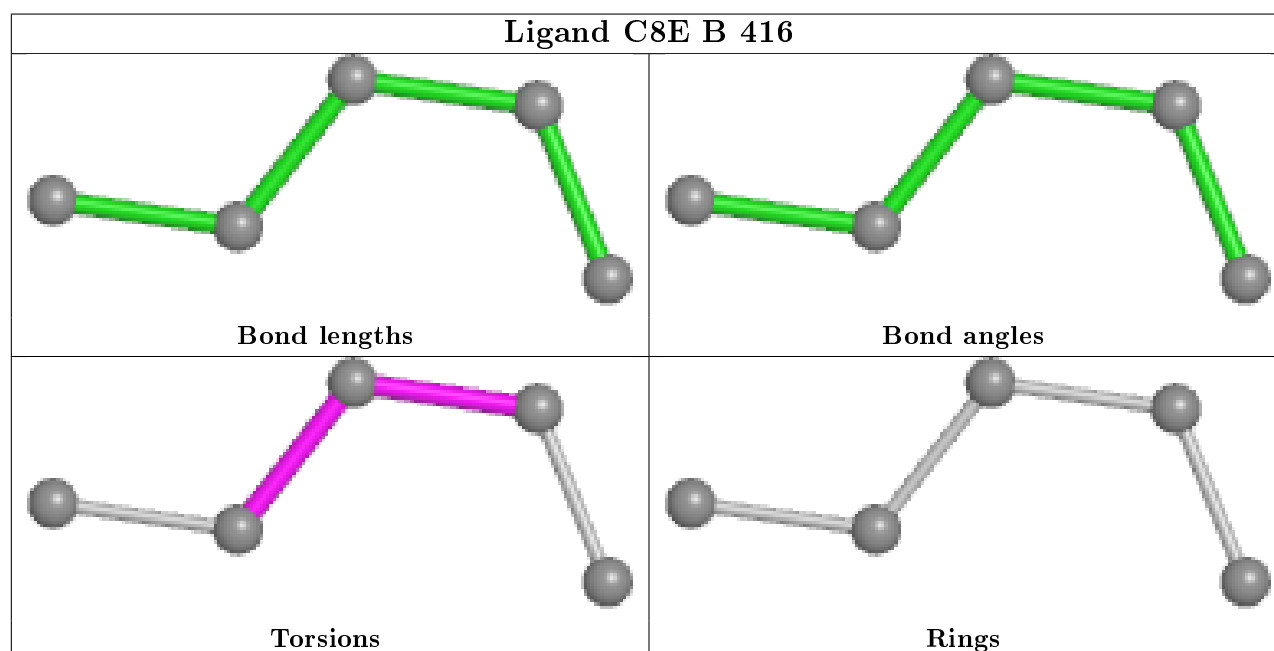
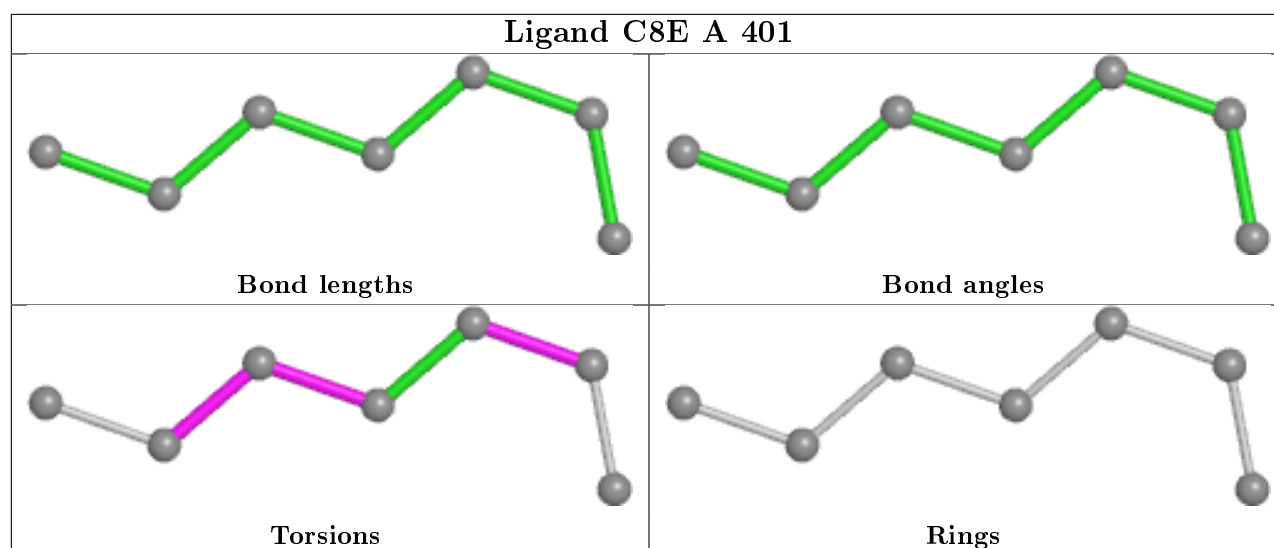


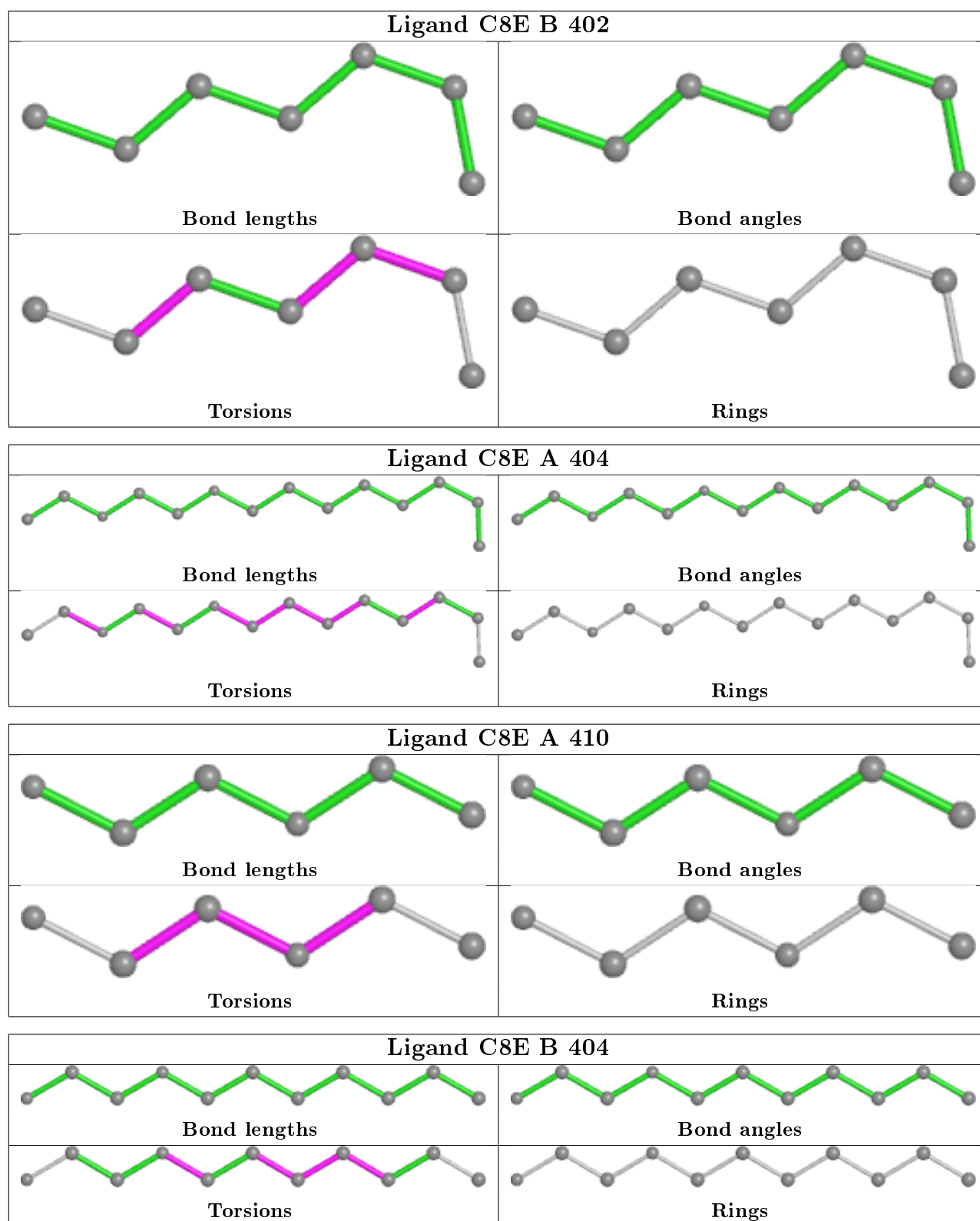












## 5.7 Other polymers [i](#)

There are no such residues in this entry.



## 5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

## 6 Fit of model and data [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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	374/398 (93%)	0.08	24 (6%)	19 18	12, 22, 46, 95	4 (1%)
1	B	374/398 (93%)	-0.05	20 (5%)	26 25	13, 21, 43, 109	6 (1%)
All	All	748/796 (93%)	0.02	44 (5%)	22 21	12, 21, 45, 109	10 (1%)

The worst 5 of 44 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	33	LEU	8.3
1	B	84	ASP	6.5
1	A	390	TRP	6.1
1	B	45	PHE	5.8
1	A	84	ASP	5.7

### 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 carbohydrates in this entry.

### 6.4 Ligands [i](#)

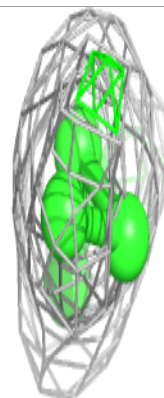
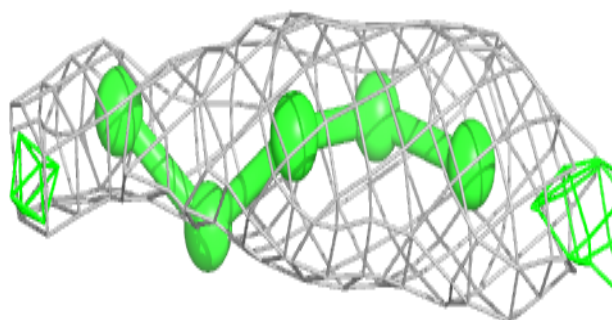
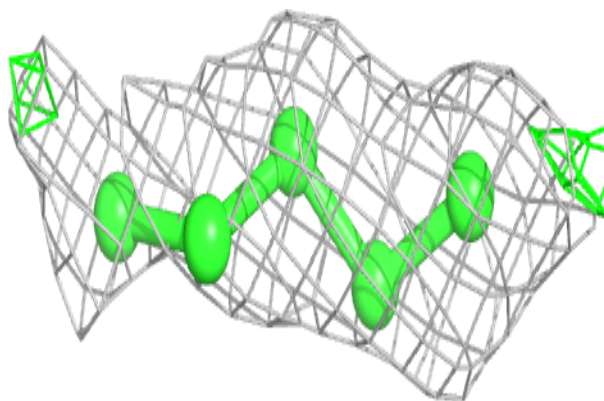
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
3	C8E	B	416	5/21	0.65	0.18	46,46,52,53	0
3	C8E	A	413	15/21	0.68	0.27	28,49,61,62	0
2	EDO	B	399	4/4	0.68	0.15	41,46,47,48	0
3	C8E	B	412	14/21	0.70	0.25	44,58,72,72	0
3	C8E	A	408	7/21	0.75	0.22	69,70,71,73	0
3	C8E	B	408	7/21	0.75	0.18	36,43,52,54	0
3	C8E	B	409	10/21	0.75	0.20	35,51,58,58	0
3	C8E	A	411	9/21	0.76	0.17	47,53,60,61	0
3	C8E	B	415	7/21	0.76	0.31	47,51,53,54	0
3	C8E	B	406	12/21	0.77	0.18	54,58,62,62	0
3	C8E	B	410	11/21	0.77	0.22	29,40,55,57	0
3	C8E	A	412	9/21	0.77	0.15	45,47,53,53	0
3	C8E	A	401	7/21	0.78	0.13	34,38,43,45	0
3	C8E	A	407	9/21	0.79	0.13	44,48,56,59	0
3	C8E	B	413	5/21	0.79	0.40	38,43,51,56	0
2	EDO	B	400	4/4	0.79	0.30	54,58,61,62	0
3	C8E	A	402	6/21	0.80	0.14	52,53,57,58	0
3	C8E	A	409	9/21	0.81	0.14	45,51,60,62	0
3	C8E	A	405	16/21	0.82	0.12	29,55,62,63	0
3	C8E	B	411	6/21	0.83	0.15	29,39,42,43	0
3	C8E	A	404	14/21	0.83	0.16	29,58,62,62	0
3	C8E	B	404	11/21	0.84	0.17	40,46,63,69	0
3	C8E	A	403	9/21	0.86	0.14	37,44,52,56	0
3	C8E	A	400	9/21	0.87	0.19	44,48,56,57	0
2	EDO	A	399	4/4	0.87	0.24	47,48,50,53	0
3	C8E	B	407	8/21	0.87	0.13	26,42,55,56	0
3	C8E	A	410	6/21	0.87	0.12	56,58,58,58	0
4	VNL	A	415	12/12	0.87	0.18	29,34,44,51	0
3	C8E	B	402	7/21	0.88	0.13	38,47,51,51	0
3	C8E	A	406	5/21	0.88	0.15	35,36,57,61	0
2	EDO	B	401	4/4	0.89	0.09	53,54,55,58	0
3	C8E	B	403	5/21	0.91	0.20	24,31,36,37	0
4	VNL	B	418	12/12	0.92	0.09	21,23,32,33	0
3	C8E	B	414	4/21	0.92	0.18	35,36,39,44	0
4	VNL	A	414	12/12	0.94	0.11	24,26,31,31	0
3	C8E	B	405	6/21	0.95	0.16	33,41,50,55	0
4	VNL	B	417	12/12	0.97	0.10	20,24,27,29	0

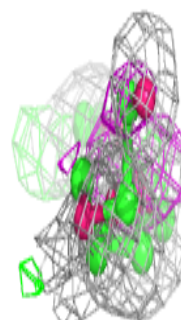
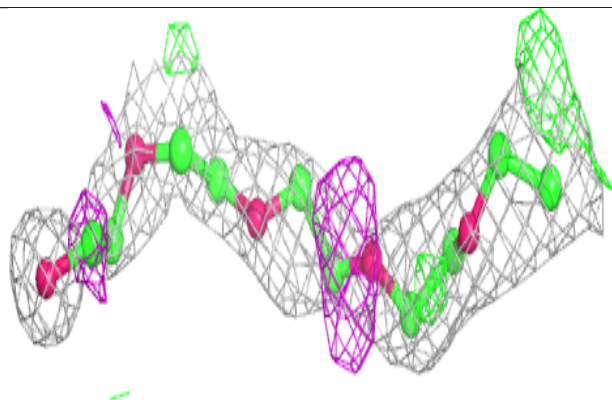
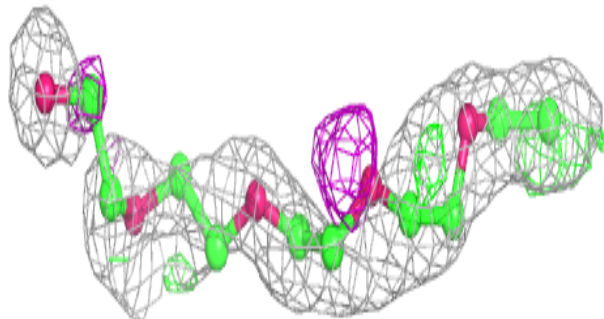
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

**Electron density around C8E B 416:**

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

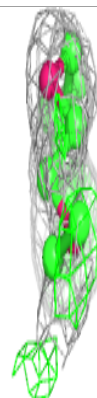
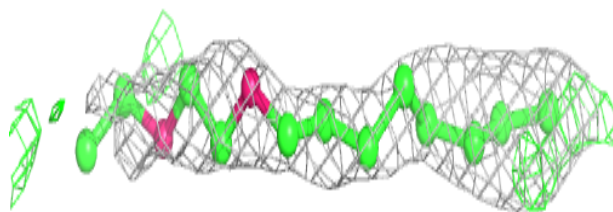
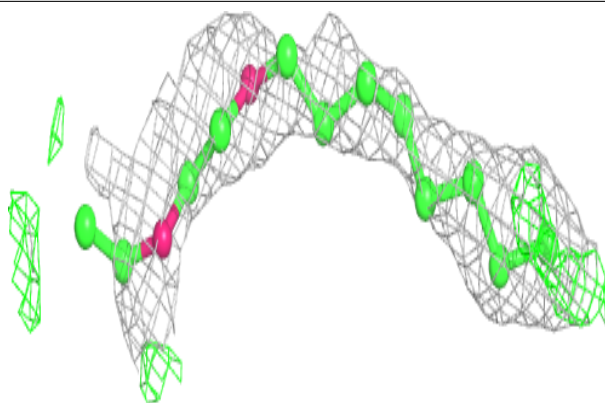
**Electron density around C8E A 413:**

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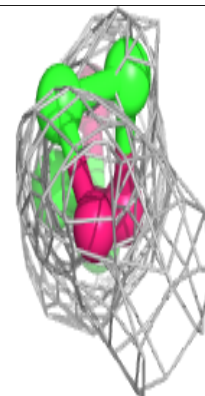
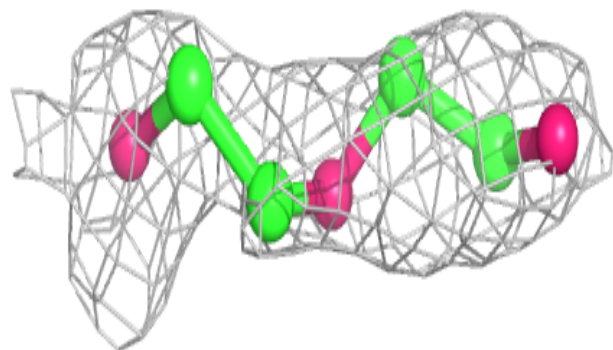
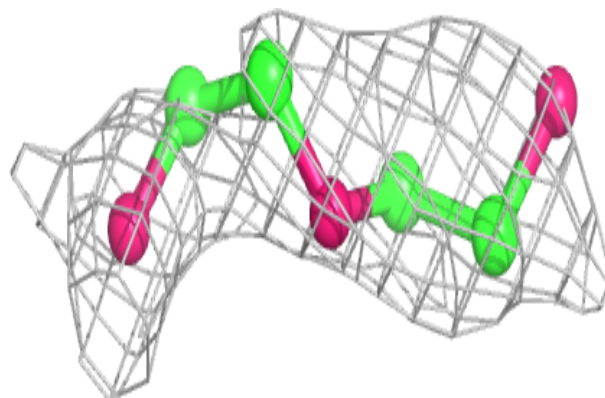


**Electron density around C8E B 412:**

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and green (positive)

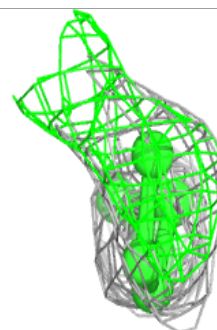
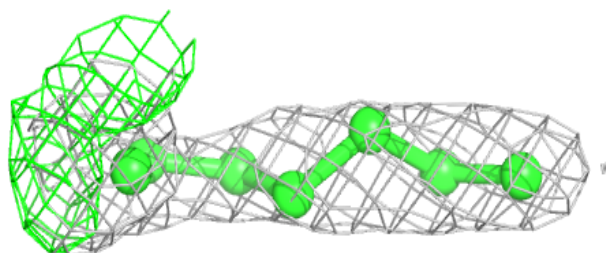
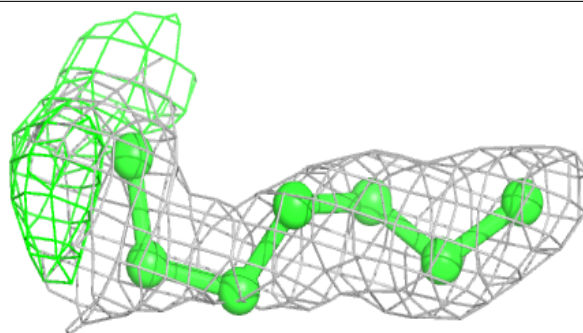
**Electron density around C8E A 408:**

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and green (positive)

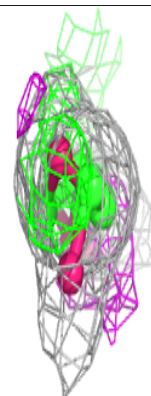
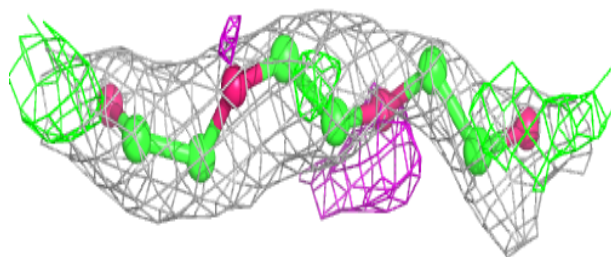
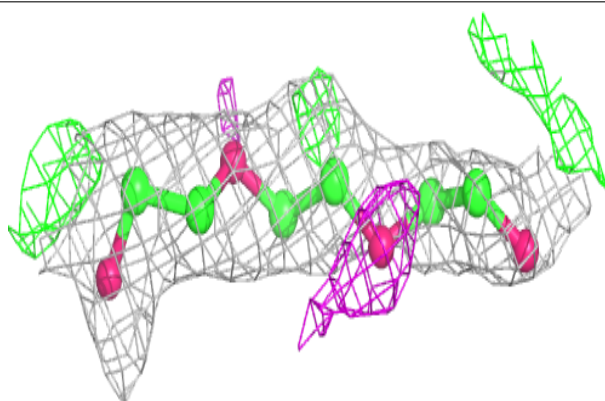


**Electron density around C8E B 408:**

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and green (positive)

**Electron density around C8E B 409:**

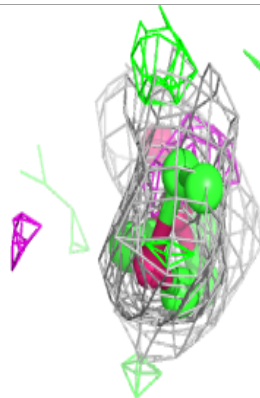
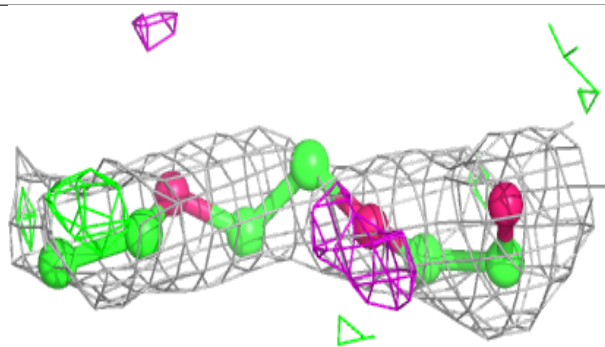
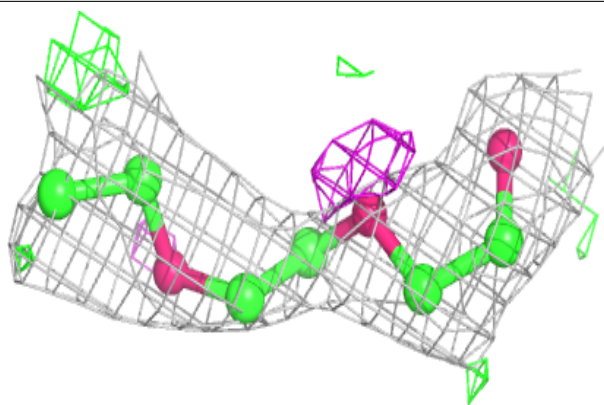
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 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



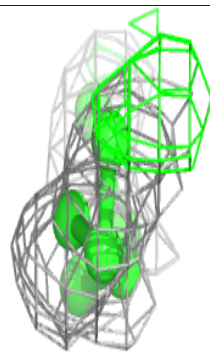
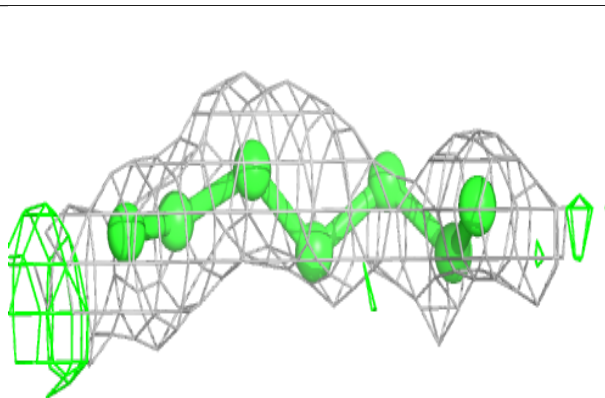
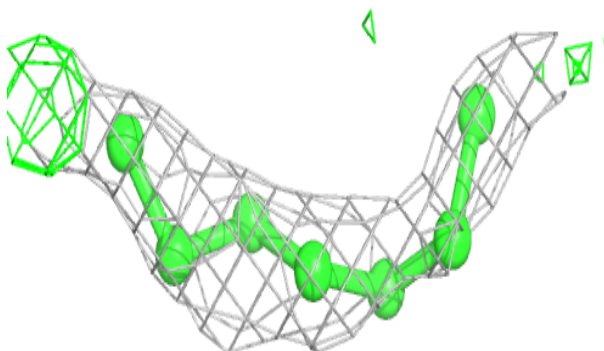


**Electron density around C8E A 411:**

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

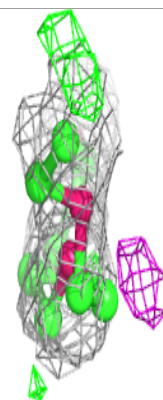
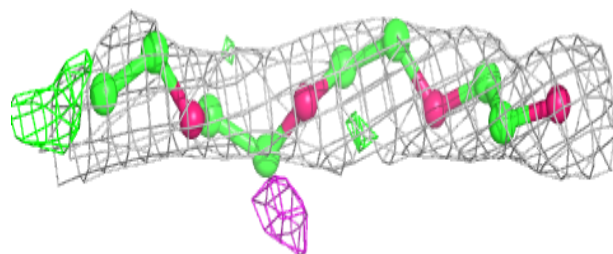
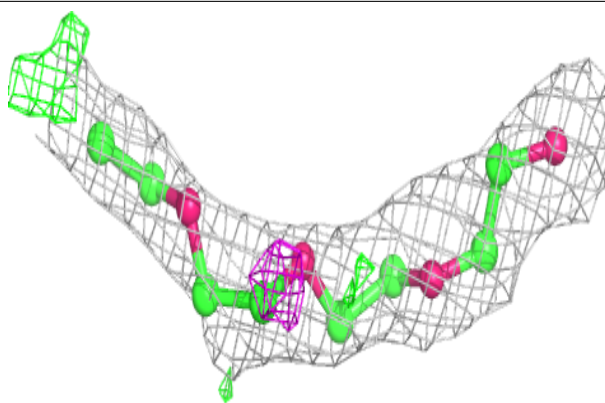
**Electron density around C8E B 415:**

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

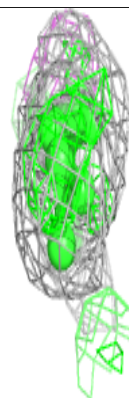
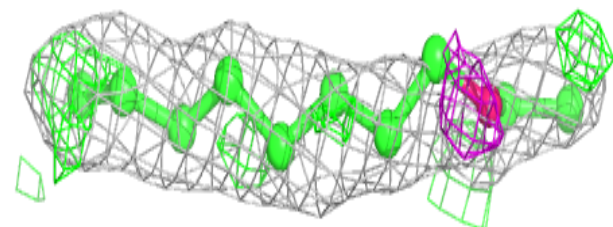
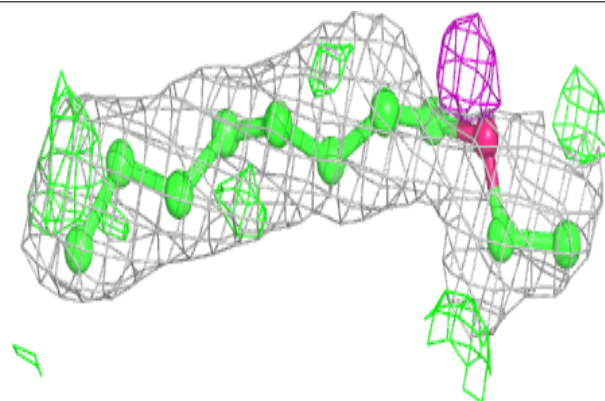


**Electron density around C8E B 406:**

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

**Electron density around C8E B 410:**

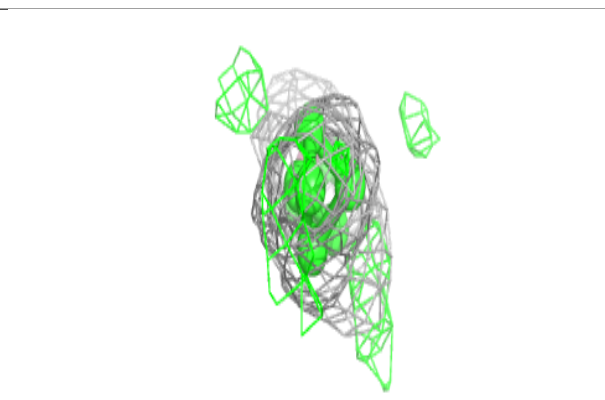
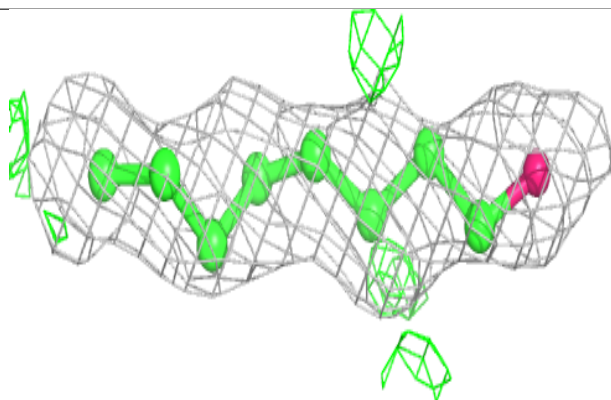
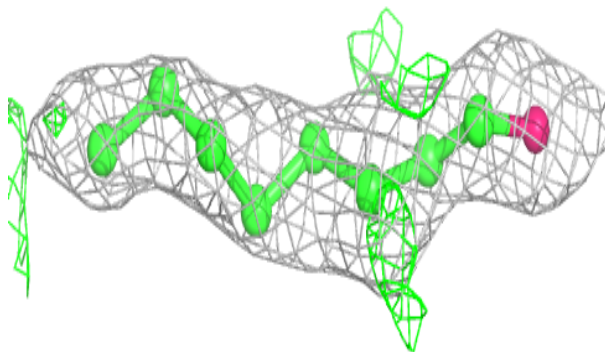
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



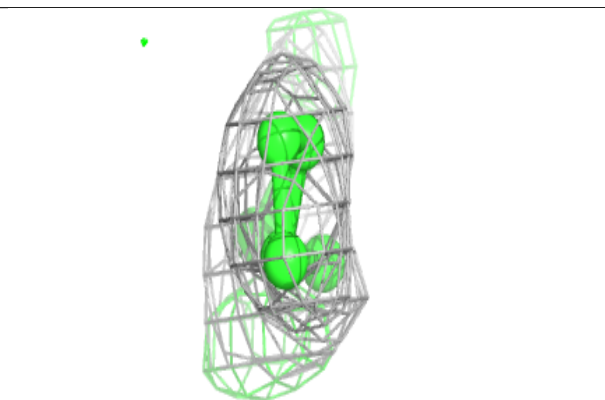
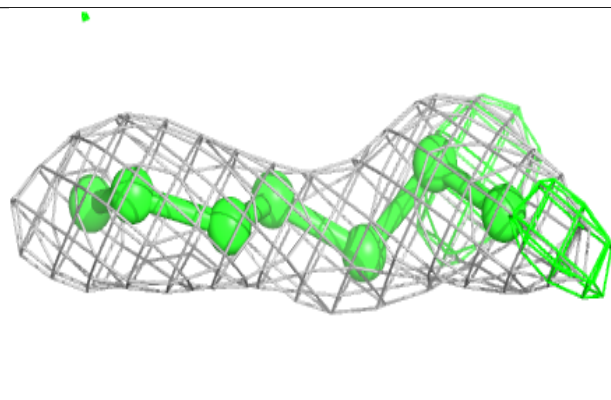
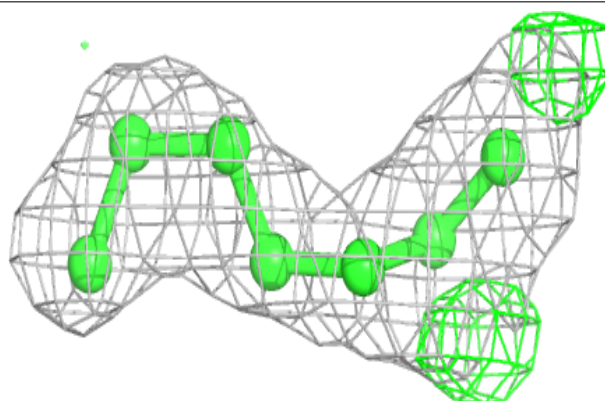


**Electron density around C8E A 412:**

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

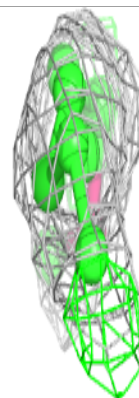
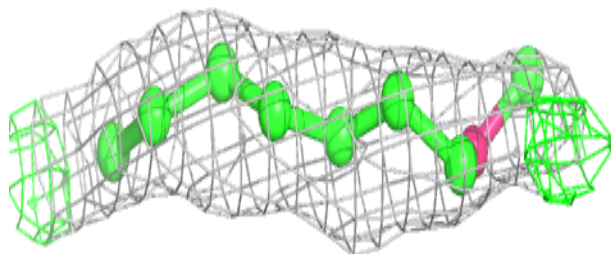
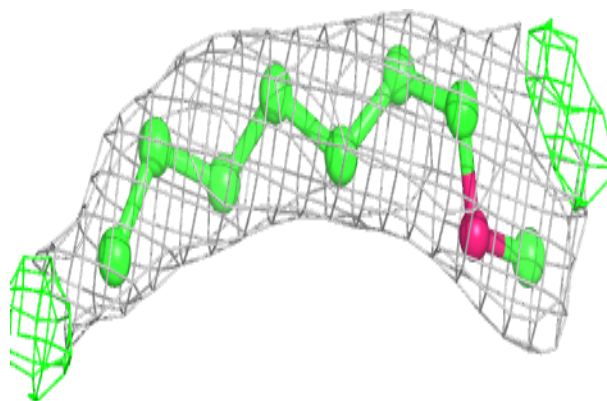
**Electron density around C8E A 401:**

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

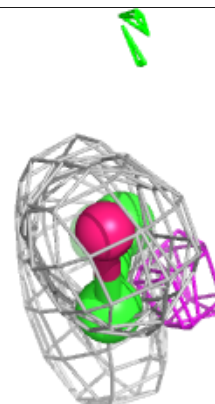
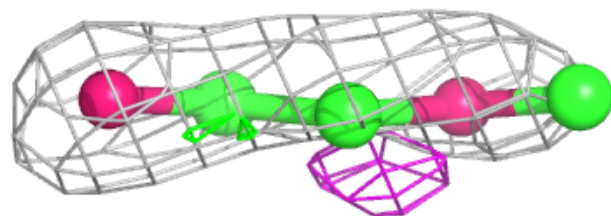
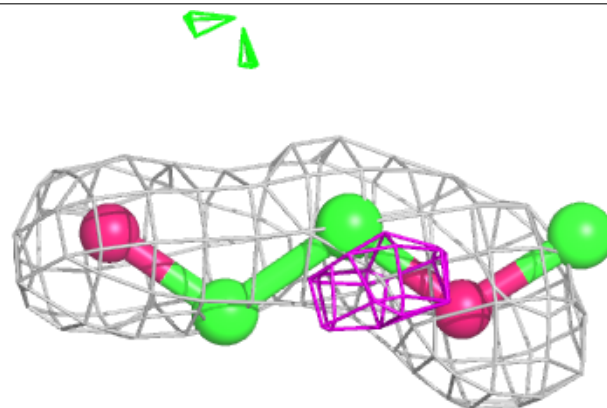


**Electron density around C8E A 407:**

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

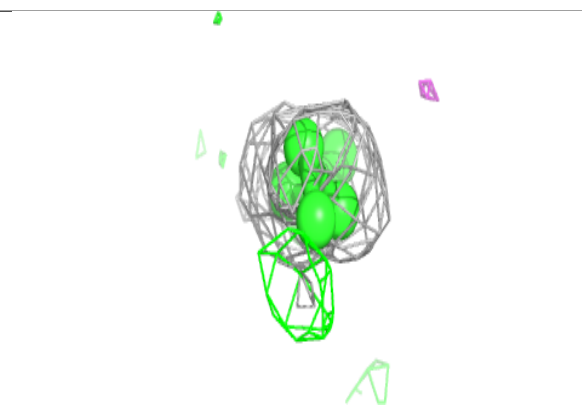
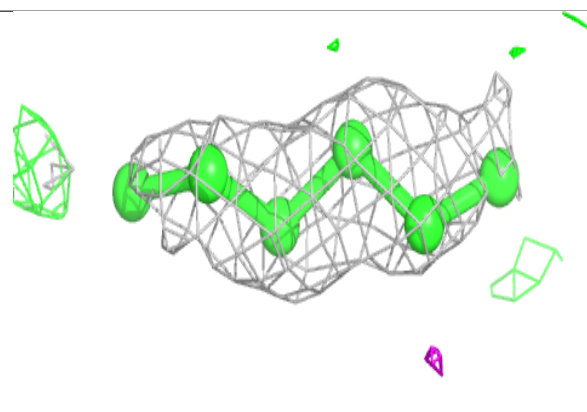
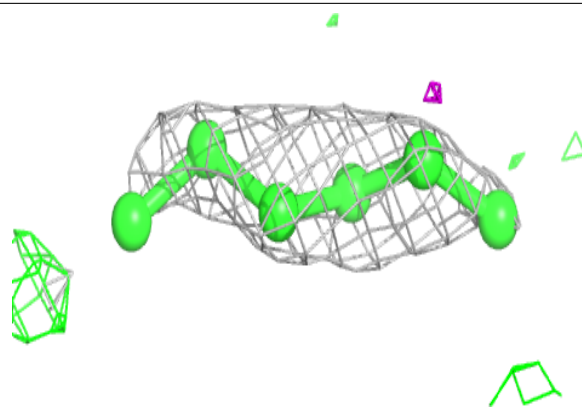
**Electron density around C8E B 413:**

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

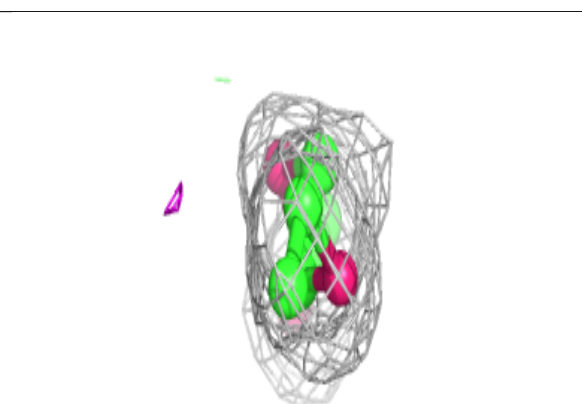
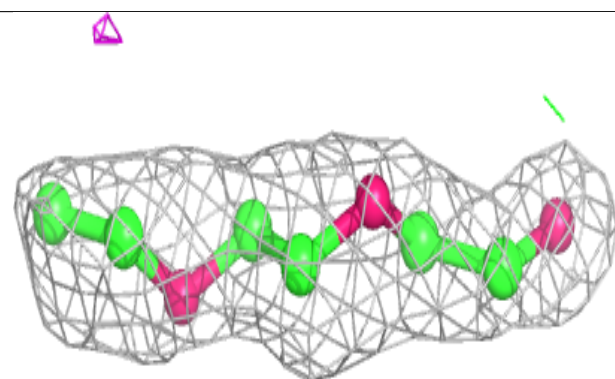
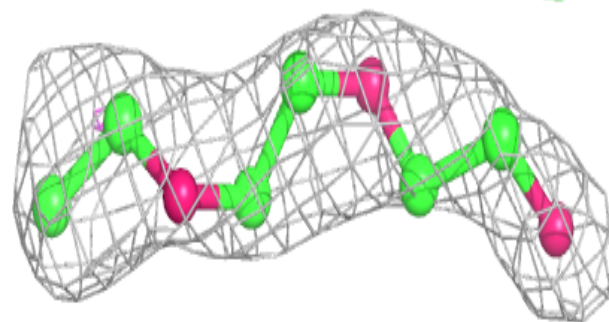


**Electron density around C8E A 402:**

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

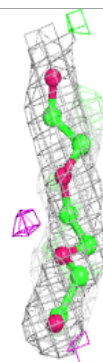
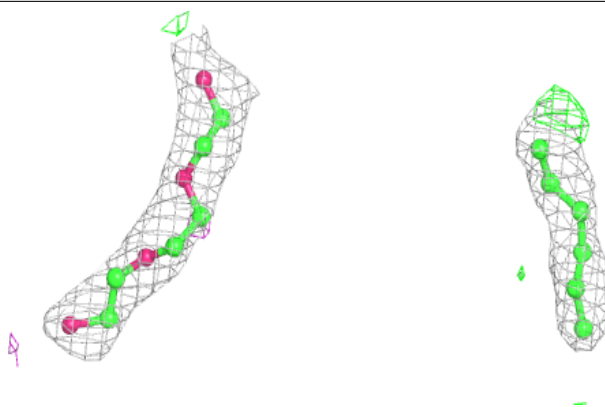
**Electron density around C8E A 409:**

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

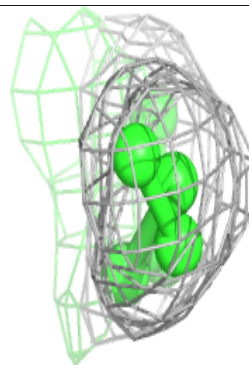
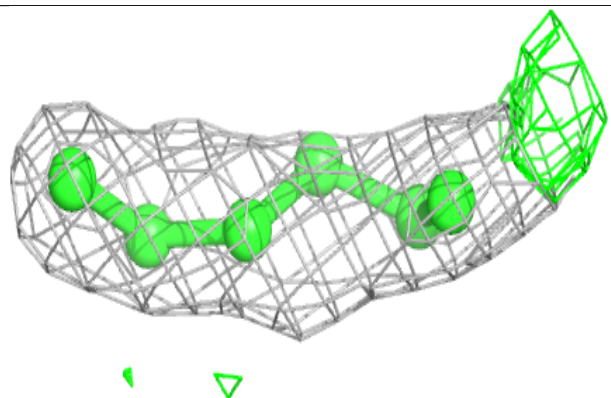
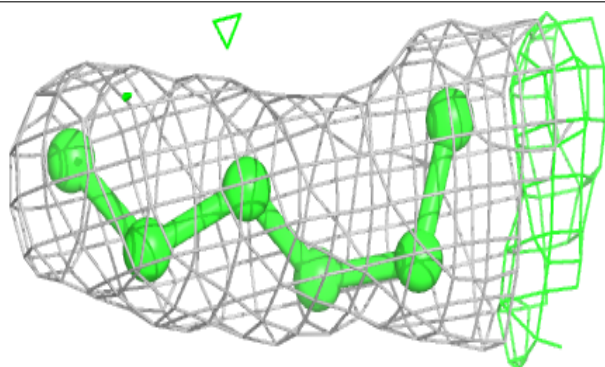


**Electron density around C8E A 405:**

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

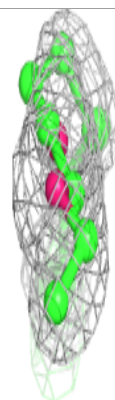
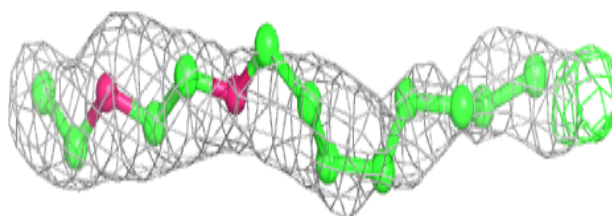
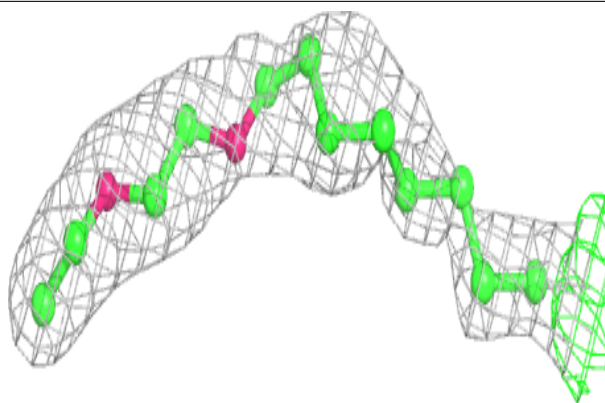
**Electron density around C8E B 411:**

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

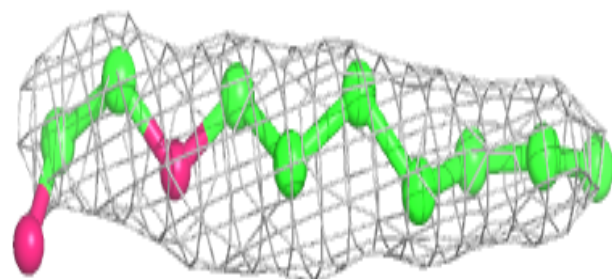
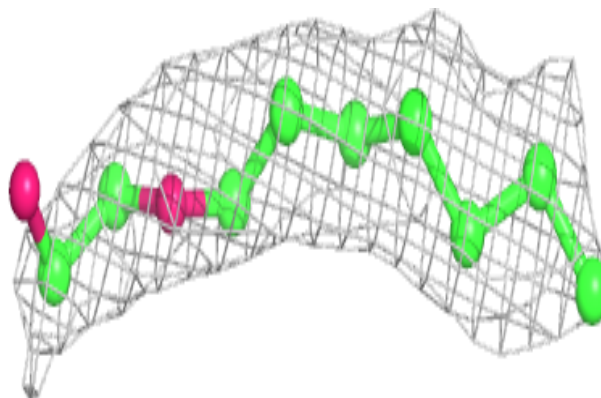


**Electron density around C8E A 404:**

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

**Electron density around C8E B 404:**

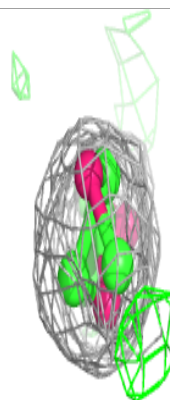
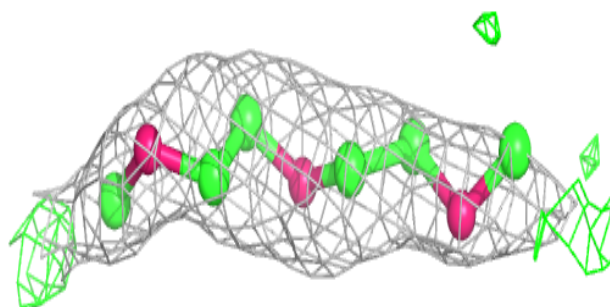
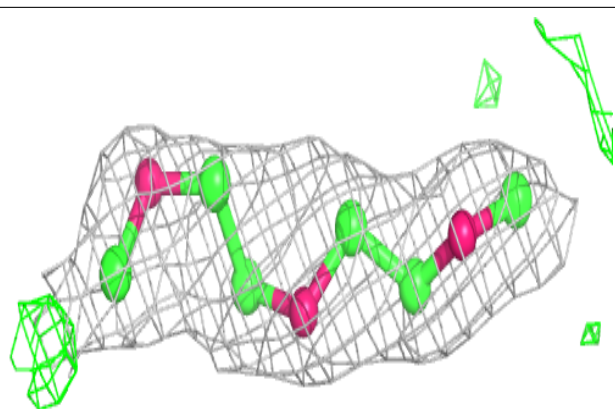
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



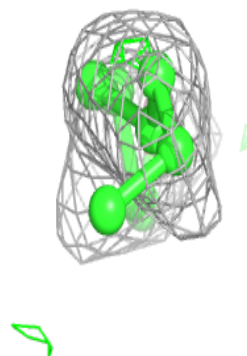
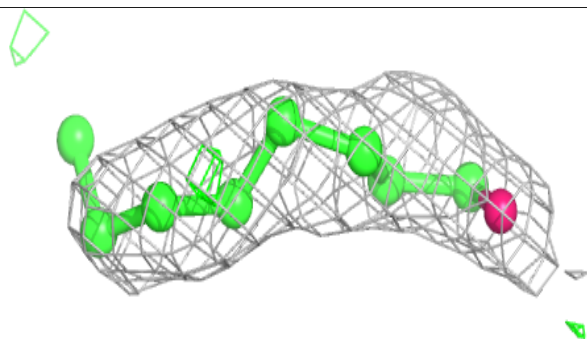
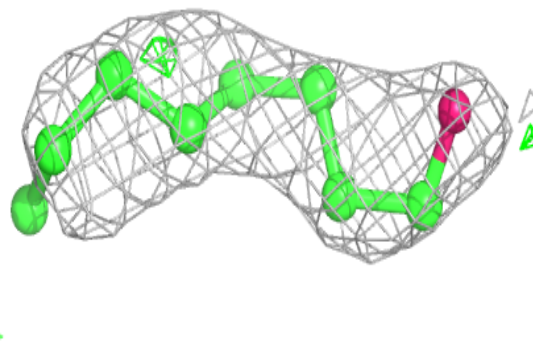


**Electron density around C8E A 403:**

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

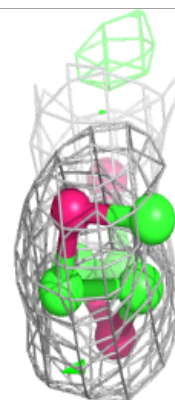
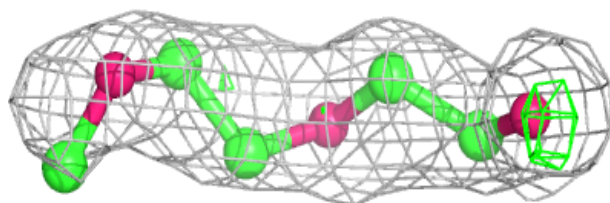
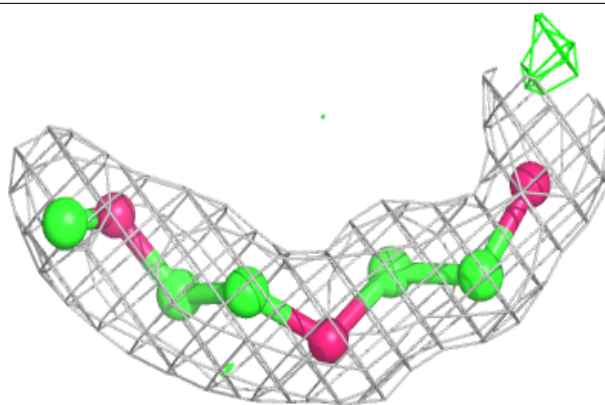
**Electron density around C8E A 400:**

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

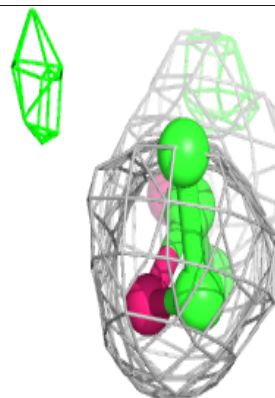
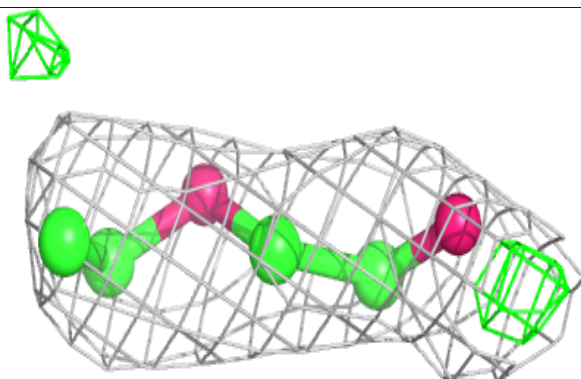
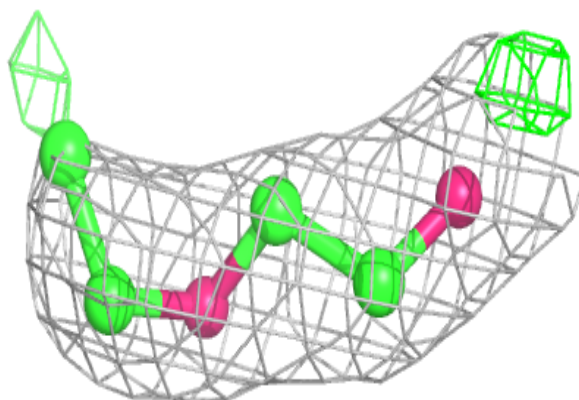


**Electron density around C8E B 407:**

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

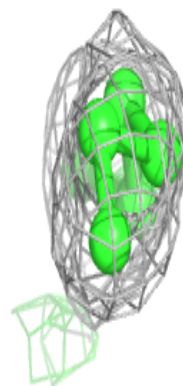
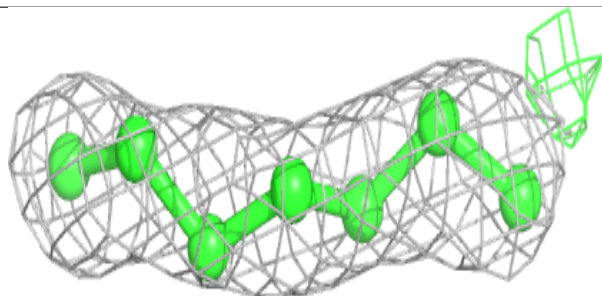
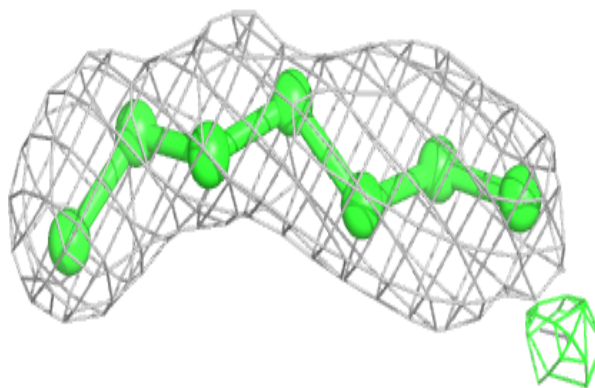
**Electron density around C8E A 410:**

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

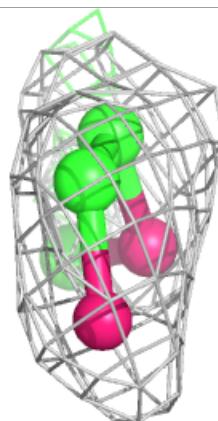
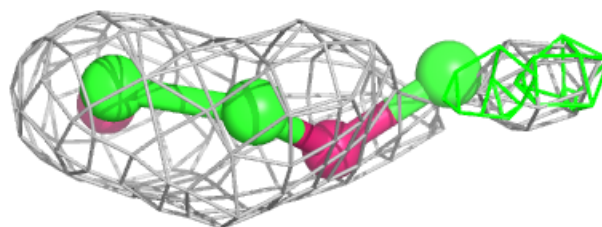
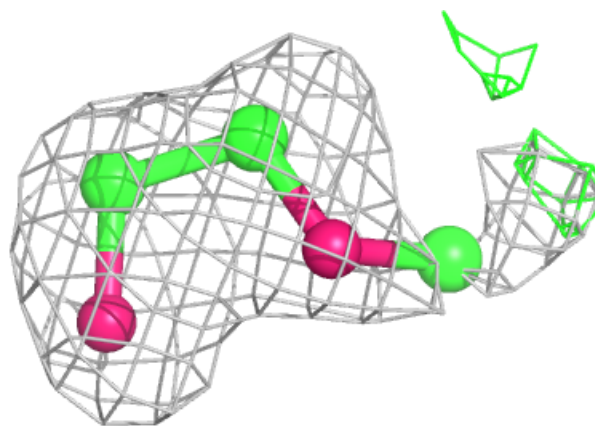


**Electron density around C8E B 402:**

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

**Electron density around C8E A 406:**

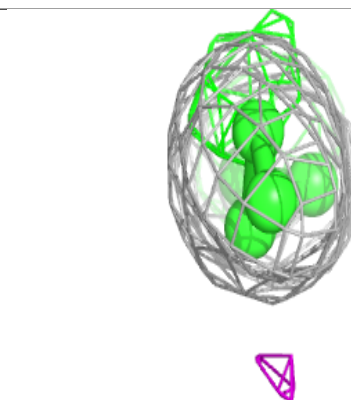
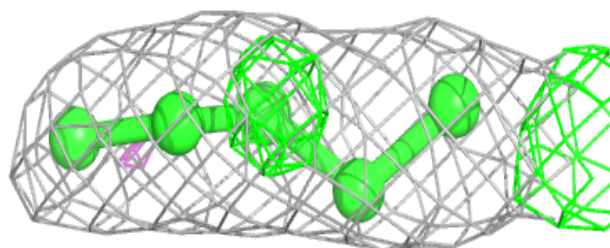
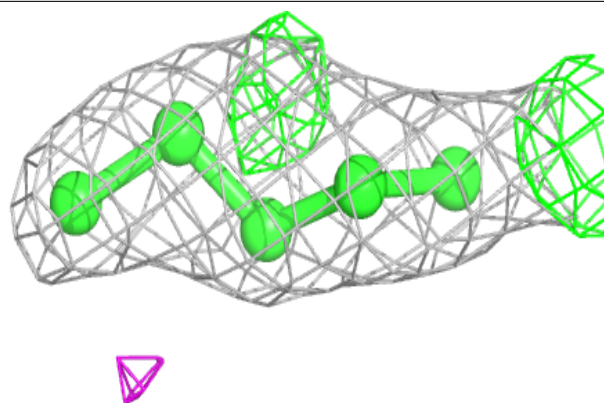
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



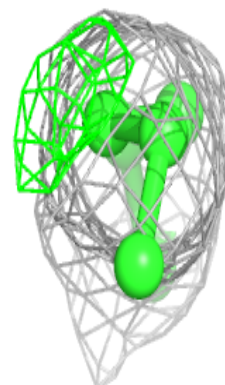
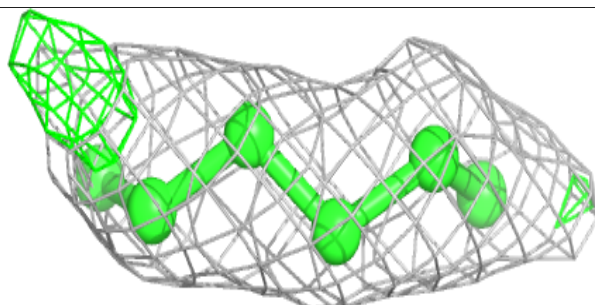
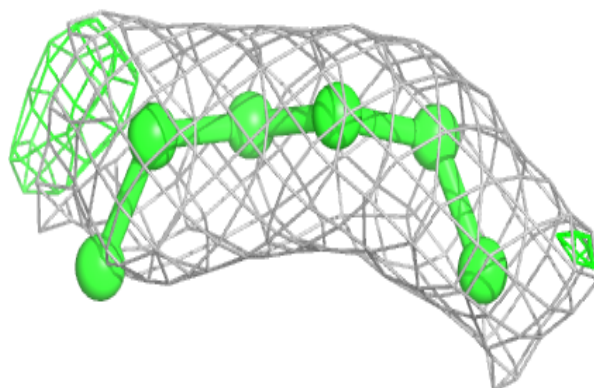


**Electron density around C8E B 403:**

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

**Electron density around C8E B 405:**

$2mF_o-DF_c$  (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.