



wwPDB EM Validation Summary Report ⓘ

Dec 21, 2022 – 02:15 PM JST

PDB ID : 7VZR
EMDB ID : EMD-32229
Title : Structure of the Acidobacteria homodimeric reaction center bound with cytochrome c (the smaller form)
Authors : Huang, G.Q.; Dong, S.S.; Qin, X.C.; Sui, S.F.
Deposited on : 2021-11-16
Resolution : 2.22 Å(reported)

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

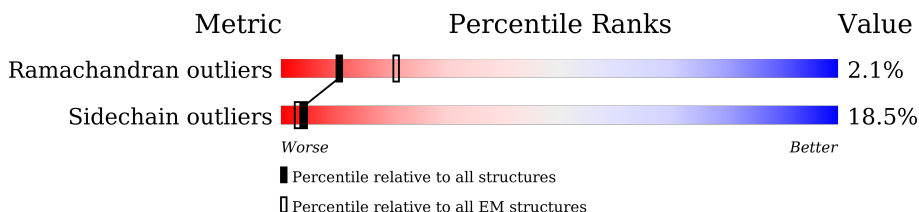
EMDB validation analysis : 0.0.1.dev43
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.3

1 Overall quality at a glance

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

The reported resolution of this entry is 2.22 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	865	62% 31% 5% .
1	a	865	66% 26% 7% .
2	C	221	45% 34% 8% 13%
3	E	35	66% 29% 6%
3	e	35	71% 26%
4	F	35	6% 43% 57%
4	f	35	71% 23% 6%
5	G	45	62% 13% 9% 16%
5	g	45	62% 20% . 16%

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Mol	Chain	Length	Quality of chain
6	H	19	 11% 100%
6	h	19	 11% 100%
7	c	145	 55% 32% 12%

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
10	CLA	A	910	X	-	-	-
10	CLA	A	911	X	-	-	-
11	LYC	c	201	-	X	-	-

2 Entry composition [i](#)

There are 19 unique types of molecules in this entry. The entry contains 21354 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a protein called Photosynthetic reaction center subunit M.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	854	Total	C	N	O	S	0	0
			6960	4602	1155	1170	33		
1	a	858	Total	C	N	O	S	0	0
			6984	4616	1160	1175	33		

- Molecule 2 is a protein called Cytochrome c, mono-and diheme variants.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	C	193	Total	C	N	O	S	0	0
			1474	900	277	288	9		

- Molecule 3 is a protein called PscE.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	E	35	Total	C	N	O	S	0	0
			258	174	40	42	2		
3	e	35	Total	C	N	O	S	0	0
			258	174	40	42	2		

- Molecule 4 is a protein called PscF.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	F	35	Total	C	N	O	S	0	0
			273	185	43	43	2		
4	f	35	Total	C	N	O	S	0	0
			273	185	43	43	2		

- Molecule 5 is a protein called PscG.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	G	38	Total	C	N	O	S	0	0
			302	210	45	44	3		

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	g	38	302	210	45	44	3	0	0

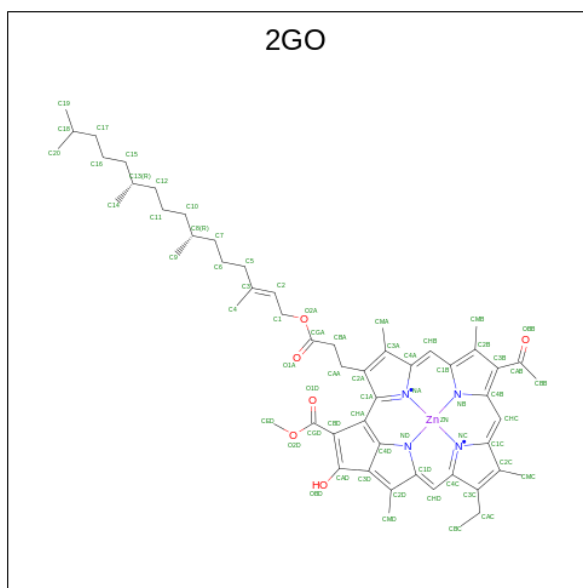
- Molecule 6 is a protein called undefined polypeptide.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
6	H	19	95	57	19	19	0	0
6	h	19	95	57	19	19	0	0

- Molecule 7 is a protein called Cytochrome c domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	c	145	1096	679	200	210	7	0	0

- Molecule 8 is [methyl 9-acetyl-14-ethyl-20-hydroxy-4,8,13,18-tetramethyl-3-{3-oxo-3-[(3,7,11,15-tetramethylhexadec-2-en-1-yl)oxy]propyl}-3,4,20,21-tetradehydrophorbine-21-carboxylato(2-)-kappa 4 N 23 ,N 24 ,N 25 ,N 26]zinc (three-letter code: 2GO) (formula: C₅₅H₇₀N₄O₆Zn) (labeled as "Ligand of Interest" by depositor).



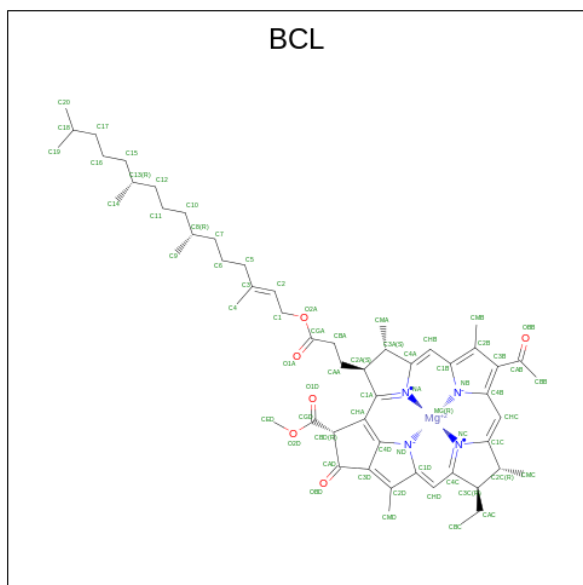
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	Zn	
8	A	1	66	55	4	6	1	0

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	Zn	
8	a	1	66	55	4	6	1	0

- Molecule 9 is BACTERIOCHLOROPHYLL A (three-letter code: BCL) (formula: $C_{55}H_{74}MgN_4O_6$) (labeled as "Ligand of Interest" by depositor).



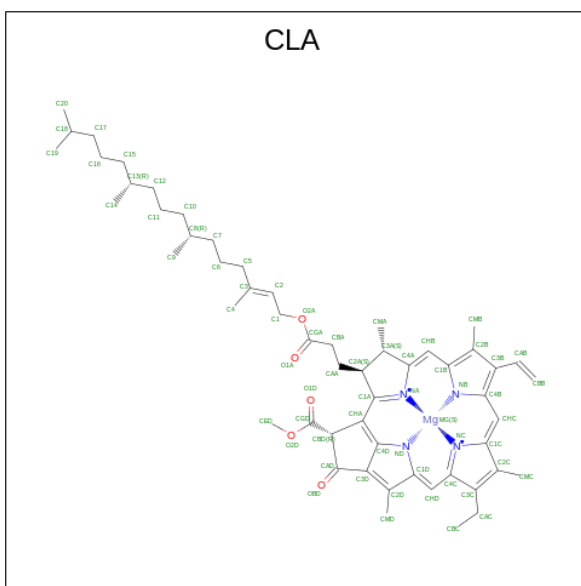
Mol	Chain	Residues	Atoms					AltConf
			Total	C	Mg	N	O	
9	A	1	489	401	8	32	48	0
9	A	1	489	401	8	32	48	0
9	A	1	489	401	8	32	48	0
9	A	1	489	401	8	32	48	0
9	A	1	489	401	8	32	48	0
9	A	1	489	401	8	32	48	0
9	A	1	489	401	8	32	48	0
9	A	1	489	401	8	32	48	0
9	a	1	508	420	8	32	48	0
9	a	1	508	420	8	32	48	0

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	Mg	N	O	
9	a	1	Total	C	Mg	N	O	0
			508	420	8	32	48	
9	a	1	Total	C	Mg	N	O	0
			508	420	8	32	48	
9	a	1	Total	C	Mg	N	O	0
			508	420	8	32	48	
9	a	1	Total	C	Mg	N	O	0
			508	420	8	32	48	
9	a	1	Total	C	Mg	N	O	0
			508	420	8	32	48	

- Molecule 10 is CHLOROPHYLL A (three-letter code: CLA) (formula: $C_{55}H_{72}MgN_4O_5$) (labeled as "Ligand of Interest" by depositor).



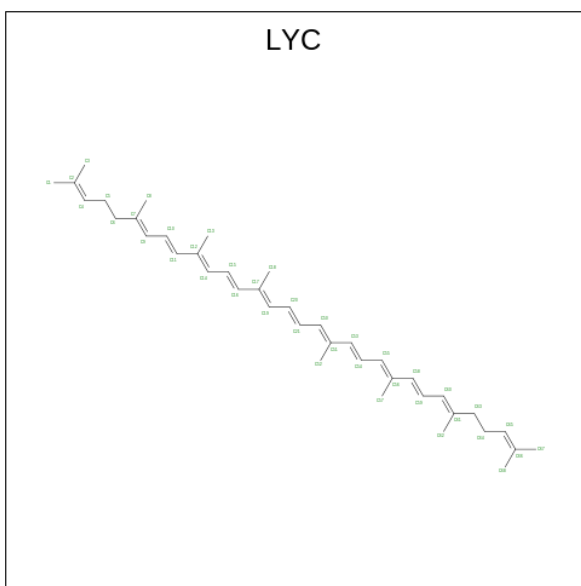
Mol	Chain	Residues	Atoms					AltConf
			Total	C	Mg	N	O	
10	A	1	Total	C	Mg	N	O	0
			292	242	5	20	25	
10	A	1	Total	C	Mg	N	O	0
			292	242	5	20	25	
10	A	1	Total	C	Mg	N	O	0
			292	242	5	20	25	
10	A	1	Total	C	Mg	N	O	0
			292	242	5	20	25	
10	A	1	Total	C	Mg	N	O	0
			292	242	5	20	25	

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	Mg	N	O	
10	a	1	292	242	5	20	25	0
10	a	1	292	242	5	20	25	0
10	a	1	292	242	5	20	25	0
10	a	1	292	242	5	20	25	0
10	a	1	292	242	5	20	25	0

- Molecule 11 is LYCOPENE (three-letter code: LYC) (formula: C₄₀H₅₆).

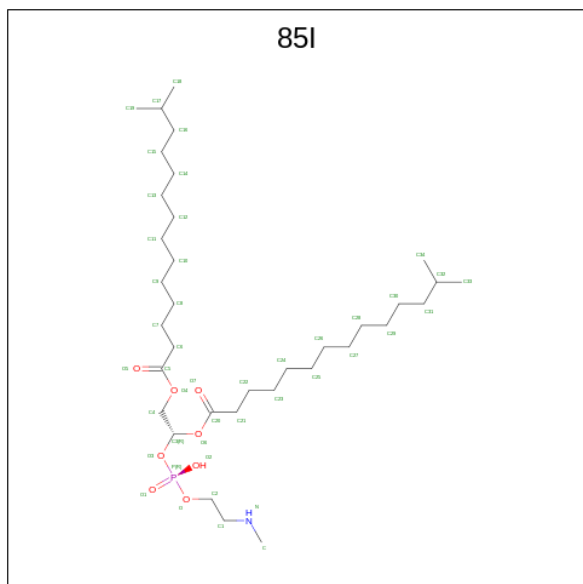


Mol	Chain	Residues	Atoms		AltConf
			Total	C	
11	A	1	40	40	0
11	c	1	40	40	0

- Molecule 12 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		AltConf
			Total	Ca	
12	A	1	1	1	0
12	a	1	1	1	0

- Molecule 13 is [(2 {R})-2-[2-(methylamino)ethoxy-oxidanyl-phosphoryl]oxy-2-(13-methyltetradecanoyloxy)ethyl] 13-methyltetradecanoate (three-letter code: 85I) (formula: $C_{35}H_{70}NO_8P$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
13	A	1	Total	C	N	O	P	0
			135	105	3	24	3	
13	A	1	Total	C	N	O	P	0
			135	105	3	24	3	
13	A	1	Total	C	N	O	P	0
			135	105	3	24	3	
13	a	1	Total	C	N	O	P	0
			135	105	3	24	3	
13	a	1	Total	C	N	O	P	0
			135	105	3	24	3	
13	a	1	Total	C	N	O	P	0
			135	105	3	24	3	

- Molecule 14 is UNKNOWN LIGAND (three-letter code: UNL) (formula:) (labeled as "Ligand of Interest" by depositor).

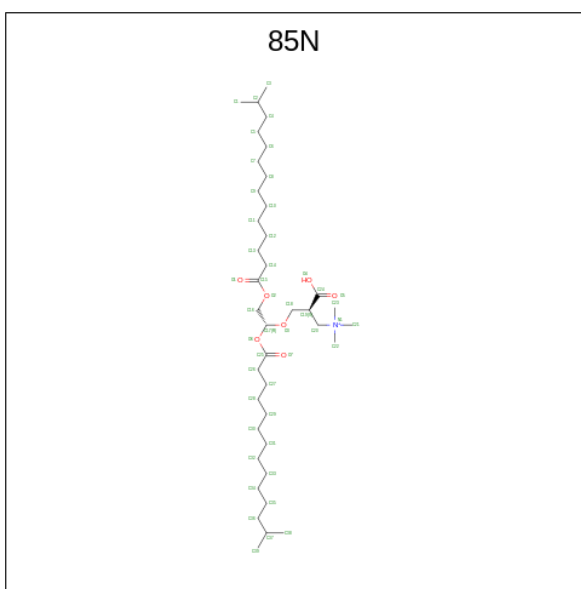
Mol	Chain	Residues	Atoms		AltConf
14	A	13	Total	C	0
			240	240	
14	C	1	Total	C	0
			18	18	
14	E	2	Total	C	0
			26	26	

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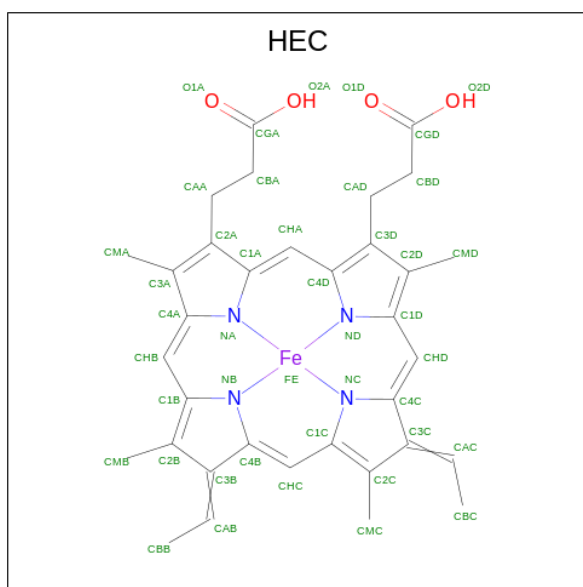
Mol	Chain	Residues	Atoms		AltConf
14	a	13	Total	C	0
			243	243	
14	c	1	Total	C	0
			8	8	
14	e	2	Total	C	0
			26	26	

- Molecule 15 is [(2 {S})-2-[[1 {R}]-1,2-bis(13-methyltetradecanoyloxy)ethoxy]methyl]-3-oxidanyl-3-oxidanylidene-propyl]-trimethyl-azanium (three-letter code: 85N) (formula: C₃₉H₇₆NO₇) (labeled as "Ligand of Interest" by depositor).



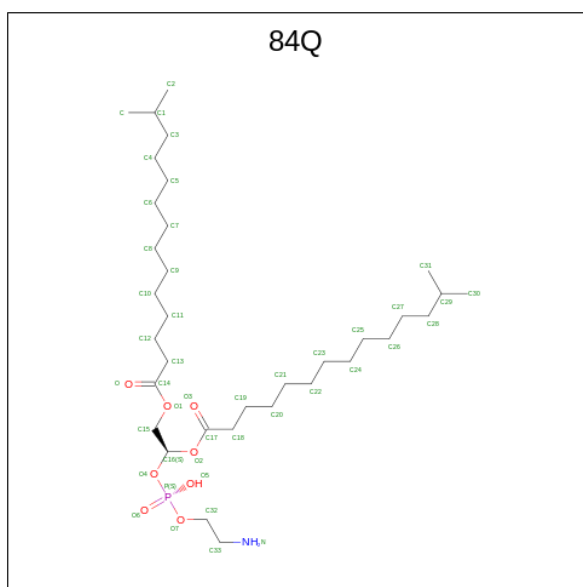
Mol	Chain	Residues	Atoms				AltConf
15	A	1	Total	C	N	O	0
			47	39	1	7	
15	G	1	Total	C	N	O	0
			38	30	1	7	
15	a	1	Total	C	N	O	0
			47	39	1	7	
15	g	1	Total	C	N	O	0
			38	30	1	7	

- Molecule 16 is HEME C (three-letter code: HEC) (formula: C₃₄H₃₄FeN₄O₄) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf	
			Total	C	Fe	N		O
16	C	1	43	34	1	4	4	0
16	c	1	43	34	1	4	4	0

- Molecule 17 is [(2S)-2-[2-azanylethoxy(oxidanyl)phosphoryl]oxy-2-(13-methyltetradecanoyloxy)ethyl] 13-methyltetradecanoate (three-letter code: 84Q) (formula: C₃₄H₆₈NO₈P) (labeled as "Ligand of Interest" by depositor).



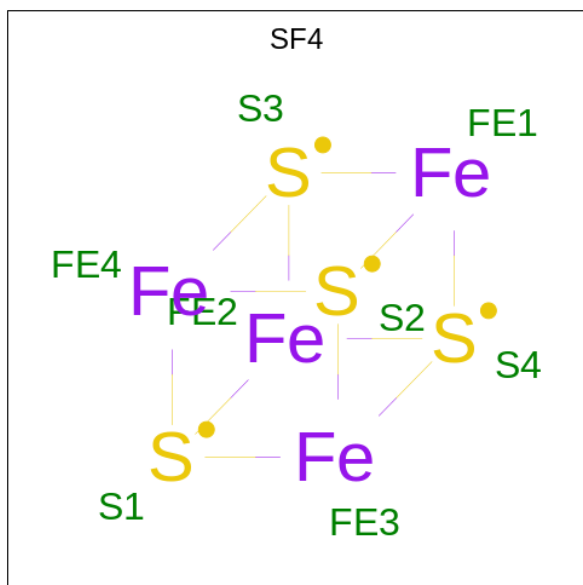
Mol	Chain	Residues	Atoms				AltConf	
			Total	C	N	O		P
17	E	1	44	34	1	8	1	0

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
17	a	1	44	34	1	8	1	0

- Molecule 18 is IRON/SULFUR CLUSTER (three-letter code: SF4) (formula: Fe_4S_4) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			AltConf
			Total	Fe	S	
18	a	1	8	4	4	0

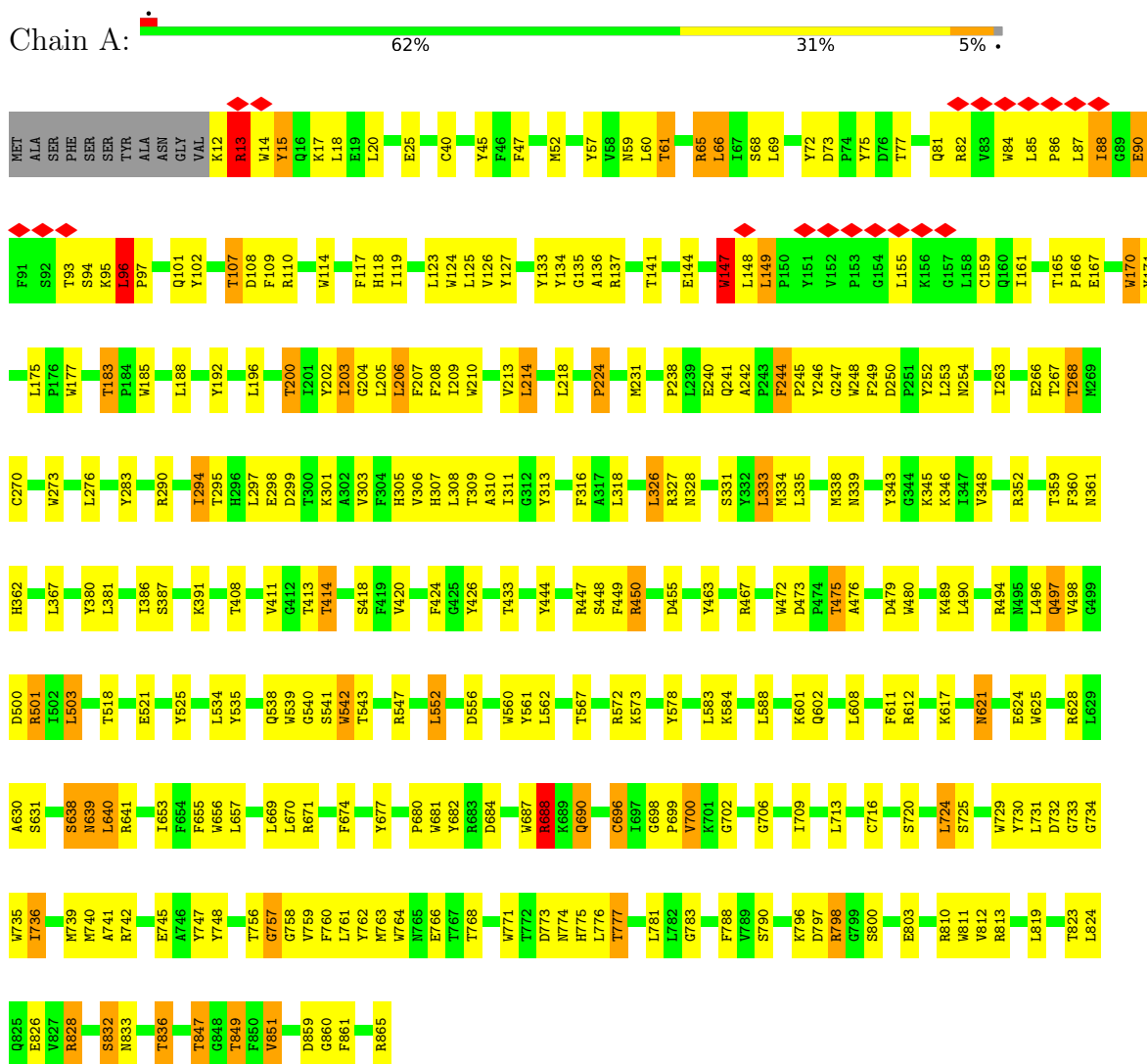
- Molecule 19 is water.

Mol	Chain	Residues	Atoms		AltConf
			Total	O	
19	A	3	3	3	0
19	a	3	3	3	0

3 Residue-property plots

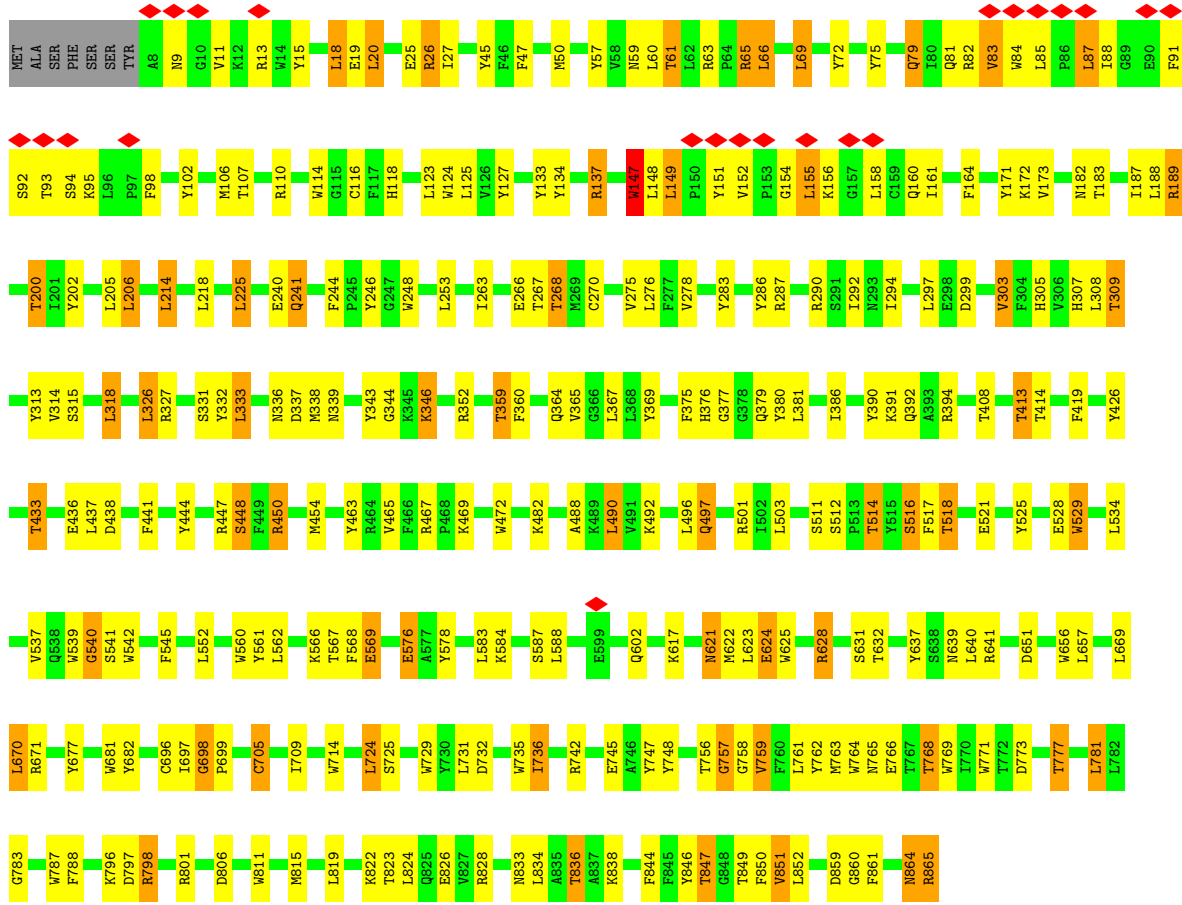
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Photosynthetic reaction center subunit M

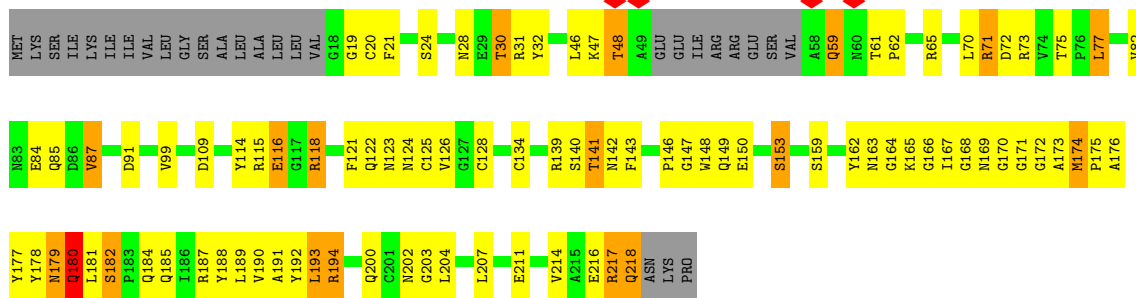


- Molecule 1: Photosynthetic reaction center subunit M





• Molecule 2: Cytochrome c, mono- and diheme variants

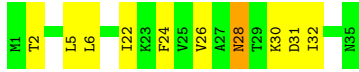


• Molecule 3: PscE

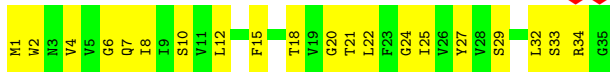


• Molecule 3: PscE

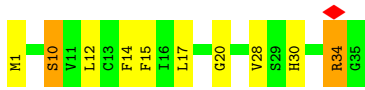




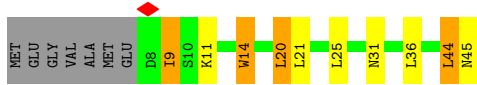
- Molecule 4: PscF



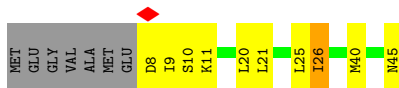
- Molecule 4: PscF



- Molecule 5: PscG



- Molecule 5: PscG



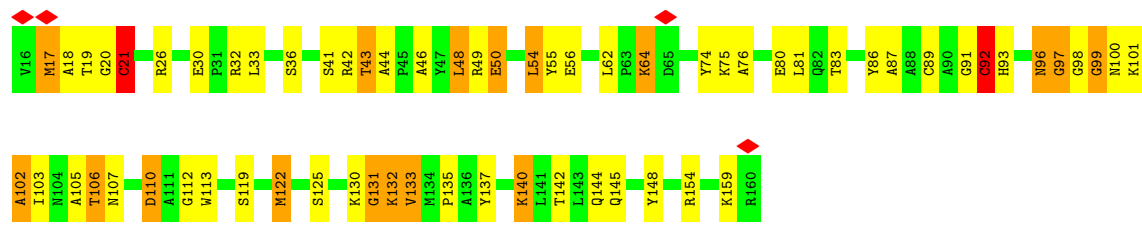
- Molecule 6: undefined polypeptide



- Molecule 6: undefined polypeptide



- Molecule 7: Cytochrome c domain-containing protein



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	490075	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	5.661	Depositor
Minimum map value	-2.809	Depositor
Average map value	0.009	Depositor
Map value standard deviation	0.164	Depositor
Recommended contour level	0.48	Depositor
Map size (\AA)	238.15, 238.15, 238.15	wwPDB
Map dimensions	220, 220, 220	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.0825, 1.0825, 1.0825	Depositor

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: CLA, 85N, 85I, BCL, LYC, SF4, UNL, 84Q, HEC, 2GO, CA

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	1.97	233/7209 (3.2%)	1.33	86/9827 (0.9%)
1	a	1.85	196/7233 (2.7%)	1.28	91/9860 (0.9%)
2	C	2.35	98/1503 (6.5%)	1.67	35/2037 (1.7%)
3	E	2.16	9/262 (3.4%)	1.43	4/356 (1.1%)
3	e	1.50	2/262 (0.8%)	1.14	1/356 (0.3%)
4	F	2.28	15/279 (5.4%)	1.21	0/379
4	f	1.98	6/279 (2.2%)	1.28	1/379 (0.3%)
5	G	1.49	4/311 (1.3%)	1.60	6/421 (1.4%)
5	g	1.25	0/311	1.16	2/421 (0.5%)
7	c	2.54	75/1115 (6.7%)	1.79	36/1506 (2.4%)
All	All	1.98	638/18764 (3.4%)	1.37	262/25542 (1.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	a	0	4
2	C	0	2
7	c	0	1
All	All	0	8

The worst 5 of 638 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	a	539	TRP	C-O	-15.07	0.94	1.23
7	c	55	TYR	CD1-CE1	-13.98	1.18	1.39
7	c	55	TYR	CD2-CE2	-13.28	1.19	1.39
1	A	309	THR	CB-CG2	-13.10	1.09	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	758	GLY	C-O	-12.33	1.03	1.23

The worst 5 of 262 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	65	ARG	NE-CZ-NH1	14.58	127.59	120.30
1	A	96	LEU	C-N-CD	-14.30	89.13	120.60
1	A	501	ARG	NE-CZ-NH2	12.88	126.74	120.30
1	a	18	LEU	CA-CB-CG	12.50	144.06	115.30
1	a	18	LEU	CB-CG-CD1	-12.46	89.83	111.00

There are no chirality outliers.

5 of 8 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	639	ASN	Mainchain
2	C	141	THR	Mainchain
2	C	179	ASN	Mainchain
1	a	92	SER	Peptide
1	a	93	THR	Peptide

5.2 Too-close contacts [i](#)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	A	852/865 (98%)	793 (93%)	41 (5%)	18 (2%)	7 3
1	a	856/865 (99%)	798 (93%)	46 (5%)	12 (1%)	11 8

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	C	189/221 (86%)	174 (92%)	9 (5%)	6 (3%)	4	1
3	E	33/35 (94%)	31 (94%)	2 (6%)	0	100	100
3	e	33/35 (94%)	32 (97%)	0	1 (3%)	4	2
4	F	33/35 (94%)	31 (94%)	2 (6%)	0	100	100
4	f	33/35 (94%)	30 (91%)	2 (6%)	1 (3%)	4	2
5	G	36/45 (80%)	32 (89%)	3 (8%)	1 (3%)	5	2
5	g	36/45 (80%)	32 (89%)	4 (11%)	0	100	100
7	c	143/145 (99%)	127 (89%)	8 (6%)	8 (6%)	2	0
All	All	2244/2326 (96%)	2080 (93%)	117 (5%)	47 (2%)	10	3

5 of 47 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	86	PRO
1	A	97	PRO
1	A	147	TRP
1	A	170	TRP
1	A	346	LYS

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	718/726 (99%)	589 (82%)	129 (18%)	1	1
1	a	720/726 (99%)	585 (81%)	135 (19%)	1	1
2	C	155/180 (86%)	127 (82%)	28 (18%)	1	1
3	E	25/25 (100%)	23 (92%)	2 (8%)	12	11
3	e	25/25 (100%)	18 (72%)	7 (28%)	0	0
4	F	31/31 (100%)	25 (81%)	6 (19%)	1	1
4	f	31/31 (100%)	26 (84%)	5 (16%)	2	1
5	G	31/36 (86%)	25 (81%)	6 (19%)	1	1

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
5	g	31/36 (86%)	22 (71%)	9 (29%)	0	0
7	c	112/112 (100%)	91 (81%)	21 (19%)	1	1
All	All	1879/1928 (98%)	1531 (82%)	348 (18%)	4	1

5 of 348 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	a	303	VAL
1	a	736	ILE
1	a	386	ILE
1	a	552	LEU
1	a	836	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 62 such sidechains are listed below:

Mol	Chain	Res	Type
2	C	85	GLN
7	c	82	GLN
1	a	16	GLN
7	c	52	GLN
7	c	144	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 79 ligands modelled in this entry, 2 are monoatomic and 32 are unknown - leaving 45 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$
11	LYC	c	201	-	39,39,39	1.65	9 (23%)	44,46,46	5.75	28 (63%)
9	BCL	a	905	-	58,74,74	2.38	14 (24%)	69,115,115	3.54	27 (39%)
9	BCL	a	911	-	58,74,74	2.51	16 (27%)	69,115,115	3.04	30 (43%)
10	CLA	a	915	-	51,59,73	2.93	17 (33%)	59,96,113	3.55	34 (57%)
10	CLA	A	911	-	65,73,73	2.62	21 (32%)	76,113,113	3.33	29 (38%)
9	BCL	a	910	-	58,74,74	3.12	15 (25%)	69,115,115	4.29	33 (47%)
10	CLA	a	912	19	65,73,73	2.79	17 (26%)	76,113,113	3.24	38 (50%)
9	BCL	A	909	-	58,74,74	2.96	22 (37%)	69,115,115	4.47	34 (49%)
10	CLA	A	910	-	65,73,73	2.53	19 (29%)	76,113,113	3.59	36 (47%)
13	85I	a	918	-	43,44,44	1.06	2 (4%)	47,51,51	1.69	4 (8%)
15	85N	g	101	-	36,37,46	0.79	1 (2%)	40,45,55	0.58	0
9	BCL	a	908	1	58,74,74	2.44	20 (34%)	69,115,115	4.44	31 (44%)
10	CLA	A	931	-	65,73,73	3.13	25 (38%)	76,113,113	4.31	38 (50%)
8	2GO	A	901	1	65,74,74	3.56	18 (27%)	76,115,115	3.49	29 (38%)
9	BCL	a	909	-	58,74,74	2.20	19 (32%)	69,115,115	3.75	21 (30%)
10	CLA	A	912	-	46,54,73	2.75	15 (32%)	53,90,113	4.13	29 (54%)
9	BCL	a	907	-	58,74,74	1.94	18 (31%)	69,115,115	3.75	24 (34%)
9	BCL	A	908	-	58,74,74	2.33	23 (39%)	69,115,115	2.64	24 (34%)
9	BCL	a	904	-	58,74,74	2.22	14 (24%)	69,115,115	3.26	21 (30%)
10	CLA	A	933	-	51,59,73	2.87	18 (35%)	59,96,113	3.90	32 (54%)
10	CLA	a	913	-	65,73,73	2.61	20 (30%)	76,113,113	4.02	34 (44%)
9	BCL	A	907	-	53,69,74	3.09	23 (43%)	63,109,115	4.62	34 (53%)
10	CLA	a	914	-	46,54,73	2.87	19 (41%)	53,90,113	3.60	27 (50%)
13	85I	A	915	-	43,44,44	2.29	10 (23%)	47,51,51	2.44	7 (14%)
16	HEC	C	301	2	32,50,50	2.95	17 (53%)	24,82,82	3.50	12 (50%)
9	BCL	A	902	-	58,74,74	2.34	18 (31%)	69,115,115	3.27	29 (42%)
13	85I	A	916	-	43,44,44	2.22	3 (6%)	47,51,51	1.93	6 (12%)
8	2GO	a	903	1	65,74,74	3.45	20 (30%)	76,115,115	3.40	28 (36%)
15	85N	a	902	-	45,46,46	0.59	0	50,55,55	0.42	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
9	BCL	A	906	1	44,60,74	2.27	9 (20%)	52,98,115	4.24	19 (36%)
10	CLA	a	901	19	65,73,73	2.67	21 (32%)	76,113,113	3.57	32 (42%)
13	85I	a	920	-	43,44,44	2.21	2 (4%)	47,51,51	2.04	3 (6%)
11	LYC	A	913	-	39,39,39	2.05	11 (28%)	44,46,46	2.49	18 (40%)
9	BCL	A	904	-	38,54,74	2.32	16 (42%)	45,91,115	2.92	22 (48%)
16	HEC	c	202	7	32,50,50	2.84	14 (43%)	24,82,82	3.87	11 (45%)
9	BCL	A	903	-	58,74,74	2.60	18 (31%)	69,115,115	3.70	25 (36%)
18	SF4	a	917	1	0,12,12	-	-	-	-	-
9	BCL	a	906	-	38,54,74	2.51	15 (39%)	45,91,115	2.77	21 (46%)
17	84Q	E	101	-	42,43,43	2.09	10 (23%)	47,50,50	1.90	8 (17%)
13	85I	a	919	-	43,44,44	1.41	2 (4%)	47,51,51	1.66	3 (6%)
13	85I	A	917	-	43,44,44	1.57	2 (4%)	47,51,51	2.42	3 (6%)
15	85N	A	932	-	45,46,46	1.04	1 (2%)	50,55,55	1.82	4 (8%)
15	85N	G	101	-	36,37,46	0.72	0	40,45,55	0.77	2 (5%)
17	84Q	a	921	-	42,43,43	1.35	2 (4%)	47,50,50	1.04	2 (4%)
9	BCL	A	905	-	58,74,74	2.41	17 (29%)	69,115,115	3.43	26 (37%)

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
11	LYC	c	201	-	-	16/43/43/43	-
9	BCL	a	905	-	-	17/37/137/137	-
9	BCL	a	911	-	-	5/37/137/137	-
10	CLA	a	915	-	-	7/21/99/115	-
10	CLA	A	911	-	1/1/15/20	11/37/115/115	-
9	BCL	a	910	-	-	11/37/137/137	-
10	CLA	a	912	19	-	12/37/115/115	-
9	BCL	A	909	-	-	12/37/137/137	-
10	CLA	A	910	-	1/1/15/20	9/37/115/115	-
13	85I	a	918	-	-	21/47/48/48	-
15	85N	g	101	-	-	19/42/42/51	-
9	BCL	a	908	1	-	20/37/137/137	-
10	CLA	A	931	-	-	18/37/115/115	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
8	2GO	A	901	1	-	4/37/97/97	-
9	BCL	a	909	-	-	13/37/137/137	-
10	CLA	A	912	-	-	2/15/93/115	-
9	BCL	a	907	-	-	12/37/137/137	-
9	BCL	A	908	-	-	14/37/137/137	-
9	BCL	a	904	-	-	12/37/137/137	-
10	CLA	A	933	-	-	4/21/99/115	-
10	CLA	a	913	-	-	11/37/115/115	-
9	BCL	A	907	-	-	16/31/131/137	-
10	CLA	a	914	-	-	4/15/93/115	-
13	85I	A	915	-	-	19/47/48/48	-
16	HEC	C	301	2	-	3/10/54/54	-
9	BCL	A	902	-	-	16/37/137/137	-
13	85I	A	916	-	-	27/47/48/48	-
8	2GO	a	903	1	-	9/37/97/97	-
15	85N	a	902	-	-	25/51/51/51	-
9	BCL	A	906	1	-	6/21/121/137	-
10	CLA	a	901	19	-	24/37/115/115	-
13	85I	a	920	-	-	30/47/48/48	-
11	LYC	A	913	-	-	1/43/43/43	-
9	BCL	A	904	-	-	6/13/113/137	-
16	HEC	c	202	7	-	3/10/54/54	-
9	BCL	A	903	-	-	21/37/137/137	-
18	SF4	a	917	1	-	-	0/6/5/5
9	BCL	a	906	-	-	6/13/113/137	-
17	84Q	E	101	-	-	27/46/47/47	-
13	85I	a	919	-	-	36/47/48/48	-
13	85I	A	917	-	-	29/47/48/48	-
15	85N	A	932	-	-	18/51/51/51	-
15	85N	G	101	-	-	18/42/42/51	-
17	84Q	a	921	-	-	32/46/47/47	-
9	BCL	A	905	-	-	16/37/137/137	-

The worst 5 of 593 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	a	910	BCL	C4B-NB	-15.63	1.21	1.35
8	A	901	2GO	C4D-ND	-14.69	1.18	1.37
8	A	901	2GO	C2A-C3A	14.62	1.67	1.36
13	a	920	85I	O6-C3	-14.01	1.20	1.44
8	a	903	2GO	C3C-C2C	11.91	1.62	1.36

The worst 5 of 918 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	A	909	BCL	O2D-CGD-CBD	20.86	148.33	111.27
9	a	908	BCL	C4A-NA-C1A	18.67	115.10	106.71
9	A	906	BCL	O2D-CGD-CBD	18.23	143.67	111.27
10	A	931	CLA	O2D-CGD-CBD	18.08	143.39	111.27
9	a	907	BCL	C4A-NA-C1A	16.53	114.14	106.71

All (2) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
10	A	910	CLA	C8
10	A	911	CLA	C8

5 of 642 torsion outliers are listed below:

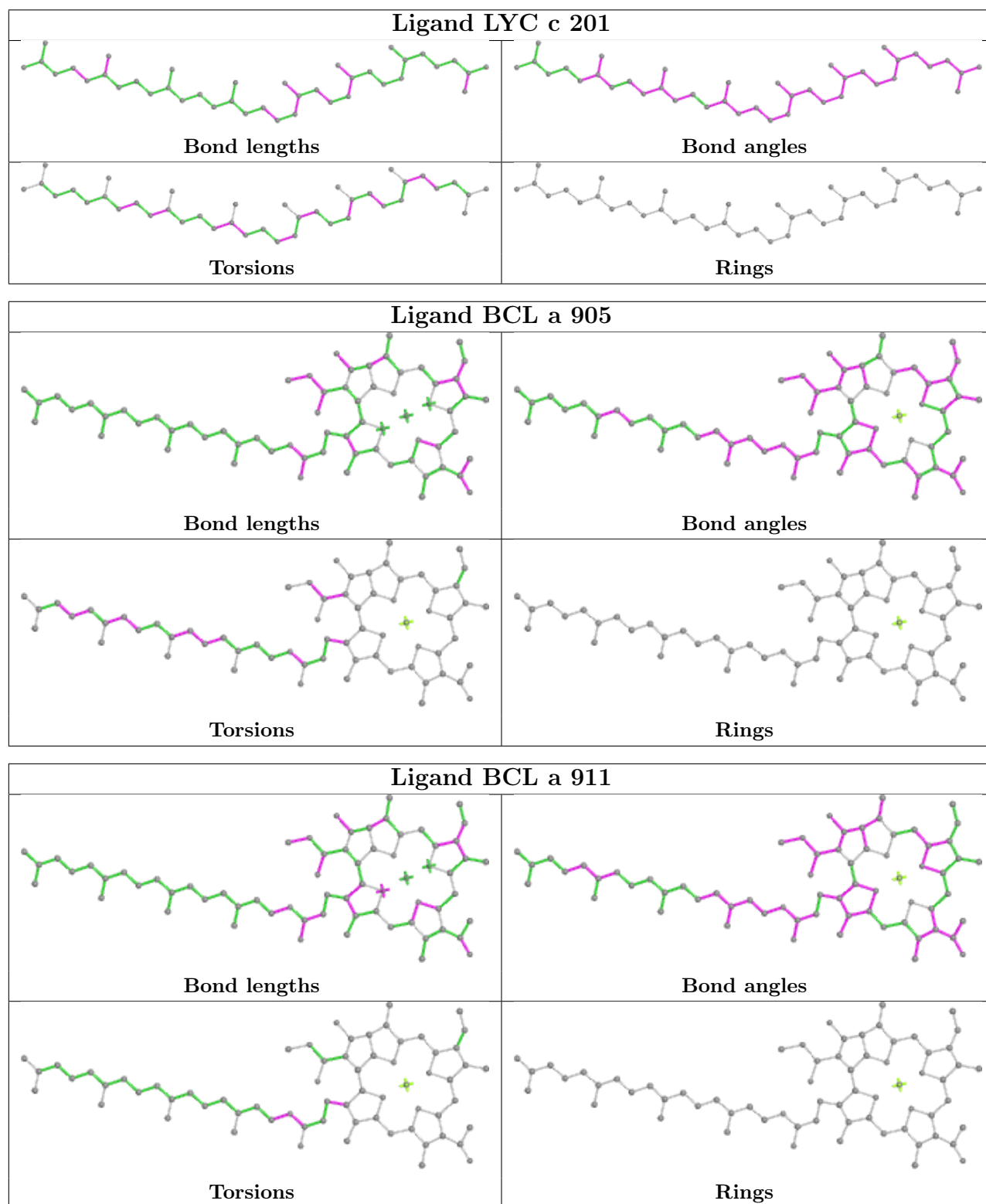
Mol	Chain	Res	Type	Atoms
8	a	903	2GO	C1A-C2A-CAA-CBA
9	A	902	BCL	C1A-C2A-CAA-CBA
9	A	902	BCL	C3A-C2A-CAA-CBA
9	A	902	BCL	CBD-CGD-O2D-CED
9	A	902	BCL	C11-C12-C13-C14

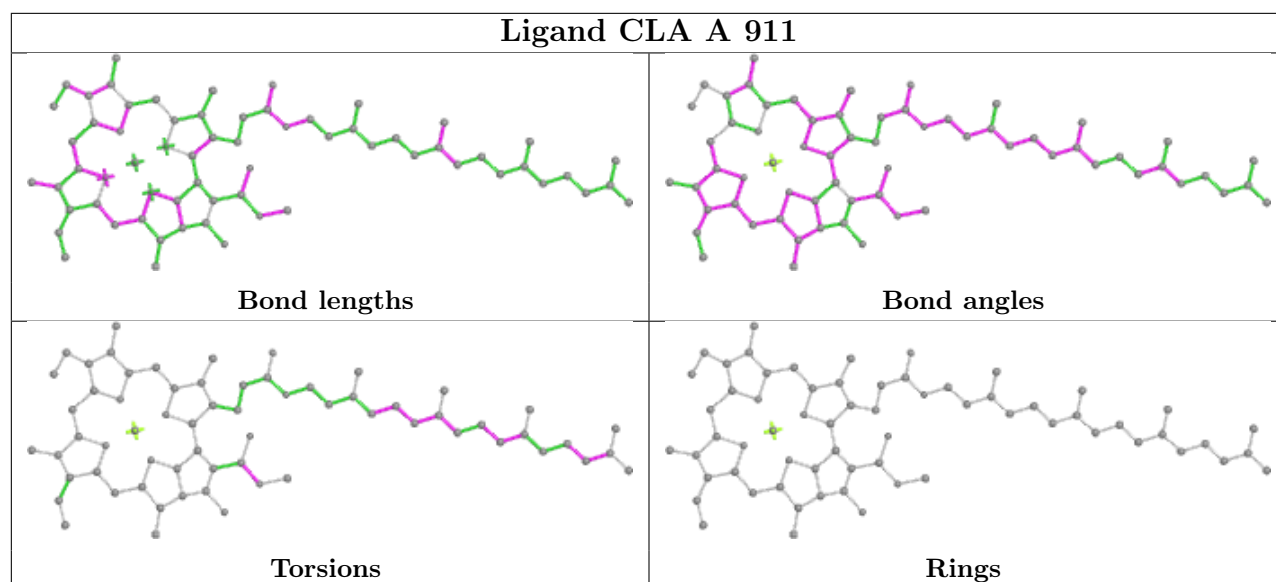
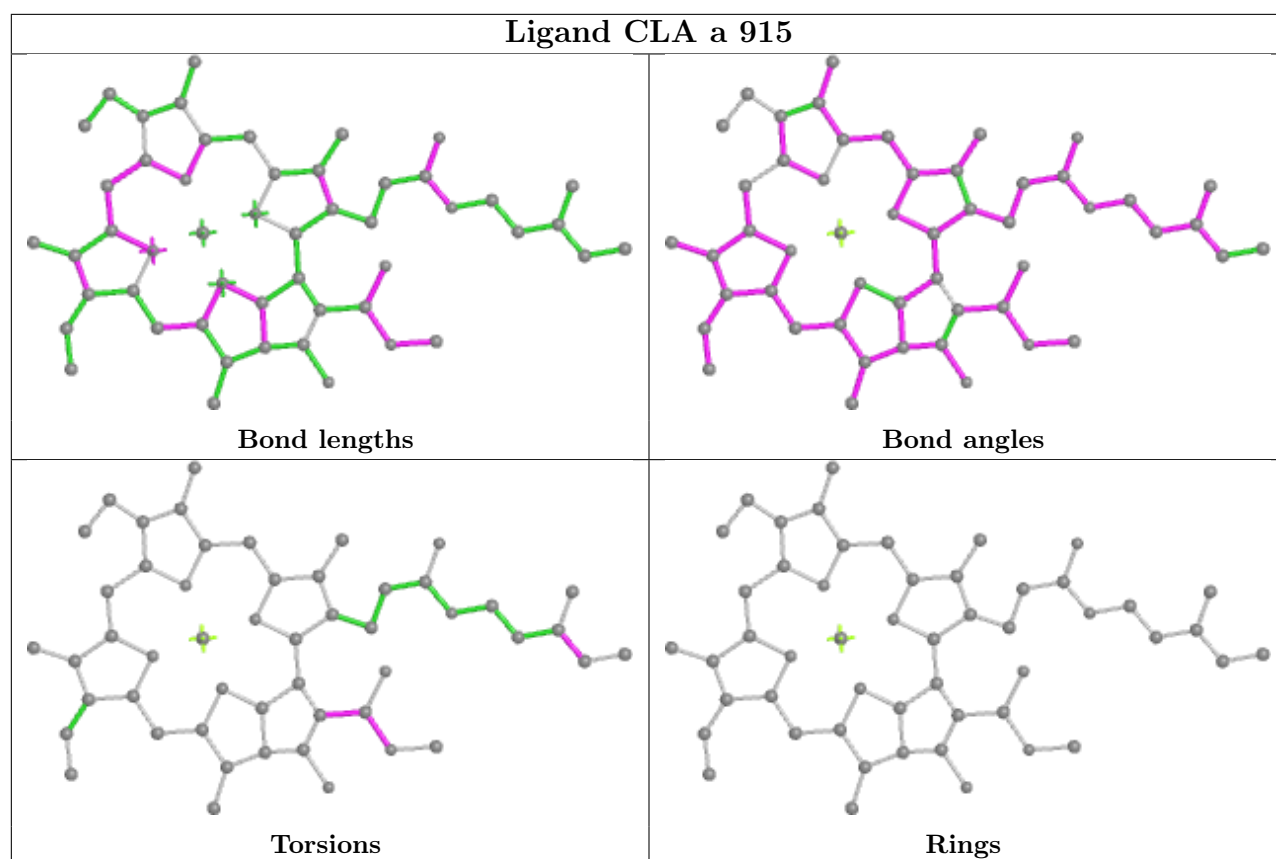
There are no ring outliers.

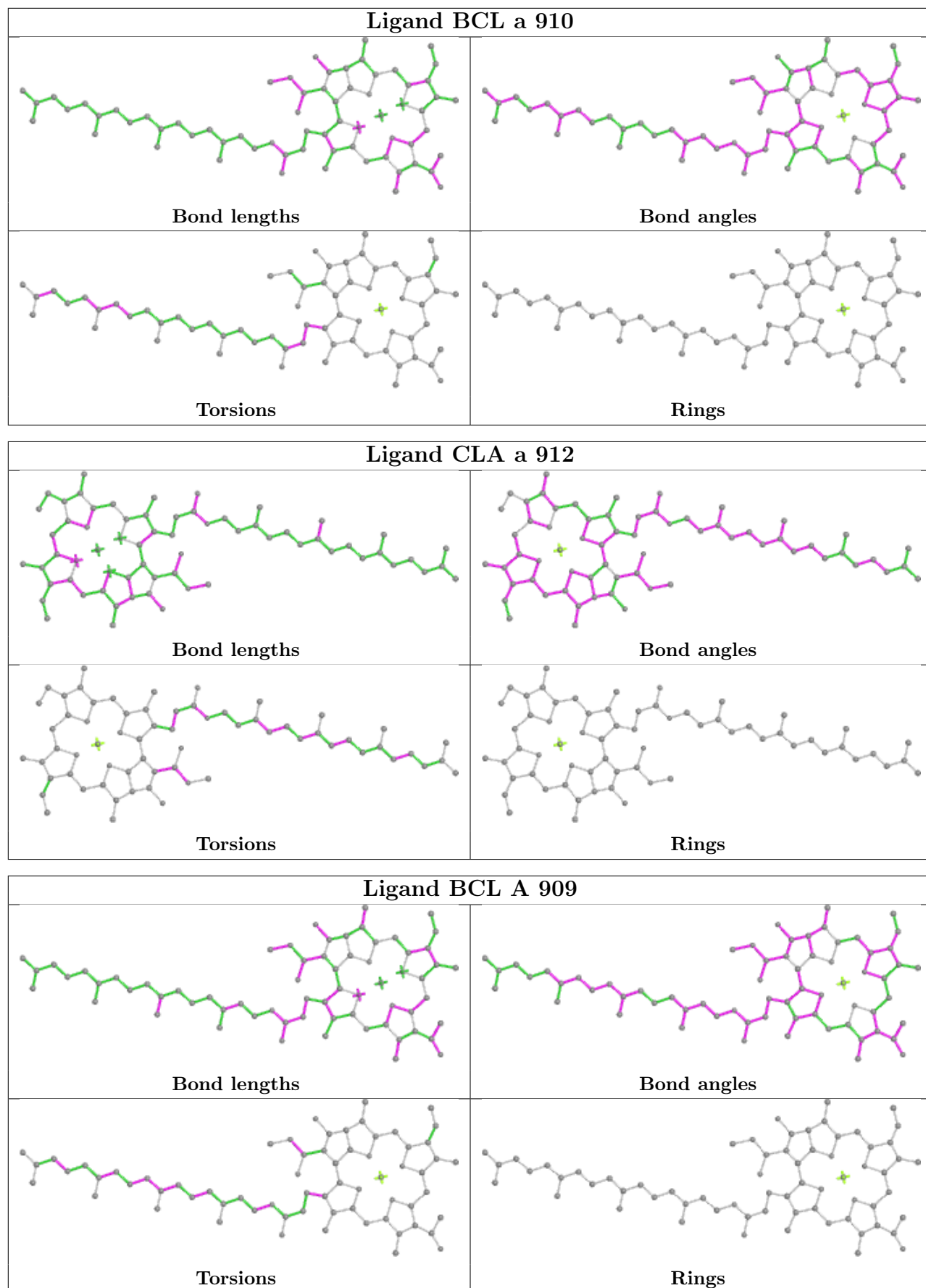
No monomer is involved in short contacts.

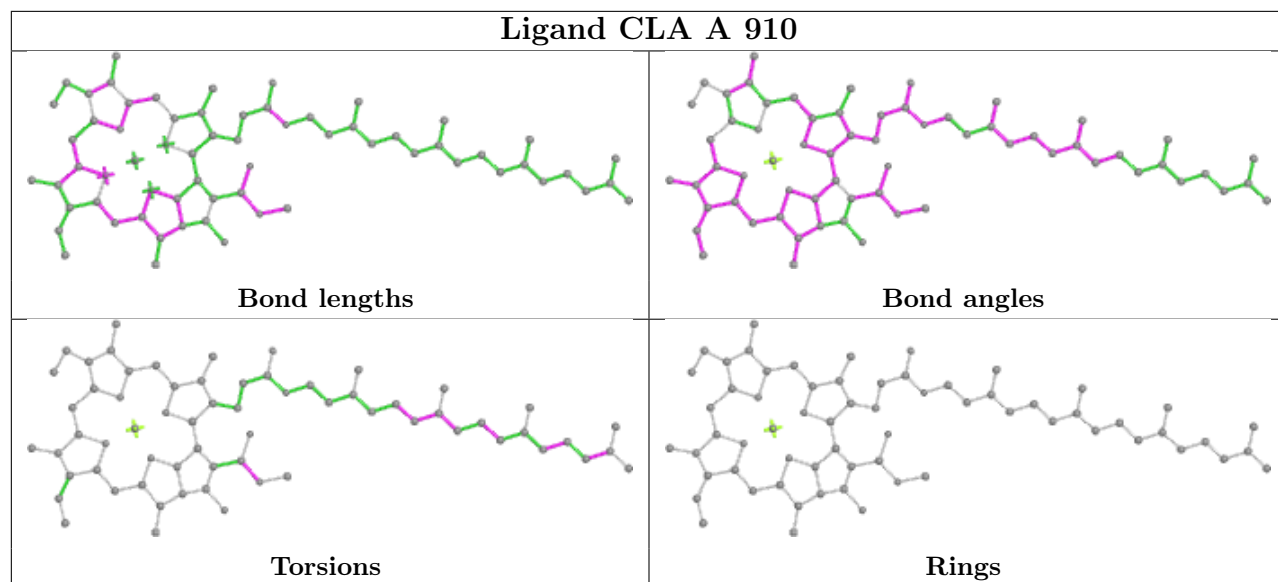
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

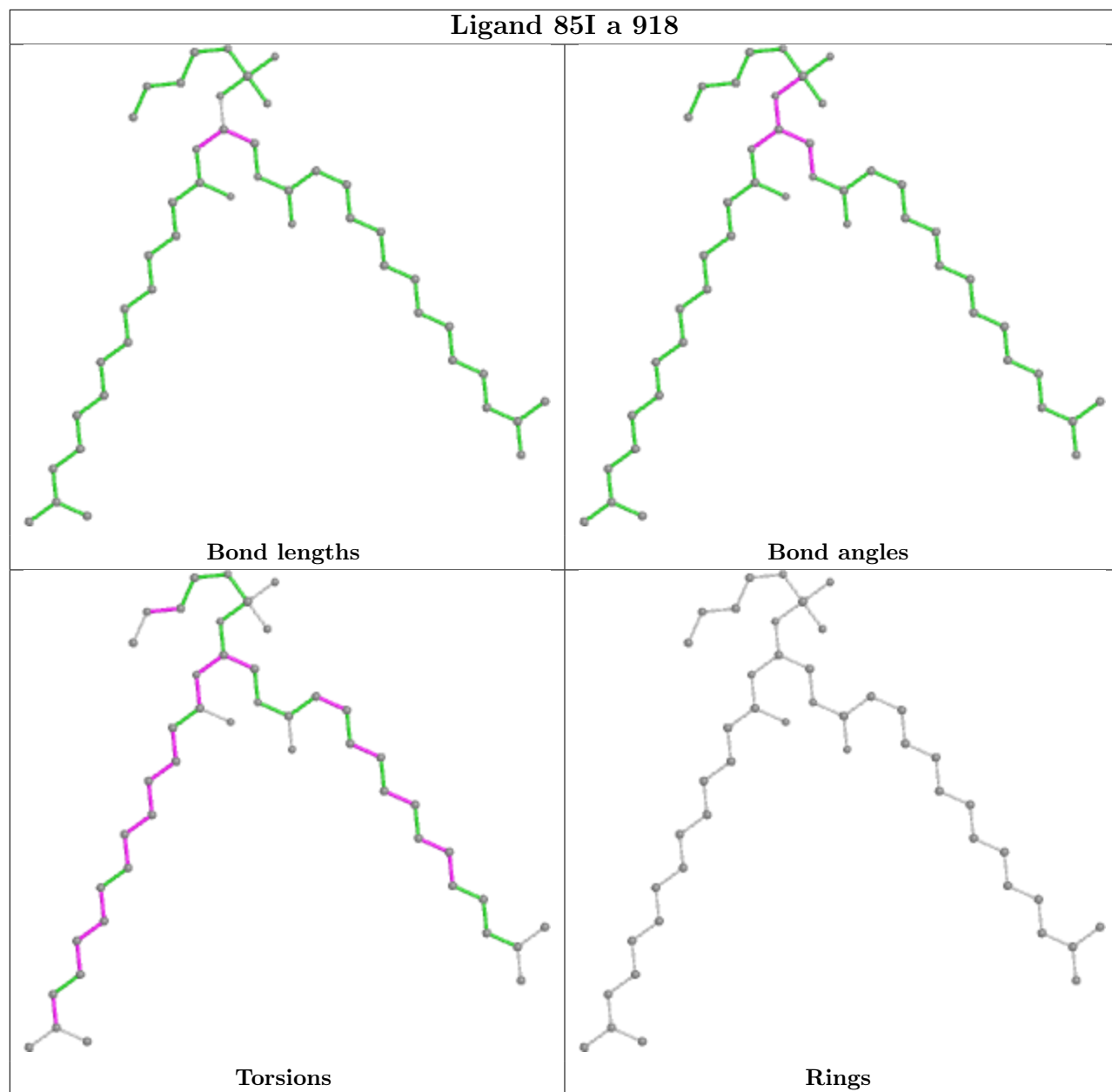
The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

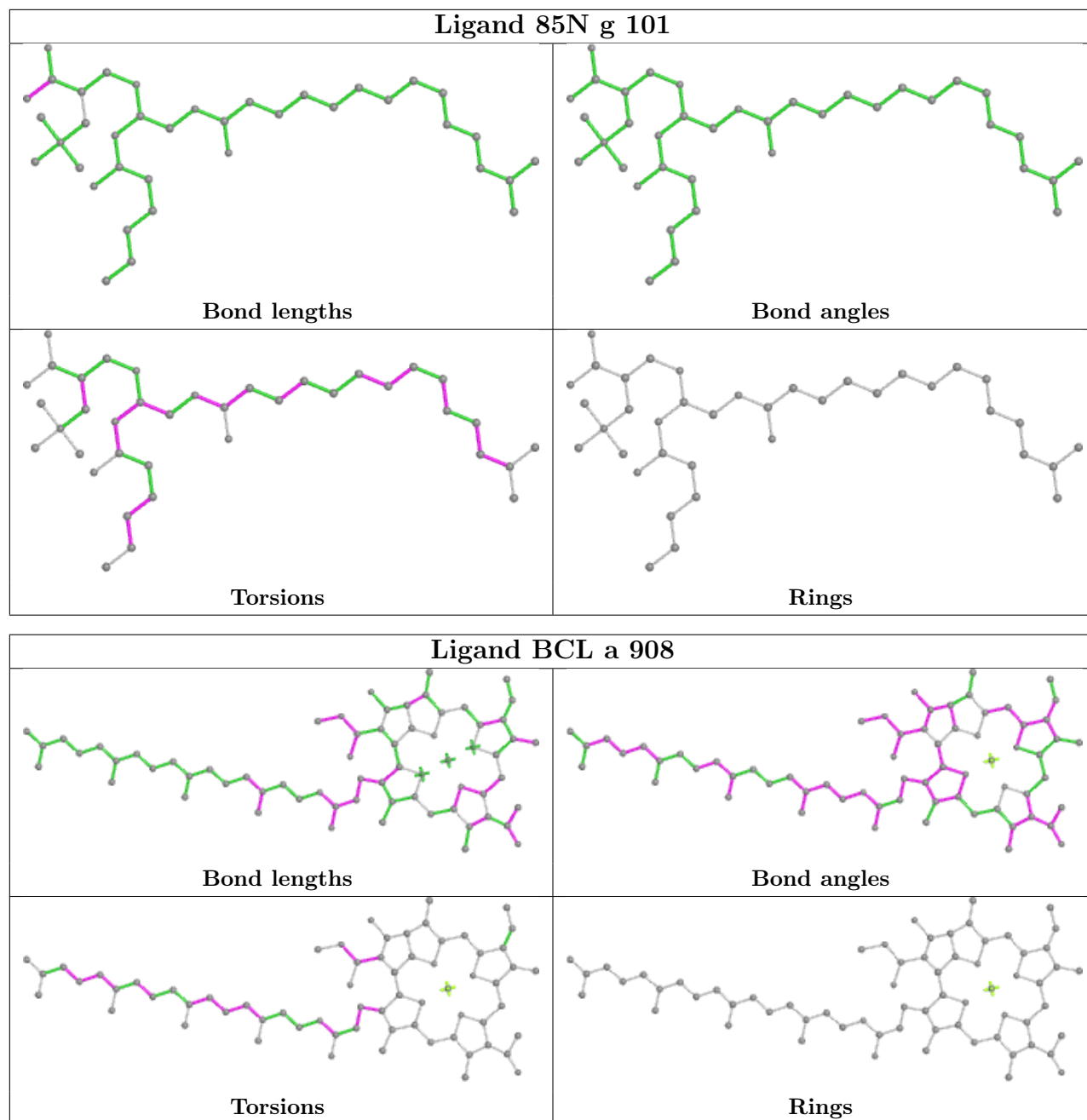


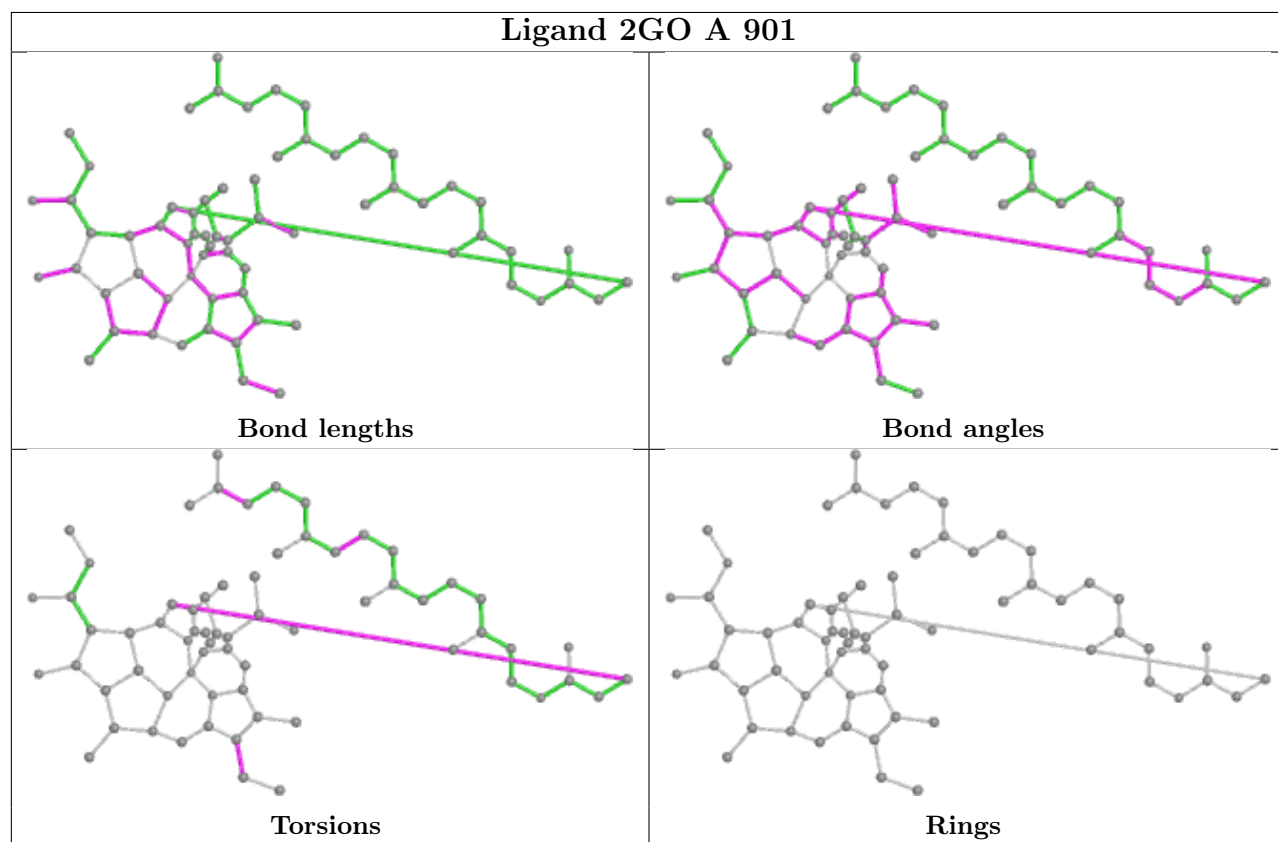
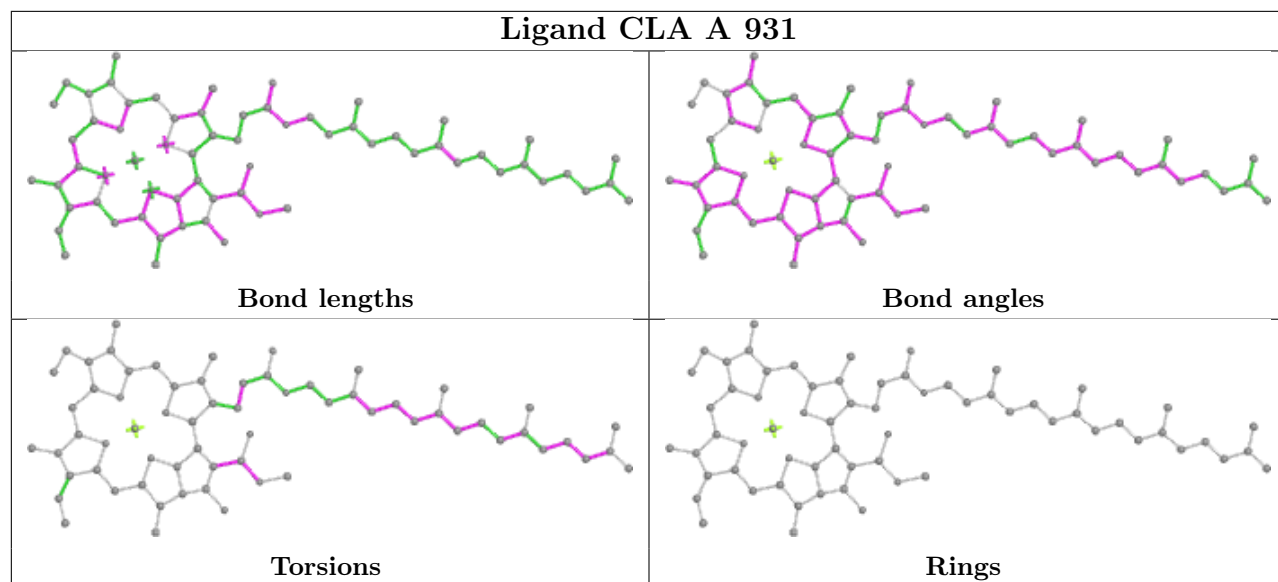


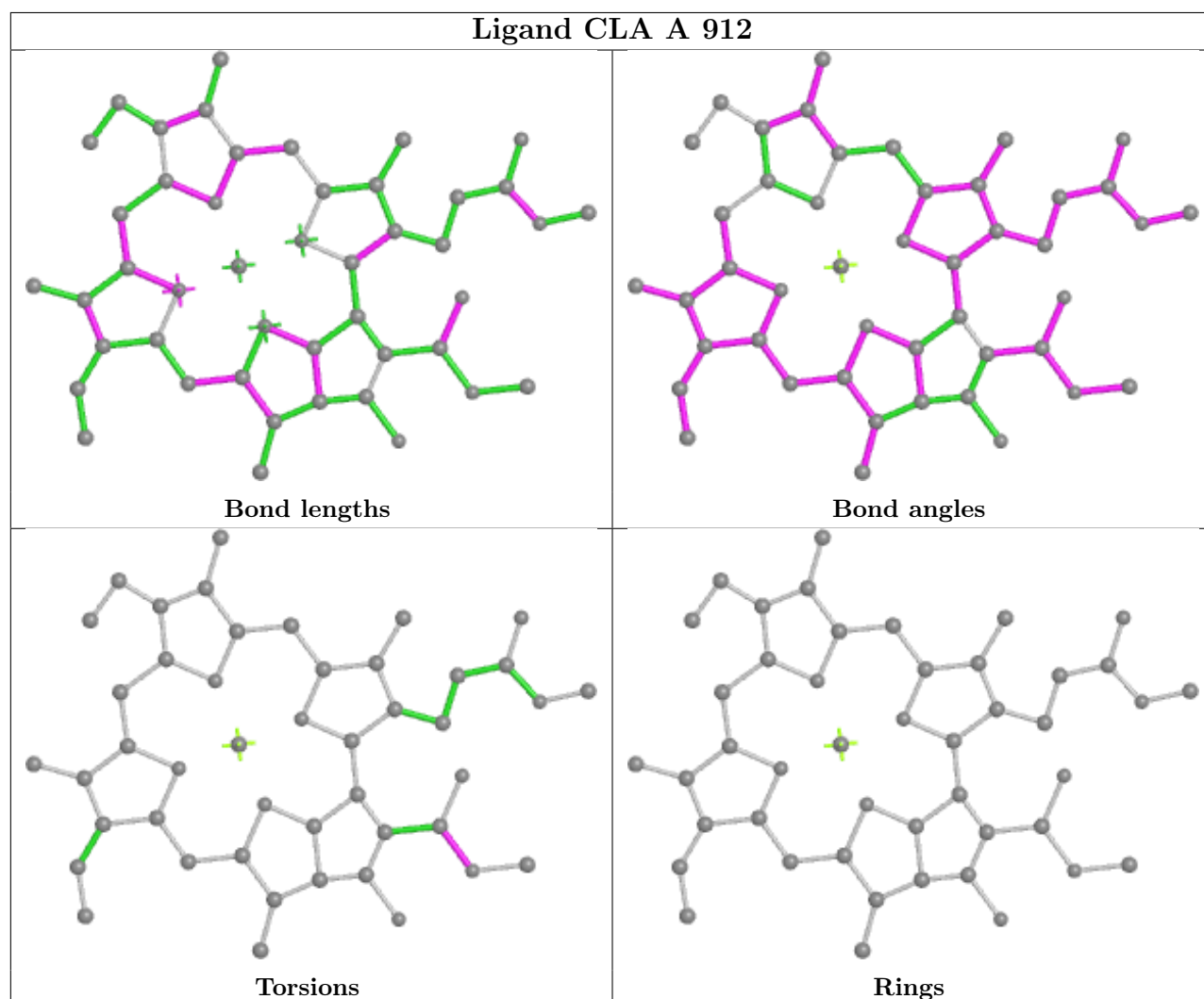
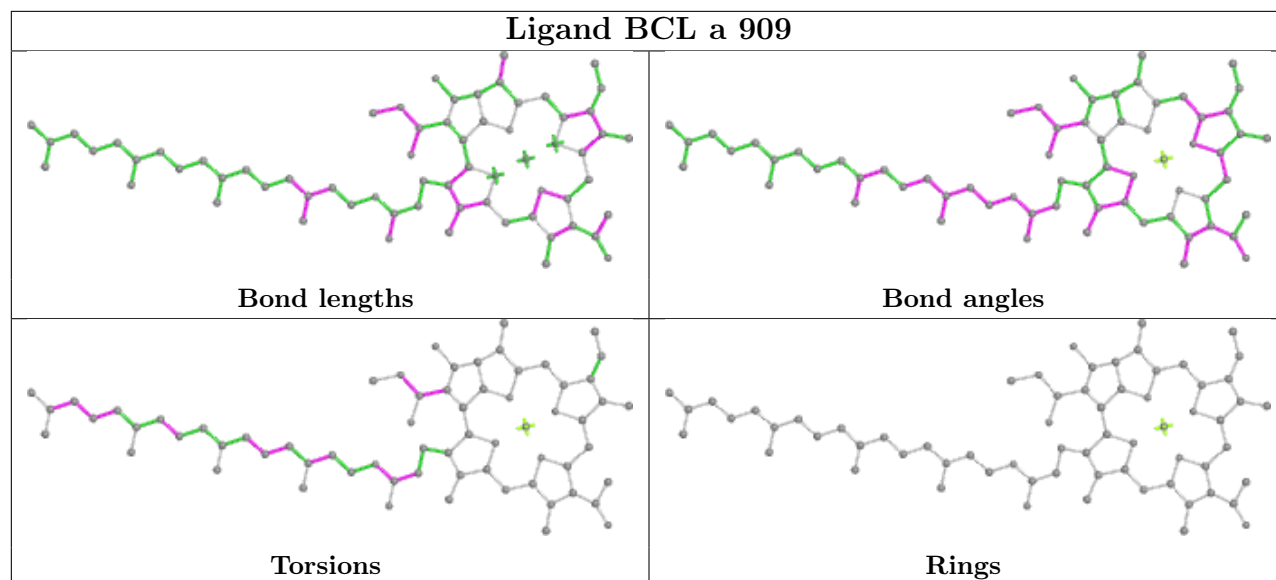


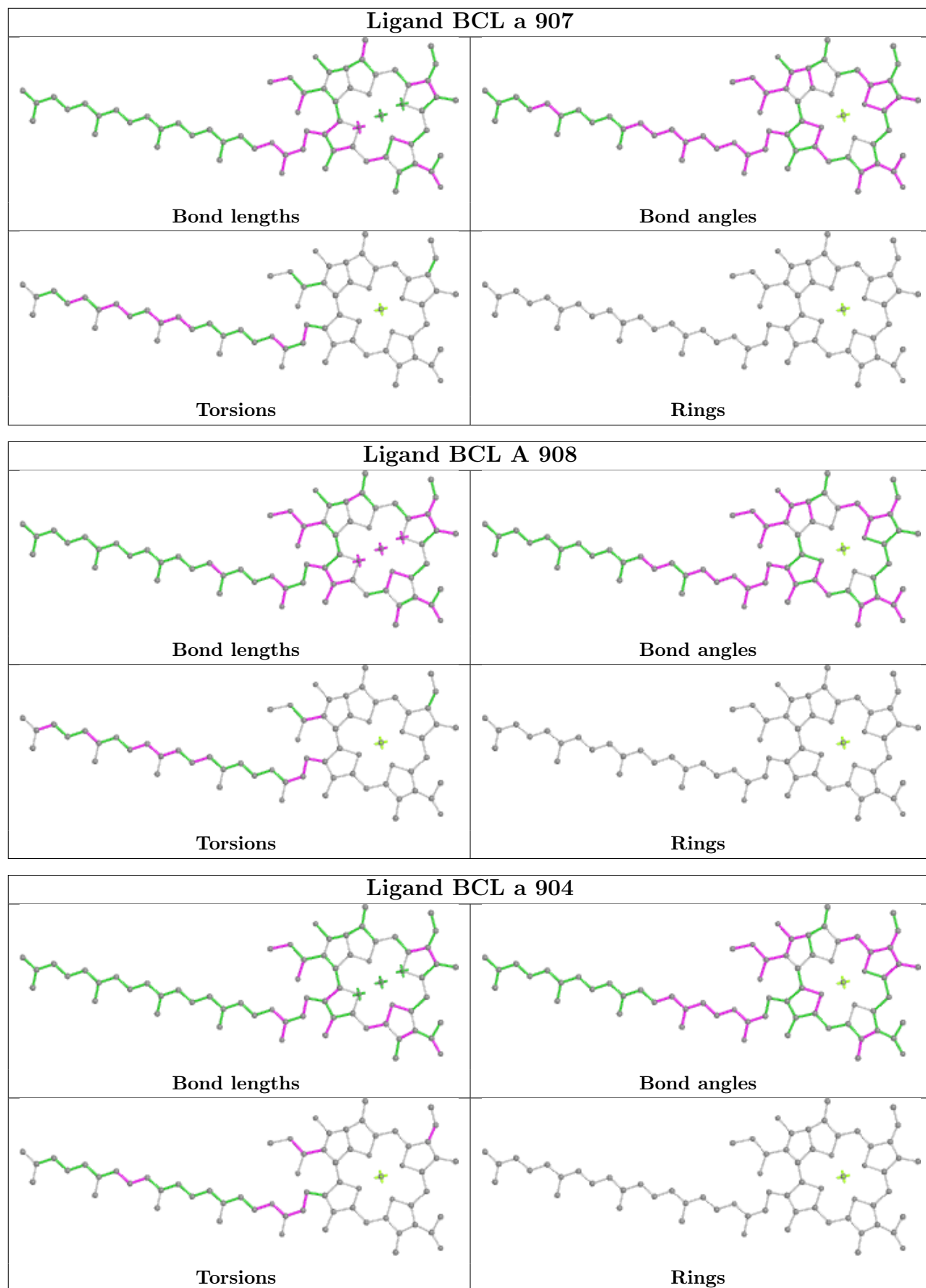


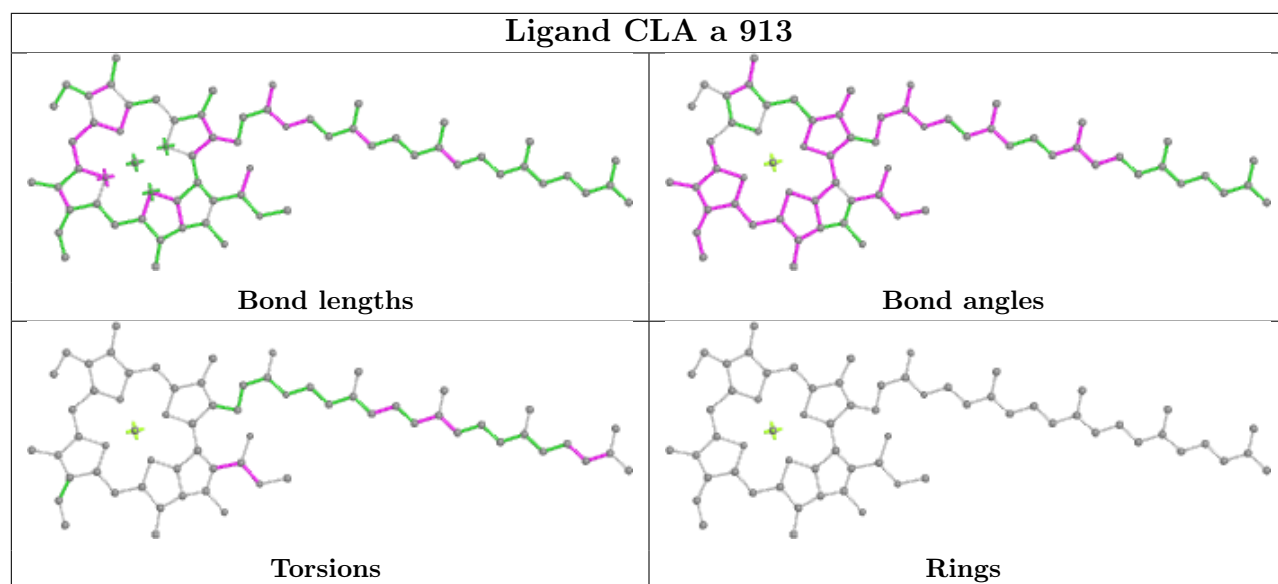
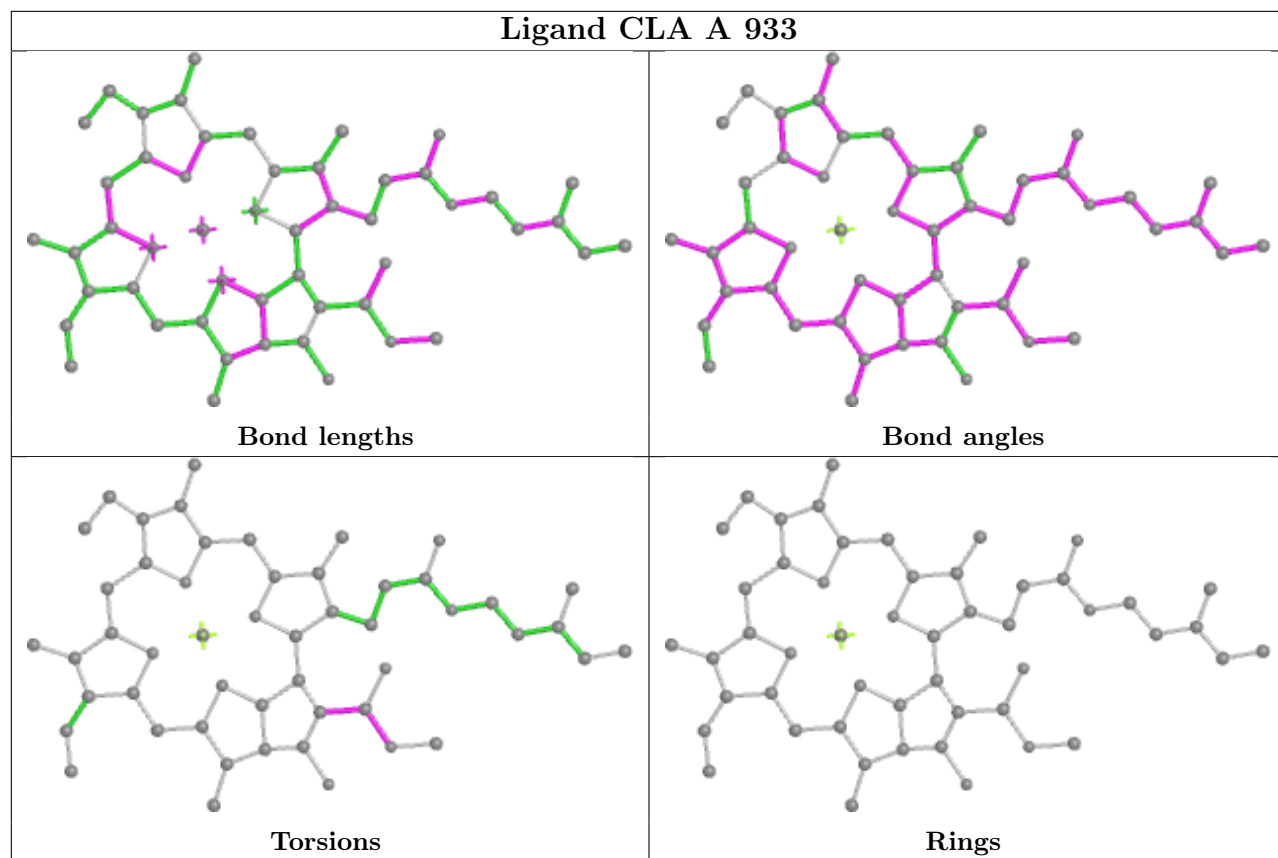


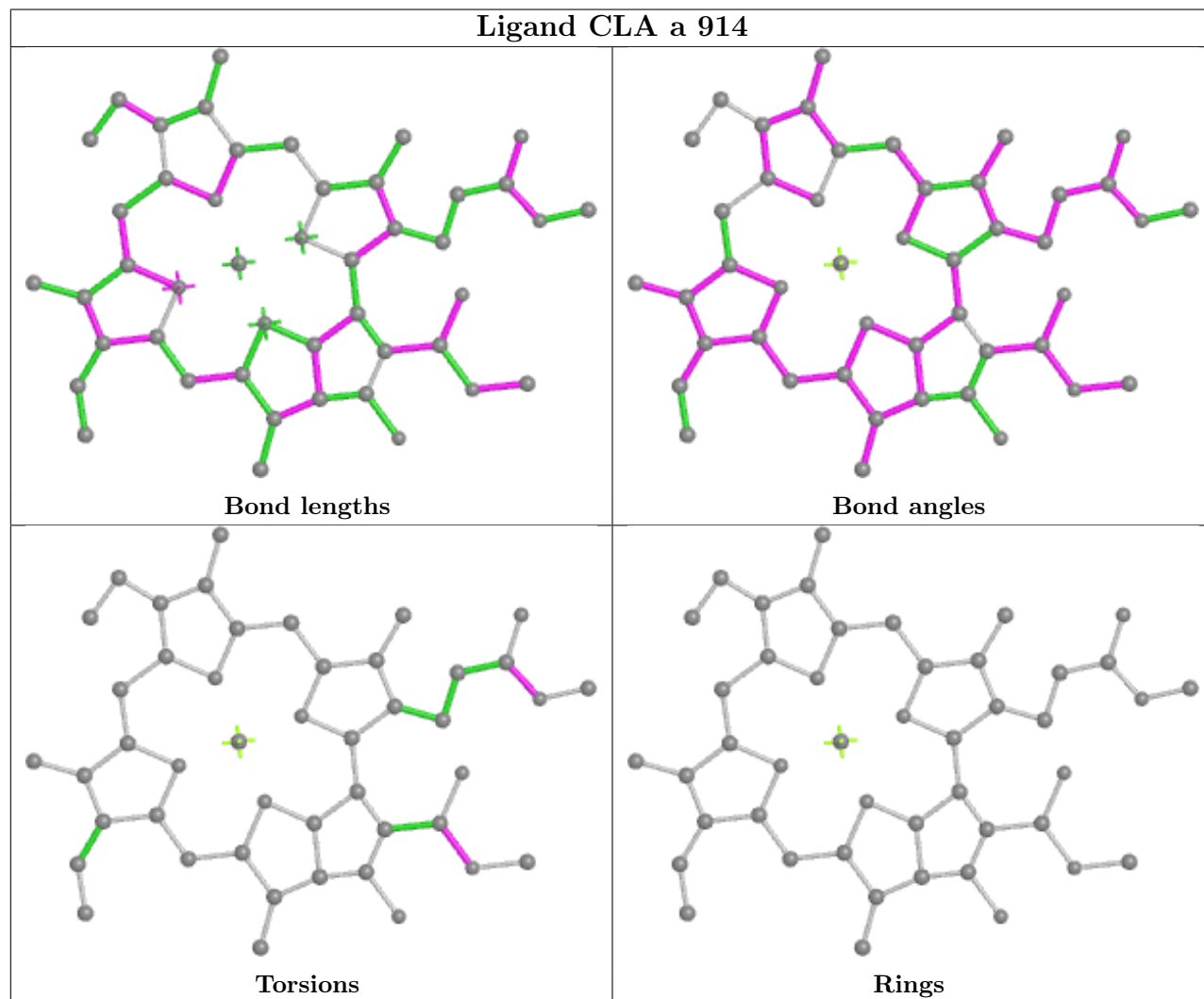
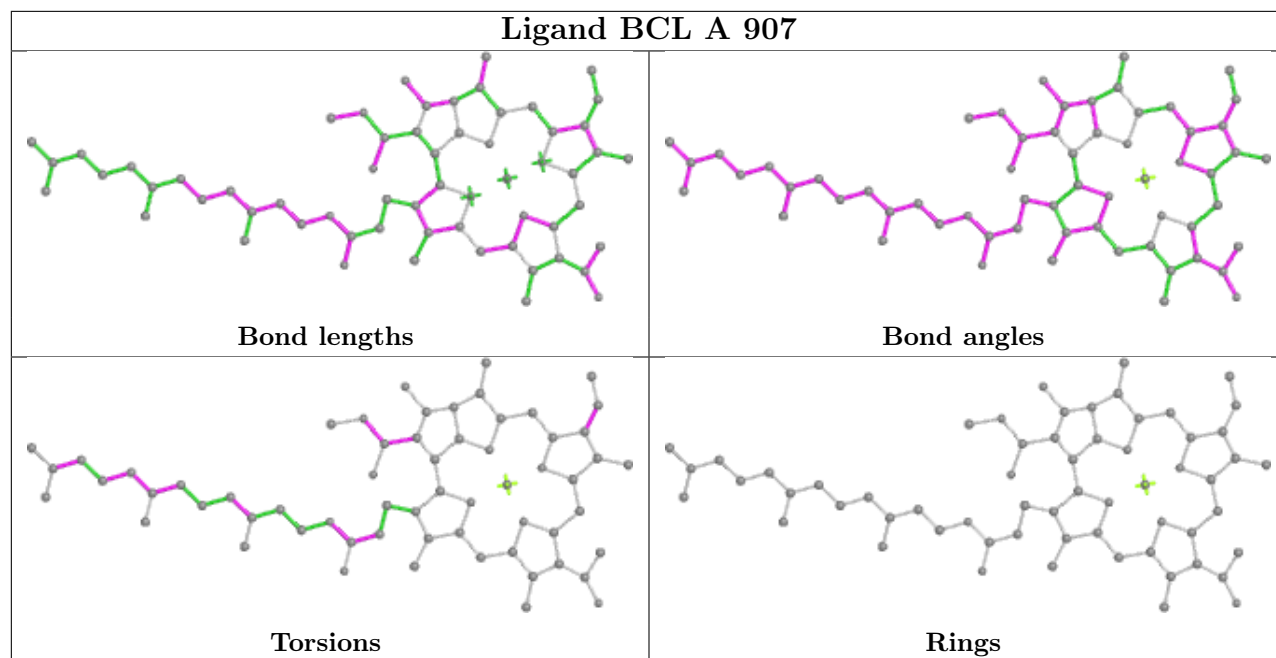


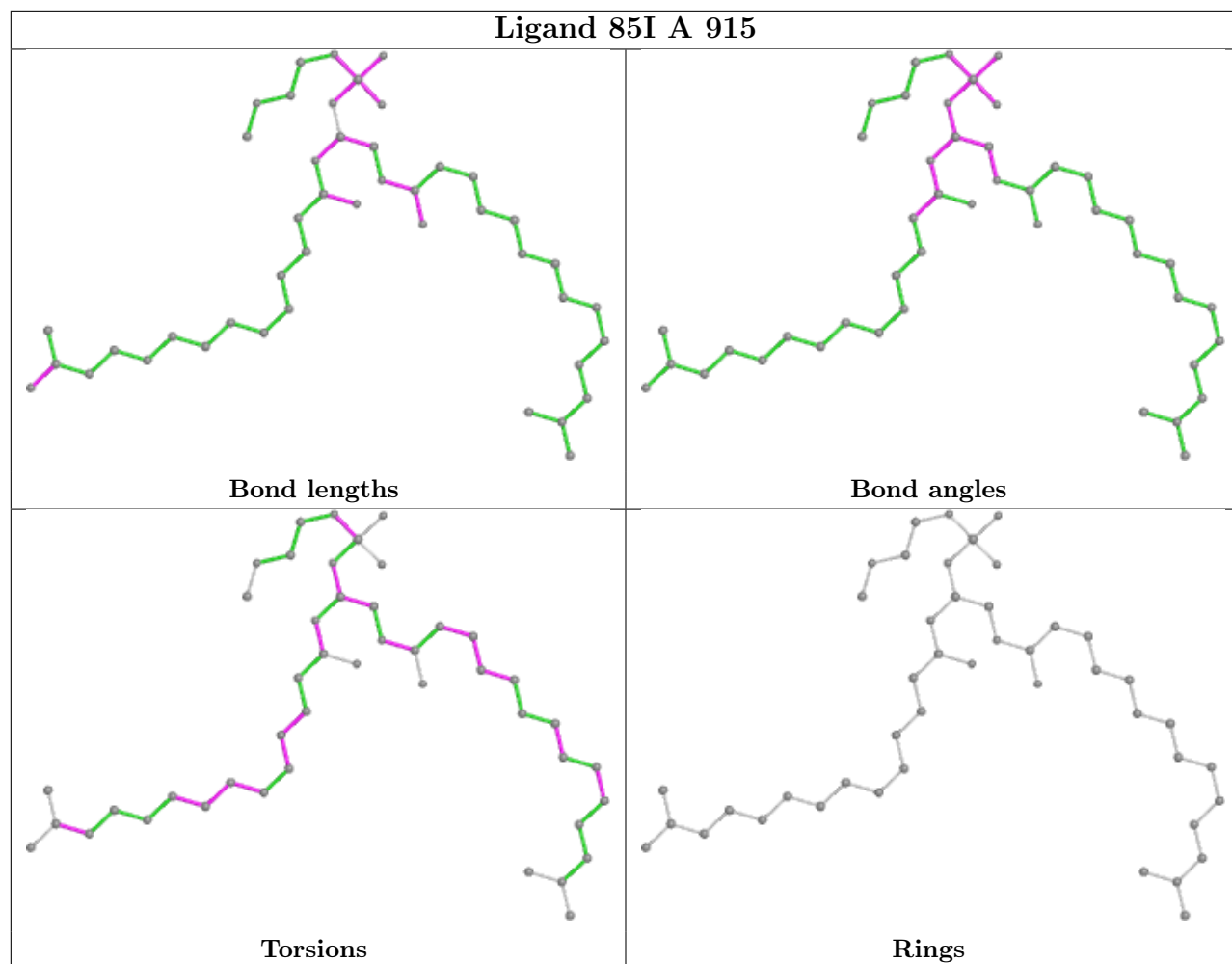


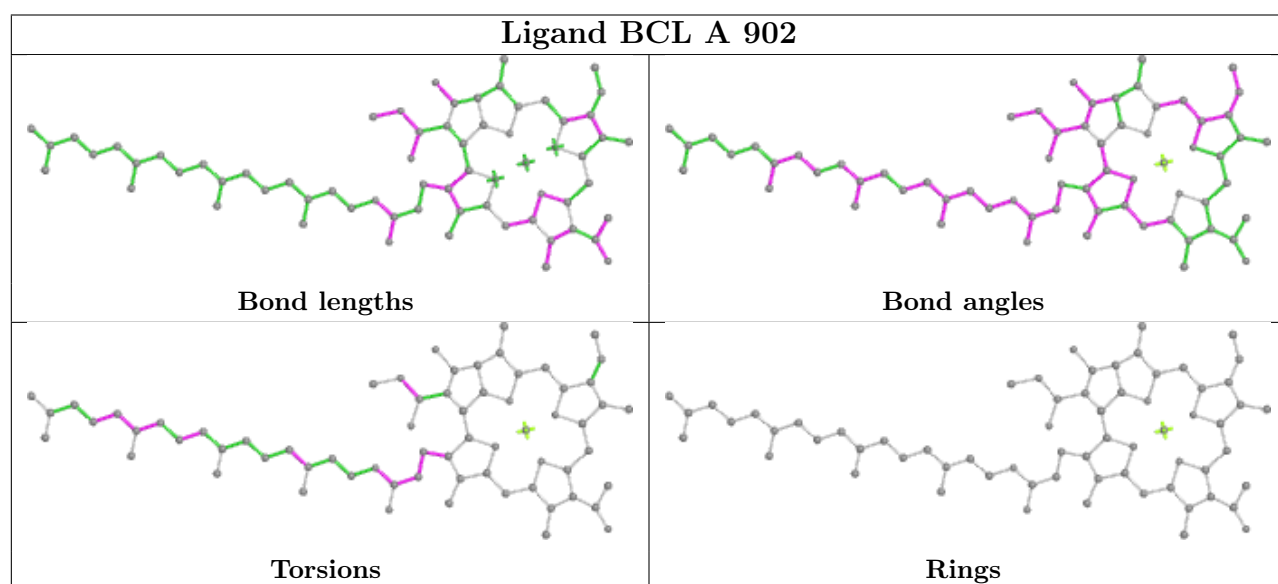
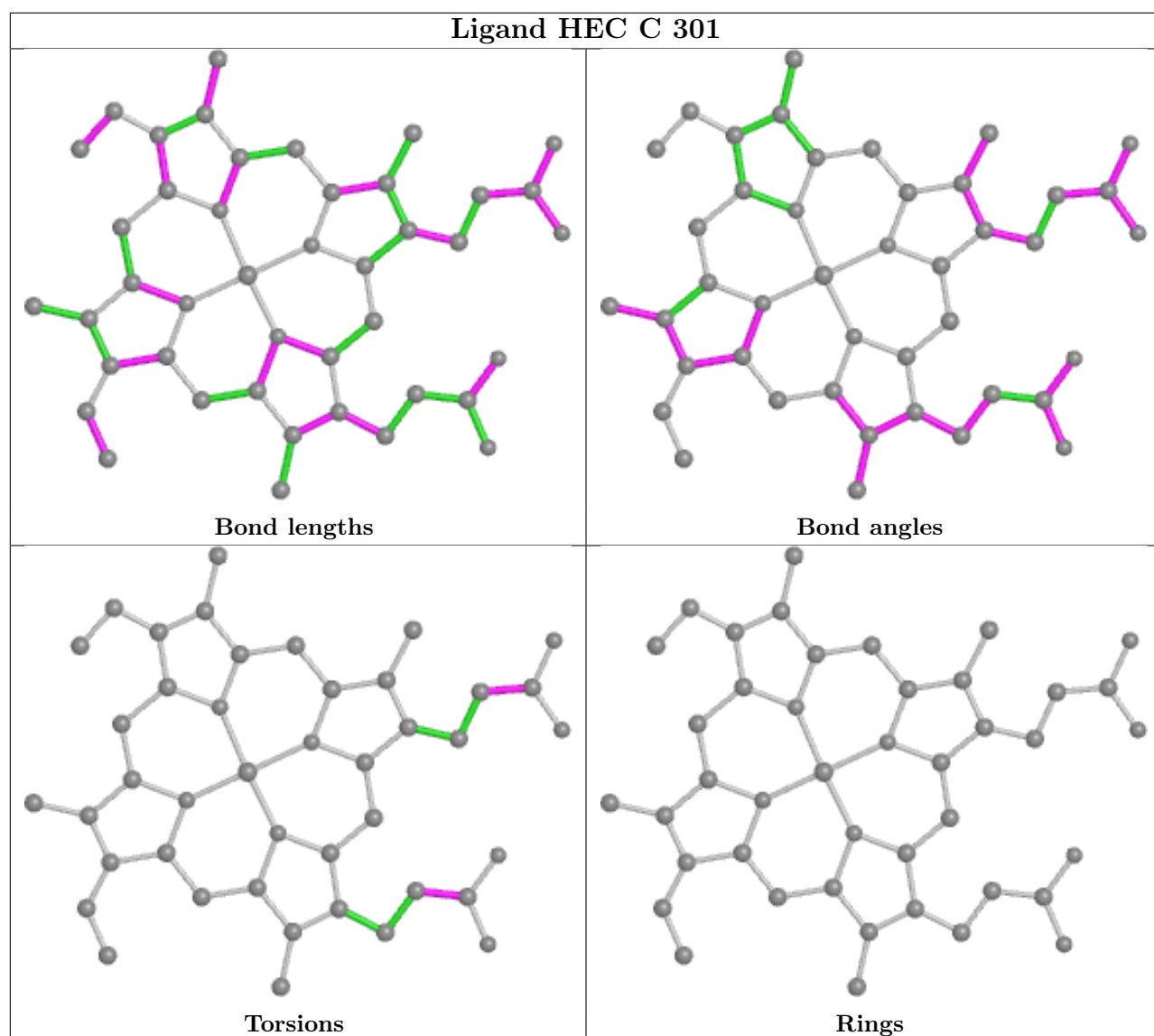


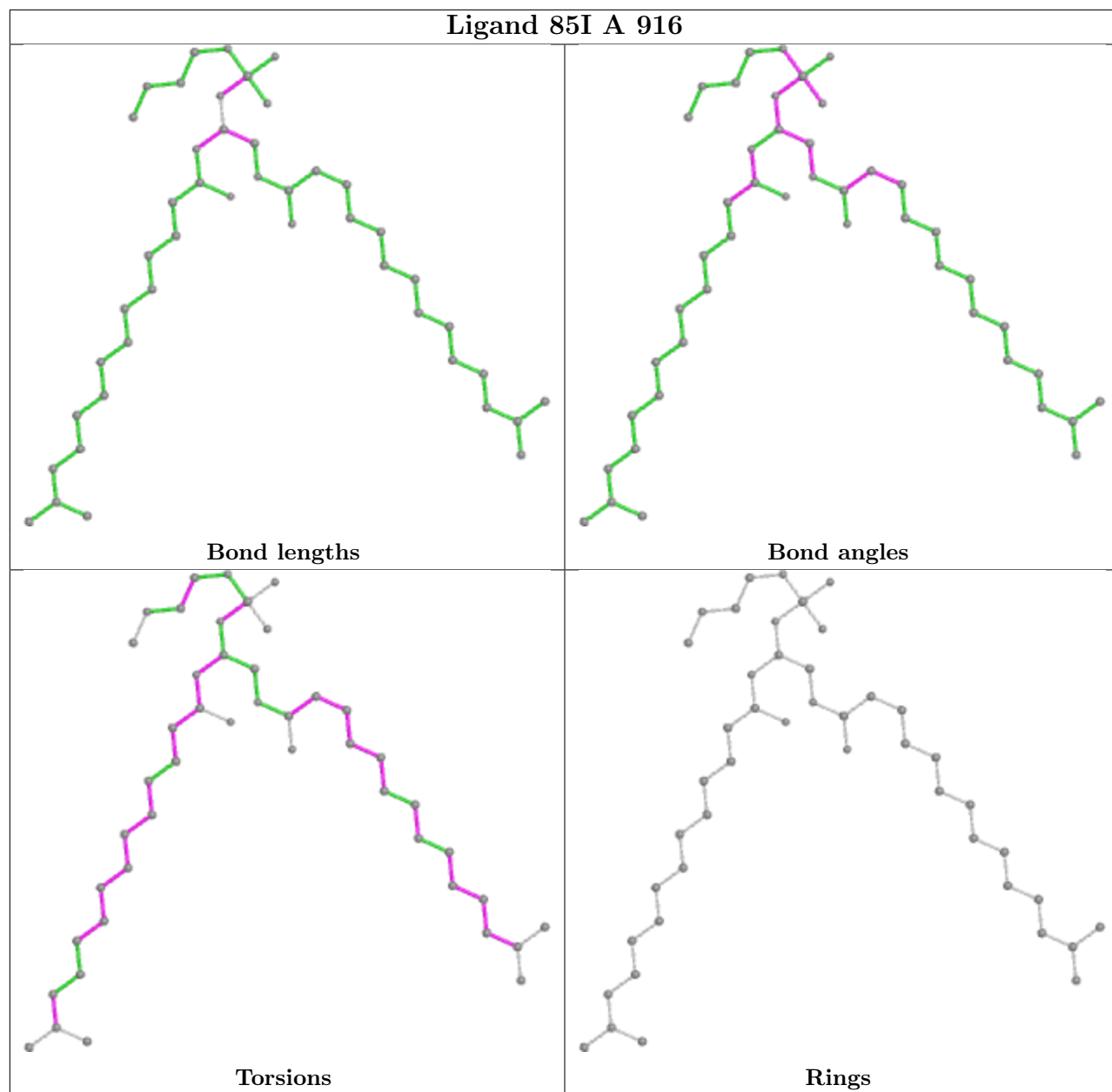


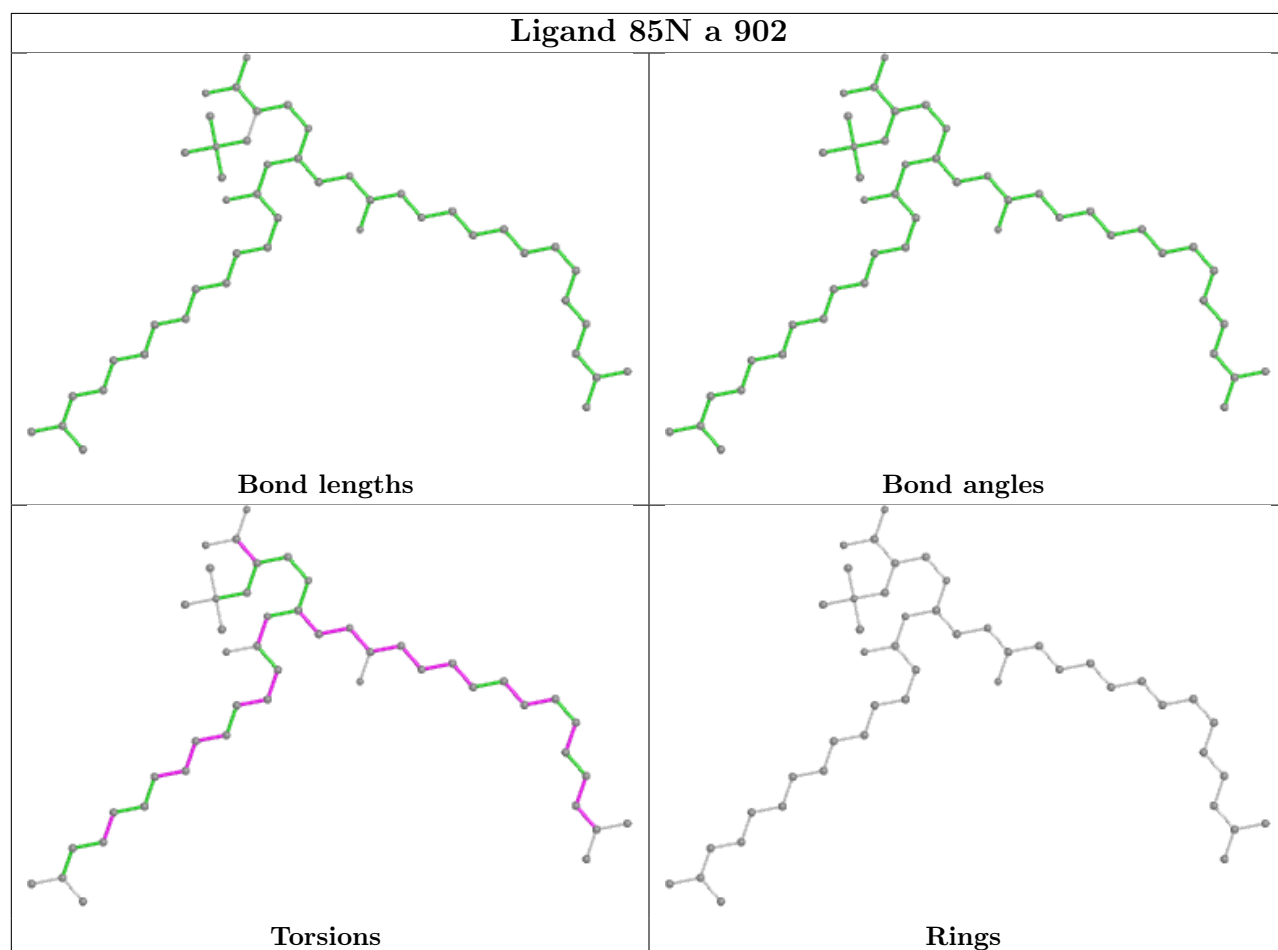
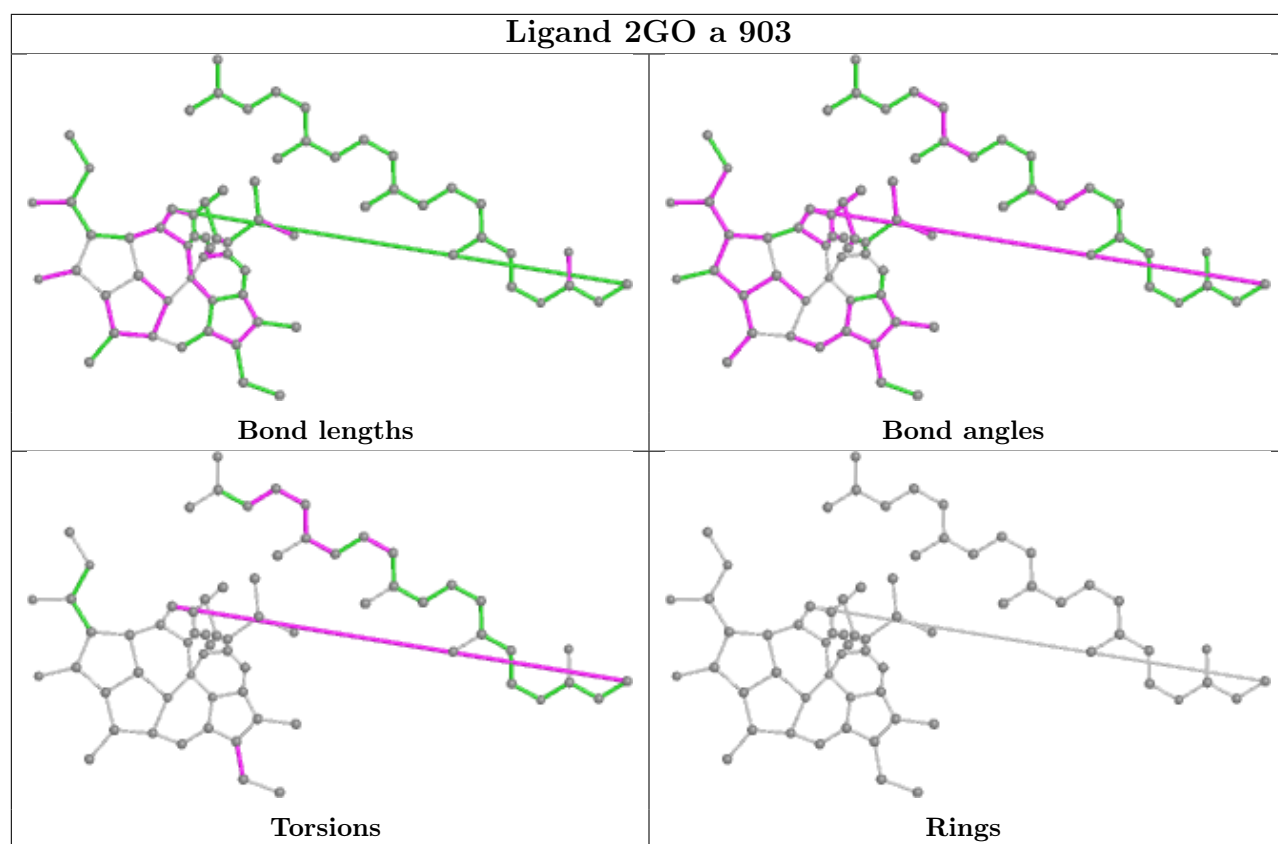


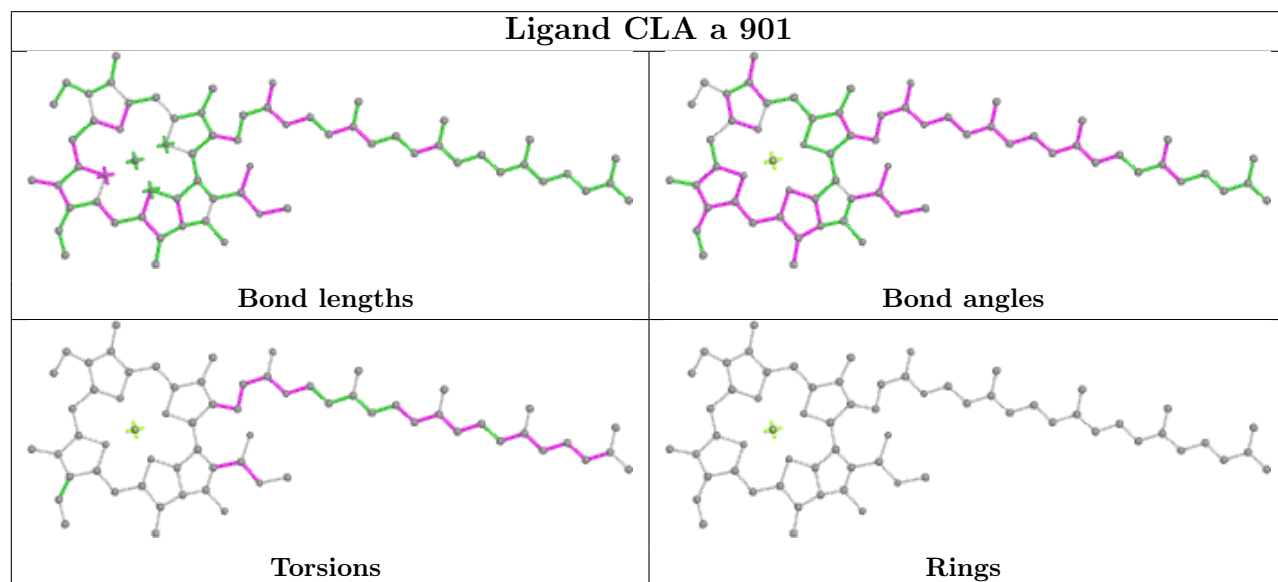
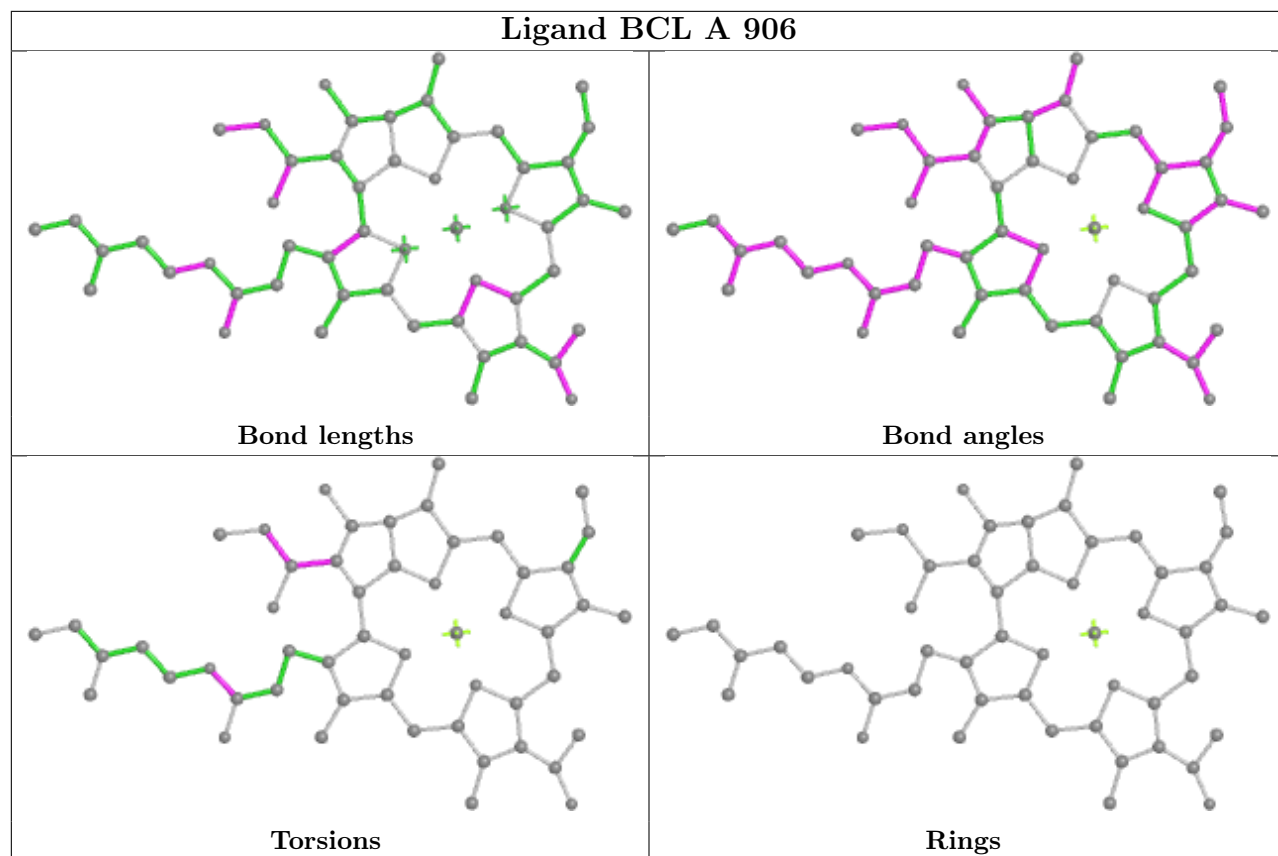


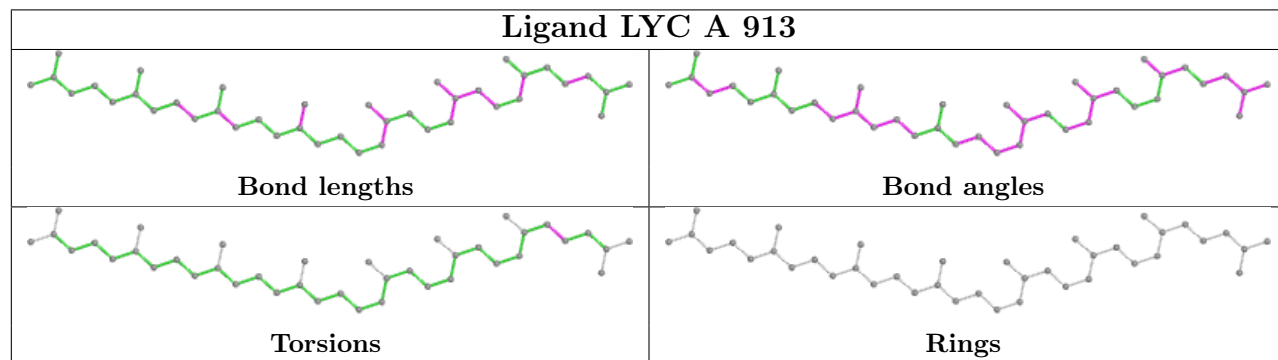
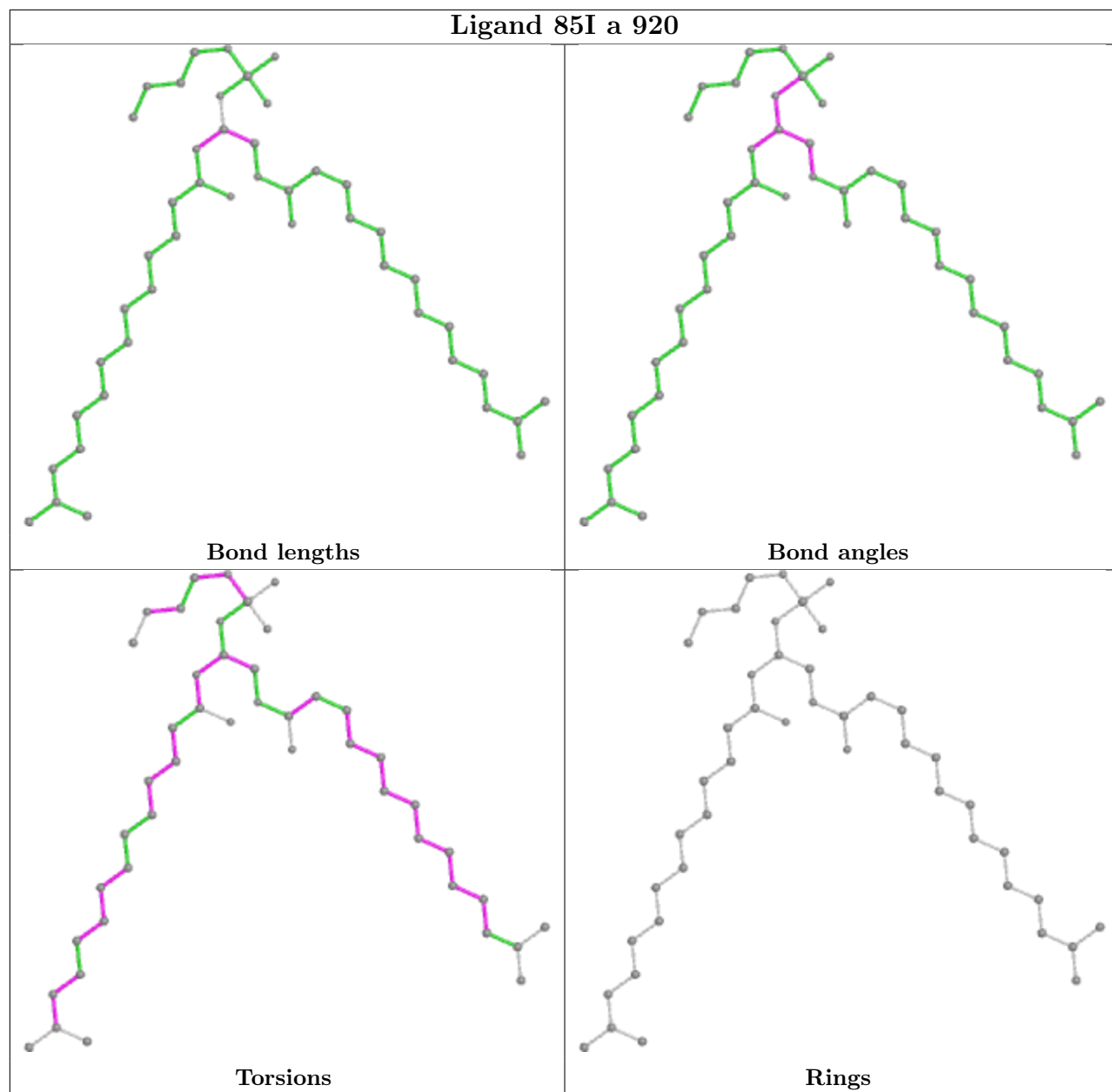


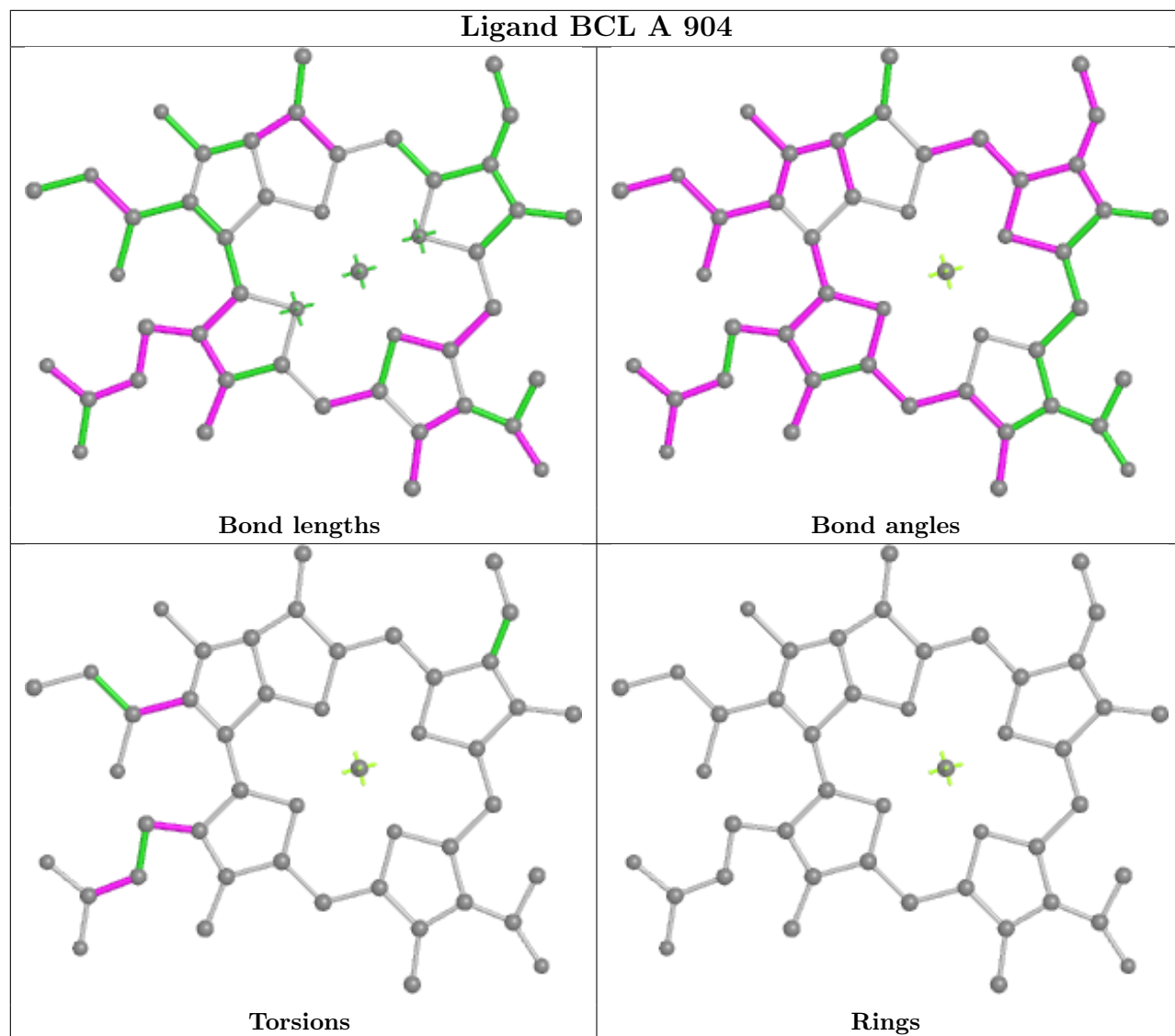


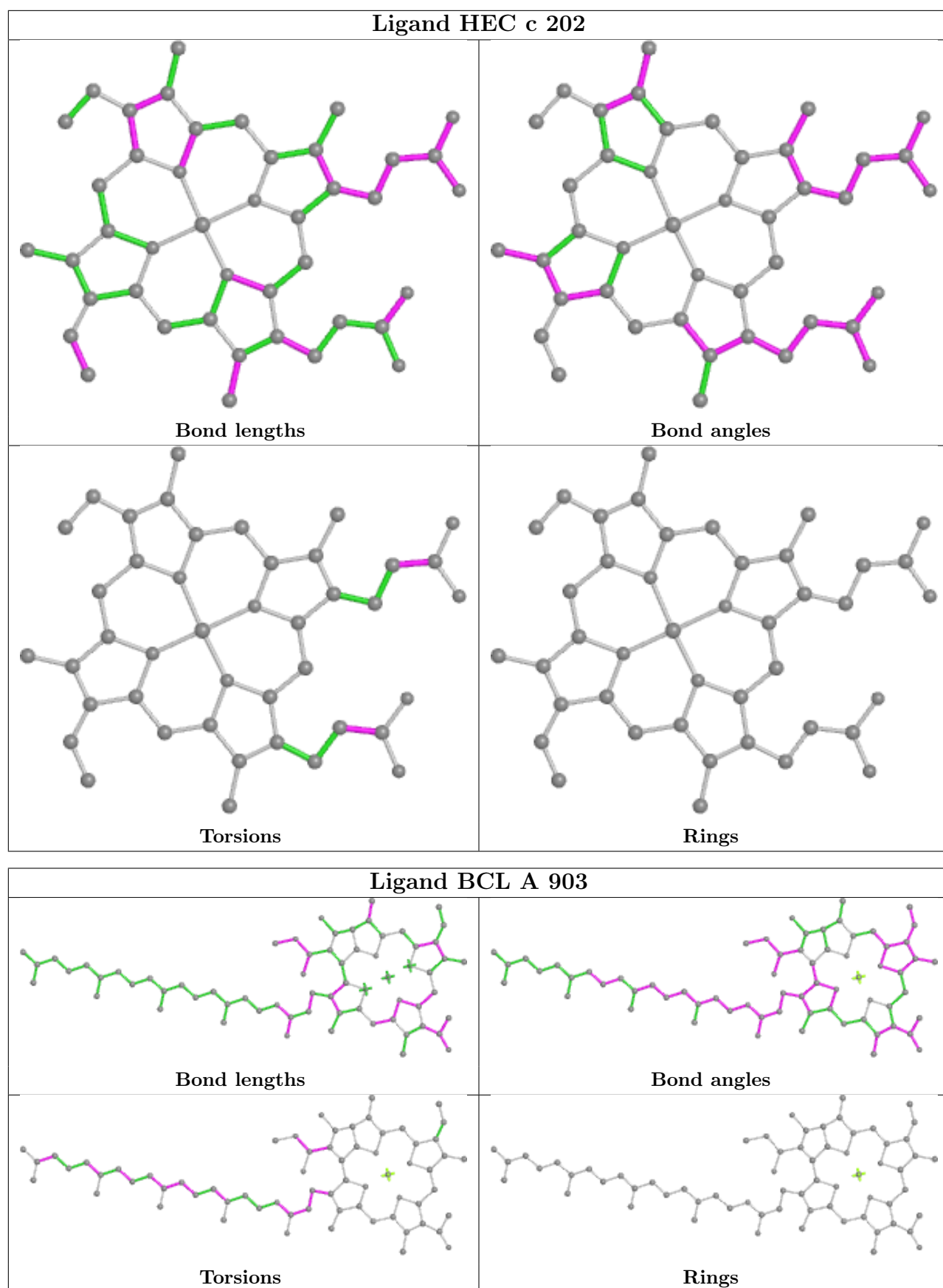


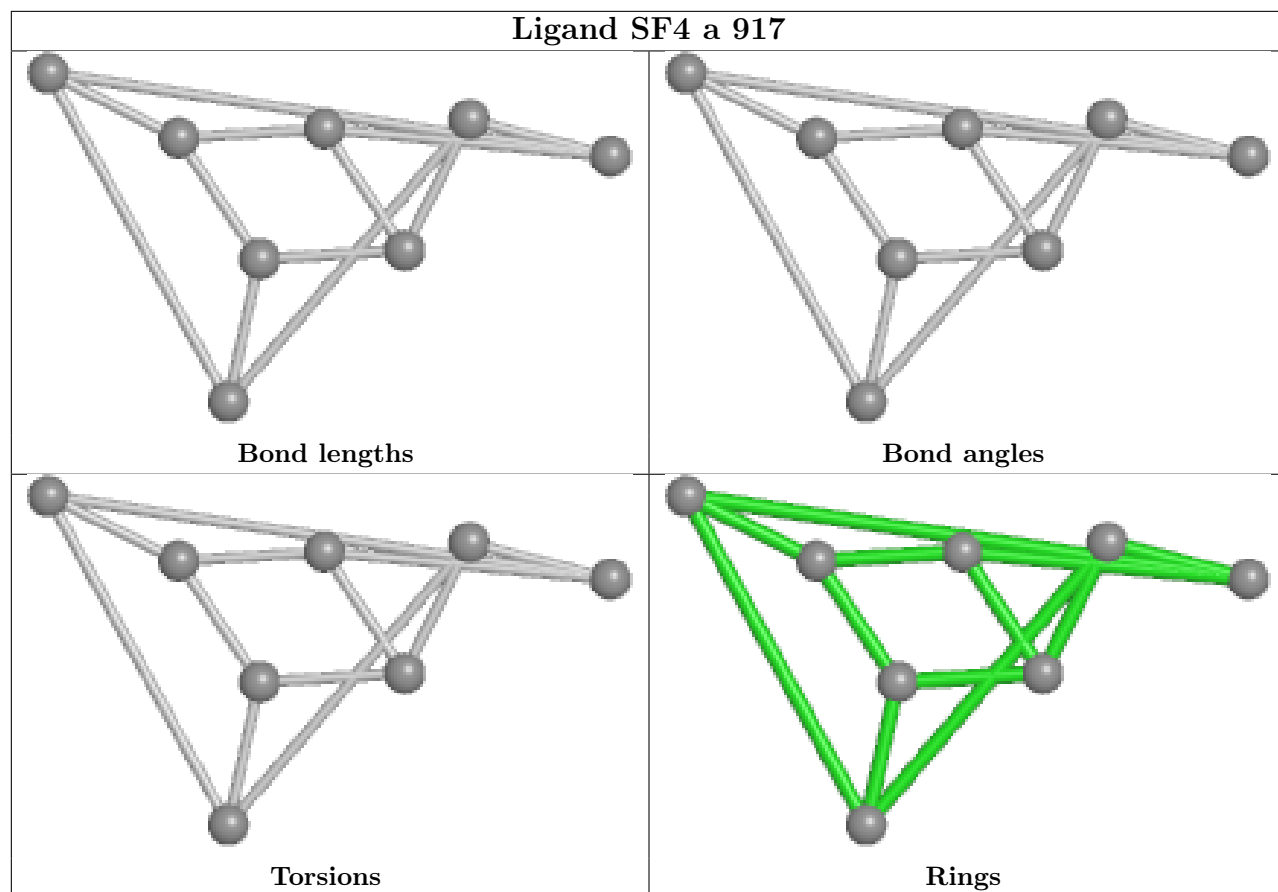


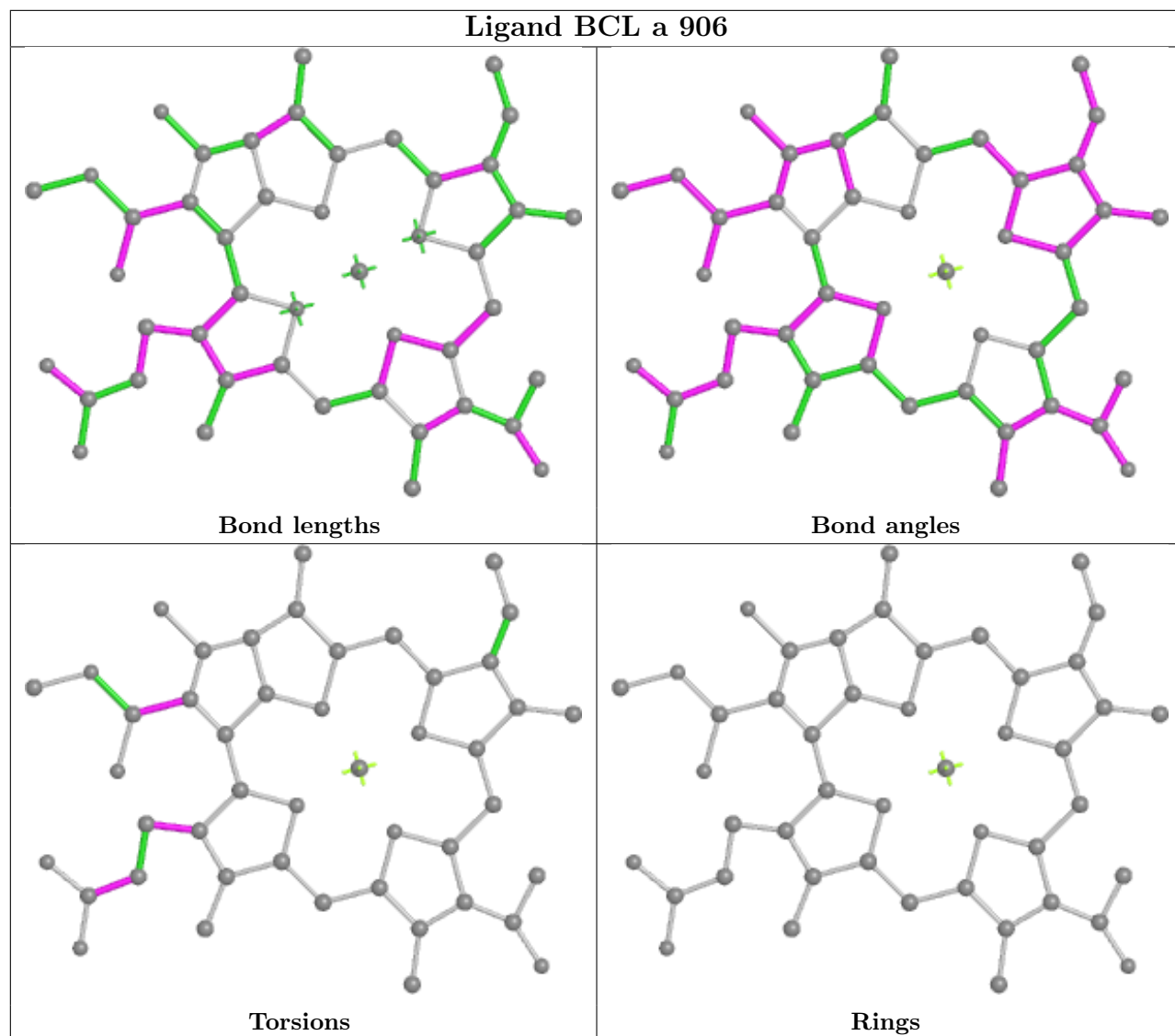


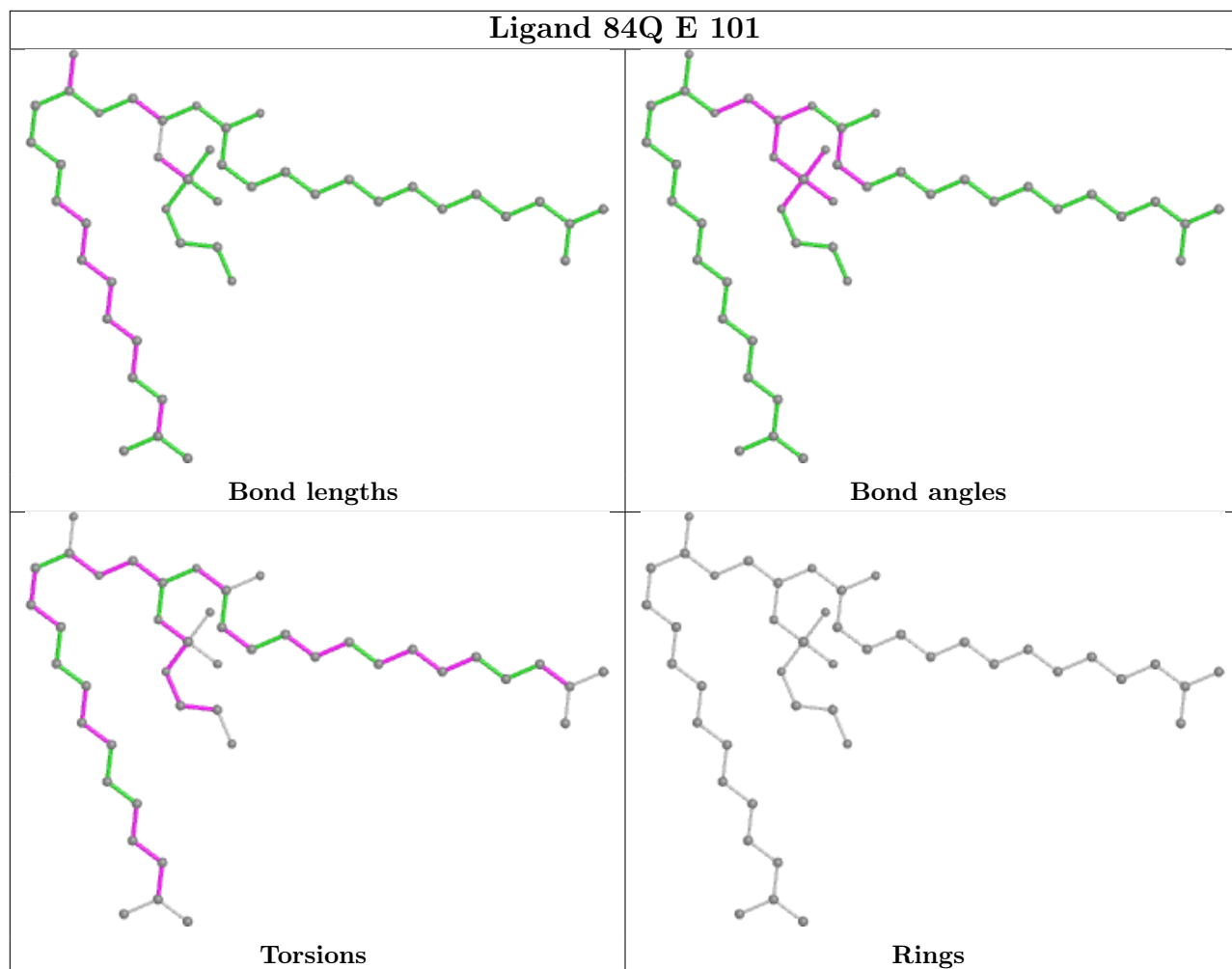


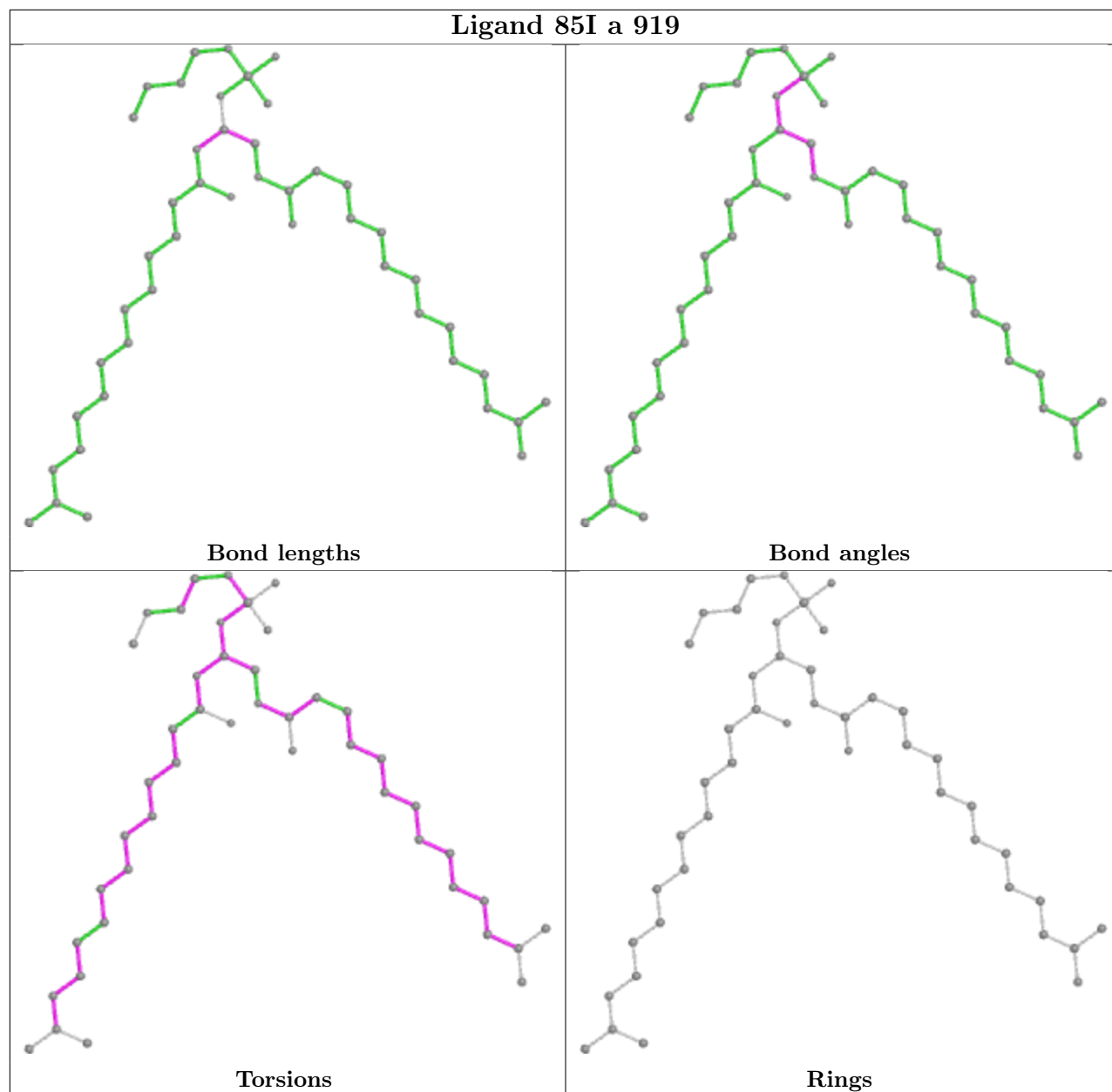


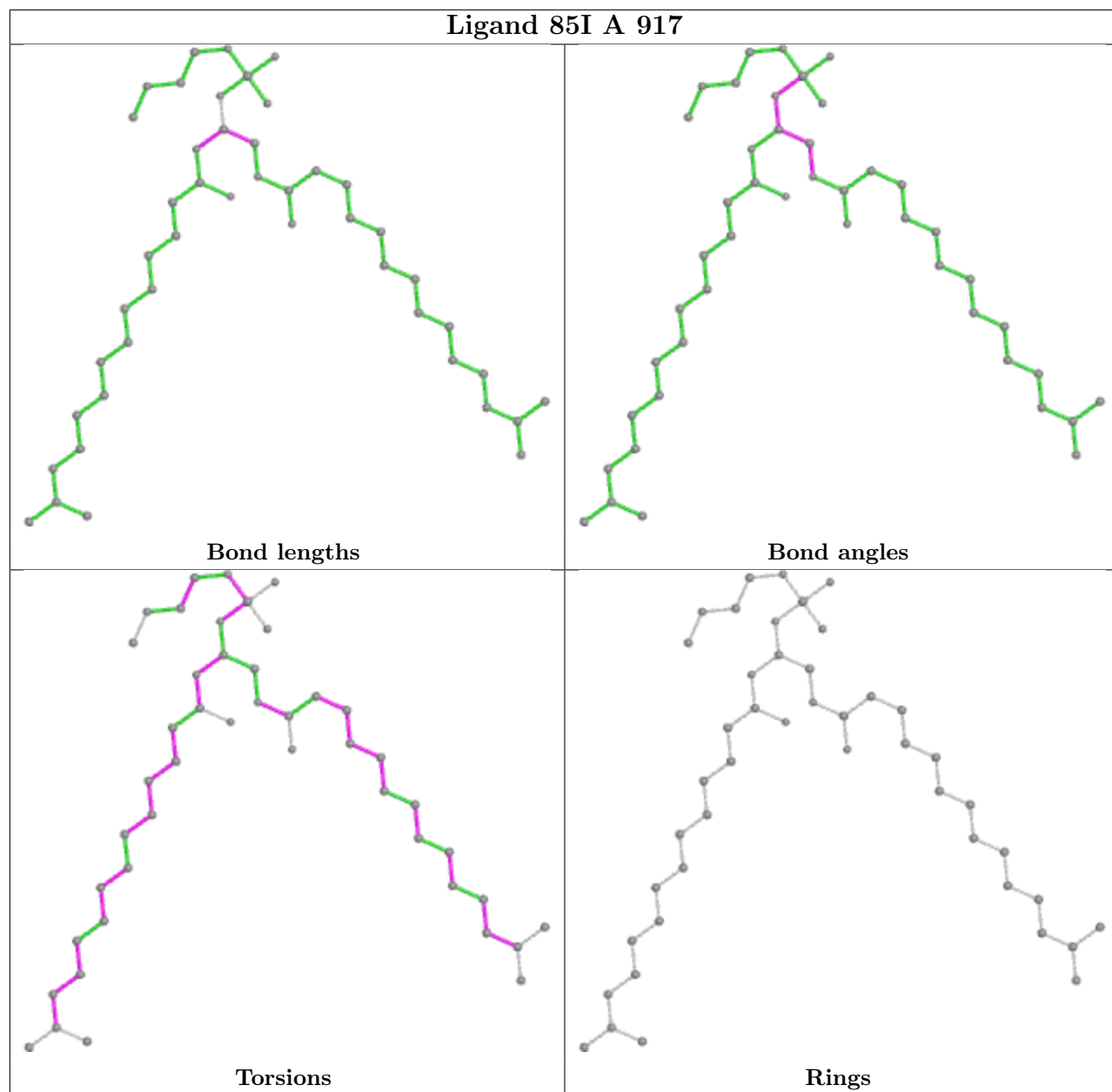


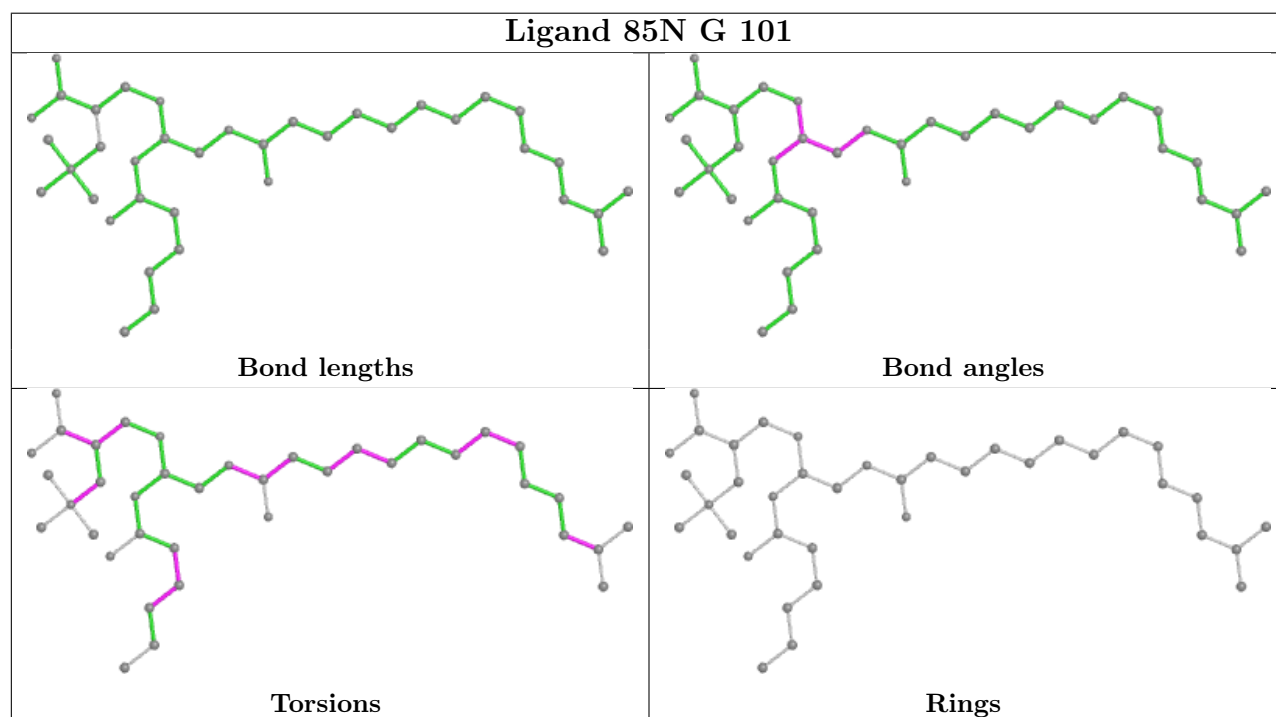
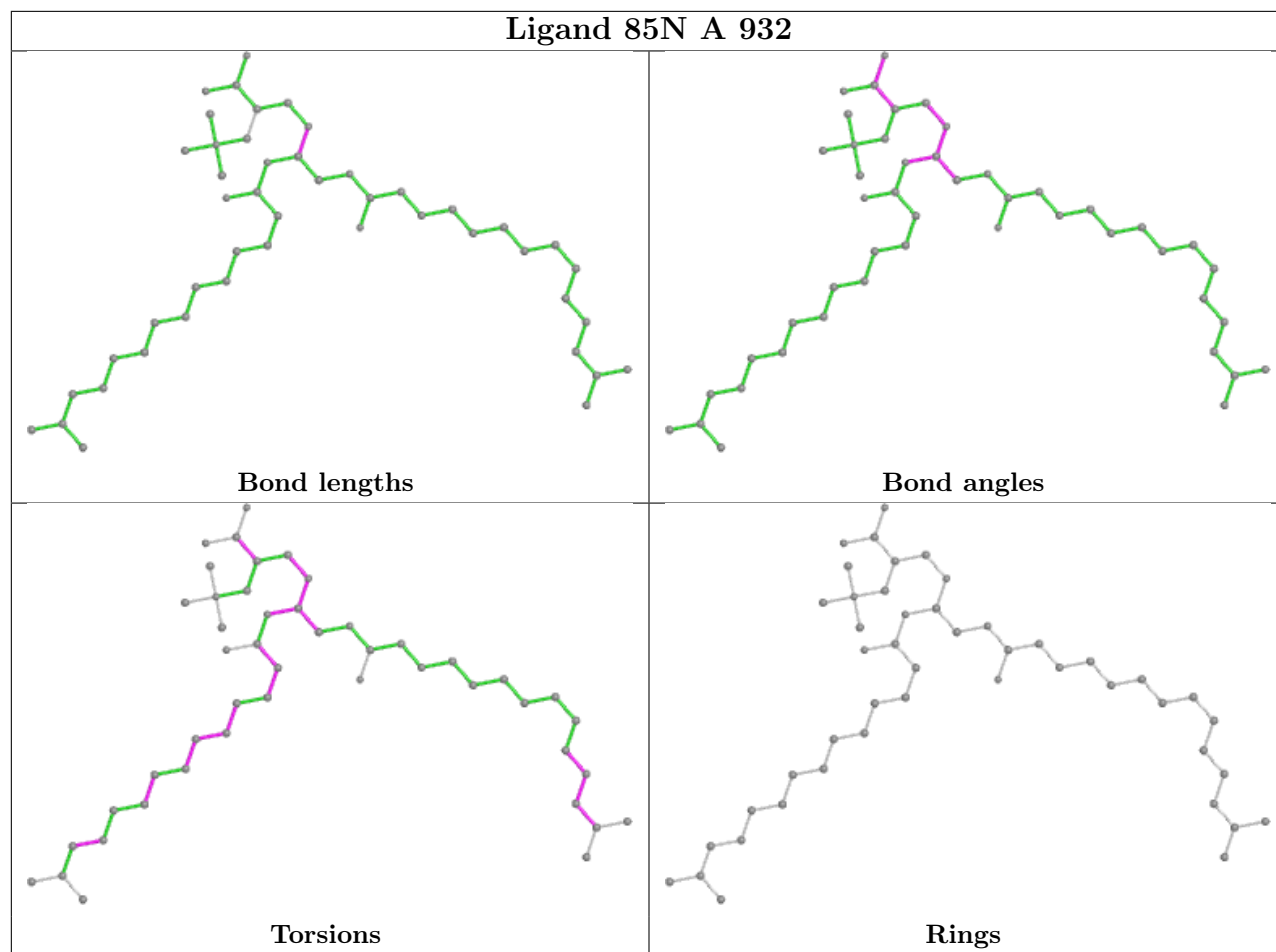


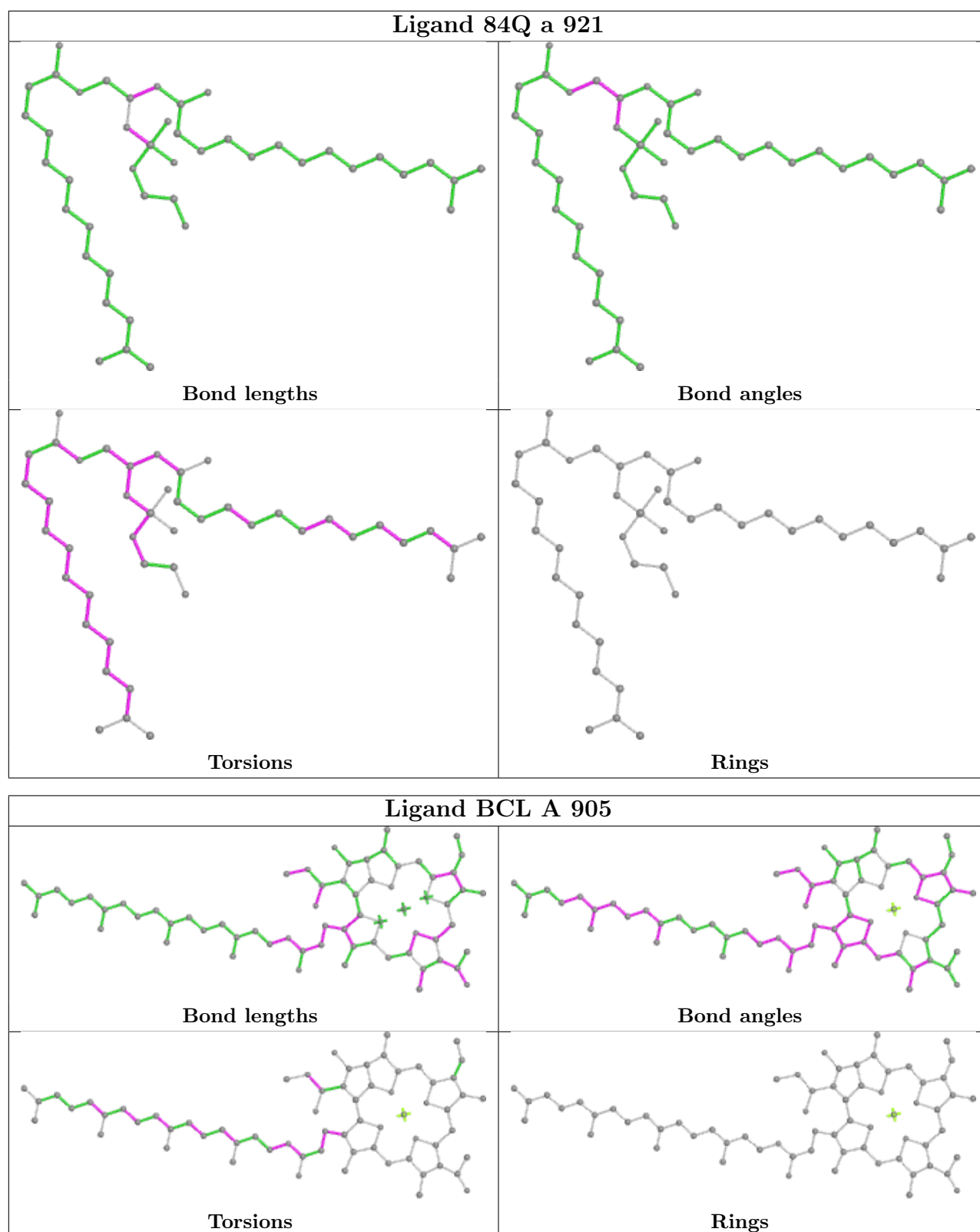












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

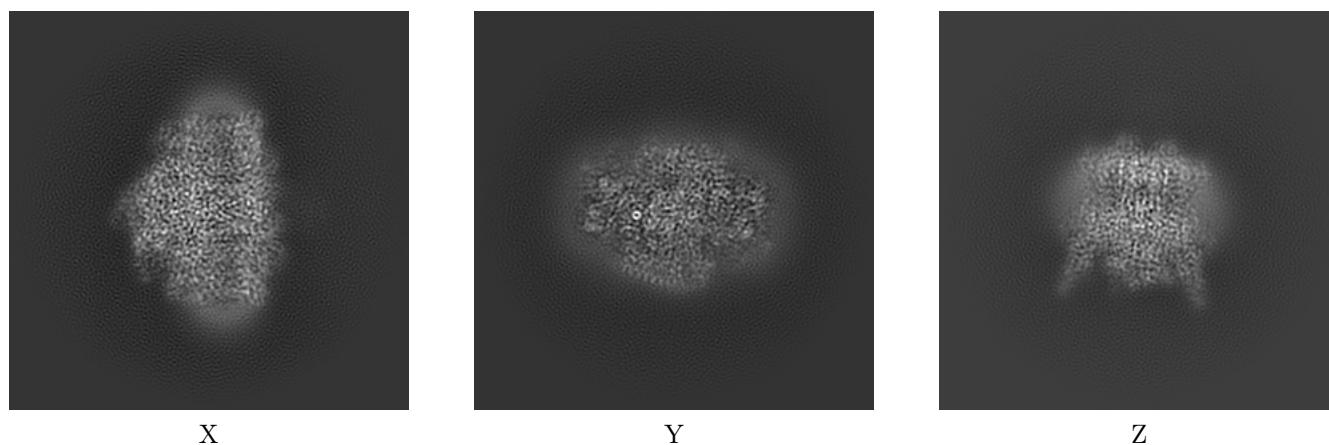
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-32229. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

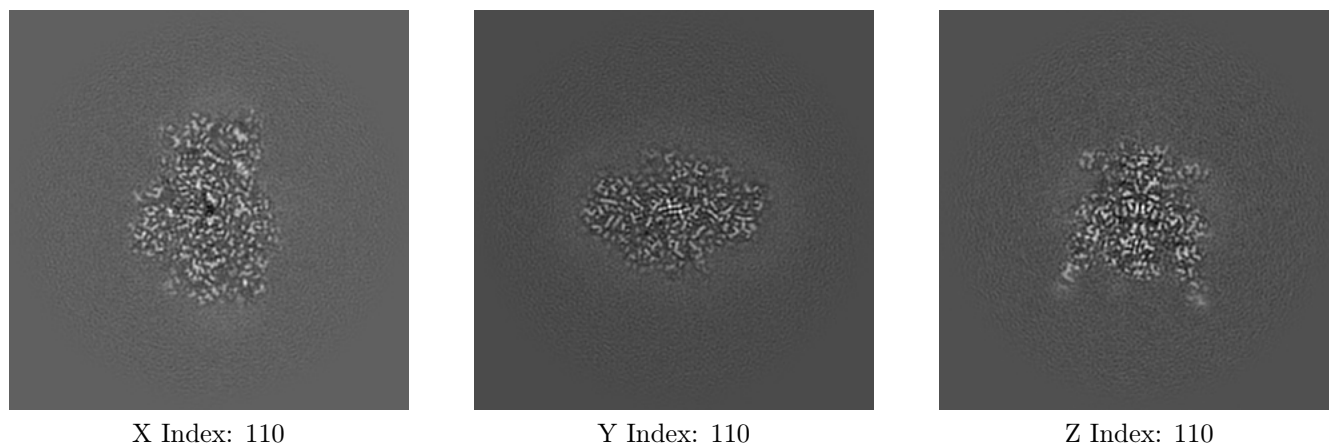
6.1.1 Primary map



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

6.2 Central slices [i](#)

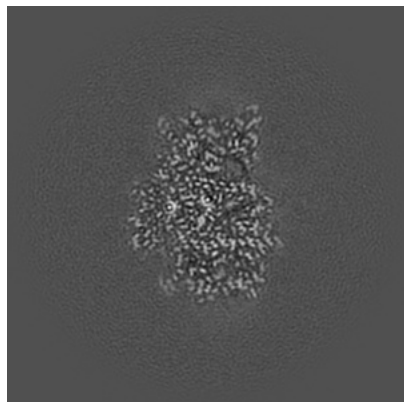
6.2.1 Primary map



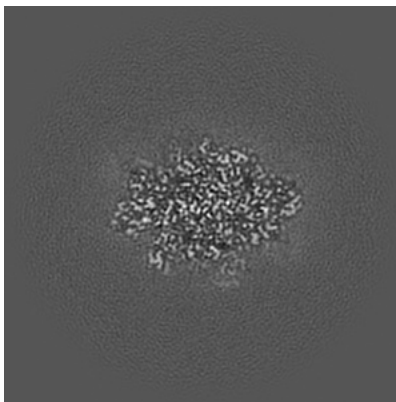
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

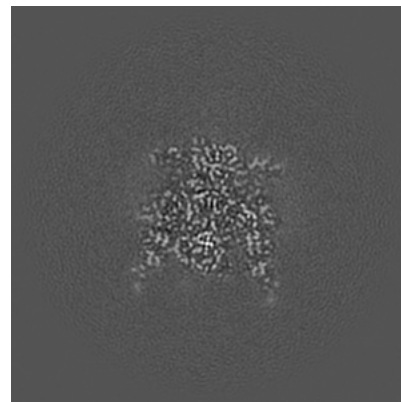
6.3.1 Primary map



X Index: 108



Y Index: 101

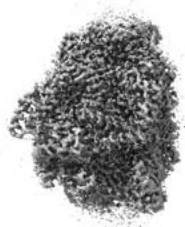


Z Index: 109

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

6.4 Orthogonal surface views [i](#)

6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.48. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

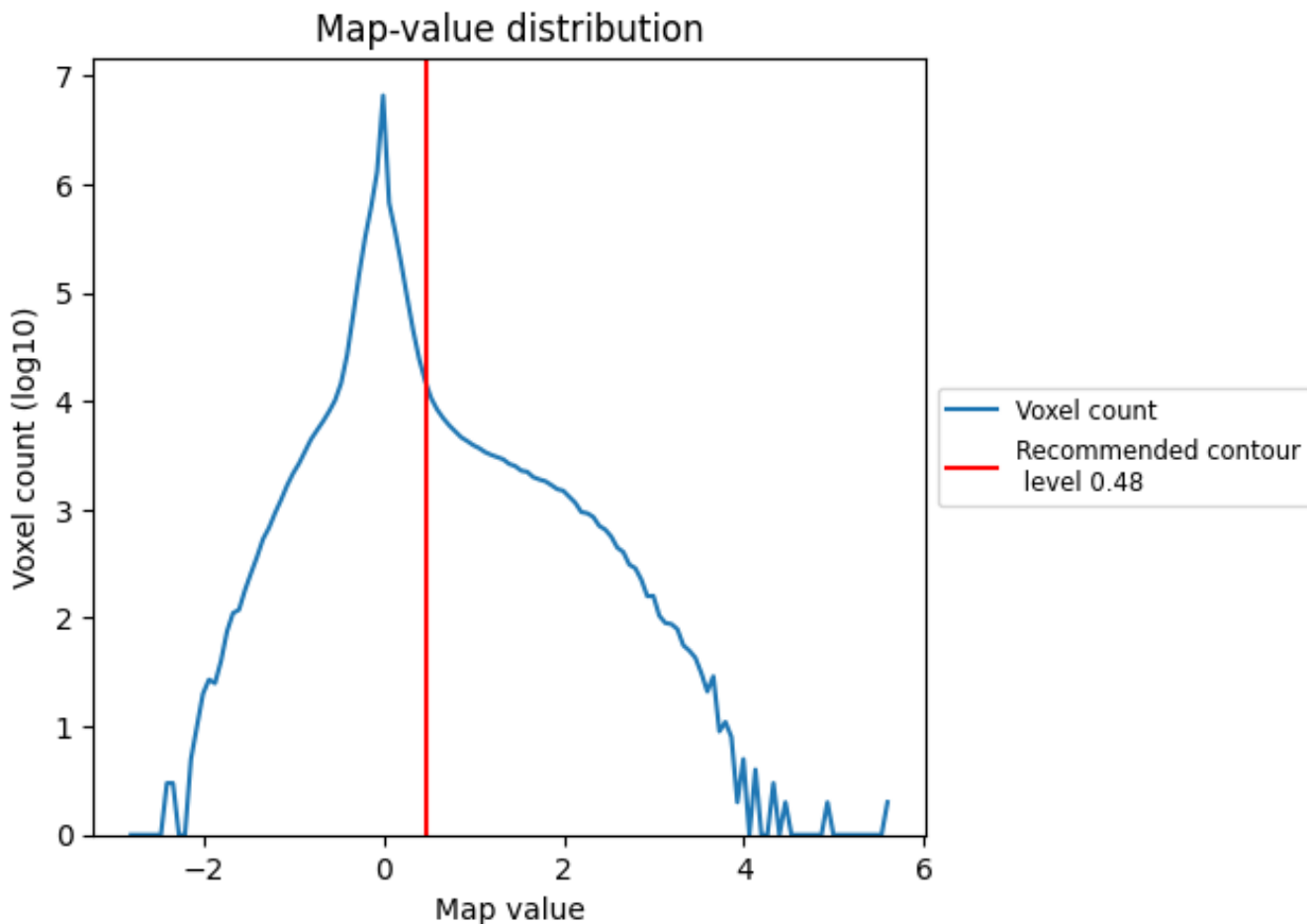
6.5 Mask visualisation

This section was not generated. No masks/segmentation were deposited.

7 Map analysis [i](#)

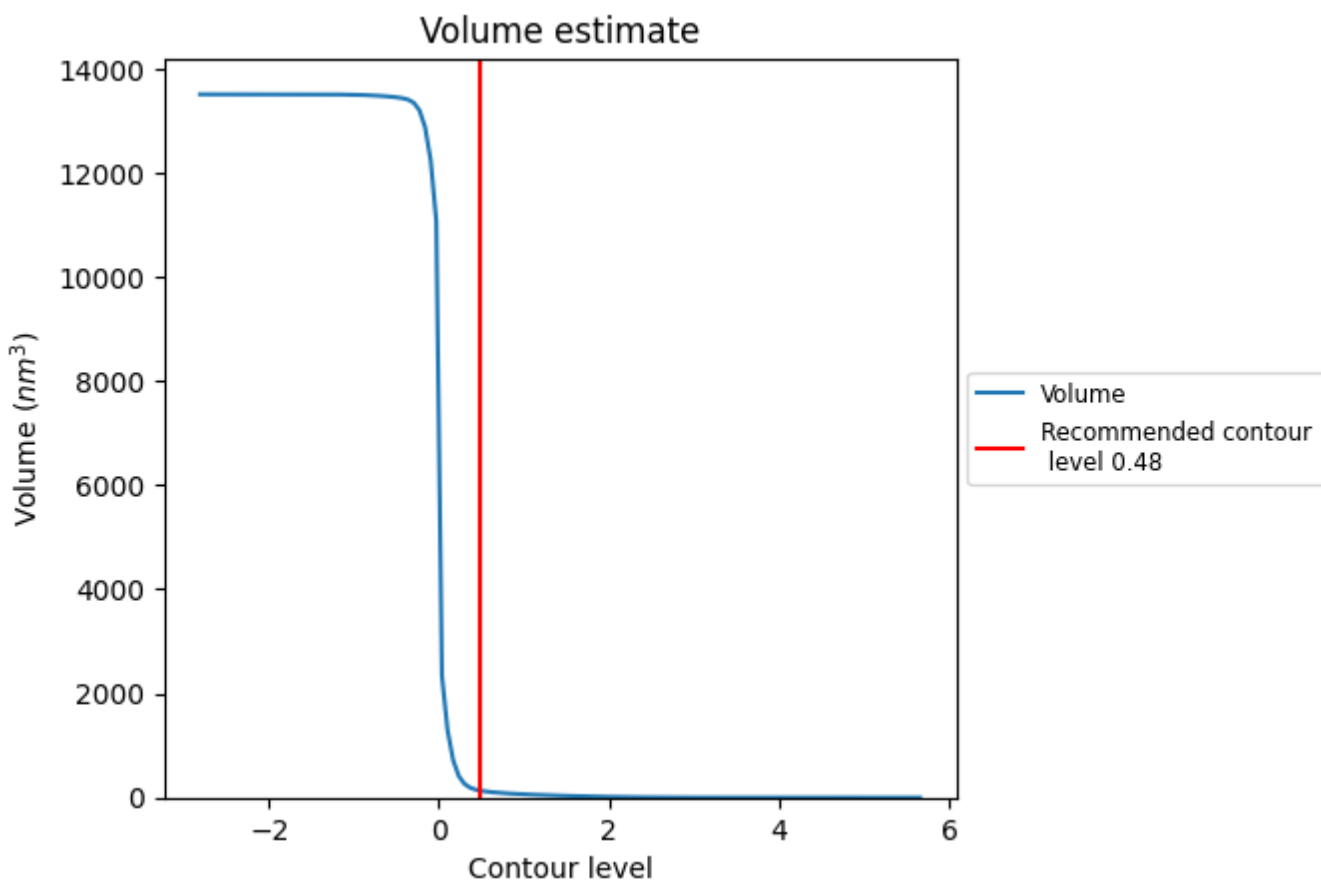
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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

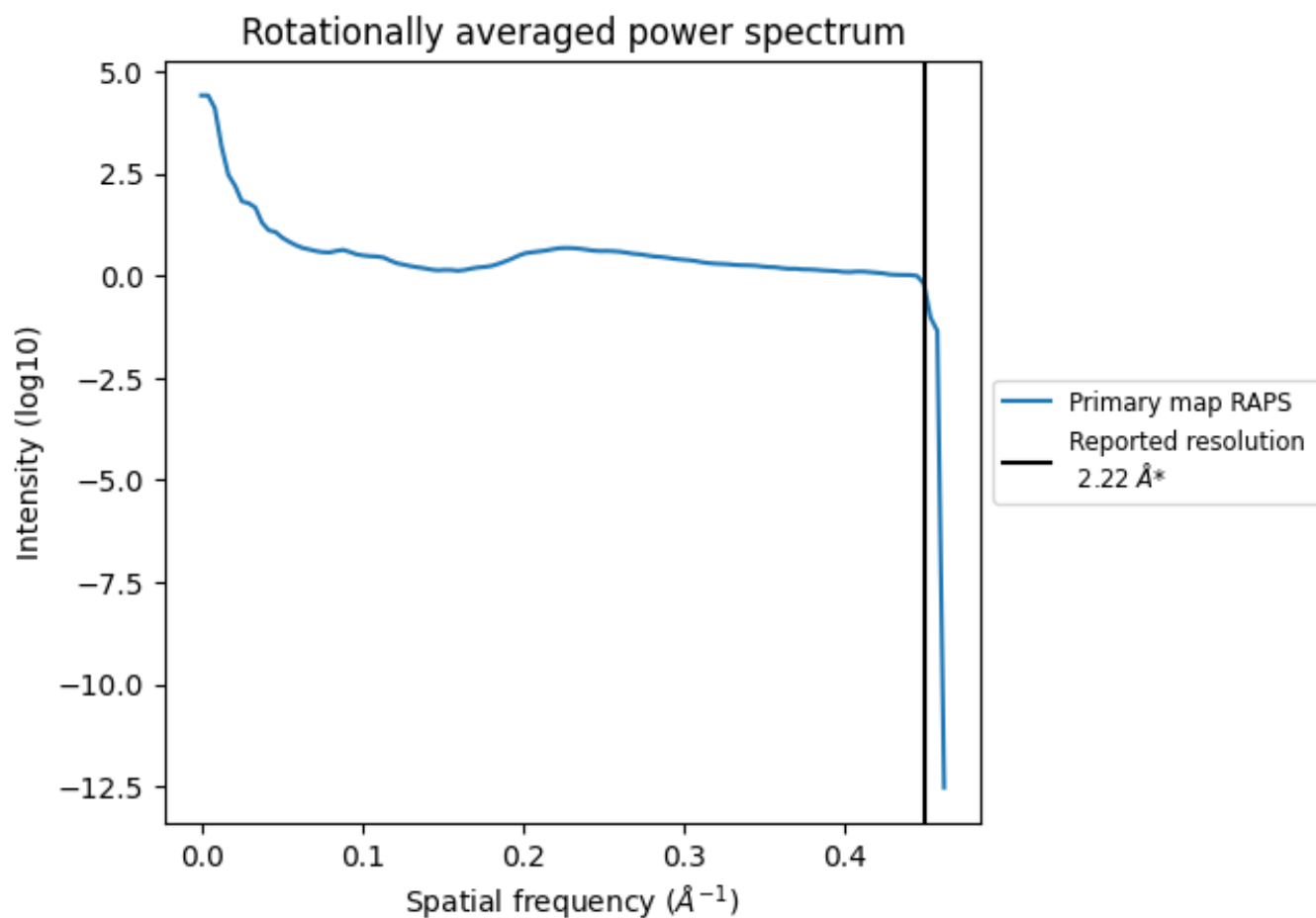
7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 136 nm³; this corresponds to an approximate mass of 123 kDa.

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

7.3 Rotationally averaged power spectrum i



*Reported resolution corresponds to spatial frequency of 0.450 Å⁻¹

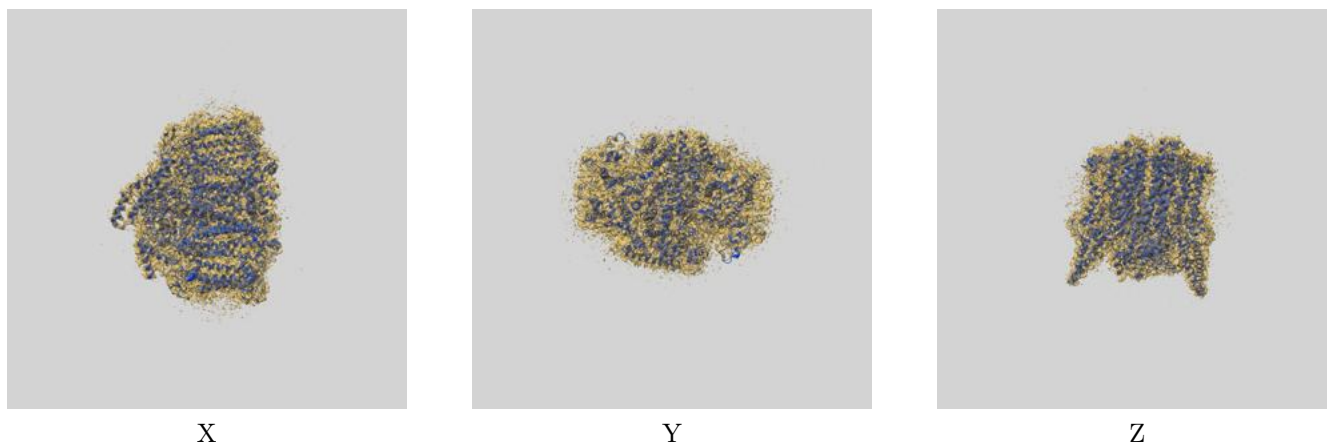
8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

9 Map-model fit [i](#)

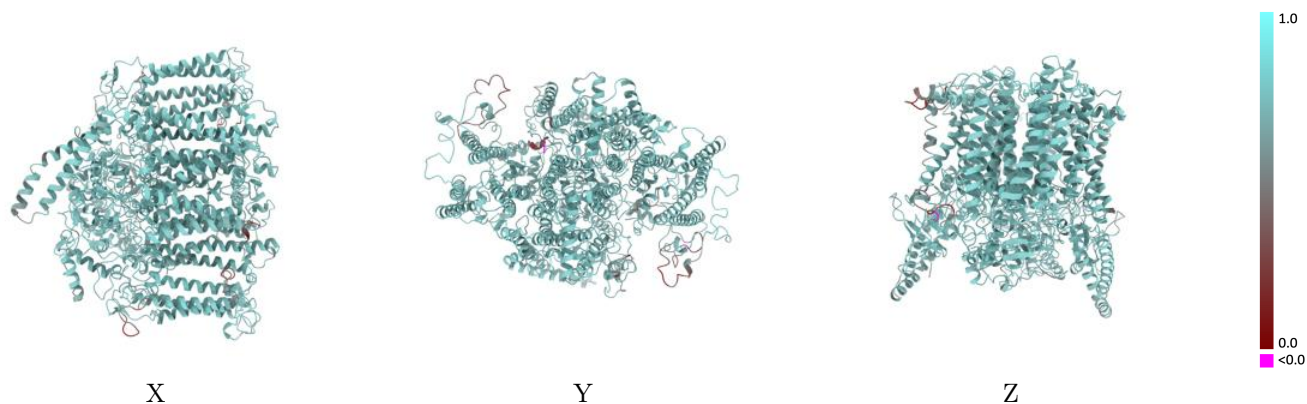
This section contains information regarding the fit between EMDB map EMD-32229 and PDB model 7VZR. Per-residue inclusion information can be found in section 3 on page 13.

9.1 Map-model overlay [i](#)



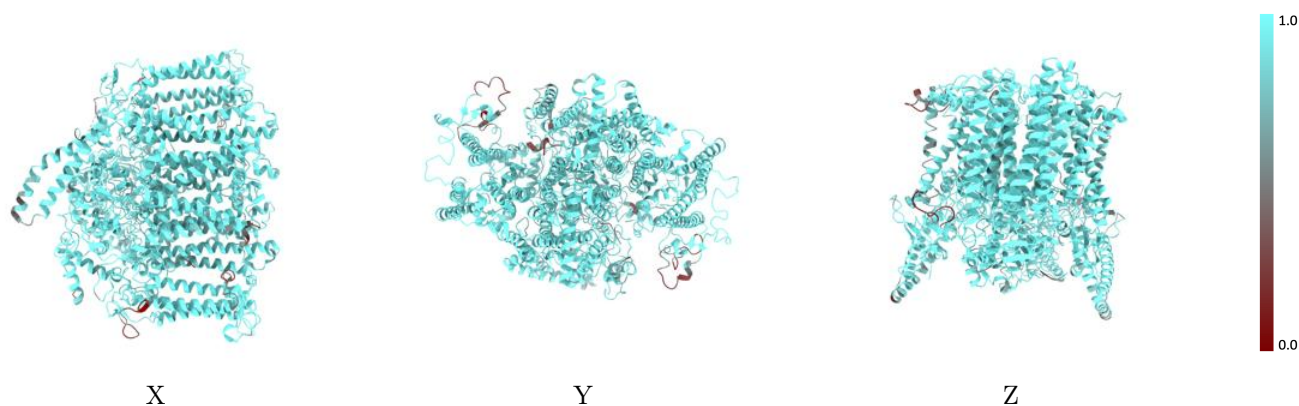
The images above show the 3D surface view of the map at the recommended contour level 0.48 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model [i](#)



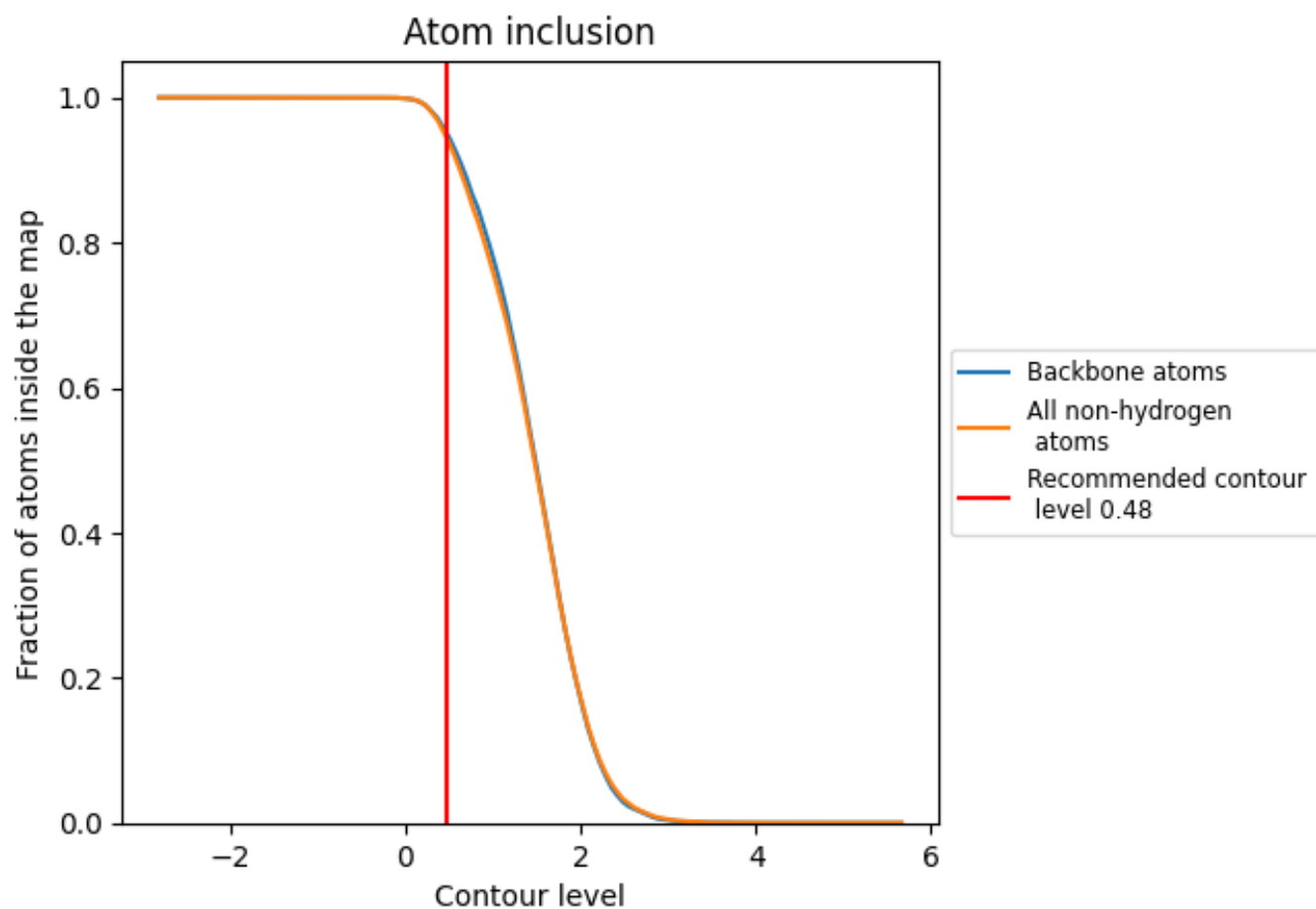
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.48).



























9.4 Atom inclusion [i](#)



At the recommended contour level, 95% of all backbone atoms, 94% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.48) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9424	 0.7050
A	 0.9519	 0.7100
C	 0.9584	 0.7210
E	 0.9632	 0.7140
F	 0.9257	 0.6700
G	 0.7982	 0.6490
H	 0.8737	 0.6670
a	 0.9496	 0.7060
c	 0.9396	 0.7060
e	 0.9681	 0.6970
f	 0.9182	 0.6770
g	 0.7537	 0.5870
h	 0.8526	 0.6610

