



# wwPDB EM Validation Summary Report ⓘ

Dec 31, 2024 – 06:58 PM EST

PDB ID : 8K5O  
EMDB ID : EMD-36907  
Title : Cryo-EM structure of the RC-LH core complexes from Halorhodospira halochloris  
Authors : Wang, G.-L.; Qi, C.-H.; Yu, L.-J.  
Deposited on : 2023-07-22  
Resolution : 2.42 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](mailto: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>.

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

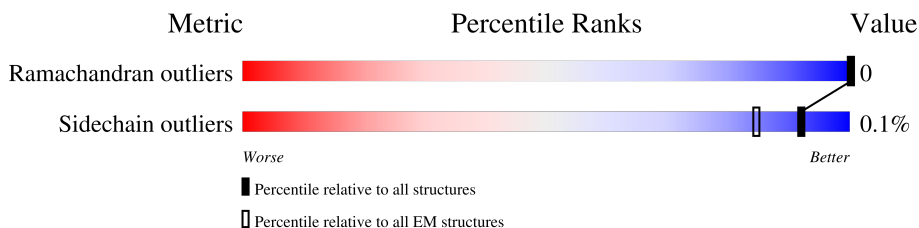
EMDB validation analysis : 0.0.1.dev113  
Mogul : 2022.3.0, CSD as543be (2022)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.40

# 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 2.42 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	207382	16835
Sidechain outliers	206894	16415

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  $\geq 3$ , 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 EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	C	372	
2	L	279	
3	M	320	
4	H	274	
5	4	105	
6	3	65	
7	6	65	
7	F	65	
7	K	65	

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Mol	Chain	Length	Quality of chain
7	P	65	97%
7	S	65	97%
7	V	65	97%
7	Y	65	97%
7	b	65	97%
7	e	65	97%
7	h	65	97%
7	k	65	97%
7	n	65	97%
7	q	65	97%
7	t	65	95%
7	w	65	97%
7	z	65	97%
8	1	86	6% 72% 28%
8	7	86	69% 31%
8	G	86	72% 28%
8	N	86	72% 28%
8	Q	86	72% 28%
8	T	86	72% 28%
8	W	86	72% 28%
8	Z	86	72% 28%
8	c	86	72% 28%
8	f	86	71% 28%
8	i	86	72% 28%
8	l	86	72% 28%

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Mol	Chain	Length	Quality of chain
8	o	86	72% 28%
8	r	86	72% 28%
8	u	86	72% 28%
8	x	86	72% 28%
9	5	29	59% 90% 10%
9	8	29	7% 97% .
9	I	29	7% 97% .
9	O	29	97% .
9	R	29	97% .
9	U	29	97% .
9	X	29	97% .
9	a	29	97% .
9	d	29	97% .
9	g	29	97% .
9	j	29	97% .
9	m	29	97% .
9	p	29	97% .
9	s	29	97% .
9	v	29	97% .
9	y	29	97% .
10	2	31	6% 94% 6%
11	9	33	88% 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
15	A1LZM	1	101	X	-	-	-
15	A1LZM	3	102	X	-	-	-
15	A1LZM	4	201	X	-	-	-
15	A1LZM	6	101	X	-	-	-
15	A1LZM	6	102	X	-	-	-
15	A1LZM	7	101	X	-	-	-
15	A1LZM	F	101	X	-	-	-
15	A1LZM	F	102	X	-	-	-
15	A1LZM	G	101	X	-	-	-
15	A1LZM	K	101	X	-	-	-
15	A1LZM	K	102	X	-	-	-
15	A1LZM	L	301	X	-	-	-
15	A1LZM	L	302	X	-	-	-
15	A1LZM	M	702	X	-	-	-
15	A1LZM	M	703	X	-	-	-
15	A1LZM	N	101	X	-	-	-
15	A1LZM	P	101	X	-	-	-
15	A1LZM	P	102	X	-	-	-
15	A1LZM	P	103	X	-	-	-
15	A1LZM	S	101	X	-	-	-
15	A1LZM	S	102	X	-	-	-
15	A1LZM	S	103	X	-	-	-
15	A1LZM	V	101	X	-	-	-
15	A1LZM	V	102	X	-	-	-
15	A1LZM	W	101	X	-	-	-
15	A1LZM	Y	101	X	-	-	-
15	A1LZM	Y	102	X	-	-	-
15	A1LZM	Z	101	X	-	-	-
15	A1LZM	b	101	X	-	-	-
15	A1LZM	b	102	X	-	-	-
15	A1LZM	c	101	X	-	-	-
15	A1LZM	e	101	X	-	-	-
15	A1LZM	e	102	X	-	-	-
15	A1LZM	f	101	X	-	-	-
15	A1LZM	h	101	X	-	-	-
15	A1LZM	h	102	X	-	-	-
15	A1LZM	i	101	X	-	-	-
15	A1LZM	k	101	X	-	-	-
15	A1LZM	k	102	X	-	-	-
15	A1LZM	l	101	X	-	-	-
15	A1LZM	n	101	X	-	-	-
15	A1LZM	n	102	X	-	-	-
15	A1LZM	o	101	X	-	-	-

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Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
15	A1LZM	q	101	X	-	-	-
15	A1LZM	q	102	X	-	-	-
15	A1LZM	r	101	X	-	-	-
15	A1LZM	t	101	X	-	-	-
15	A1LZM	t	102	X	-	-	-
15	A1LZM	u	101	X	-	-	-
15	A1LZM	w	101	X	-	-	-
15	A1LZM	w	102	X	-	-	-
15	A1LZM	w	103	X	-	-	-
15	A1LZM	z	101	X	-	-	-
15	A1LZM	z	102	X	-	-	-
23	A1LZQ	1	102	X	-	-	-
23	A1LZQ	7	102	X	-	-	-
23	A1LZQ	G	102	X	-	-	-
23	A1LZQ	N	102	X	-	-	-
23	A1LZQ	Q	101	X	-	-	-
23	A1LZQ	T	101	X	-	-	-
23	A1LZQ	W	102	X	-	-	-
23	A1LZQ	Z	102	X	-	-	-
23	A1LZQ	c	102	X	-	-	-
23	A1LZQ	f	102	X	-	-	-
23	A1LZQ	i	102	X	-	-	-
23	A1LZQ	l	102	X	-	-	-
23	A1LZQ	o	102	X	-	-	-
23	A1LZQ	r	102	X	-	-	-
23	A1LZQ	u	102	X	-	-	-
23	A1LZQ	x	101	X	-	-	-

## 2 Entry composition [i](#)

There are 25 unique types of molecules in this entry. The entry contains 38551 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 cytochrome c subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	C	346	2732	1690	469	554	19	0	0

- Molecule 2 is a protein called Reaction center protein L chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	L	275	2188	1470	356	355	7	0	0

- Molecule 3 is a protein called Reaction center protein M chain.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	M	318	2553	1691	427	425	10	0	0

- Molecule 4 is a protein called Photosynthetic reaction center H subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	H	268	2160	1384	375	389	12	0	0

- Molecule 5 is a protein called Antenna complex alpha/beta subunit domain-containing protein.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
5	4	72	615	408	98	109	0	0

- Molecule 6 is a protein called Light-harvesting LHI.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	3	51	433	292	72	67	2	0	0

- Molecule 7 is a protein called Antenna complex alpha/beta subunit domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	w	63	Total 533	C 359	N 84	O 86	S 4	0	0
7	Y	63	Total 533	C 359	N 84	O 86	S 4	0	0
7	b	63	Total 533	C 359	N 84	O 86	S 4	0	0
7	k	63	Total 533	C 359	N 84	O 86	S 4	0	0
7	n	63	Total 533	C 359	N 84	O 86	S 4	0	0
7	t	63	Total 533	C 359	N 84	O 86	S 4	0	0
7	z	63	Total 533	C 359	N 84	O 86	S 4	0	0
7	6	63	Total 533	C 359	N 84	O 86	S 4	0	0
7	F	63	Total 533	C 359	N 84	O 86	S 4	0	0
7	K	63	Total 533	C 359	N 84	O 86	S 4	0	0
7	P	63	Total 533	C 359	N 84	O 86	S 4	0	0
7	S	63	Total 533	C 359	N 84	O 86	S 4	0	0
7	V	63	Total 533	C 359	N 84	O 86	S 4	0	0
7	e	63	Total 533	C 359	N 84	O 86	S 4	0	0
7	h	63	Total 533	C 359	N 84	O 86	S 4	0	0
7	q	63	Total 533	C 359	N 84	O 86	S 4	0	0

- Molecule 8 is a protein called Beta subunit of light-harvesting 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	x	62	Total 498	C 312	N 92	O 90	S 4	0	0
8	Z	62	Total 498	C 312	N 92	O 90	S 4	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
8	c	62	Total 498	C 312	N 92	O 90	S 4	0	0
8	l	62	Total 498	C 312	N 92	O 90	S 4	0	0
8	o	62	Total 498	C 312	N 92	O 90	S 4	0	0
8	u	62	Total 498	C 312	N 92	O 90	S 4	0	0
8	1	62	Total 498	C 312	N 92	O 90	S 4	0	0
8	7	59	Total 472	C 296	N 86	O 86	S 4	0	0
8	G	62	Total 498	C 312	N 92	O 90	S 4	0	0
8	N	62	Total 498	C 312	N 92	O 90	S 4	0	0
8	Q	62	Total 498	C 312	N 92	O 90	S 4	0	0
8	T	62	Total 498	C 312	N 92	O 90	S 4	0	0
8	W	62	Total 498	C 312	N 92	O 90	S 4	0	0
8	f	62	Total 498	C 312	N 92	O 90	S 4	0	0
8	i	62	Total 498	C 312	N 92	O 90	S 4	0	0
8	r	62	Total 498	C 312	N 92	O 90	S 4	0	0

- Molecule 9 is a protein called Gamma subunit of light-harvesting 1.

Mol	Chain	Residues	Atoms				AltConf	Trace
9	v	28	Total 211	C 140	N 37	O 34	0	0
9	X	28	Total 211	C 140	N 37	O 34	0	0
9	a	28	Total 211	C 140	N 37	O 34	0	0
9	j	28	Total 211	C 140	N 37	O 34	0	0
9	m	28	Total 211	C 140	N 37	O 34	0	0

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Mol	Chain	Residues	Atoms				AltConf	Trace
9	s	28	Total	C	N	O	0	0
			211	140	37	34		
9	y	28	Total	C	N	O	0	0
			211	140	37	34		
9	5	26	Total	C	N	O	0	0
			186	123	31	32		
9	8	28	Total	C	N	O	0	0
			211	140	37	34		
9	I	28	Total	C	N	O	0	0
			211	140	37	34		
9	O	28	Total	C	N	O	0	0
			211	140	37	34		
9	R	28	Total	C	N	O	0	0
			211	140	37	34		
9	U	28	Total	C	N	O	0	0
			211	140	37	34		
9	d	28	Total	C	N	O	0	0
			211	140	37	34		
9	g	28	Total	C	N	O	0	0
			211	140	37	34		
9	p	28	Total	C	N	O	0	0
			211	140	37	34		

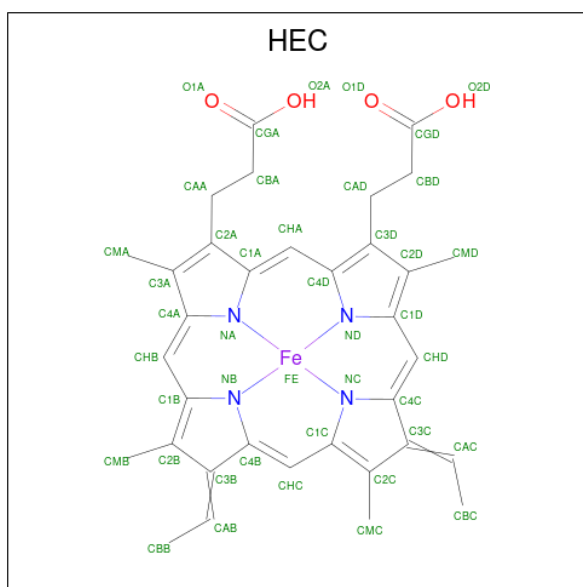
- Molecule 10 is a protein called reaction center small polypeptide.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	2	29	Total	C	N	O	S	0	0
			232	162	37	32	1		

- Molecule 11 is a protein called reactin center small polypeptide.

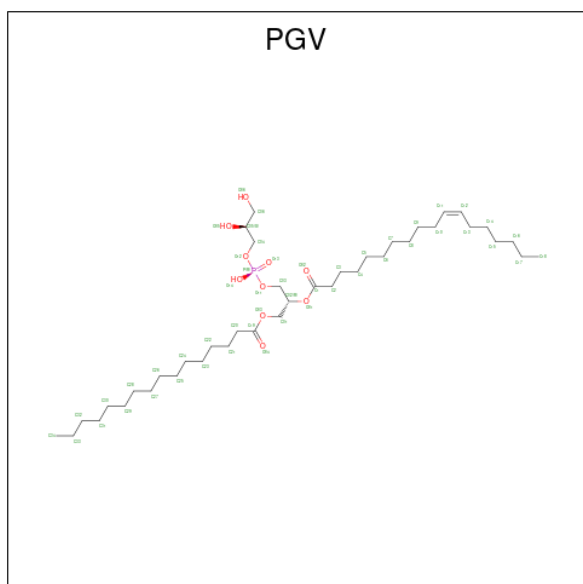
Mol	Chain	Residues	Atoms					AltConf	Trace
11	9	29	Total	C	N	O	S	0	0
			233	158	38	36	1		

- Molecule 12 is HEME C (three-letter code: HEC) (formula:  $C_{34}H_{34}FeN_4O_4$ ) (labeled as "Ligand of Interest" by depositor).



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

- Molecule 13 is (1R)-2-{{{[(2S)-2,3-DIHYDROXYPROPYL]OXY}}(HYDROXY)PHOSPHORYL]OXY}-1-[(PALMITOYLOXY)METHYL]ETHYL (11E)-OCTADEC-11-ENOATE (three-letter code: PGV) (formula:  $C_{40}H_{77}O_{10}P$ ).



Mol	Chain	Residues	Atoms				AltConf
13	C	1	Total	C	O		0
			28	24	4		
13	C	1	Total	C	O	P	0
			32	23	8	1	
13	C	1	Total	C	O	P	0
			38	27	10	1	
13	L	1	Total	C	O	P	0
			48	37	10	1	
13	L	1	Total	C	O	P	0
			46	35	10	1	
13	L	1	Total	C	O	P	0
			44	33	10	1	
13	L	1	Total	C	O	P	0
			48	37	10	1	
13	M	1	Total	C	O	P	0
			32	23	8	1	
13	M	1	Total	C	O	P	0
			32	21	10	1	
13	H	1	Total	C	O	P	0
			32	21	10	1	
13	H	1	Total	C	O	P	0
			42	33	8	1	
13	H	1	Total	C	O	P	0
			47	36	10	1	
13	H	1	Total	C	O	P	0
			33	22	10	1	
13	H	1	Total	C	O	P	0
			42	31	10	1	
13	4	1	Total	C	O	P	0
			37	26	10	1	
13	w	1	Total	C	O	P	0
			39	30	8	1	
13	v	1	Total	C	O		0
			42	37	5		
13	Y	1	Total	C	O	P	0
			51	40	10	1	
13	Y	1	Total	C	O	P	0
			40	31	8	1	
13	X	1	Total	C	O		0
			42	37	5		
13	b	1	Total	C	O	P	0
			37	28	8	1	
13	a	1	Total	C	O		0
			42	37	5		

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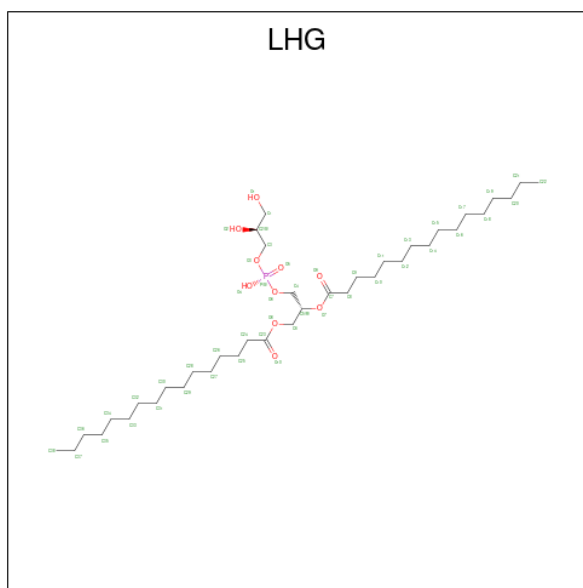
Mol	Chain	Residues	Atoms	AltConf
13	k	1	Total C O P 46 37 8 1	0
13	j	1	Total C O 42 37 5	0
13	n	1	Total C O P 37 28 8 1	0
13	m	1	Total C O 42 37 5	0
13	t	1	Total C O P 39 30 8 1	0
13	s	1	Total C O 42 37 5	0
13	z	1	Total C O P 38 29 8 1	0
13	5	1	Total C O 41 36 5	0
13	F	1	Total C O P 36 27 8 1	0
13	8	1	Total C O 42 37 5	0
13	K	1	Total C O P 40 31 8 1	0
13	K	1	Total C O P 25 16 8 1	0
13	I	1	Total C O 36 31 5	0
13	P	1	Total C O P 40 31 8 1	0
13	P	1	Total C O P 45 34 10 1	0
13	O	1	Total C O 42 37 5	0
13	S	1	Total C O P 40 31 8 1	0
13	R	1	Total C O 42 37 5	0
13	V	1	Total C O P 39 30 8 1	0
13	U	1	Total C O 42 37 5	0
13	e	1	Total C O P 40 31 8 1	0

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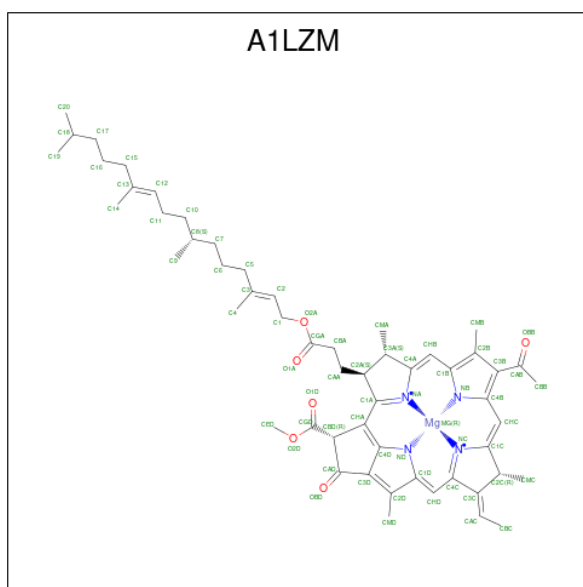
Mol	Chain	Residues	Atoms	AltConf
13	d	1	Total C O 42 37 5	0
13	h	1	Total C O P 36 27 8 1	0
13	g	1	Total C O 42 37 5	0
13	q	1	Total C O P 40 31 8 1	0
13	p	1	Total C O 39 34 5	0
13	9	1	Total C O P 25 16 8 1	0
13	9	1	Total C O P 38 29 8 1	0

- Molecule 14 is 1,2-DIPALMITOYL-PHOSPHATIDYL-GLYCEROLE (three-letter code: LHG) (formula:  $C_{38}H_{75}O_{10}P$ ).



Mol	Chain	Residues	Atoms	AltConf
14	C	1	Total C O 10 9 1	0

- Molecule 15 is Trans-Geranyl Bacteriochlorophyll B (three-letter code: A1LZM) (formula:  $C_{55}H_{70}MgN_4O_6$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf	
15	L	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	L	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	M	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	M	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	4	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	3	1	Total	C	Mg	N	O	0
			51	40	1	4	6	
15	w	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	w	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	w	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	Y	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	Y	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	Z	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	b	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	b	1	Total	C	Mg	N	O	0
			66	55	1	4	6	

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Mol	Chain	Residues	Atoms				AltConf	
			Total	C	Mg	N		O
15	c	1	66	55	1	4	6	0
15	k	1	66	55	1	4	6	0
15	k	1	66	55	1	4	6	0
15	l	1	66	55	1	4	6	0
15	n	1	66	55	1	4	6	0
15	n	1	66	55	1	4	6	0
15	o	1	66	55	1	4	6	0
15	t	1	66	55	1	4	6	0
15	t	1	66	55	1	4	6	0
15	u	1	66	55	1	4	6	0
15	z	1	66	55	1	4	6	0
15	z	1	66	55	1	4	6	0
15	1	1	66	55	1	4	6	0
15	6	1	66	55	1	4	6	0
15	6	1	66	55	1	4	6	0
15	7	1	66	55	1	4	6	0
15	F	1	66	55	1	4	6	0
15	F	1	66	55	1	4	6	0
15	G	1	66	55	1	4	6	0
15	K	1	66	55	1	4	6	0
15	K	1	66	55	1	4	6	0

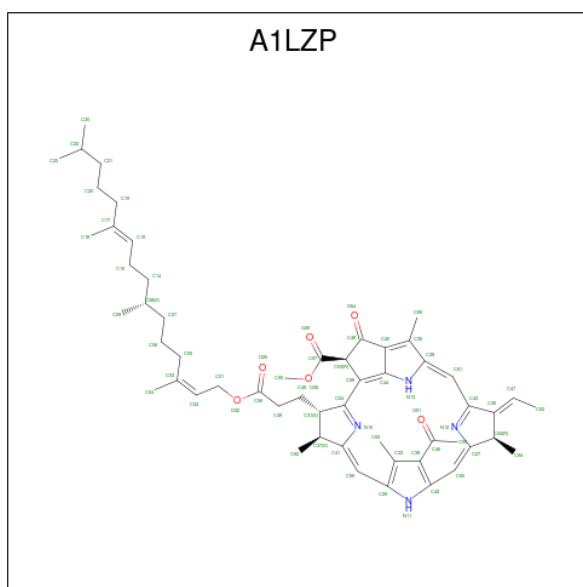
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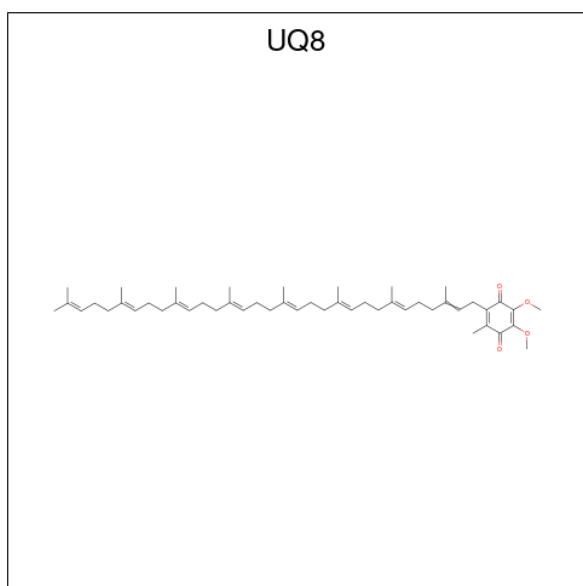
Mol	Chain	Residues	Atoms					AltConf
15	N	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	P	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	P	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	P	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	S	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	S	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	S	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	V	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	V	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	W	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	e	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	e	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	f	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	h	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	h	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	i	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	q	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	q	1	Total	C	Mg	N	O	0
			66	55	1	4	6	
15	r	1	Total	C	Mg	N	O	0
			66	55	1	4	6	

- Molecule 16 is Trans-Geranyl Bacteriopheophytin B (three-letter code: A1LZP) (formula:  $C_{55}H_{72}N_4O_6$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
16	L	1	65	55	4	6	0
16	M	1	65	55	4	6	0

- Molecule 17 is Ubiquinone-8 (three-letter code: UQ8) (formula:  $C_{49}H_{74}O_4$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			AltConf
			Total	C	O	
17	L	1	33	29	4	0

- Molecule 18 is UNKNOWN LIGAND (three-letter code: UNL) (formula: ).

Mol	Chain	Residues	Atoms	AltConf
18	L	2	Total C 24 24	0
18	M	3	Total C 50 50	0
18	4	1	Total C 15 15	0
18	v	3	Total C 27 27	0
18	X	3	Total C 25 25	0
18	b	2	Total C 32 32	0
18	a	3	Total C 25 25	0
18	k	1	Total C 18 18	0
18	j	3	Total C 23 23	0
18	n	1	Total C 9 9	0
18	m	3	Total C 24 24	0
18	s	3	Total C 23 23	0
18	l	1	Total C 10 10	0
18	y	1	Total C 7 7	0
18	F	1	Total C 12 12	0
18	8	2	Total C 17 17	0
18	K	1	Total C 18 18	0
18	I	3	Total C 29 29	0
18	O	3	Total C 24 24	0
18	R	3	Total C 27 27	0
18	U	3	Total C 27 27	0

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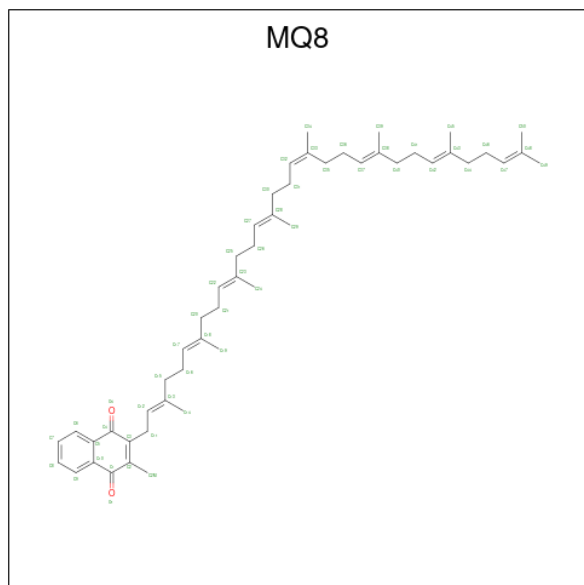
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Mol	Chain	Residues	Atoms	AltConf
18	d	3	Total C 27 27	0
18	g	3	Total C 26 26	0
18	q	1	Total C 12 12	0
18	p	3	Total C 25 25	0
18	9	1	Total C 16 16	0

- Molecule 19 is FE (III) ION (three-letter code: FE) (formula: Fe) (labeled as "Ligand of Interest" by depositor).

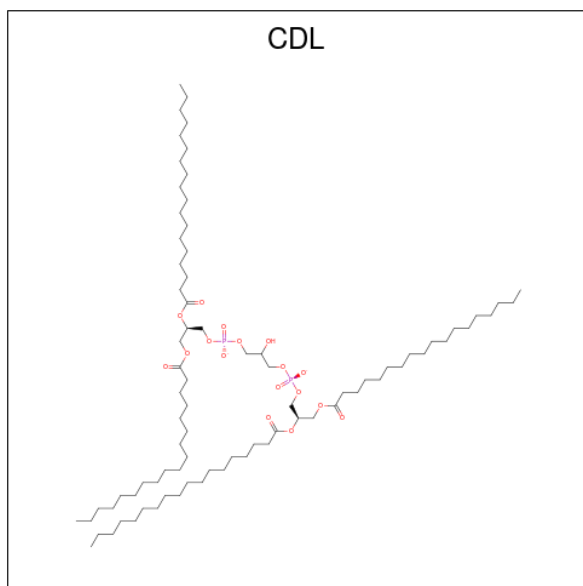
Mol	Chain	Residues	Atoms	AltConf
19	M	1	Total Fe 1 1	0

- Molecule 20 is MENAQUINONE 8 (three-letter code: MQ8) (formula: C<sub>51</sub>H<sub>72</sub>O<sub>2</sub>) (labeled as "Ligand of Interest" by depositor).



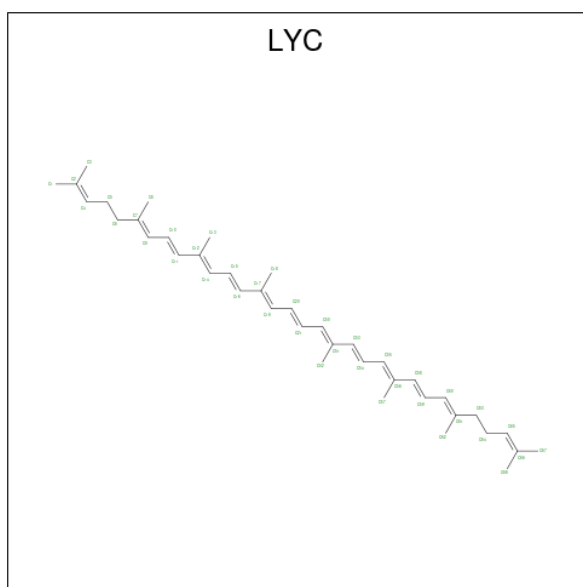
Mol	Chain	Residues	Atoms	AltConf
20	M	1	Total C O 53 51 2	0
20	M	1	Total C O 23 21 2	0

- Molecule 21 is CARDIOLIPIN (three-letter code: CDL) (formula:  $C_{81}H_{156}O_{17}P_2$ ).



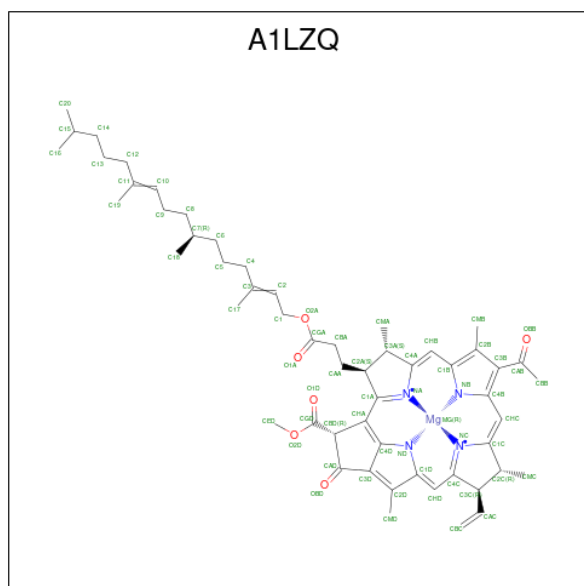
Mol	Chain	Residues	Atoms				AltConf
			Total	C	O	P	
21	M	1	83	64	17	2	0
21	M	1	54	35	17	2	0
21	H	1	77	58	17	2	0

- Molecule 22 is LYCOPENE (three-letter code: LYC) (formula:  $C_{40}H_{56}$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	AltConf
22	3	1	Total C 40 40	0

- Molecule 23 is Trans-Geranyl 8-vinyl-bacteriochlorophyll B (three-letter code: A1LZQ) (formula:  $C_{55}H_{70}MgN_4O_6$ ) (labeled as "Ligand of Interest" by depositor).



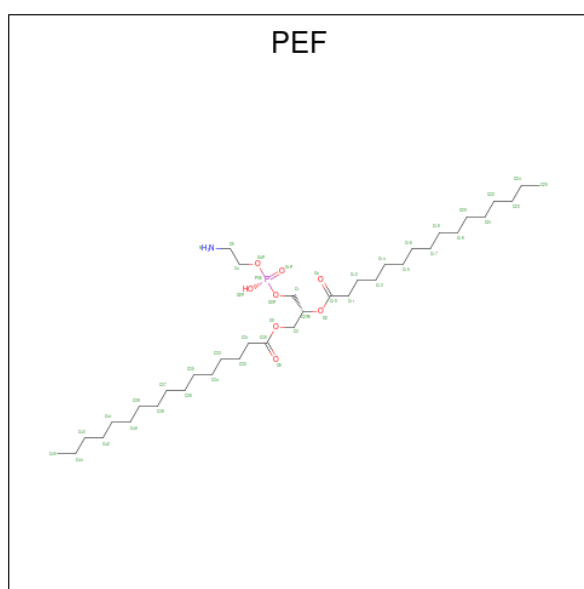
Mol	Chain	Residues	Atoms				AltConf	
			Total	C	Mg	N		O
23	x	1	Total	C	Mg	N	O	0
			46	35	1	4	6	
23	Z	1	Total	C	Mg	N	O	0
			46	35	1	4	6	
23	c	1	Total	C	Mg	N	O	0
			46	35	1	4	6	
23	l	1	Total	C	Mg	N	O	0
			46	35	1	4	6	
23	o	1	Total	C	Mg	N	O	0
			46	35	1	4	6	
23	u	1	Total	C	Mg	N	O	0
			46	35	1	4	6	
23	1	1	Total	C	Mg	N	O	0
			46	35	1	4	6	
23	7	1	Total	C	Mg	N	O	0
			46	35	1	4	6	
23	G	1	Total	C	Mg	N	O	0
			46	35	1	4	6	
23	N	1	Total	C	Mg	N	O	0
			46	35	1	4	6	

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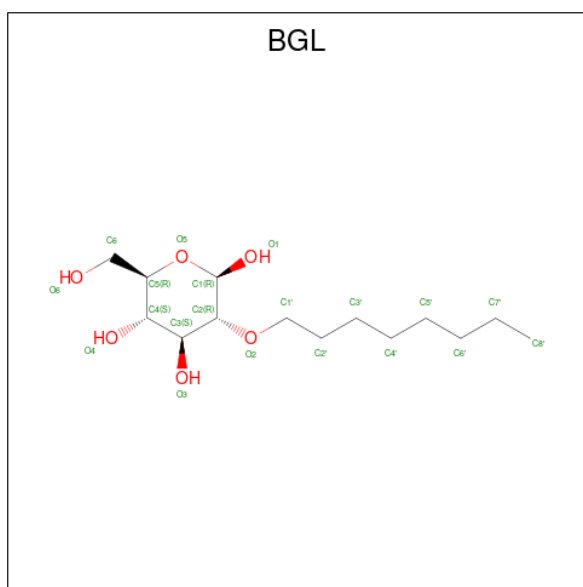
Mol	Chain	Residues	Atoms					AltConf
			Total	C	Mg	N	O	
23	Q	1	Total 46	C 35	Mg 1	N 4	O 6	0
23	T	1	Total 46	C 35	Mg 1	N 4	O 6	0
23	W	1	Total 46	C 35	Mg 1	N 4	O 6	0
23	f	1	Total 46	C 35	Mg 1	N 4	O 6	0
23	i	1	Total 46	C 35	Mg 1	N 4	O 6	0
23	r	1	Total 46	C 35	Mg 1	N 4	O 6	0

- Molecule 24 is DI-PALMITOYL-3-SN-PHOSPHATIDYLETHANOLAMINE (three-letter code: PEF) (formula:  $C_{37}H_{74}NO_8P$ ).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
24	K	1	Total 39	C 29	N 1	O 8	P 1	0

- Molecule 25 is 2-O-octyl-beta-D-glucopyranose (three-letter code: BGL) (formula:  $C_{14}H_{28}O_6$ ).



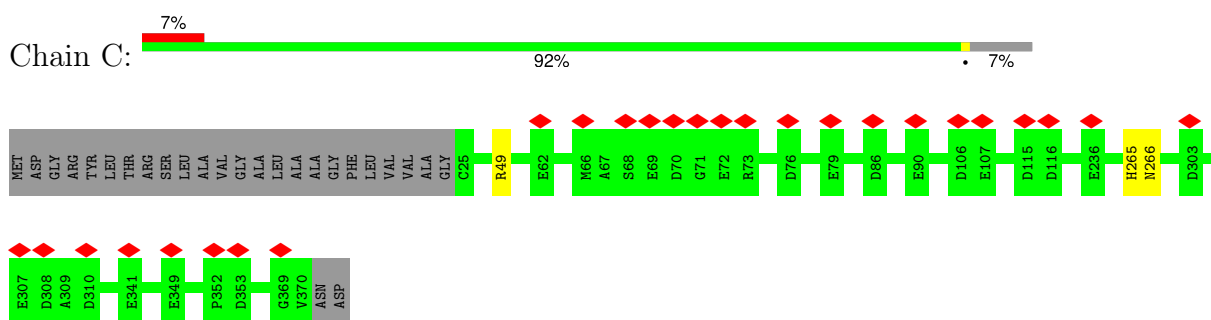
Mol	Chain	Residues	Atoms			AltConf
25	S	1	Total	C	O	0
			20	14	6	
25	h	1	Total	C	O	0
			20	14	6	



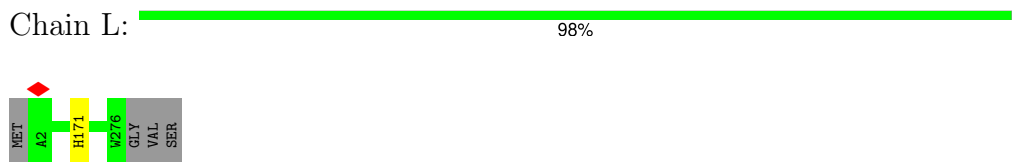
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and 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.

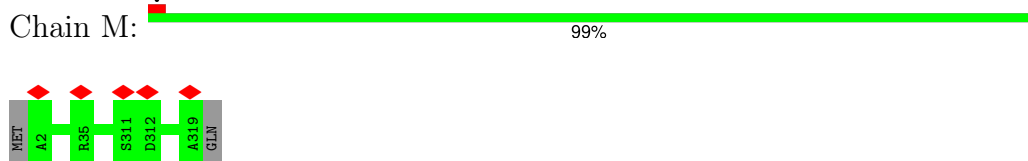
- Molecule 1: Photosynthetic reaction center cytochrome c subunit



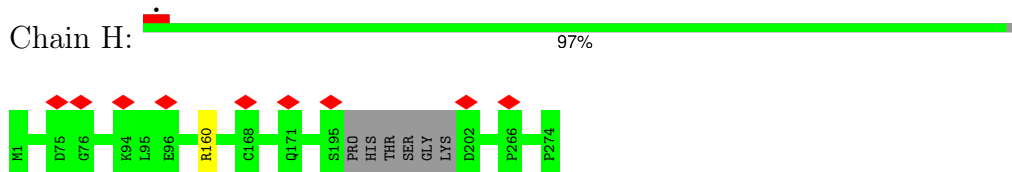
- Molecule 2: Reaction center protein L chain



- Molecule 3: Reaction center protein M chain

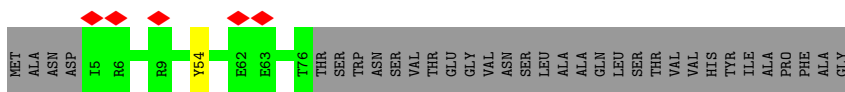


- Molecule 4: Photosynthetic reaction center H subunit

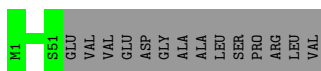
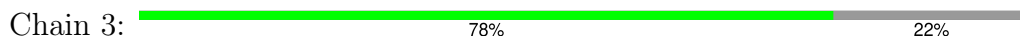


- Molecule 5: Antenna complex alpha/beta subunit domain-containing protein

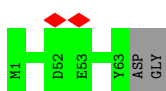




- Molecule 6: Light-harvesting LHI



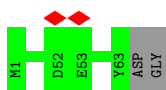
- Molecule 7: Antenna complex alpha/beta subunit domain-containing protein



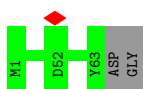
- Molecule 7: Antenna complex alpha/beta subunit domain-containing protein



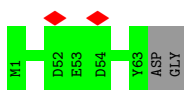
- Molecule 7: Antenna complex alpha/beta subunit domain-containing protein



- Molecule 7: Antenna complex alpha/beta subunit domain-containing protein

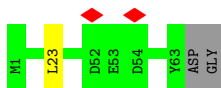


- Molecule 7: Antenna complex alpha/beta subunit domain-containing protein



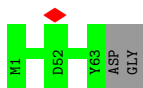
- Molecule 7: Antenna complex alpha/beta subunit domain-containing protein

Chain t:  95%



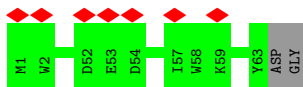
- Molecule 7: Antenna complex alpha/beta subunit domain-containing protein

Chain z:  97%



- Molecule 7: Antenna complex alpha/beta subunit domain-containing protein

Chain 6:  11% 97%



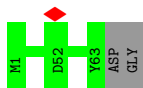
- Molecule 7: Antenna complex alpha/beta subunit domain-containing protein

Chain F:  97%



- Molecule 7: Antenna complex alpha/beta subunit domain-containing protein

Chain K:  97%



- Molecule 7: Antenna complex alpha/beta subunit domain-containing protein

Chain P:  97%

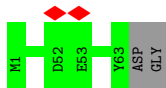


- Molecule 7: Antenna complex alpha/beta subunit domain-containing protein

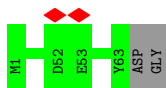
Chain S:  97%



- Molecule 7: Antenna complex alpha/beta subunit domain-containing protein



- Molecule 7: Antenna complex alpha/beta subunit domain-containing protein



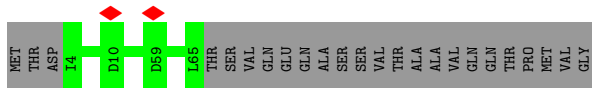
- Molecule 7: Antenna complex alpha/beta subunit domain-containing protein



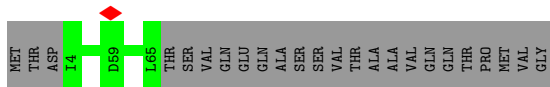
- Molecule 7: Antenna complex alpha/beta subunit domain-containing protein



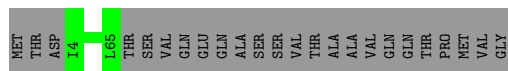
- Molecule 8: Beta subunit of light-harvesting 1



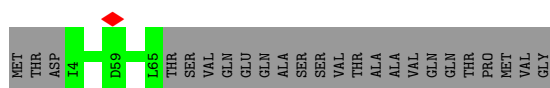
- Molecule 8: Beta subunit of light-harvesting 1



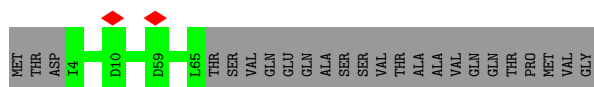
- Molecule 8: Beta subunit of light-harvesting 1



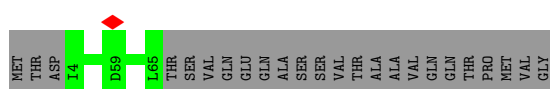
● Molecule 8: Beta subunit of light-harvesting 1



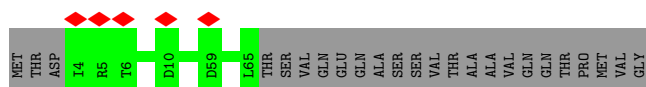
● Molecule 8: Beta subunit of light-harvesting 1



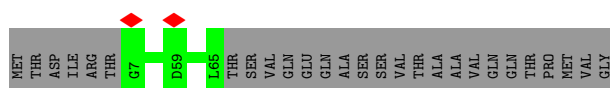
● Molecule 8: Beta subunit of light-harvesting 1



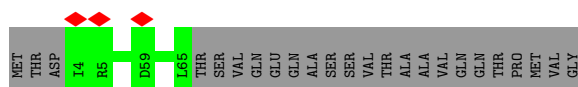
● Molecule 8: Beta subunit of light-harvesting 1



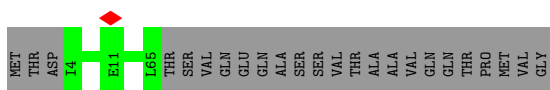
● Molecule 8: Beta subunit of light-harvesting 1



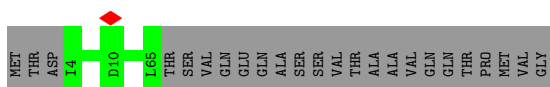
● Molecule 8: Beta subunit of light-harvesting 1



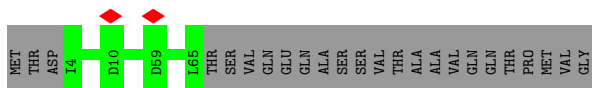
- Molecule 8: Beta subunit of light-harvesting 1



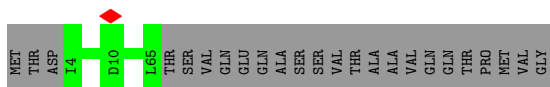
- Molecule 8: Beta subunit of light-harvesting 1



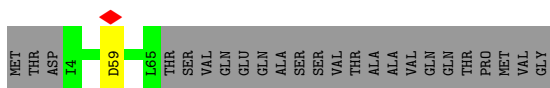
- Molecule 8: Beta subunit of light-harvesting 1



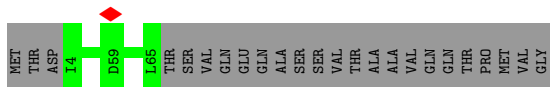
- Molecule 8: Beta subunit of light-harvesting 1



- Molecule 8: Beta subunit of light-harvesting 1

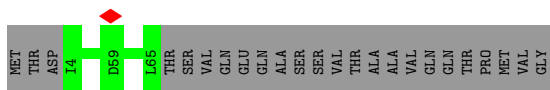


- Molecule 8: Beta subunit of light-harvesting 1



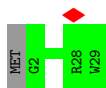
- Molecule 8: Beta subunit of light-harvesting 1





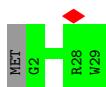
- Molecule 9: Gamma subunit of light-harvesting 1

Chain v: 97%



- Molecule 9: Gamma subunit of light-harvesting 1

Chain X: 97%



- Molecule 9: Gamma subunit of light-harvesting 1

Chain a: 97%



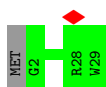
- Molecule 9: Gamma subunit of light-harvesting 1

Chain j: 97%



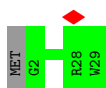
- Molecule 9: Gamma subunit of light-harvesting 1

Chain m: 97%

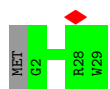


- Molecule 9: Gamma subunit of light-harvesting 1

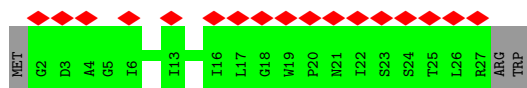
Chain s: 97%



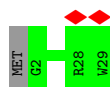
- Molecule 9: Gamma subunit of light-harvesting 1



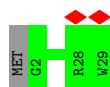
• Molecule 9: Gamma subunit of light-harvesting 1



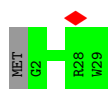
• Molecule 9: Gamma subunit of light-harvesting 1



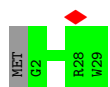
• Molecule 9: Gamma subunit of light-harvesting 1



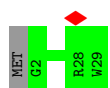
• Molecule 9: Gamma subunit of light-harvesting 1



• Molecule 9: Gamma subunit of light-harvesting 1



• Molecule 9: Gamma subunit of light-harvesting 1





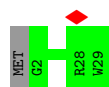
- Molecule 9: Gamma subunit of light-harvesting 1

Chain d:  97%



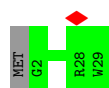
- Molecule 9: Gamma subunit of light-harvesting 1

Chain g:  97%



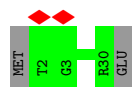
- Molecule 9: Gamma subunit of light-harvesting 1

Chain p:  97%




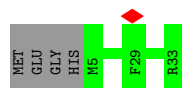
- Molecule 10: reaction center small polypeptide

Chain 2:  6% 94% 6%



- Molecule 11: reactin center small polypeptide

Chain 9:  88% 12%



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	353518	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	60.8	Depositor
Minimum defocus (nm)	700	Depositor
Maximum defocus (nm)	2300	Depositor
Magnification	Not provided	
Image detector	GATAN K2 BASE (4k x 4k)	Depositor
Maximum map value	2.882	Depositor
Minimum map value	-1.656	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.074	Depositor
Recommended contour level	0.4	Depositor
Map size ( $\text{\AA}$ )	367.19998, 367.19998, 367.19998	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.02, 1.02, 1.02	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: LYC, FE, HEC, A1LZP, UQ8, MQ8, PEF, BGL, PGV, A1LZM, UNL, A1LZQ, LHG, CDL

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	C	0.37	0/2798	0.55	2/3802 (0.1%)
2	L	0.36	0/2273	0.50	0/3104
3	M	0.39	0/2646	0.52	0/3617
4	H	0.36	0/2222	0.55	0/3022
5	4	0.37	0/640	0.50	0/876
6	3	0.32	0/447	0.50	0/611
7	6	0.33	0/555	0.44	0/752
7	F	0.32	0/555	0.45	0/752
7	K	0.34	0/555	0.45	0/752
7	P	0.35	0/555	0.46	0/752
7	S	0.37	0/555	0.45	0/752
7	V	0.33	0/555	0.44	0/752
7	Y	0.34	0/555	0.45	0/752
7	b	0.36	0/555	0.45	0/752
7	e	0.40	0/555	0.49	0/752
7	h	0.34	0/555	0.46	0/752
7	k	0.34	0/555	0.46	0/752
7	n	0.34	0/555	0.45	0/752
7	q	0.34	0/555	0.47	0/752
7	t	0.35	0/555	0.51	1/752 (0.1%)
7	w	0.35	0/555	0.45	0/752
7	z	0.35	0/555	0.45	0/752
8	1	0.34	0/511	0.52	0/692
8	7	0.36	0/485	0.50	0/657
8	G	0.36	0/511	0.49	0/692
8	N	0.38	0/511	0.52	0/692
8	Q	0.32	0/511	0.51	0/692
8	T	0.32	0/511	0.51	0/692
8	W	0.32	0/511	0.50	0/692
8	Z	0.32	0/511	0.51	0/692
8	c	0.33	0/511	0.51	0/692
8	f	0.33	0/511	0.56	1/692 (0.1%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
8	i	0.33	0/511	0.50	0/692
8	l	0.33	0/511	0.50	0/692
8	o	0.33	0/511	0.51	0/692
8	r	0.32	0/511	0.49	0/692
8	u	0.33	0/511	0.52	0/692
8	x	0.33	0/511	0.51	0/692
9	5	0.23	0/188	0.41	0/258
9	8	0.25	0/215	0.45	0/295
9	I	0.25	0/215	0.44	0/295
9	O	0.41	0/215	0.48	0/295
9	R	0.39	0/215	0.46	0/295
9	U	0.30	0/215	0.46	0/295
9	X	0.38	0/215	0.51	0/295
9	a	0.26	0/215	0.44	0/295
9	d	0.24	0/215	0.46	0/295
9	g	0.26	0/215	0.44	0/295
9	j	0.25	0/215	0.46	0/295
9	m	0.29	0/215	0.48	0/295
9	p	0.26	0/215	0.46	0/295
9	s	0.23	0/215	0.45	0/295
9	v	0.24	0/215	0.43	0/295
9	y	0.24	0/215	0.44	0/295
10	2	0.29	0/241	0.45	0/331
11	9	0.26	0/239	0.46	0/327
All	All	0.34	0/31949	0.50	4/43442 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	266	ASN	N-CA-C	-6.91	92.36	111.00
1	C	265	HIS	CB-CA-C	-5.72	98.95	110.40
7	t	23	LEU	CA-CB-CG	5.15	127.14	115.30
8	f	59	ASP	CB-CG-OD1	5.05	122.85	118.30

There are no chirality outliers.

There are no planarity outliers.

## 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	C	344/372 (92%)	330 (96%)	14 (4%)	0	100	100
2	L	273/279 (98%)	264 (97%)	9 (3%)	0	100	100
3	M	316/320 (99%)	307 (97%)	9 (3%)	0	100	100
4	H	264/274 (96%)	258 (98%)	6 (2%)	0	100	100
5	4	70/105 (67%)	67 (96%)	3 (4%)	0	100	100
6	3	49/65 (75%)	49 (100%)	0	0	100	100
7	6	61/65 (94%)	61 (100%)	0	0	100	100
7	F	61/65 (94%)	61 (100%)	0	0	100	100
7	K	61/65 (94%)	60 (98%)	1 (2%)	0	100	100
7	P	61/65 (94%)	61 (100%)	0	0	100	100
7	S	61/65 (94%)	60 (98%)	1 (2%)	0	100	100
7	V	61/65 (94%)	60 (98%)	1 (2%)	0	100	100
7	Y	61/65 (94%)	58 (95%)	3 (5%)	0	100	100
7	b	61/65 (94%)	59 (97%)	2 (3%)	0	100	100
7	e	61/65 (94%)	58 (95%)	3 (5%)	0	100	100
7	h	61/65 (94%)	61 (100%)	0	0	100	100
7	k	61/65 (94%)	58 (95%)	3 (5%)	0	100	100
7	n	61/65 (94%)	60 (98%)	1 (2%)	0	100	100
7	q	61/65 (94%)	61 (100%)	0	0	100	100
7	t	61/65 (94%)	60 (98%)	1 (2%)	0	100	100
7	w	61/65 (94%)	60 (98%)	1 (2%)	0	100	100
7	z	61/65 (94%)	61 (100%)	0	0	100	100
8	1	60/86 (70%)	59 (98%)	1 (2%)	0	100	100
8	7	57/86 (66%)	55 (96%)	2 (4%)	0	100	100
8	G	60/86 (70%)	60 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
8	N	60/86 (70%)	60 (100%)	0	0	100	100
8	Q	60/86 (70%)	59 (98%)	1 (2%)	0	100	100
8	T	60/86 (70%)	59 (98%)	1 (2%)	0	100	100
8	W	60/86 (70%)	59 (98%)	1 (2%)	0	100	100
8	Z	60/86 (70%)	60 (100%)	0	0	100	100
8	c	60/86 (70%)	59 (98%)	1 (2%)	0	100	100
8	f	60/86 (70%)	56 (93%)	4 (7%)	0	100	100
8	i	60/86 (70%)	59 (98%)	1 (2%)	0	100	100
8	l	60/86 (70%)	59 (98%)	1 (2%)	0	100	100
8	o	60/86 (70%)	60 (100%)	0	0	100	100
8	r	60/86 (70%)	59 (98%)	1 (2%)	0	100	100
8	u	60/86 (70%)	58 (97%)	2 (3%)	0	100	100
8	x	60/86 (70%)	59 (98%)	1 (2%)	0	100	100
9	5	24/29 (83%)	24 (100%)	0	0	100	100
9	8	26/29 (90%)	26 (100%)	0	0	100	100
9	I	26/29 (90%)	26 (100%)	0	0	100	100
9	O	26/29 (90%)	26 (100%)	0	0	100	100
9	R	26/29 (90%)	25 (96%)	1 (4%)	0	100	100
9	U	26/29 (90%)	26 (100%)	0	0	100	100
9	X	26/29 (90%)	26 (100%)	0	0	100	100
9	a	26/29 (90%)	26 (100%)	0	0	100	100
9	d	26/29 (90%)	25 (96%)	1 (4%)	0	100	100
9	g	26/29 (90%)	26 (100%)	0	0	100	100
9	j	26/29 (90%)	26 (100%)	0	0	100	100
9	m	26/29 (90%)	26 (100%)	0	0	100	100
9	p	26/29 (90%)	26 (100%)	0	0	100	100
9	s	26/29 (90%)	26 (100%)	0	0	100	100
9	v	26/29 (90%)	26 (100%)	0	0	100	100
9	y	26/29 (90%)	26 (100%)	0	0	100	100
10	2	27/31 (87%)	27 (100%)	0	0	100	100
11	9	27/33 (82%)	27 (100%)	0	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
All	All	3717/4359 (85%)	3640 (98%)	77 (2%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	C	294/311 (94%)	293 (100%)	1 (0%)	91	96
2	L	218/221 (99%)	217 (100%)	1 (0%)	86	94
3	M	253/255 (99%)	253 (100%)	0	100	100
4	H	229/234 (98%)	228 (100%)	1 (0%)	89	95
5	4	63/89 (71%)	62 (98%)	1 (2%)	58	75
6	3	45/56 (80%)	45 (100%)	0	100	100
7	6	52/53 (98%)	52 (100%)	0	100	100
7	F	52/53 (98%)	52 (100%)	0	100	100
7	K	52/53 (98%)	52 (100%)	0	100	100
7	P	52/53 (98%)	52 (100%)	0	100	100
7	S	52/53 (98%)	52 (100%)	0	100	100
7	V	52/53 (98%)	52 (100%)	0	100	100
7	Y	52/53 (98%)	52 (100%)	0	100	100
7	b	52/53 (98%)	52 (100%)	0	100	100
7	e	52/53 (98%)	52 (100%)	0	100	100
7	h	52/53 (98%)	52 (100%)	0	100	100
7	k	52/53 (98%)	52 (100%)	0	100	100
7	n	52/53 (98%)	52 (100%)	0	100	100
7	q	52/53 (98%)	52 (100%)	0	100	100
7	t	52/53 (98%)	52 (100%)	0	100	100
7	w	52/53 (98%)	52 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
7	z	52/53 (98%)	52 (100%)	0	100	100
8	1	49/69 (71%)	49 (100%)	0	100	100
8	7	46/69 (67%)	46 (100%)	0	100	100
8	G	49/69 (71%)	49 (100%)	0	100	100
8	N	49/69 (71%)	49 (100%)	0	100	100
8	Q	49/69 (71%)	49 (100%)	0	100	100
8	T	49/69 (71%)	49 (100%)	0	100	100
8	W	49/69 (71%)	49 (100%)	0	100	100
8	Z	49/69 (71%)	49 (100%)	0	100	100
8	c	49/69 (71%)	49 (100%)	0	100	100
8	f	49/69 (71%)	49 (100%)	0	100	100
8	i	49/69 (71%)	49 (100%)	0	100	100
8	l	49/69 (71%)	49 (100%)	0	100	100
8	o	49/69 (71%)	49 (100%)	0	100	100
8	r	49/69 (71%)	49 (100%)	0	100	100
8	u	49/69 (71%)	49 (100%)	0	100	100
8	x	49/69 (71%)	49 (100%)	0	100	100
9	5	20/23 (87%)	20 (100%)	0	100	100
9	8	22/23 (96%)	22 (100%)	0	100	100
9	I	22/23 (96%)	22 (100%)	0	100	100
9	O	22/23 (96%)	22 (100%)	0	100	100
9	R	22/23 (96%)	22 (100%)	0	100	100
9	U	22/23 (96%)	22 (100%)	0	100	100
9	X	22/23 (96%)	22 (100%)	0	100	100
9	a	22/23 (96%)	22 (100%)	0	100	100
9	d	22/23 (96%)	22 (100%)	0	100	100
9	g	22/23 (96%)	22 (100%)	0	100	100
9	j	22/23 (96%)	22 (100%)	0	100	100
9	m	22/23 (96%)	22 (100%)	0	100	100
9	p	22/23 (96%)	22 (100%)	0	100	100
9	s	22/23 (96%)	22 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
9	v	22/23 (96%)	22 (100%)	0	100	100
9	y	22/23 (96%)	22 (100%)	0	100	100
10	2	21/23 (91%)	21 (100%)	0	100	100
11	9	24/27 (89%)	24 (100%)	0	100	100
All	All	3110/3536 (88%)	3106 (100%)	4 (0%)	92	97

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	49	ARG
2	L	171	HIS
4	H	160	ARG
5	4	54	TYR

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

Mol	Chain	Res	Type
2	L	167	HIS
9	a	21	ASN
8	1	20	ASN
9	g	21	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 oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 195 ligands modelled in this entry, 57 are unknown and 1 is monoatomic - leaving 137 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
23	A1LZQ	f	102	-	43,54,74	2.27	16 (37%)	47,91,115	2.87	20 (42%)
13	PGV	p	104	-	38,38,50	1.01	2 (5%)	40,40,56	1.07	2 (5%)
13	PGV	I	101	-	35,35,50	1.05	2 (5%)	37,37,56	1.07	2 (5%)
13	PGV	L	309	-	43,43,50	0.99	2 (4%)	46,49,56	1.04	3 (6%)
13	PGV	9	102	-	24,24,50	1.35	2 (8%)	27,29,56	1.42	4 (14%)
15	A1LZM	b	102	-	63,74,74	2.25	16 (25%)	72,115,115	2.44	25 (34%)
13	PGV	h	104	-	35,35,50	1.11	2 (5%)	38,40,56	1.22	4 (10%)
13	PGV	L	306	-	45,45,50	0.97	2 (4%)	48,51,56	1.03	4 (8%)
15	A1LZM	w	102	-	63,74,74	2.03	12 (19%)	72,115,115	2.92	28 (38%)
13	PGV	O	104	-	41,41,50	0.98	2 (4%)	43,43,56	1.10	3 (6%)
15	A1LZM	n	101	-	63,74,74	2.10	14 (22%)	72,115,115	2.60	25 (34%)
15	A1LZM	S	103	8	63,74,74	2.21	17 (26%)	72,115,115	2.69	26 (36%)
13	PGV	C	408	-	37,37,50	1.05	2 (5%)	40,43,56	1.23	4 (10%)
23	A1LZQ	x	101	-	43,54,74	2.34	14 (32%)	47,91,115	6.66	20 (42%)
15	A1LZM	h	101	-	63,74,74	2.10	14 (22%)	72,115,115	2.69	24 (33%)
13	PGV	t	103	-	38,38,50	1.09	2 (5%)	41,43,56	1.14	4 (9%)
13	PGV	L	305	-	47,47,50	0.95	2 (4%)	50,53,56	1.00	3 (6%)
15	A1LZM	e	101	-	63,74,74	2.10	15 (23%)	72,115,115	2.58	26 (36%)
13	PGV	5	101	-	40,40,50	1.01	2 (5%)	42,42,56	1.03	2 (4%)
15	A1LZM	i	101	8	63,74,74	2.01	13 (20%)	72,115,115	2.63	22 (30%)
13	PGV	H	302	-	41,41,50	1.04	2 (4%)	44,46,56	1.08	3 (6%)
13	PGV	j	104	-	41,41,50	0.98	2 (4%)	43,43,56	1.05	2 (4%)
13	PGV	V	103	-	38,38,50	1.09	2 (5%)	41,43,56	1.15	4 (9%)
14	LHG	C	406	-	8,9,48	0.68	0	7,8,54	1.95	1 (14%)
15	A1LZM	P	101	-	63,74,74	2.10	14 (22%)	72,115,115	2.59	25 (34%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
23	A1LZQ	T	101	-	43,54,74	2.31	14 (32%)	47,91,115	2.70	20 (42%)
15	A1LZM	P	103	8	63,74,74	2.02	12 (19%)	72,115,115	2.71	24 (33%)
13	PGV	n	104	-	36,36,50	1.11	2 (5%)	39,41,56	1.21	5 (12%)
17	UQ8	L	304	-	33,33,53	0.85	2 (6%)	42,43,67	1.06	4 (9%)
23	A1LZQ	7	102	-	43,54,74	2.42	14 (32%)	47,91,115	2.62	23 (48%)
15	A1LZM	M	702	-	63,74,74	2.07	15 (23%)	72,115,115	2.72	24 (33%)
15	A1LZM	h	102	-	63,74,74	1.98	12 (19%)	72,115,115	2.95	28 (38%)
15	A1LZM	t	102	-	63,74,74	2.06	16 (25%)	72,115,115	2.75	23 (31%)
13	PGV	q	104	-	39,39,50	1.05	2 (5%)	42,44,56	1.21	5 (11%)
15	A1LZM	V	101	-	63,74,74	2.09	15 (23%)	72,115,115	2.58	26 (36%)
15	A1LZM	z	101	-	63,74,74	2.10	15 (23%)	72,115,115	2.66	28 (38%)
13	PGV	K	103	-	39,39,50	1.06	2 (5%)	42,44,56	1.18	4 (9%)
15	A1LZM	4	201	-	63,74,74	2.08	15 (23%)	72,115,115	2.68	22 (30%)
15	A1LZM	Y	101	-	63,74,74	2.12	14 (22%)	72,115,115	2.65	24 (33%)
15	A1LZM	W	101	8	63,74,74	2.17	15 (23%)	72,115,115	2.55	21 (29%)
21	CDL	H	304	-	76,76,99	0.31	0	82,88,111	0.50	0
13	PGV	X	104	-	41,41,50	0.98	2 (4%)	43,43,56	1.13	3 (6%)
23	A1LZQ	r	102	-	43,54,74	2.33	14 (32%)	47,91,115	2.68	19 (40%)
23	A1LZQ	W	102	-	43,54,74	2.31	14 (32%)	47,91,115	2.68	19 (40%)
13	PGV	S	105	-	39,39,50	1.07	2 (5%)	42,44,56	1.07	3 (7%)
15	A1LZM	z	102	-	63,74,74	2.05	15 (23%)	72,115,115	2.68	25 (34%)
15	A1LZM	k	102	-	63,74,74	2.01	15 (23%)	72,115,115	2.83	24 (33%)
13	PGV	U	104	-	41,41,50	0.99	2 (4%)	43,43,56	1.18	3 (6%)
15	A1LZM	N	101	8	63,74,74	2.02	10 (15%)	72,115,115	2.61	22 (30%)
23	A1LZQ	G	102	-	43,54,74	2.33	15 (34%)	47,91,115	2.69	19 (40%)
13	PGV	d	104	-	41,41,50	0.97	2 (4%)	43,43,56	1.05	2 (4%)
15	A1LZM	K	102	-	63,74,74	2.01	13 (20%)	72,115,115	2.85	30 (41%)
23	A1LZQ	u	102	-	43,54,74	2.36	14 (32%)	47,91,115	2.64	20 (42%)
13	PGV	R	104	-	41,41,50	0.97	2 (4%)	43,43,56	1.11	4 (9%)
23	A1LZQ	Q	101	-	43,54,74	2.32	14 (32%)	47,91,115	2.71	21 (44%)
15	A1LZM	G	101	8	63,74,74	2.04	15 (23%)	72,115,115	2.61	24 (33%)
15	A1LZM	F	102	-	63,74,74	2.06	16 (25%)	72,115,115	2.72	24 (33%)
15	A1LZM	t	101	-	63,74,74	2.11	15 (23%)	72,115,115	2.62	23 (31%)
13	PGV	C	405	-	27,27,50	1.26	3 (11%)	29,29,56	1.39	3 (10%)
15	A1LZM	e	102	-	63,74,74	1.98	15 (23%)	72,115,115	2.82	27 (37%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
15	A1LZM	S	102	-	63,74,74	2.01	16 (25%)	72,115,115	2.77	24 (33%)
13	PGV	z	103	-	37,37,50	1.11	2 (5%)	40,42,56	1.26	4 (10%)
20	MQ8	M	705	-	54,54,54	0.40	0	67,69,69	0.49	1 (1%)
13	PGV	g	104	-	41,41,50	0.97	2 (4%)	43,43,56	0.95	2 (4%)
15	A1LZM	o	101	8	63,74,74	2.24	17 (26%)	72,115,115	2.80	29 (40%)
15	A1LZM	f	101	8	63,74,74	2.03	14 (22%)	72,115,115	2.67	24 (33%)
24	PEF	K	106	-	38,38,46	0.32	0	41,43,51	0.41	0
15	A1LZM	P	102	-	63,74,74	2.01	13 (20%)	72,115,115	2.87	28 (38%)
22	LYC	3	101	-	39,39,39	1.32	6 (15%)	46,46,46	1.54	11 (23%)
25	BGL	S	104	-	20,20,20	0.39	0	24,25,25	0.51	0
15	A1LZM	3	102	-	48,59,74	2.31	13 (27%)	54,97,115	3.22	22 (40%)
13	PGV	s	104	-	41,41,50	0.99	2 (4%)	43,43,56	1.04	3 (6%)
15	A1LZM	M	703	-	63,74,74	2.16	17 (26%)	72,115,115	2.99	28 (38%)
15	A1LZM	c	101	8	63,74,74	2.16	14 (22%)	72,115,115	2.25	25 (34%)
23	A1LZQ	c	102	-	43,54,74	2.33	14 (32%)	47,91,115	2.65	21 (44%)
23	A1LZQ	N	102	-	43,54,74	2.32	14 (32%)	47,91,115	2.70	20 (42%)
15	A1LZM	l	101	8	63,74,74	2.02	13 (20%)	72,115,115	2.61	23 (31%)
12	HEC	C	403	1	32,50,50	1.55	4 (12%)	30,82,82	1.52	3 (10%)
13	PGV	v	104	-	41,41,50	0.99	2 (4%)	43,43,56	1.14	4 (9%)
15	A1LZM	K	101	-	63,74,74	2.08	15 (23%)	72,115,115	2.60	23 (31%)
13	PGV	b	105	-	36,36,50	1.12	2 (5%)	39,41,56	1.18	4 (10%)
13	PGV	H	306	-	41,41,50	1.01	2 (4%)	44,47,56	1.06	4 (9%)
15	A1LZM	V	102	-	63,74,74	2.10	14 (22%)	72,115,115	2.70	26 (36%)
15	A1LZM	r	101	8	63,74,74	2.05	12 (19%)	72,115,115	2.62	22 (30%)
23	A1LZQ	l	102	-	43,54,74	2.32	14 (32%)	47,91,115	2.63	18 (38%)
13	PGV	4	203	-	36,36,50	1.11	2 (5%)	39,42,56	1.05	2 (5%)
15	A1LZM	L	302	-	63,74,74	2.09	15 (23%)	72,115,115	2.75	27 (37%)
13	PGV	M	708	-	31,31,50	1.15	2 (6%)	34,37,56	1.26	3 (8%)
12	HEC	C	401	1	32,50,50	1.53	4 (12%)	30,82,82	1.58	4 (13%)
13	PGV	H	303	-	46,46,50	0.94	2 (4%)	49,52,56	1.09	3 (6%)
12	HEC	C	404	1	32,50,50	1.53	4 (12%)	30,82,82	1.77	8 (26%)
21	CDL	M	710	-	53,53,99	0.35	0	59,65,111	0.40	0
15	A1LZM	S	101	-	63,74,74	2.08	15 (23%)	72,115,115	2.64	25 (34%)
13	PGV	H	305	-	32,32,50	1.15	2 (6%)	35,38,56	1.19	3 (8%)
15	A1LZM	q	102	-	63,74,74	2.06	16 (25%)	72,115,115	2.72	23 (31%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
20	MQ8	M	706	-	24,24,54	0.47	0	31,33,69	0.63	1 (3%)
13	PGV	K	104	-	24,24,50	1.36	2 (8%)	27,29,56	1.43	5 (18%)
15	A1LZM	u	101	8	63,74,74	2.24	18 (28%)	72,115,115	2.74	29 (40%)
23	A1LZQ	Z	102	-	43,54,74	2.36	14 (32%)	47,91,115	2.67	19 (40%)
15	A1LZM	q	101	-	63,74,74	2.10	14 (22%)	72,115,115	2.64	23 (31%)
15	A1LZM	w	103	8	63,74,74	2.03	14 (22%)	72,115,115	2.60	24 (33%)
13	PGV	Y	104	-	39,39,50	1.06	2 (5%)	42,44,56	1.18	4 (9%)
13	PGV	C	407	-	31,31,50	1.20	2 (6%)	34,36,56	1.32	4 (11%)
13	PGV	P	104	-	39,39,50	1.07	2 (5%)	42,44,56	1.11	3 (7%)
15	A1LZM	Z	101	8	63,74,74	2.05	13 (20%)	72,115,115	2.79	27 (37%)
15	A1LZM	6	102	-	63,74,74	2.07	16 (25%)	72,115,115	2.83	29 (40%)
23	A1LZQ	i	102	-	43,54,74	2.33	14 (32%)	47,91,115	2.70	21 (44%)
13	PGV	P	105	-	44,44,50	0.95	2 (4%)	47,50,56	1.11	4 (8%)
15	A1LZM	F	101	-	63,74,74	2.10	15 (23%)	72,115,115	2.60	24 (33%)
13	PGV	9	103	-	37,37,50	1.08	2 (5%)	40,42,56	1.16	4 (10%)
13	PGV	8	103	-	41,41,50	0.97	2 (4%)	43,43,56	1.10	3 (6%)
13	PGV	w	104	-	38,38,50	1.11	2 (5%)	41,43,56	1.09	3 (7%)
13	PGV	L	310	-	47,47,50	0.93	2 (4%)	50,53,56	1.07	3 (6%)
13	PGV	k	104	-	45,45,50	0.98	2 (4%)	48,50,56	1.13	4 (8%)
15	A1LZM	L	301	-	63,74,74	2.08	15 (23%)	72,115,115	2.94	27 (37%)
13	PGV	M	707	-	31,31,50	1.19	2 (6%)	34,36,56	1.27	4 (11%)
13	PGV	H	301	-	31,31,50	1.14	2 (6%)	34,37,56	1.21	4 (11%)
25	BGL	h	103	-	20,20,20	0.37	0	24,25,25	0.60	0
15	A1LZM	l	101	8	63,74,74	2.24	15 (23%)	72,115,115	2.75	30 (41%)
15	A1LZM	n	102	-	63,74,74	2.01	15 (23%)	72,115,115	2.69	26 (36%)
15	A1LZM	6	101	-	63,74,74	2.11	15 (23%)	72,115,115	2.63	25 (34%)
15	A1LZM	w	101	-	63,74,74	2.10	15 (23%)	72,115,115	2.67	24 (33%)
13	PGV	m	104	-	41,41,50	0.98	2 (4%)	43,43,56	1.07	3 (6%)
13	PGV	F	104	-	35,35,50	1.11	2 (5%)	38,40,56	1.22	4 (10%)
16	A1LZP	M	704	-	49,70,70	1.96	7 (14%)	48,101,101	2.57	17 (35%)
15	A1LZM	Y	102	-	63,74,74	1.98	15 (23%)	72,115,115	2.90	31 (43%)
21	CDL	M	709	-	82,82,99	0.30	0	88,94,111	0.36	0
13	PGV	a	104	-	41,41,50	0.98	2 (4%)	43,43,56	1.07	3 (6%)
13	PGV	e	103	-	39,39,50	1.07	2 (5%)	42,44,56	1.17	4 (9%)
23	A1LZQ	l	102	-	43,54,74	2.32	14 (32%)	47,91,115	2.71	19 (40%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
13	PGV	Y	103	-	50,50,50	0.90	2 (4%)	53,56,56	1.06	4 (7%)
15	A1LZM	7	101	8	63,74,74	2.01	13 (20%)	72,115,115	2.70	23 (31%)
15	A1LZM	b	101	-	63,74,74	2.09	14 (22%)	72,115,115	2.70	22 (30%)
16	A1LZP	L	303	-	49,70,70	1.89	7 (14%)	48,101,101	2.80	16 (33%)
12	HEC	C	402	1	32,50,50	1.52	4 (12%)	30,82,82	1.50	4 (13%)
15	A1LZM	k	101	-	63,74,74	2.04	13 (20%)	72,115,115	2.77	28 (38%)
23	A1LZQ	o	102	-	43,54,74	2.35	14 (32%)	47,91,115	2.70	19 (40%)

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
23	A1LZQ	f	102	-	1/1/17/27	7/13/113/137	-
13	PGV	p	104	-	-	6/40/40/55	-
13	PGV	I	101	-	-	6/37/37/55	-
13	PGV	L	309	-	-	7/48/48/55	-
15	A1LZM	b	102	-	1/1/21/27	12/37/137/137	-
13	PGV	9	102	-	-	4/26/26/55	-
13	PGV	h	104	-	-	10/37/37/55	-
13	PGV	L	306	-	-	24/50/50/55	-
15	A1LZM	w	102	-	1/1/21/27	9/37/137/137	-
13	PGV	O	104	-	-	15/43/43/55	-
15	A1LZM	n	101	-	1/1/21/27	11/37/137/137	-
15	A1LZM	S	103	8	1/1/21/27	10/37/137/137	-
13	PGV	C	408	-	-	8/42/42/55	-
23	A1LZQ	x	101	-	1/1/17/27	5/13/113/137	-
15	A1LZM	h	101	-	1/1/21/27	11/37/137/137	-
13	PGV	t	103	-	-	11/40/40/55	-
15	A1LZM	e	101	-	1/1/21/27	14/37/137/137	-
15	A1LZM	i	101	8	1/1/21/27	13/37/137/137	-
13	PGV	L	305	-	-	15/52/52/55	-
13	PGV	5	101	-	-	10/42/42/55	-
13	PGV	H	302	-	-	18/43/43/55	-
13	PGV	j	104	-	-	14/43/43/55	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
13	PGV	V	103	-	-	14/40/40/55	-
14	LHG	C	406	-	-	0/7/7/53	-
15	A1LZM	P	101	-	1/1/21/27	9/37/137/137	-
23	A1LZQ	T	101	-	1/1/17/27	4/13/113/137	-
15	A1LZM	P	103	8	1/1/21/27	9/37/137/137	-
13	PGV	n	104	-	-	16/38/38/55	-
23	A1LZQ	7	102	-	1/1/17/27	7/13/113/137	-
17	UQ8	L	304	-	-	9/27/51/75	0/1/1/1
15	A1LZM	M	702	-	1/1/21/27	11/37/137/137	-
15	A1LZM	h	102	-	1/1/21/27	10/37/137/137	-
15	A1LZM	t	102	-	1/1/21/27	8/37/137/137	-
13	PGV	q	104	-	-	12/41/41/55	-
15	A1LZM	V	101	-	1/1/21/27	14/37/137/137	-
15	A1LZM	z	101	-	1/1/21/27	15/37/137/137	-
13	PGV	K	103	-	-	11/41/41/55	-
15	A1LZM	4	201	-	1/1/21/27	13/37/137/137	-
15	A1LZM	Y	101	-	1/1/21/27	10/37/137/137	-
15	A1LZM	W	101	8	1/1/21/27	16/37/137/137	-
21	CDL	H	304	-	-	15/87/87/110	-
23	A1LZQ	r	102	-	1/1/17/27	4/13/113/137	-
13	PGV	X	104	-	-	9/43/43/55	-
23	A1LZQ	W	102	-	1/1/17/27	4/13/113/137	-
13	PGV	S	105	-	-	11/41/41/55	-
15	A1LZM	z	102	-	1/1/21/27	8/37/137/137	-
15	A1LZM	k	102	-	1/1/21/27	8/37/137/137	-
13	PGV	U	104	-	-	10/43/43/55	-
15	A1LZM	N	101	8	1/1/21/27	7/37/137/137	-
23	A1LZQ	G	102	-	1/1/17/27	4/13/113/137	-
13	PGV	d	104	-	-	13/43/43/55	-
15	A1LZM	K	102	-	1/1/21/27	9/37/137/137	-
23	A1LZQ	u	102	-	1/1/17/27	2/13/113/137	-
13	PGV	R	104	-	-	14/43/43/55	-
23	A1LZQ	Q	101	-	1/1/17/27	6/13/113/137	-
15	A1LZM	G	101	8	1/1/21/27	12/37/137/137	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
15	A1LZM	F	102	-	1/1/21/27	11/37/137/137	-
15	A1LZM	t	101	-	1/1/21/27	9/37/137/137	-
13	PGV	C	405	-	-	7/28/28/55	-
15	A1LZM	e	102	-	1/1/21/27	11/37/137/137	-
15	A1LZM	S	102	-	1/1/21/27	12/37/137/137	-
13	PGV	z	103	-	-	6/39/39/55	-
20	MQ8	M	705	-	-	6/47/67/67	0/2/2/2
13	PGV	g	104	-	-	16/43/43/55	-
15	A1LZM	o	101	8	1/1/21/27	10/37/137/137	-
15	A1LZM	f	101	8	1/1/21/27	8/37/137/137	-
24	PEF	K	106	-	-	6/42/42/50	-
15	A1LZM	P	102	-	1/1/21/27	11/37/137/137	-
22	LYC	3	101	-	-	6/43/43/43	-
25	BGL	S	104	-	-	0/11/31/31	0/1/1/1
15	A1LZM	3	102	-	1/1/18/27	5/19/119/137	-
15	A1LZM	c	101	8	1/1/21/27	13/37/137/137	-
15	A1LZM	M	703	-	1/1/21/27	11/37/137/137	-
13	PGV	s	104	-	-	8/43/43/55	-
23	A1LZQ	c	102	-	1/1/17/27	9/13/113/137	-
23	A1LZQ	N	102	-	1/1/17/27	4/13/113/137	-
15	A1LZM	1	101	8	1/1/21/27	6/37/137/137	-
12	HEC	C	403	1	-	4/10/54/54	-
13	PGV	v	104	-	-	14/43/43/55	-
15	A1LZM	K	101	-	1/1/21/27	9/37/137/137	-
13	PGV	b	105	-	-	6/38/38/55	-
13	PGV	H	306	-	-	14/46/46/55	-
15	A1LZM	V	102	-	1/1/21/27	10/37/137/137	-
15	A1LZM	r	101	8	1/1/21/27	7/37/137/137	-
23	A1LZQ	1	102	-	1/1/17/27	2/13/113/137	-
15	A1LZM	L	302	-	1/1/21/27	9/37/137/137	-
13	PGV	4	203	-	-	13/41/41/55	-
13	PGV	M	708	-	-	8/36/36/55	-
12	HEC	C	401	1	-	3/10/54/54	-
13	PGV	H	303	-	-	18/51/51/55	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
12	HEC	C	404	1	-	2/10/54/54	-
21	CDL	M	710	-	-	13/64/64/110	-
15	A1LZM	S	101	-	1/1/21/27	12/37/137/137	-
13	PGV	H	305	-	-	12/37/37/55	-
15	A1LZM	q	102	-	1/1/21/27	6/37/137/137	-
20	MQ8	M	706	-	-	2/11/31/67	0/2/2/2
13	PGV	K	104	-	-	3/26/26/55	-
15	A1LZM	u	101	8	1/1/21/27	10/37/137/137	-
23	A1LZQ	Z	102	-	1/1/17/27	5/13/113/137	-
15	A1LZM	q	101	-	1/1/21/27	9/37/137/137	-
15	A1LZM	w	103	8	1/1/21/27	14/37/137/137	-
13	PGV	Y	104	-	-	14/41/41/55	-
13	PGV	C	407	-	-	7/33/33/55	-
13	PGV	P	104	-	-	13/41/41/55	-
15	A1LZM	Z	101	8	1/1/21/27	6/37/137/137	-
15	A1LZM	6	102	-	1/1/21/27	15/37/137/137	-
23	A1LZQ	i	102	-	1/1/17/27	4/13/113/137	-
13	PGV	P	105	-	-	13/49/49/55	-
15	A1LZM	F	101	-	1/1/21/27	11/37/137/137	-
13	PGV	9	103	-	-	13/39/39/55	-
13	PGV	8	103	-	-	15/43/43/55	-
13	PGV	w	104	-	-	11/40/40/55	-
13	PGV	L	310	-	-	17/52/52/55	-
13	PGV	k	104	-	-	16/47/47/55	-
15	A1LZM	L	301	-	1/1/21/27	12/37/137/137	-
13	PGV	M	707	-	-	10/33/33/55	-
13	PGV	H	301	-	-	15/36/36/55	-
25	BGL	h	103	-	-	3/11/31/31	0/1/1/1
15	A1LZM	l	101	8	1/1/21/27	10/37/137/137	-
15	A1LZM	n	102	-	1/1/21/27	10/37/137/137	-
15	A1LZM	6	101	-	1/1/21/27	11/37/137/137	-
15	A1LZM	w	101	-	1/1/21/27	15/37/137/137	-
13	PGV	m	104	-	-	11/43/43/55	-
13	PGV	F	104	-	-	15/37/37/55	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
16	A1LZP	M	704	-	-	14/37/105/105	0/5/6/6
15	A1LZM	Y	102	-	1/1/21/27	7/37/137/137	-
21	CDL	M	709	-	-	11/93/93/110	-
13	PGV	a	104	-	-	9/43/43/55	-
13	PGV	e	103	-	-	11/41/41/55	-
23	A1LZQ	l	102	-	1/1/17/27	6/13/113/137	-
13	PGV	Y	103	-	-	22/55/55/55	-
15	A1LZM	7	101	8	1/1/21/27	11/37/137/137	-
15	A1LZM	b	101	-	1/1/21/27	11/37/137/137	-
16	A1LZP	L	303	-	-	12/37/105/105	0/5/6/6
12	HEC	C	402	1	-	4/10/54/54	-
15	A1LZM	k	101	-	1/1/21/27	14/37/137/137	-
23	A1LZQ	o	102	-	1/1/17/27	5/13/113/137	-

The worst 5 of 1148 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
16	M	704	A1LZP	O54-C48	8.55	1.33	1.22
15	u	101	A1LZM	C2C-C3C	-7.78	1.41	1.51
15	l	101	A1LZM	C2C-C3C	-7.69	1.41	1.51
15	o	101	A1LZM	C2C-C3C	-7.65	1.41	1.51
15	W	101	A1LZM	C2C-C3C	-7.45	1.42	1.51

The worst 5 of 1920 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
23	x	101	A1LZQ	O2D-CGD-CBD	28.10	160.35	111.23
23	x	101	A1LZQ	O2D-CGD-O1D	-22.80	79.47	123.85
23	x	101	A1LZQ	O1D-CGD-CBD	-22.10	80.93	124.52
16	L	303	A1LZP	O36-C57-C53	13.59	125.88	110.95
15	o	101	A1LZM	CHD-C4C-C3C	-12.30	110.48	125.91

5 of 70 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
15	L	301	A1LZM	ND
15	L	302	A1LZM	ND
15	M	702	A1LZM	ND
15	M	703	A1LZM	ND

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Mol	Chain	Res	Type	Atom
15	4	201	A1LZM	ND

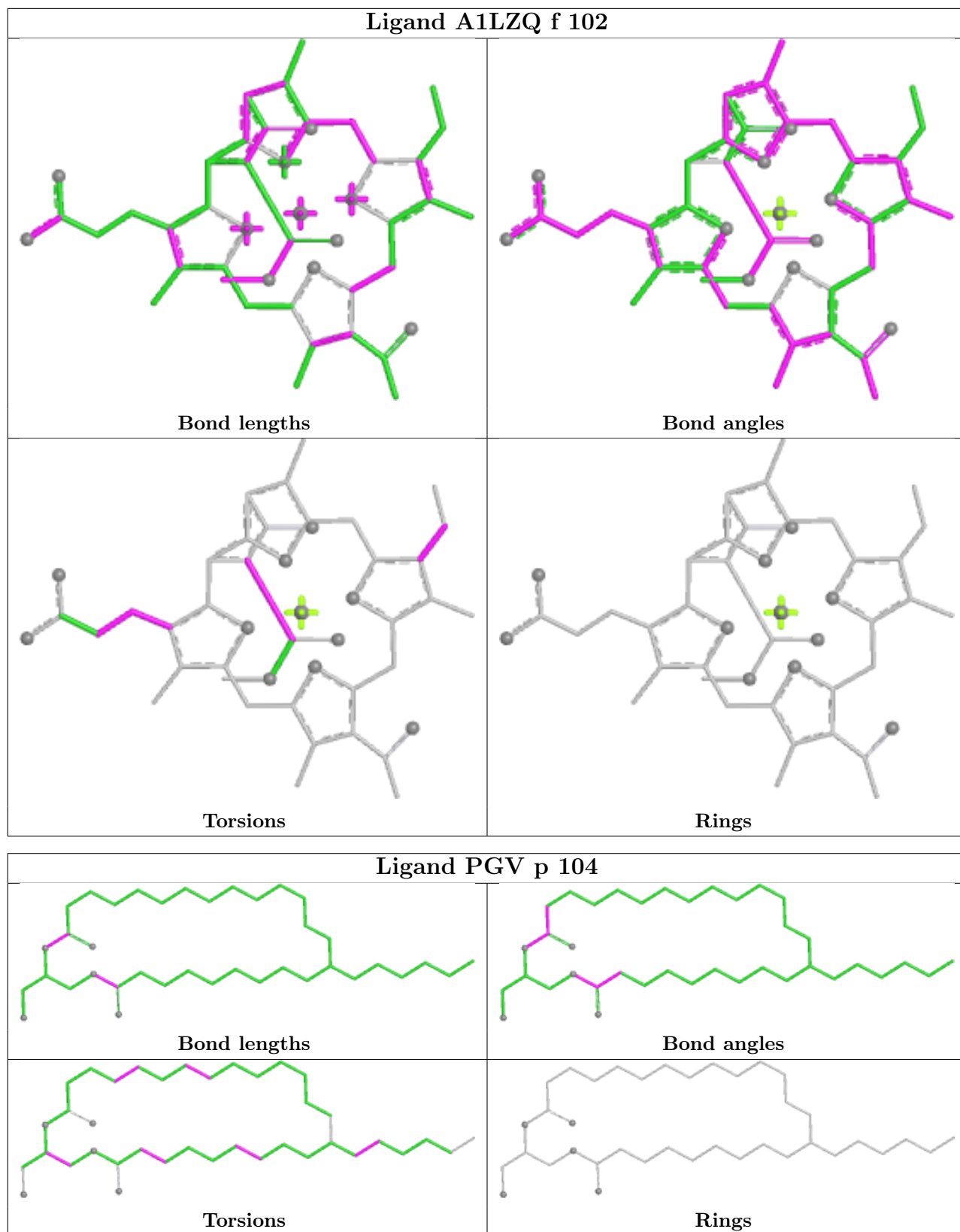
5 of 1348 torsion outliers are listed below:

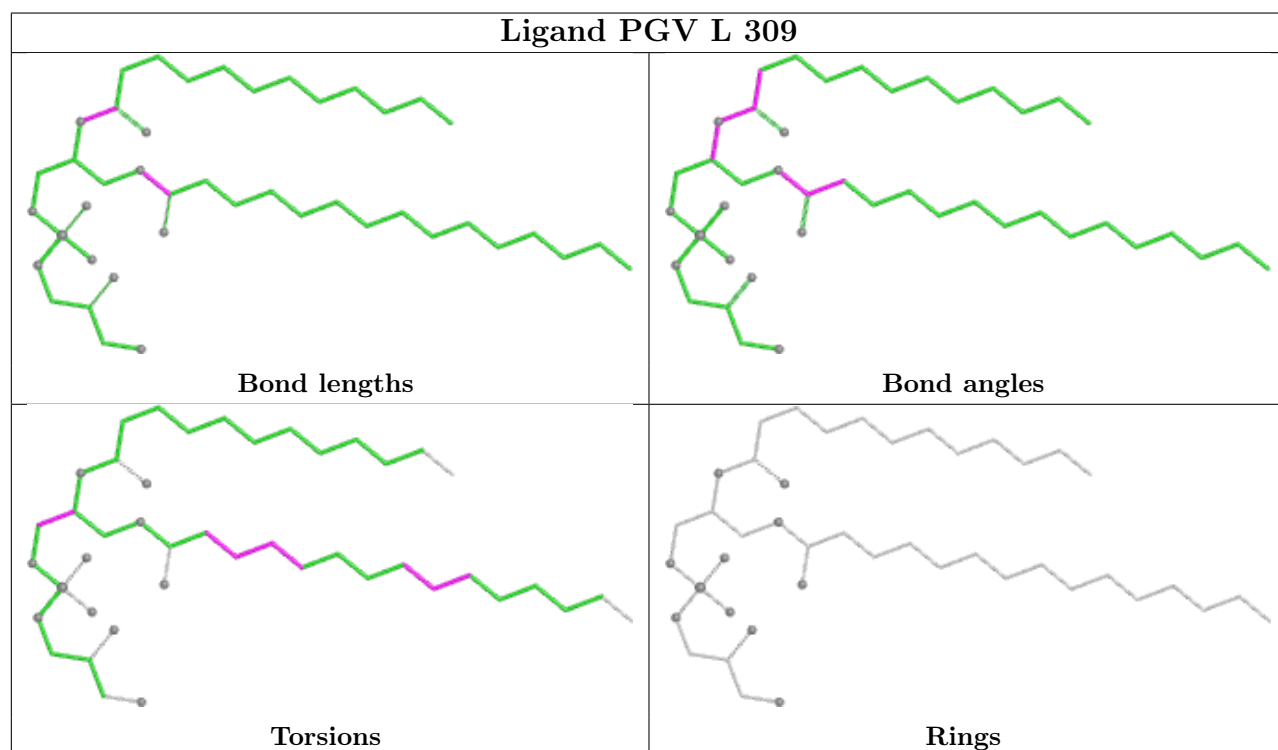
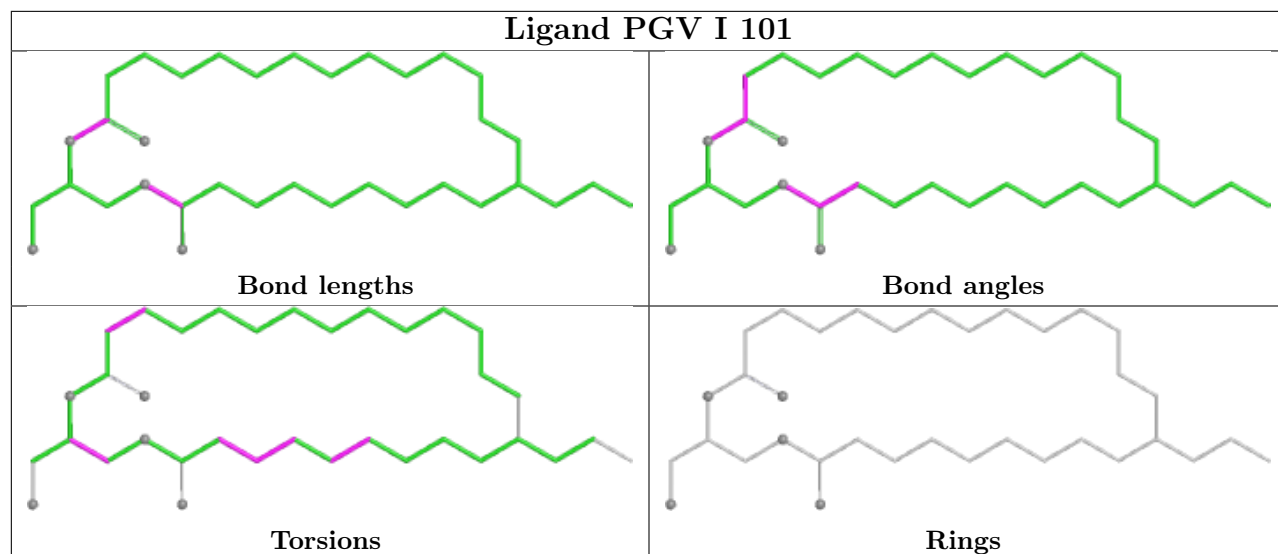
Mol	Chain	Res	Type	Atoms
13	C	408	PGV	C04-O12-P-O11
13	C	408	PGV	C04-O12-P-O14
13	C	408	PGV	O12-C04-C05-C06
13	L	305	PGV	C03-O11-P-O12
13	L	305	PGV	C03-O11-P-O13

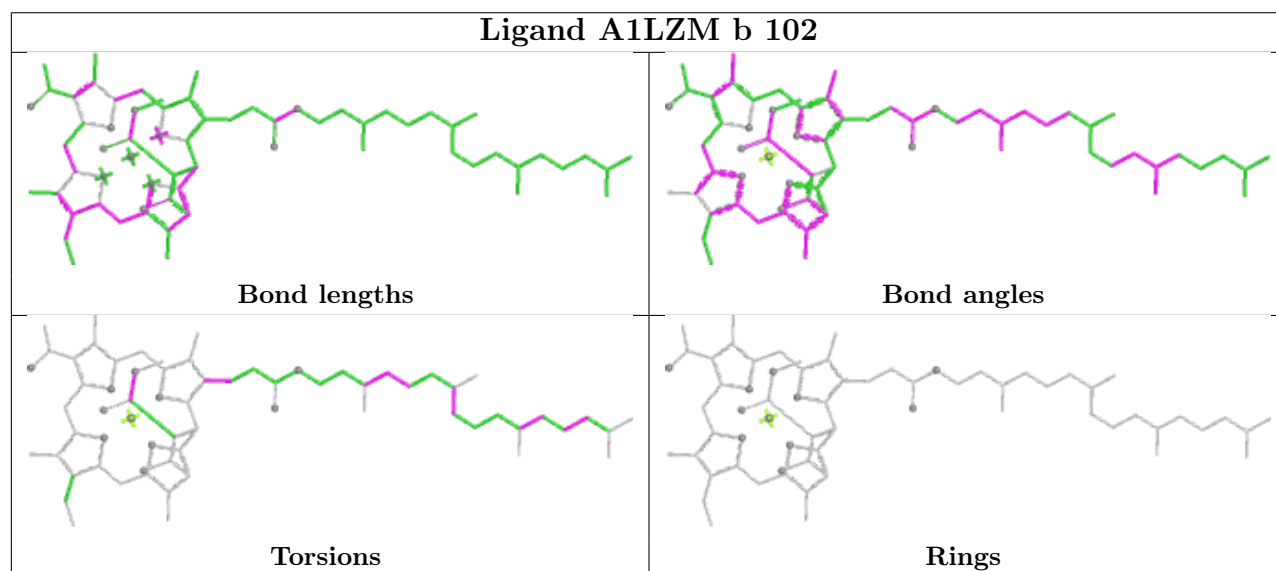
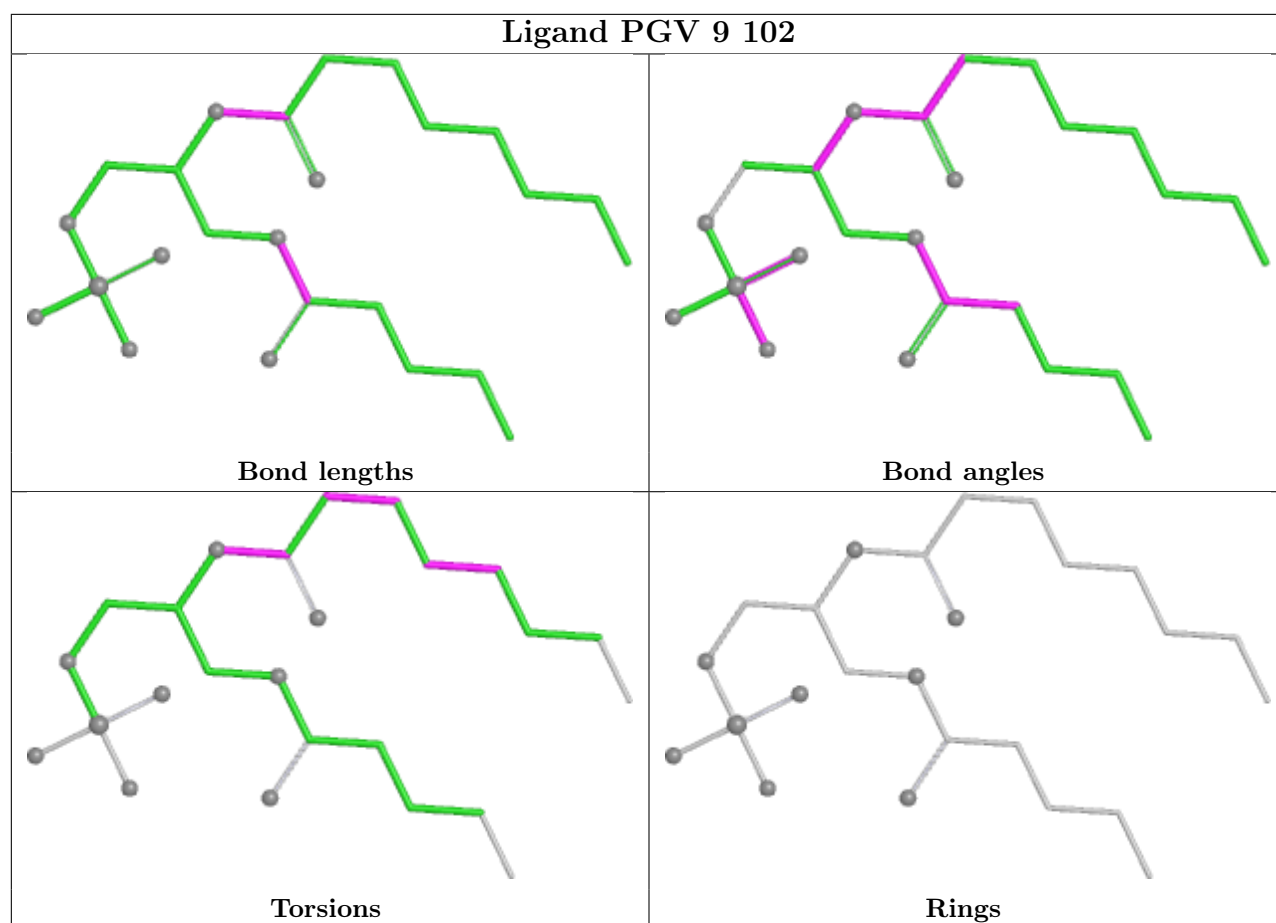
There are no ring outliers.

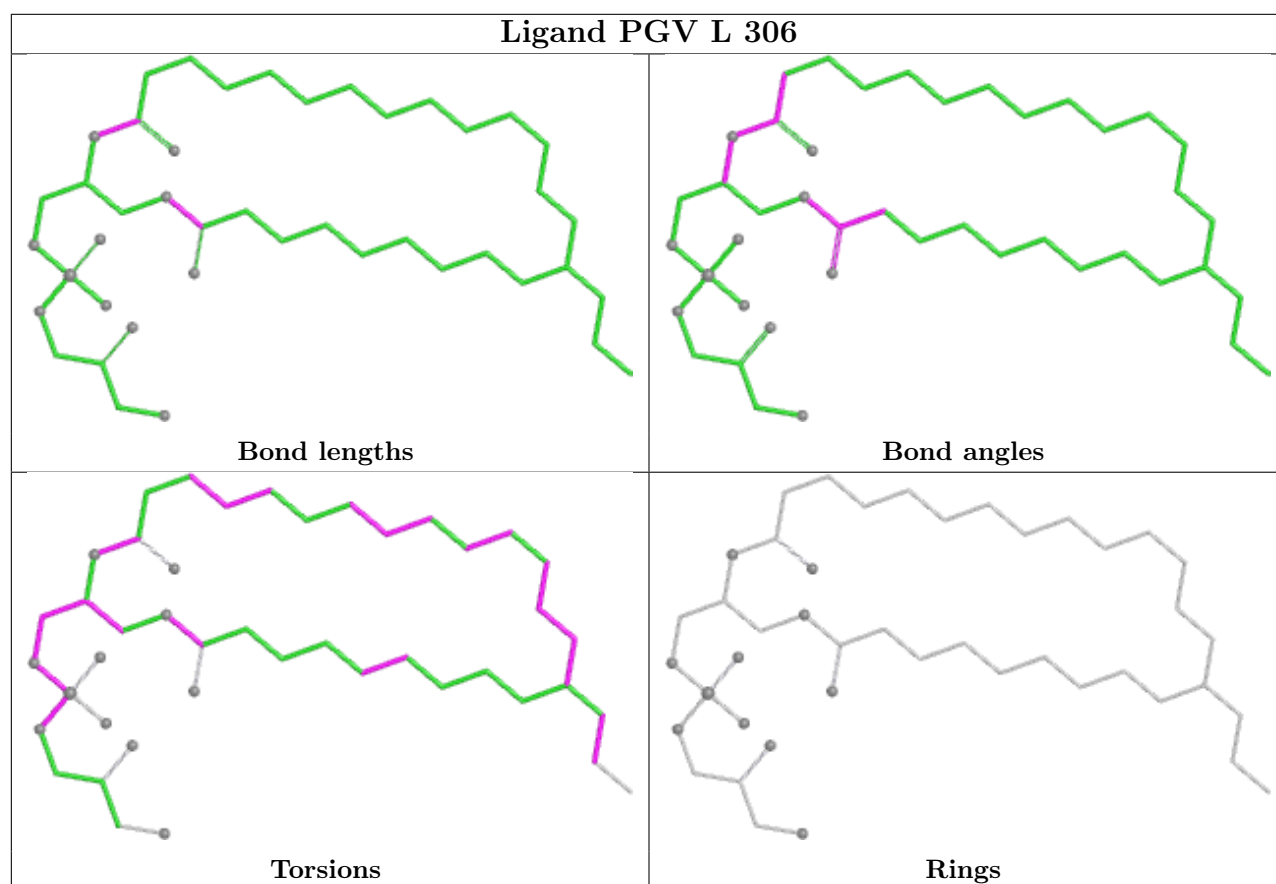
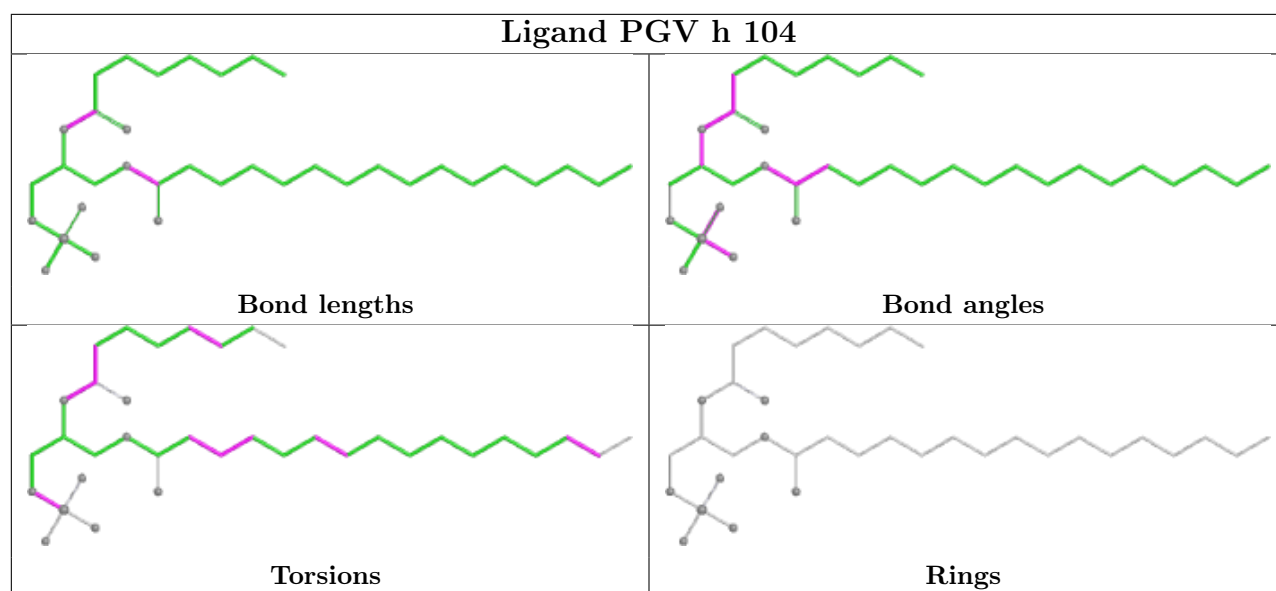
No monomer is involved in short contacts.

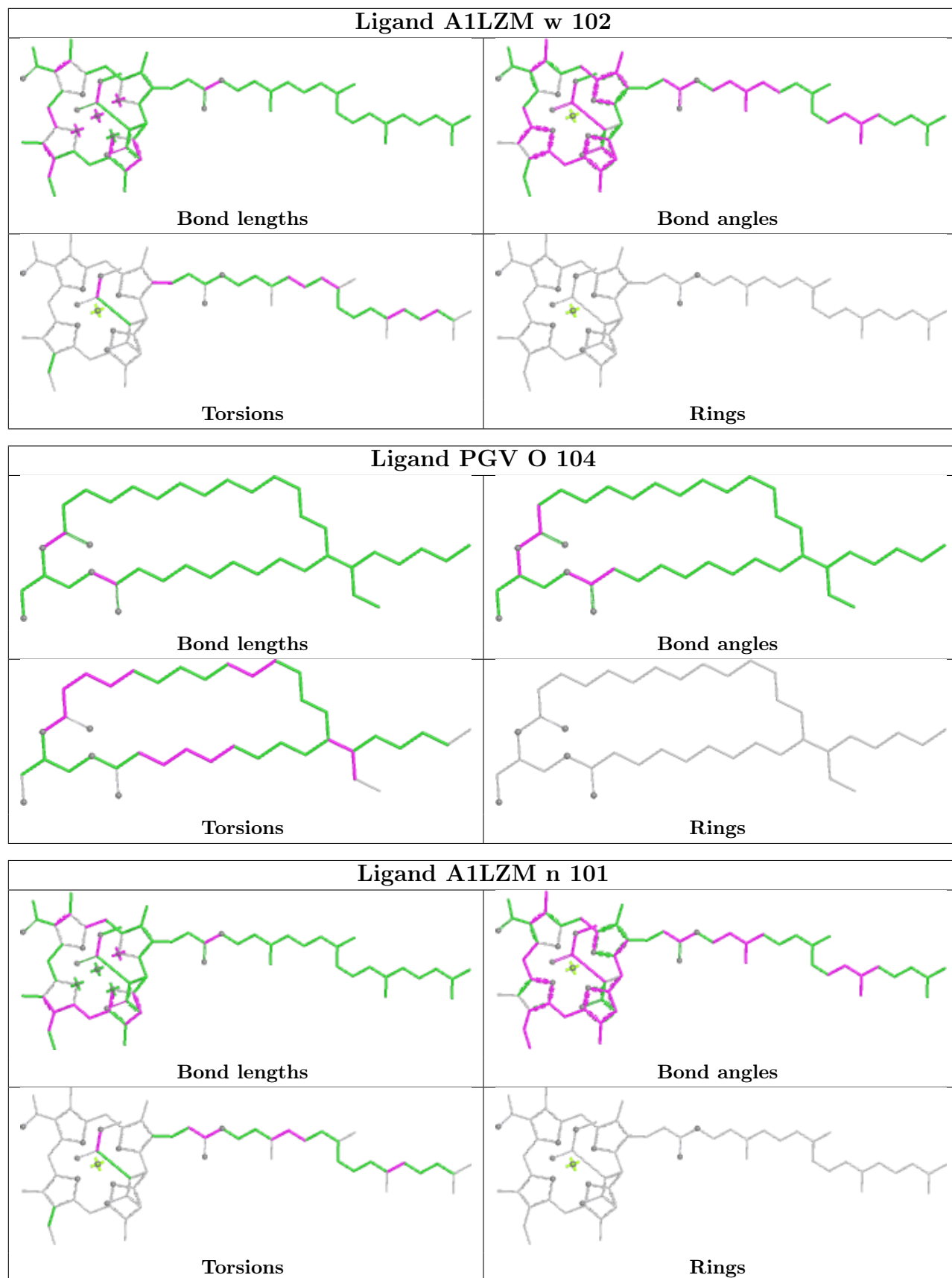
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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



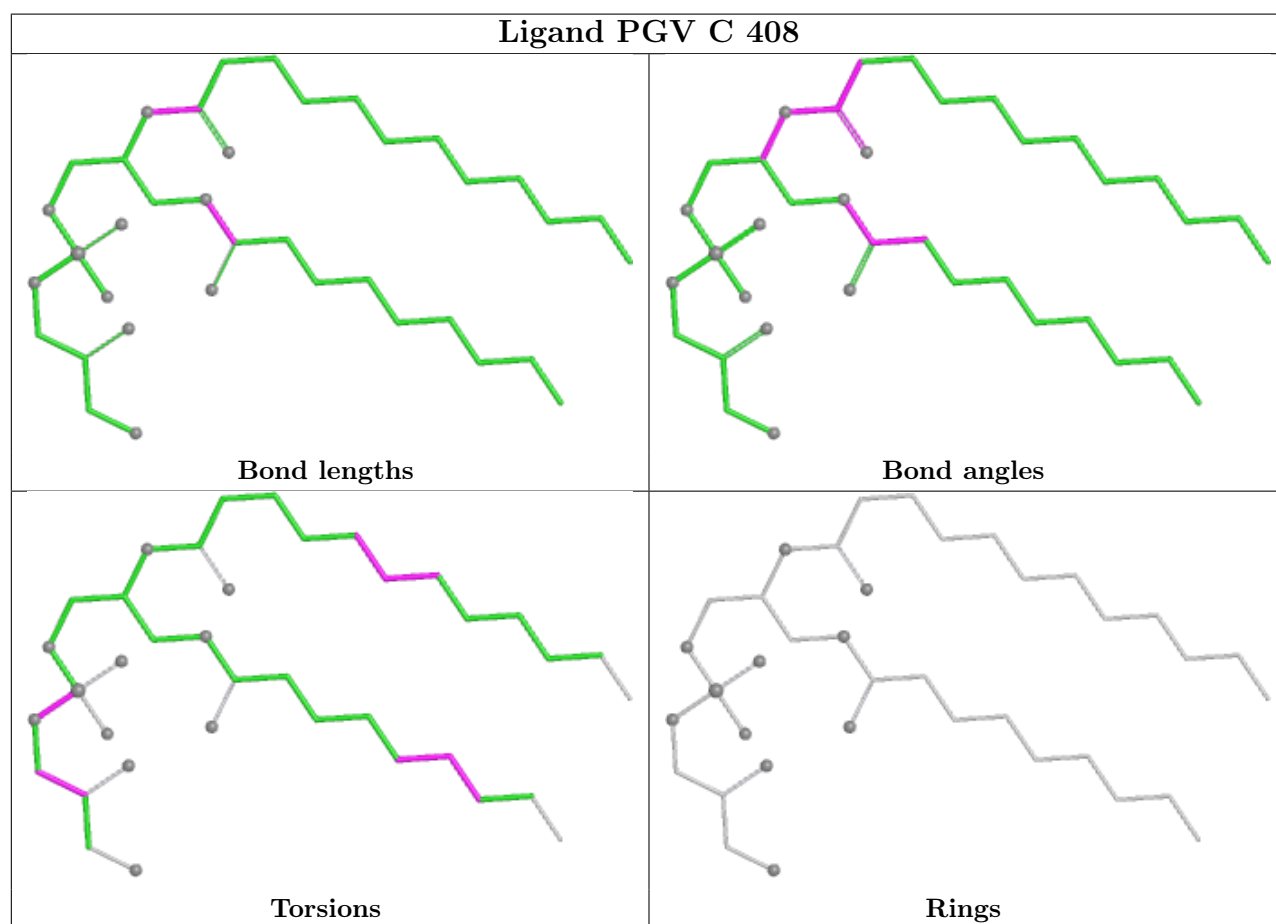
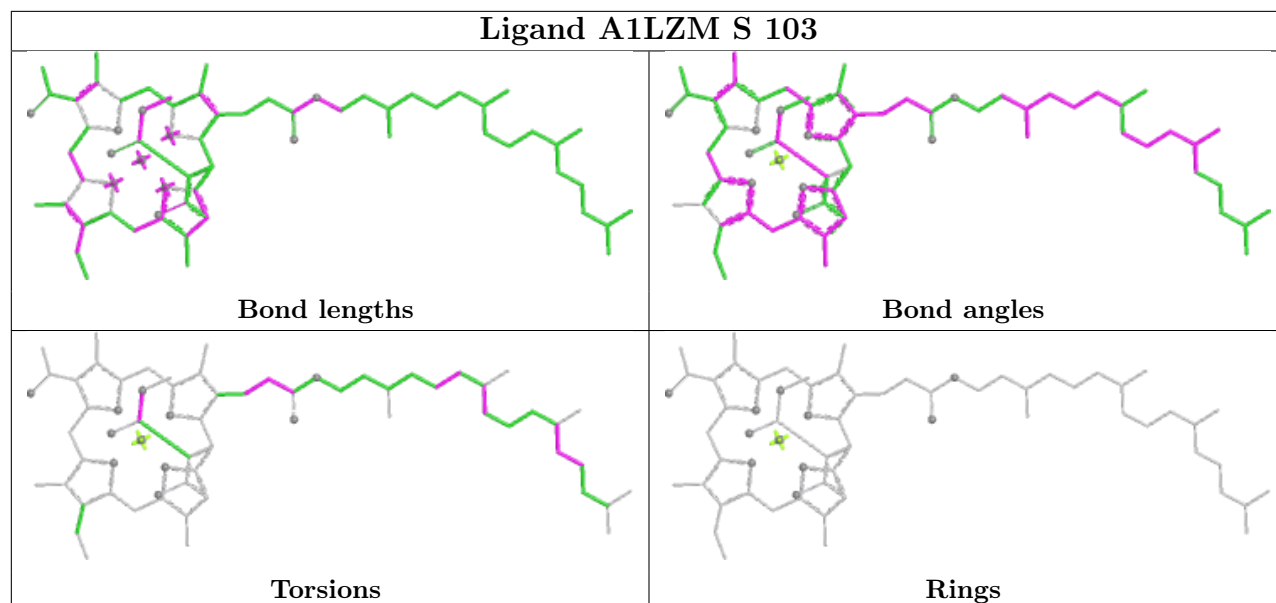


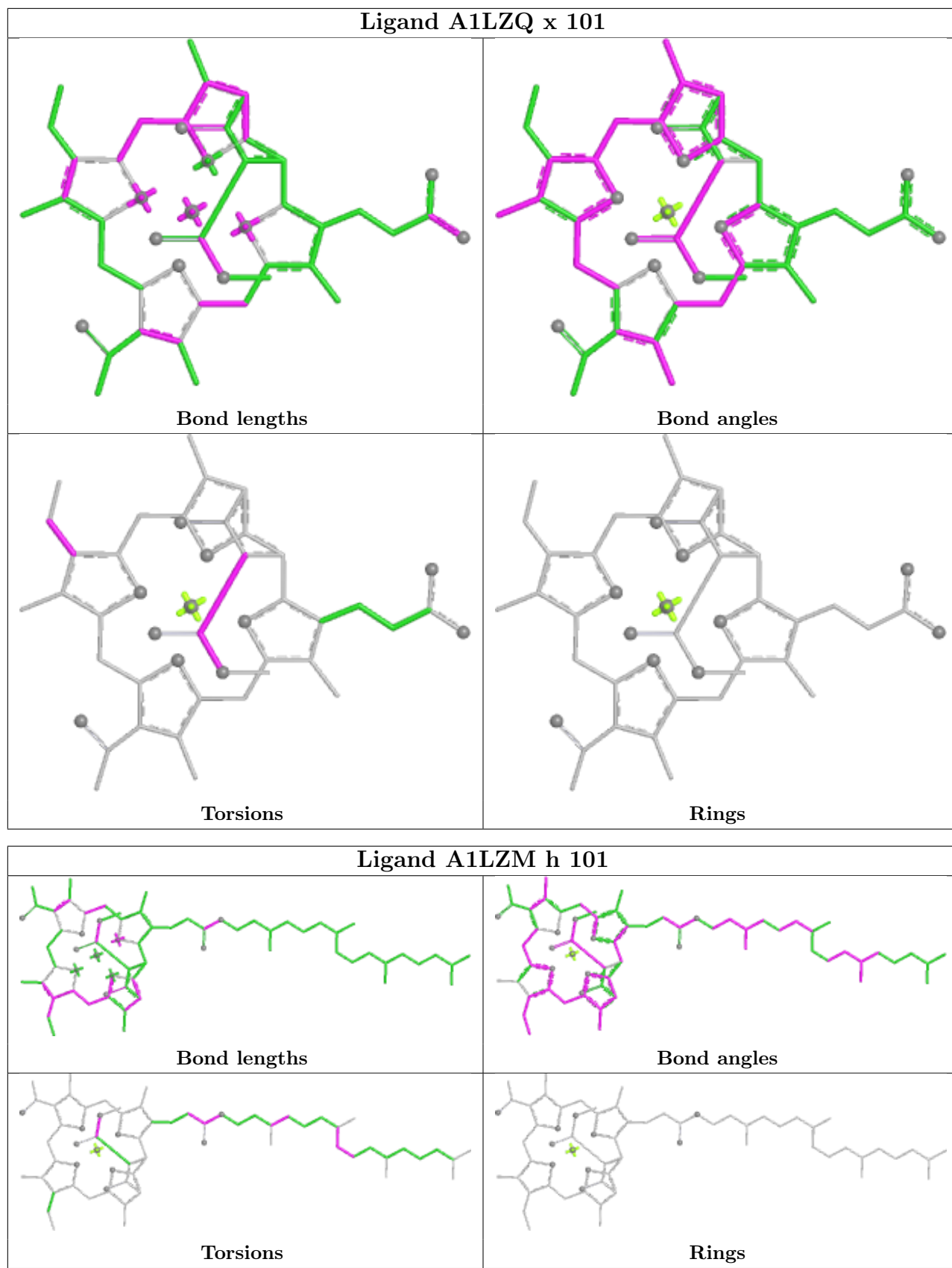


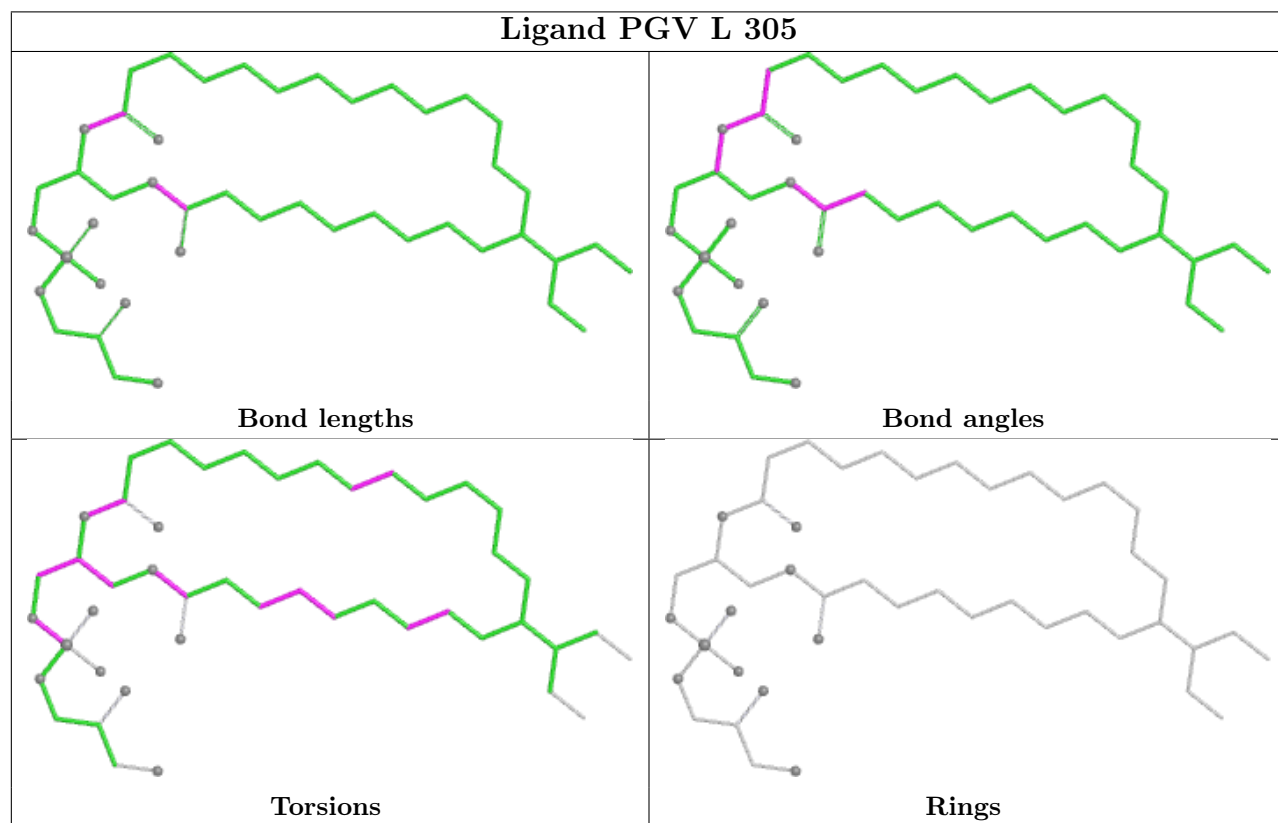
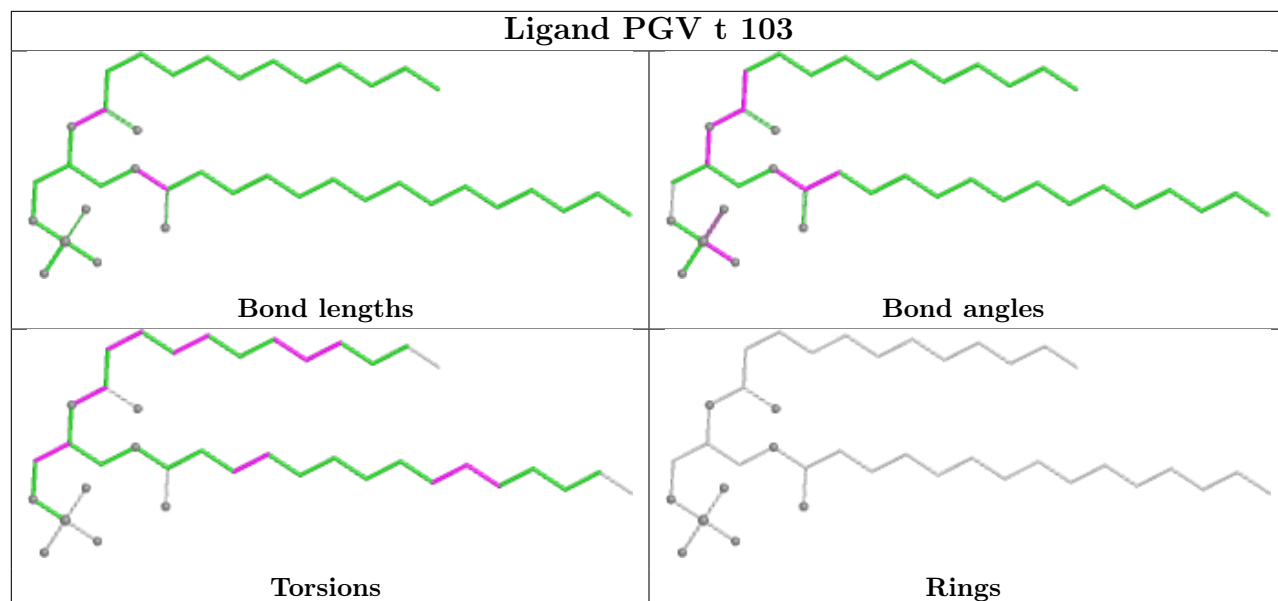


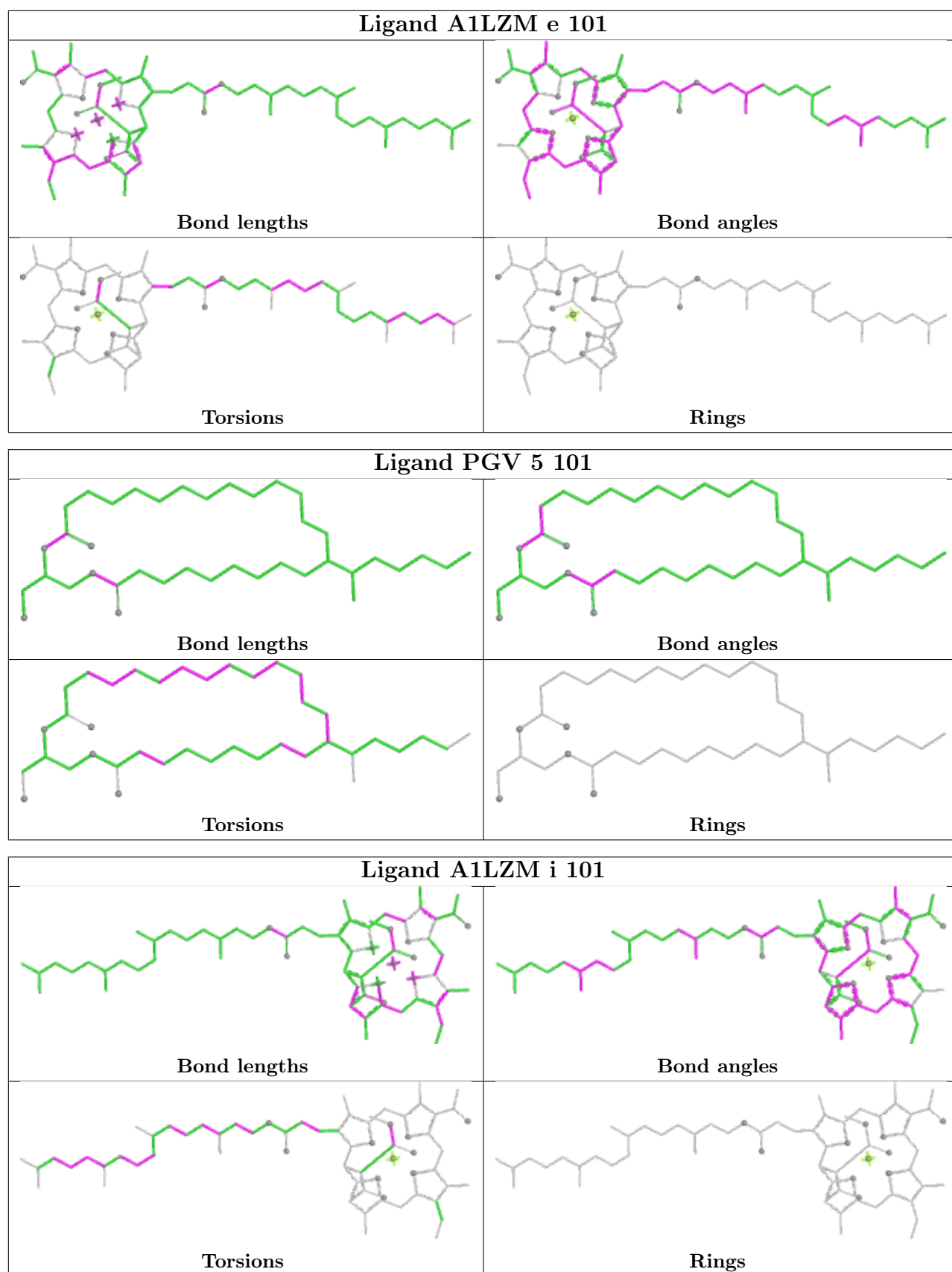


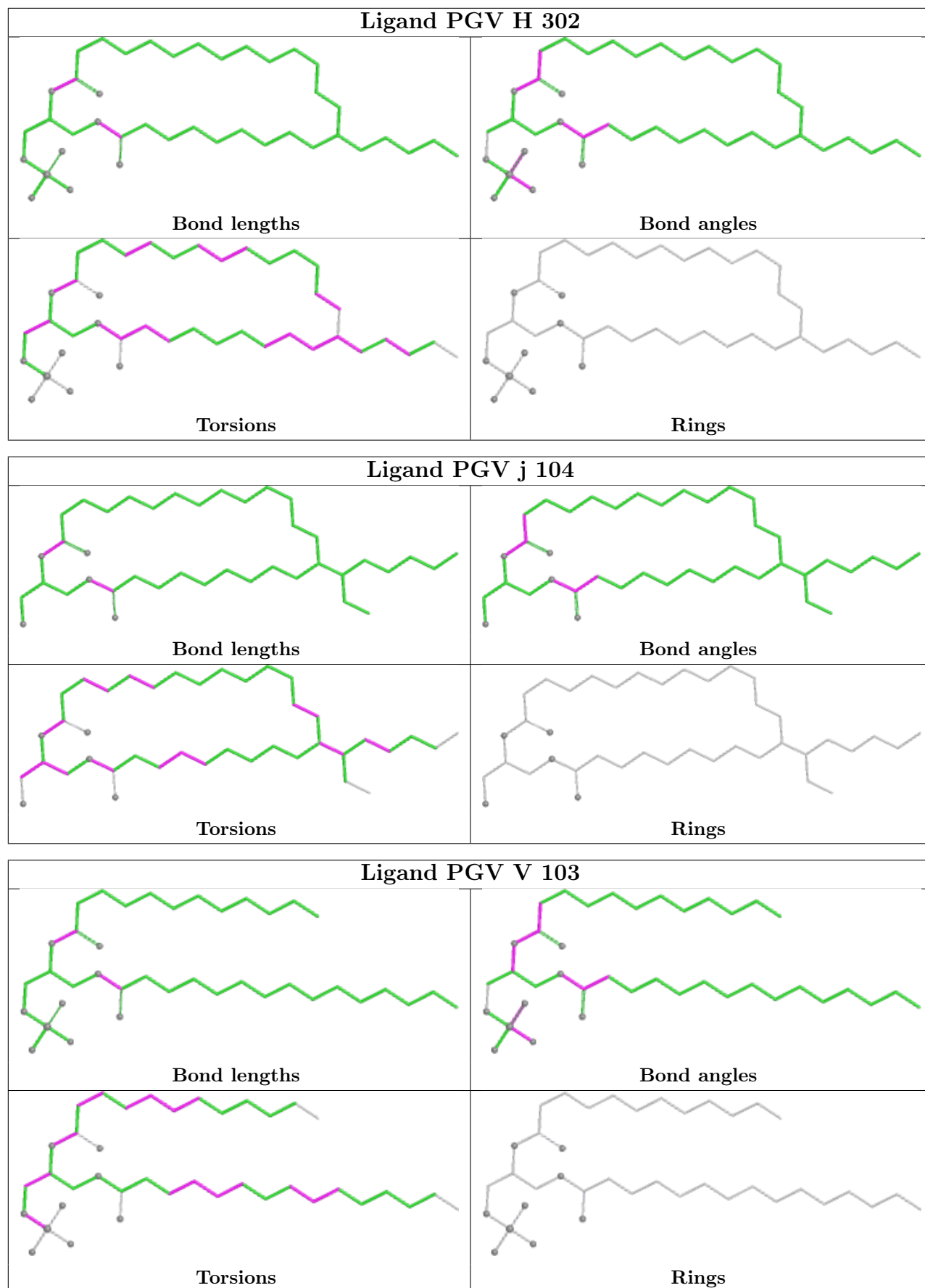


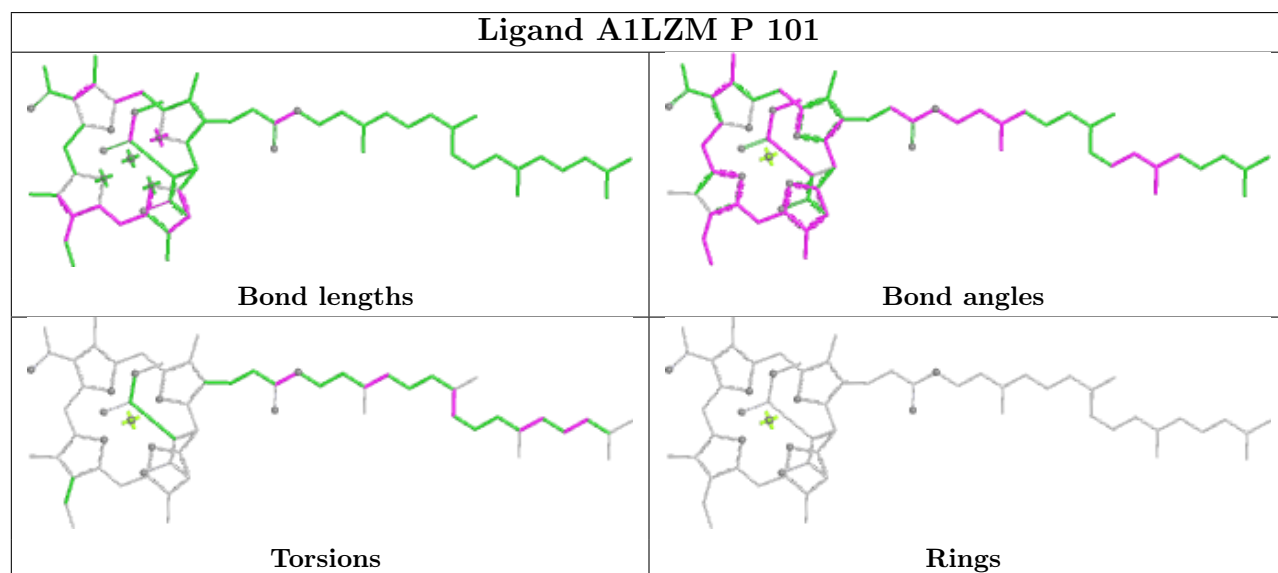
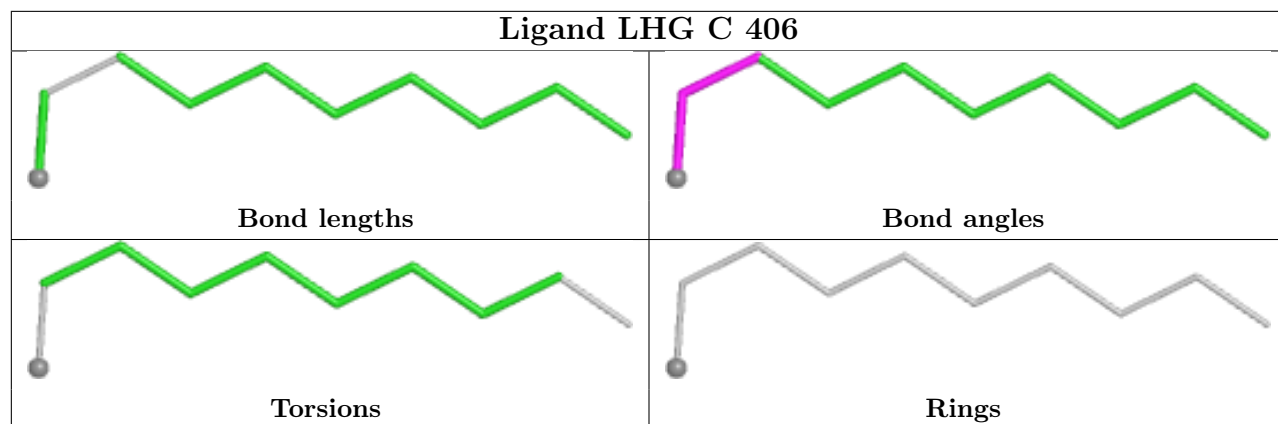


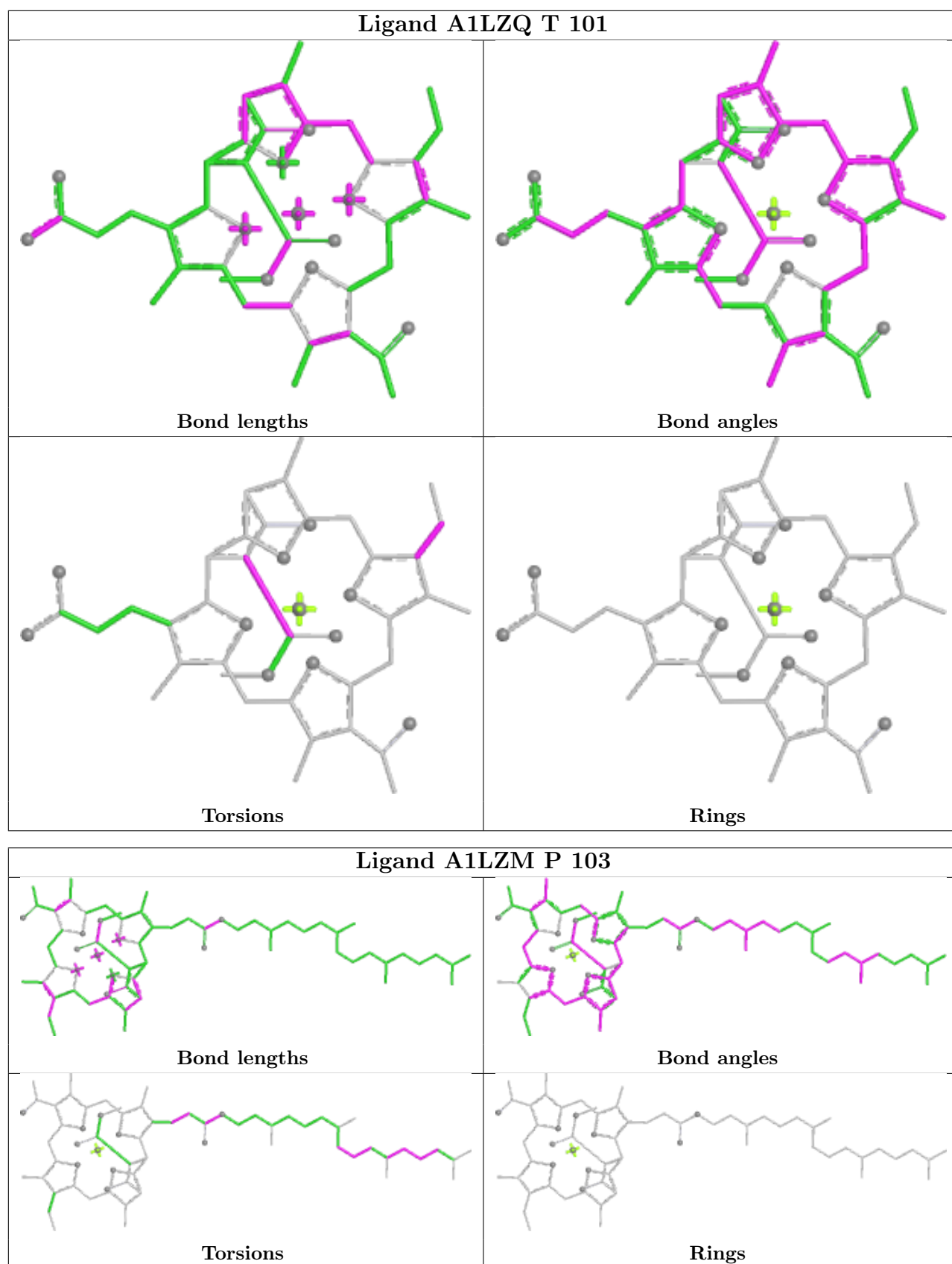


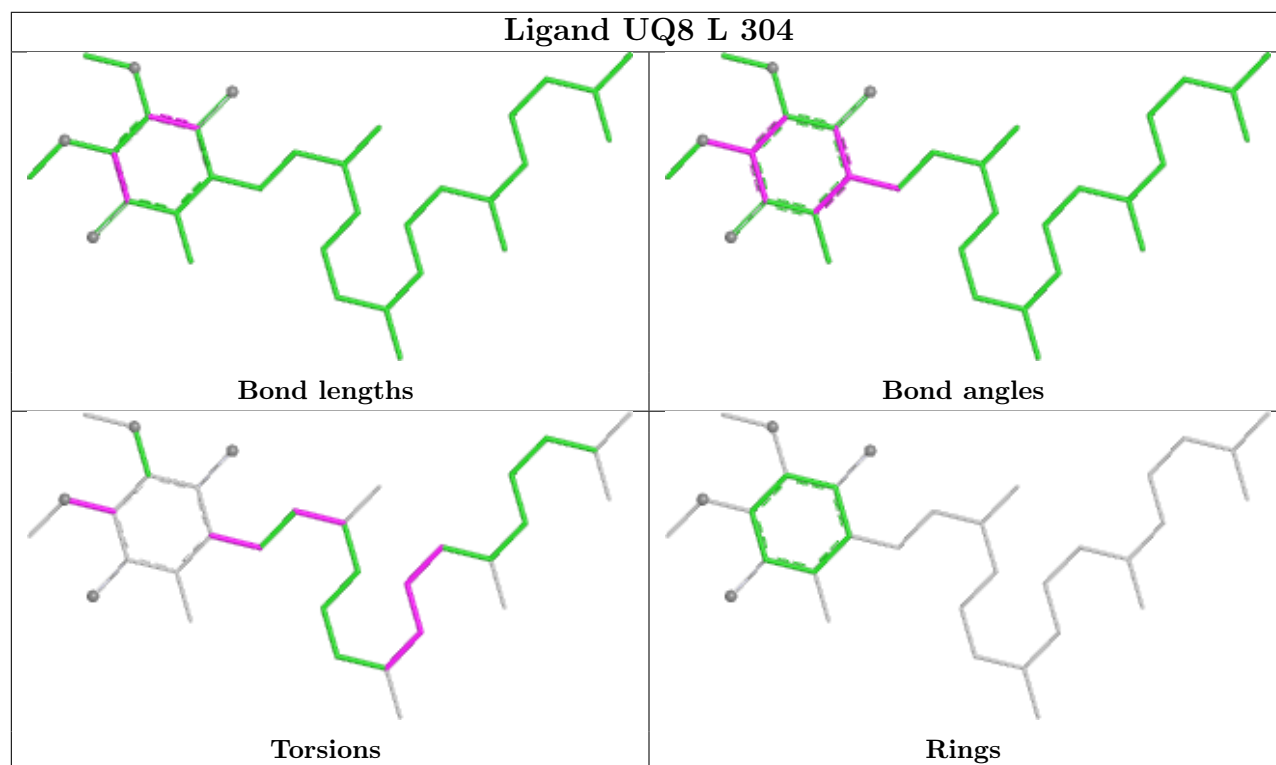
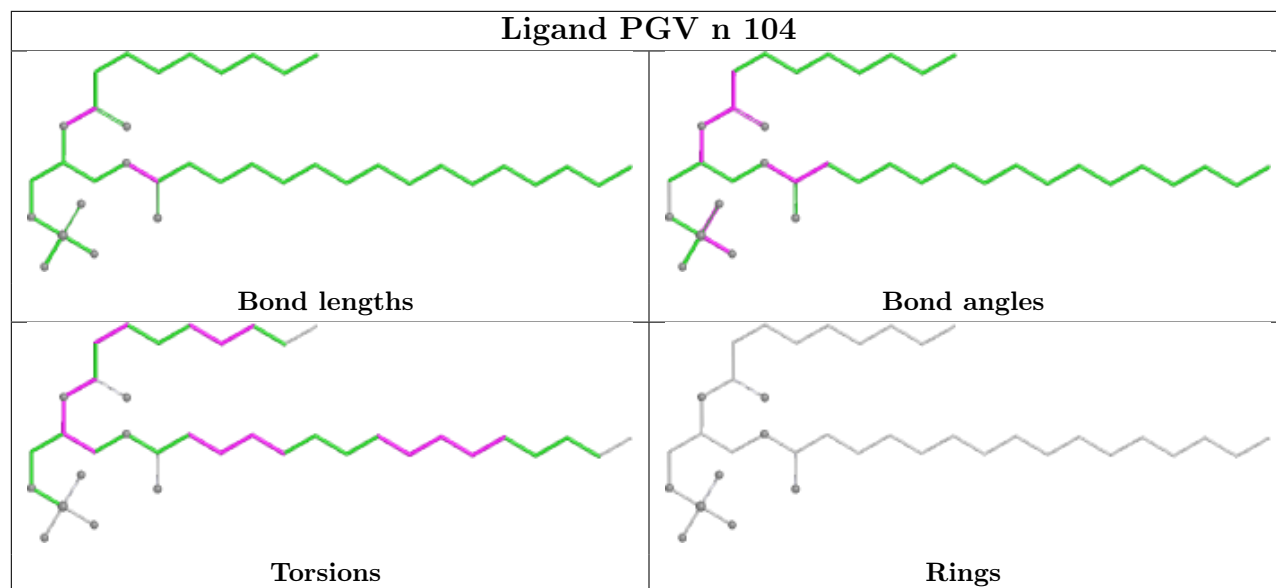




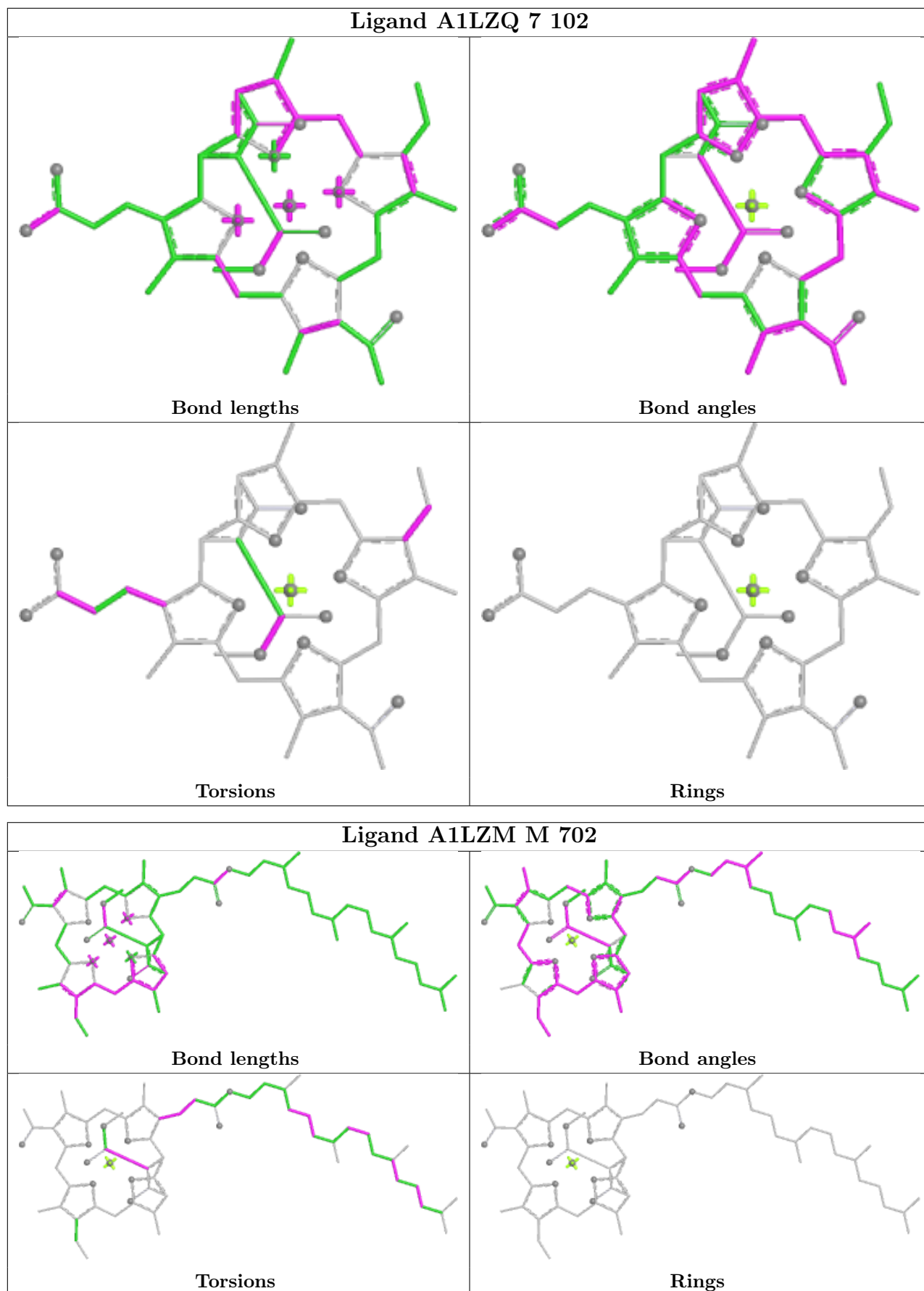


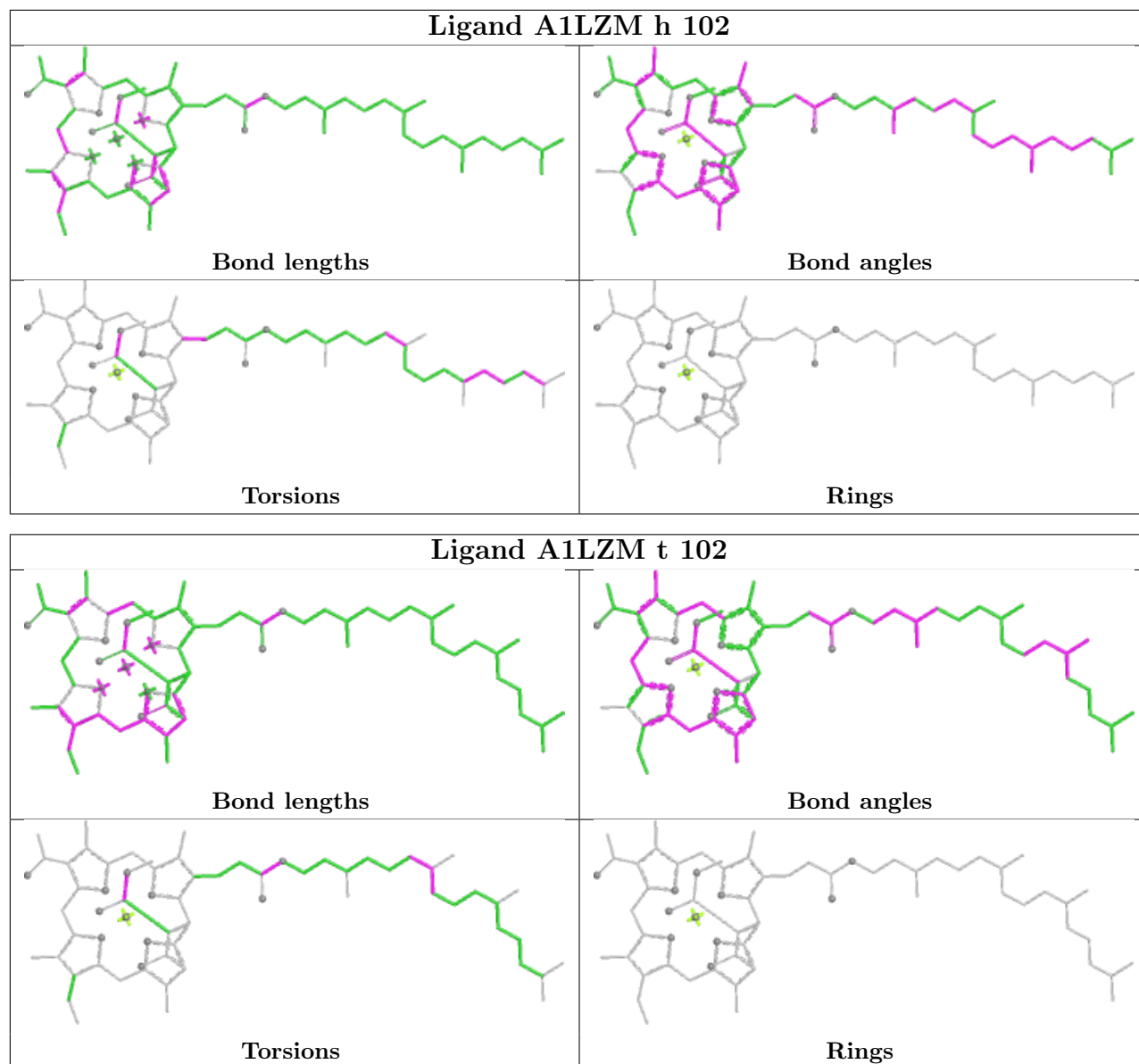


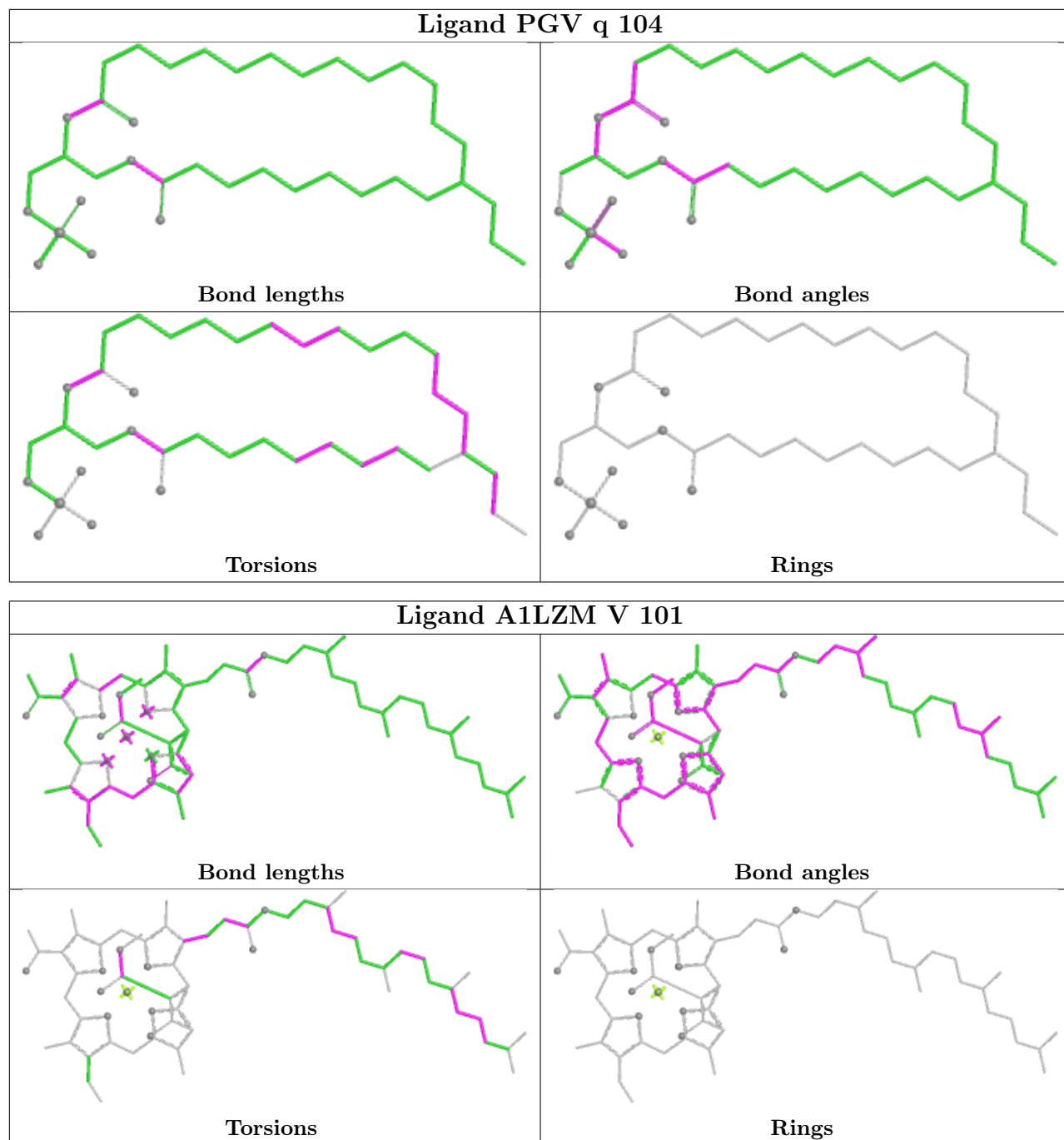


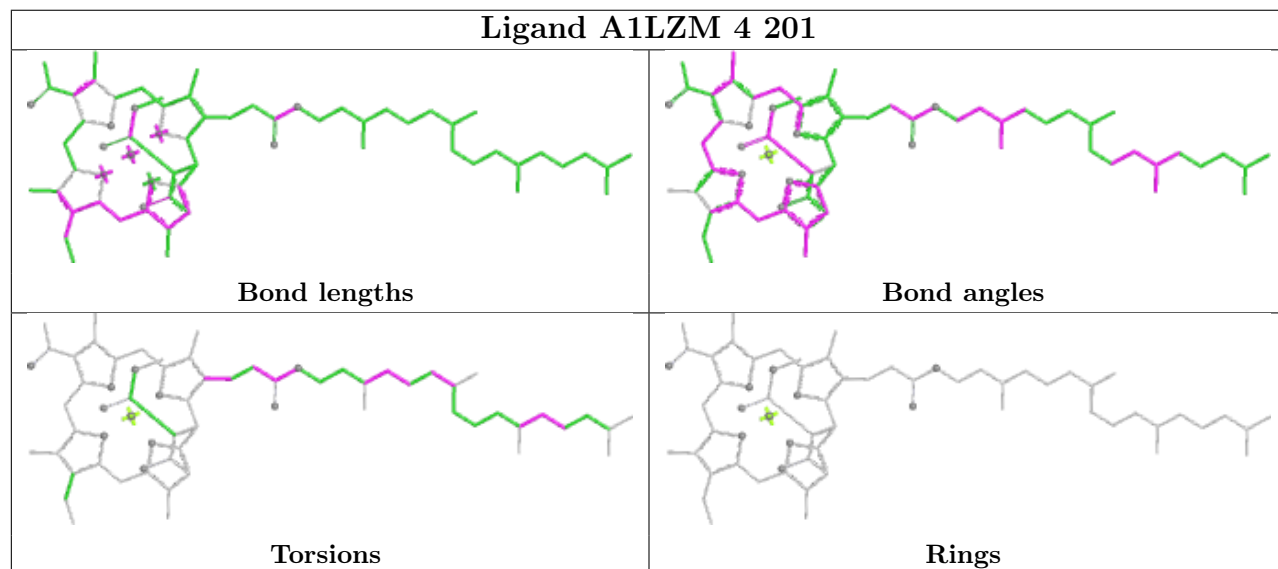
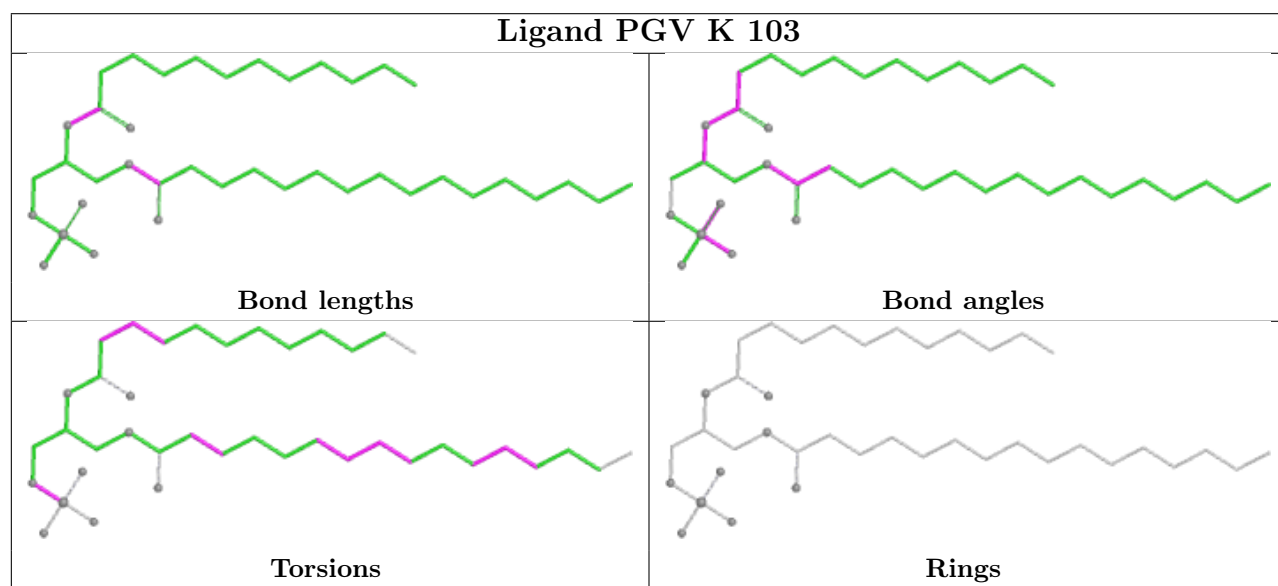
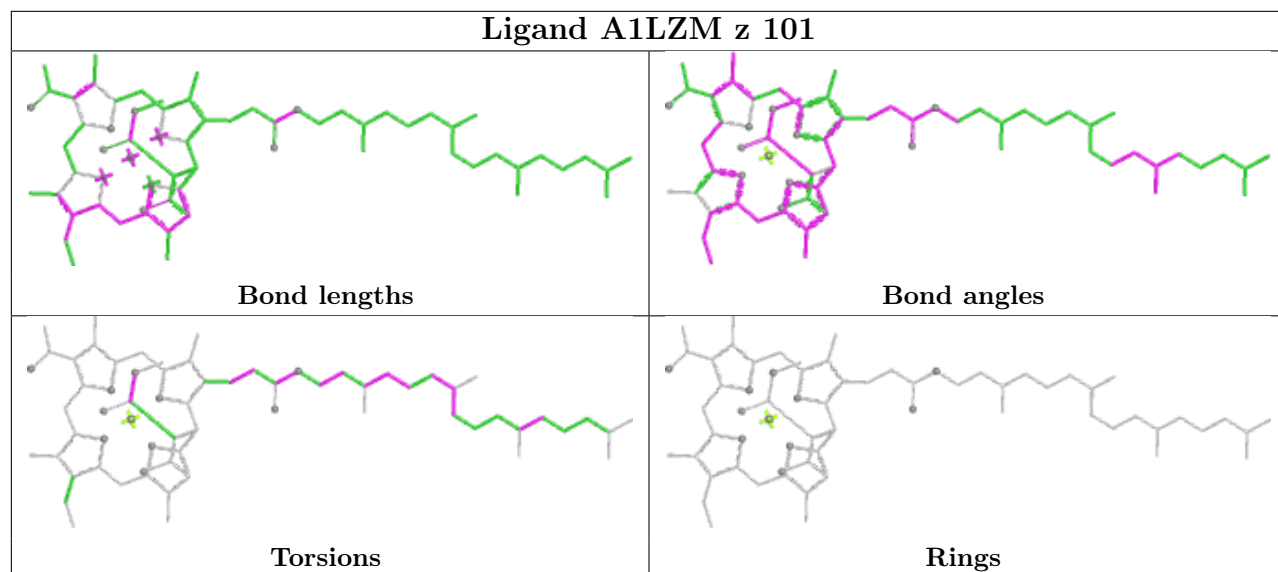


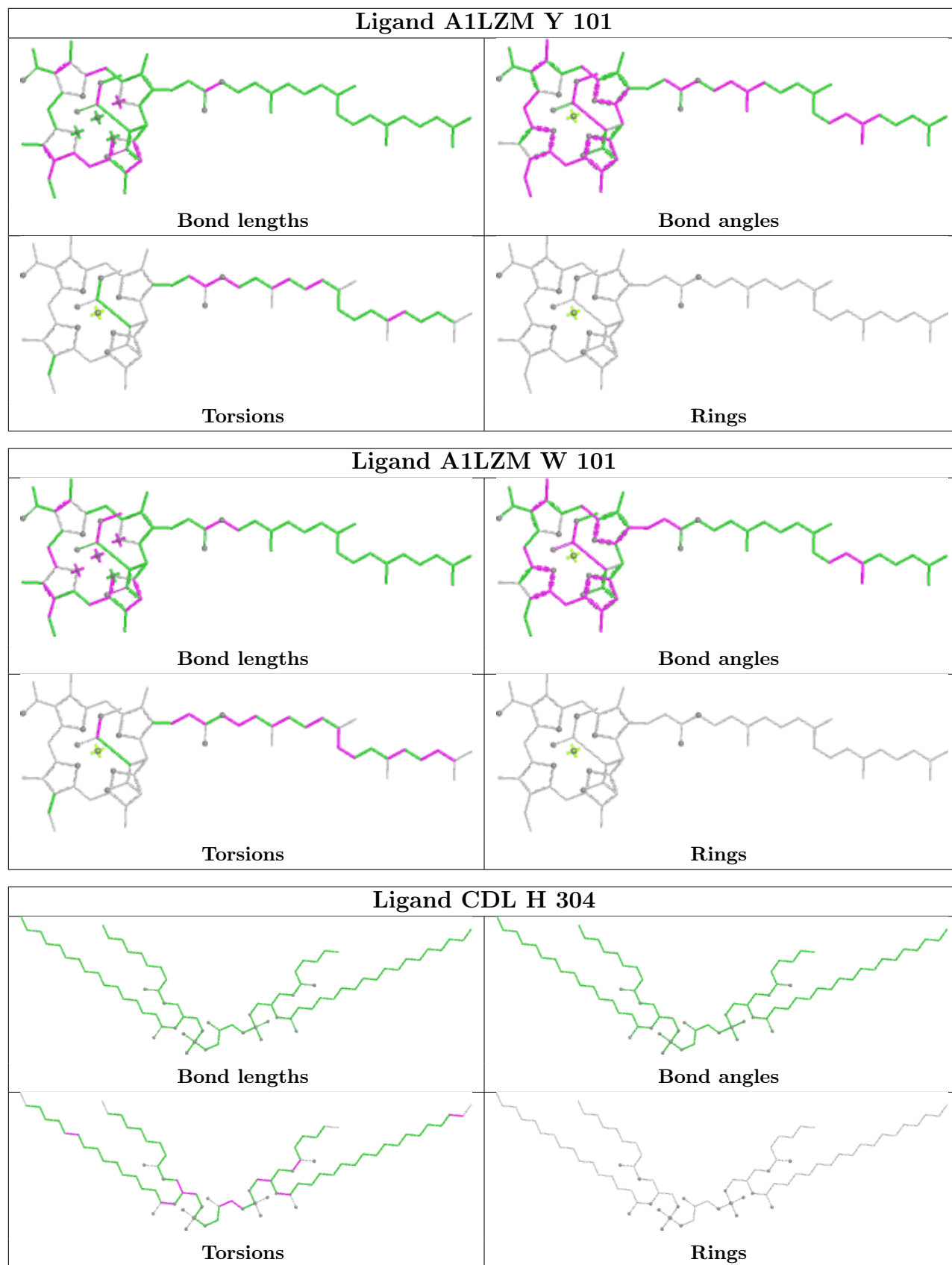


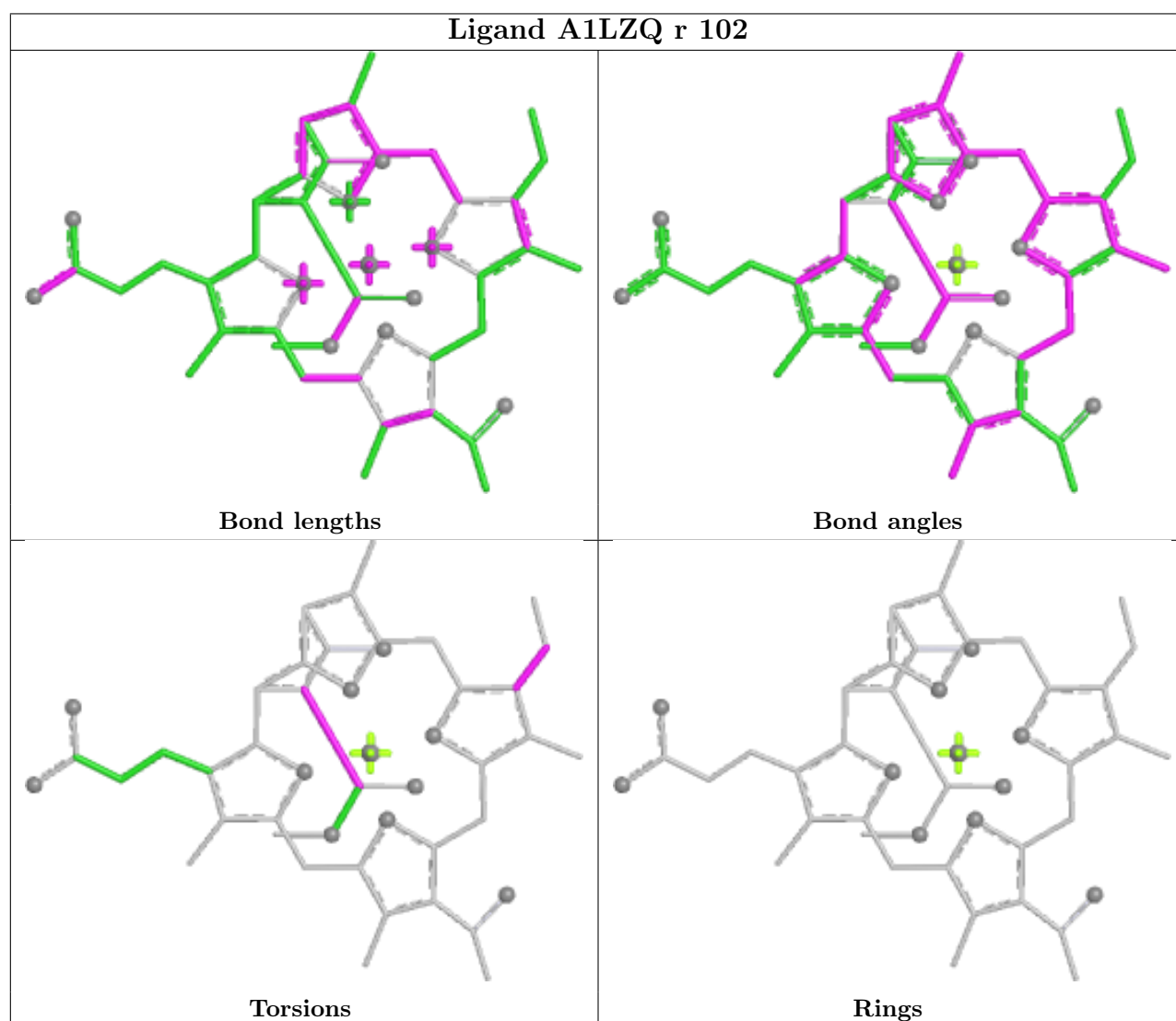
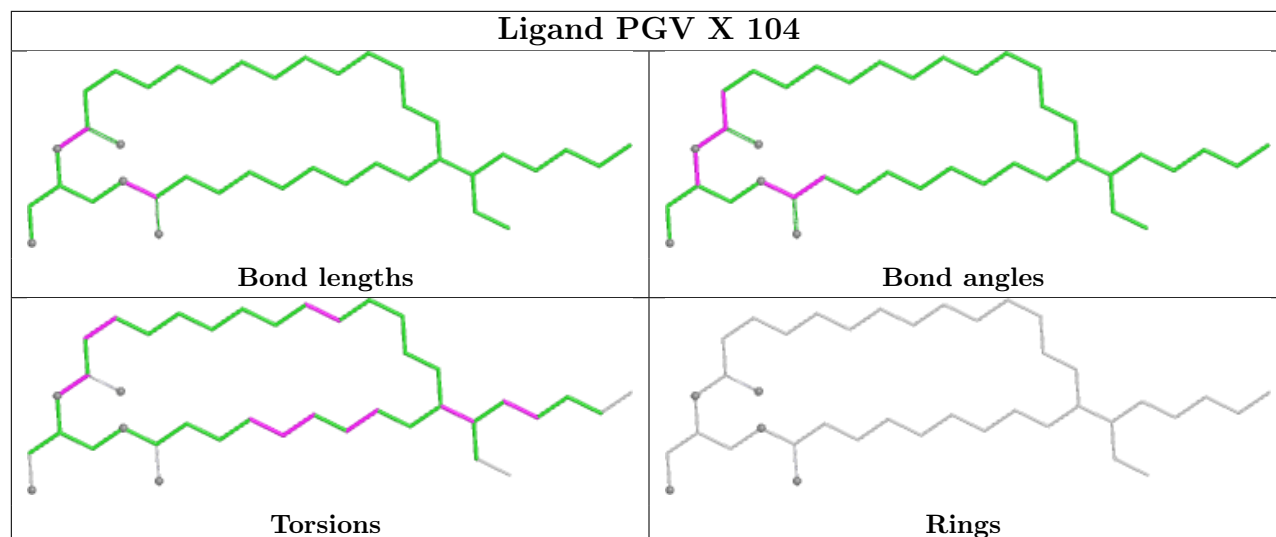


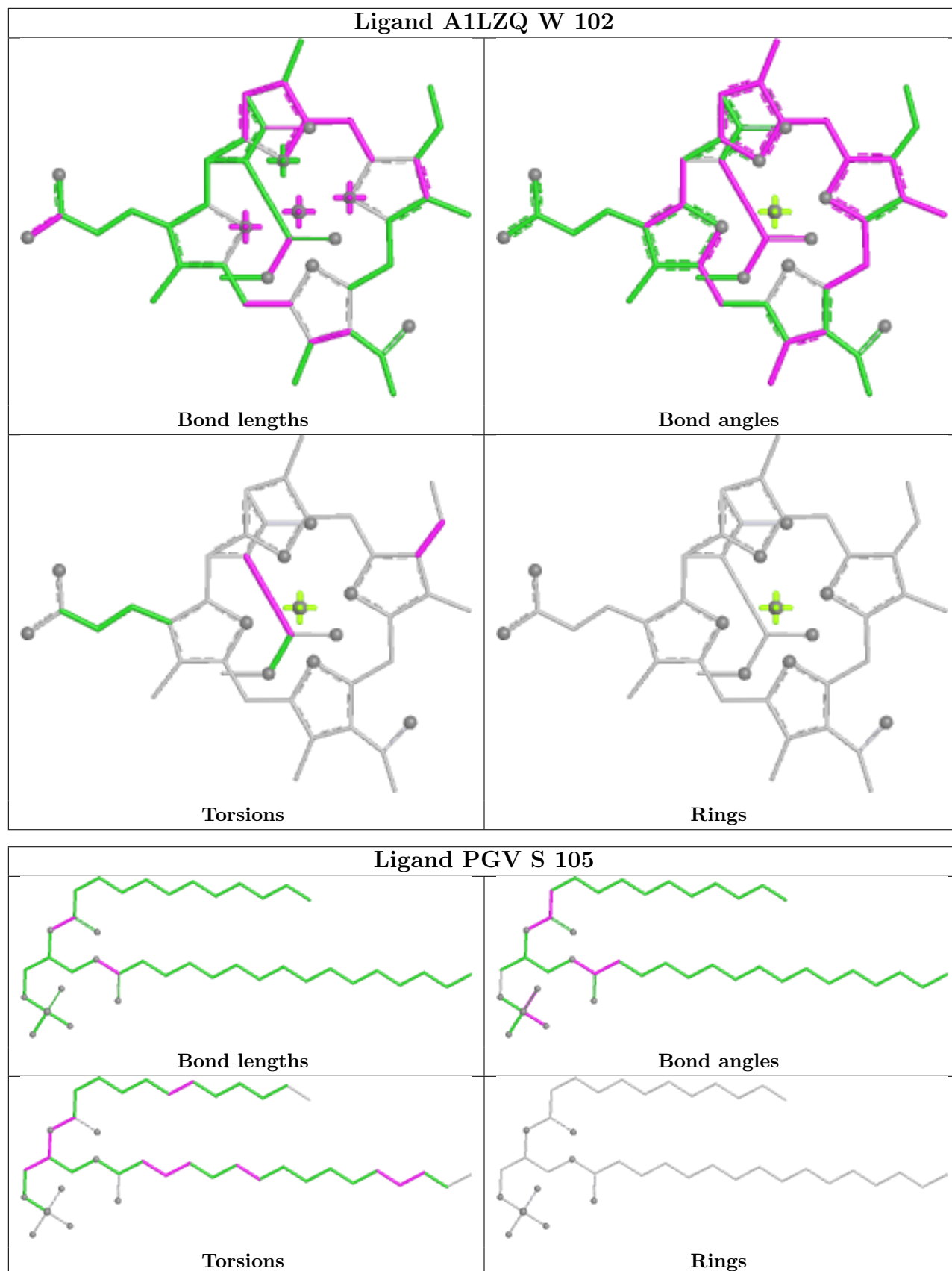


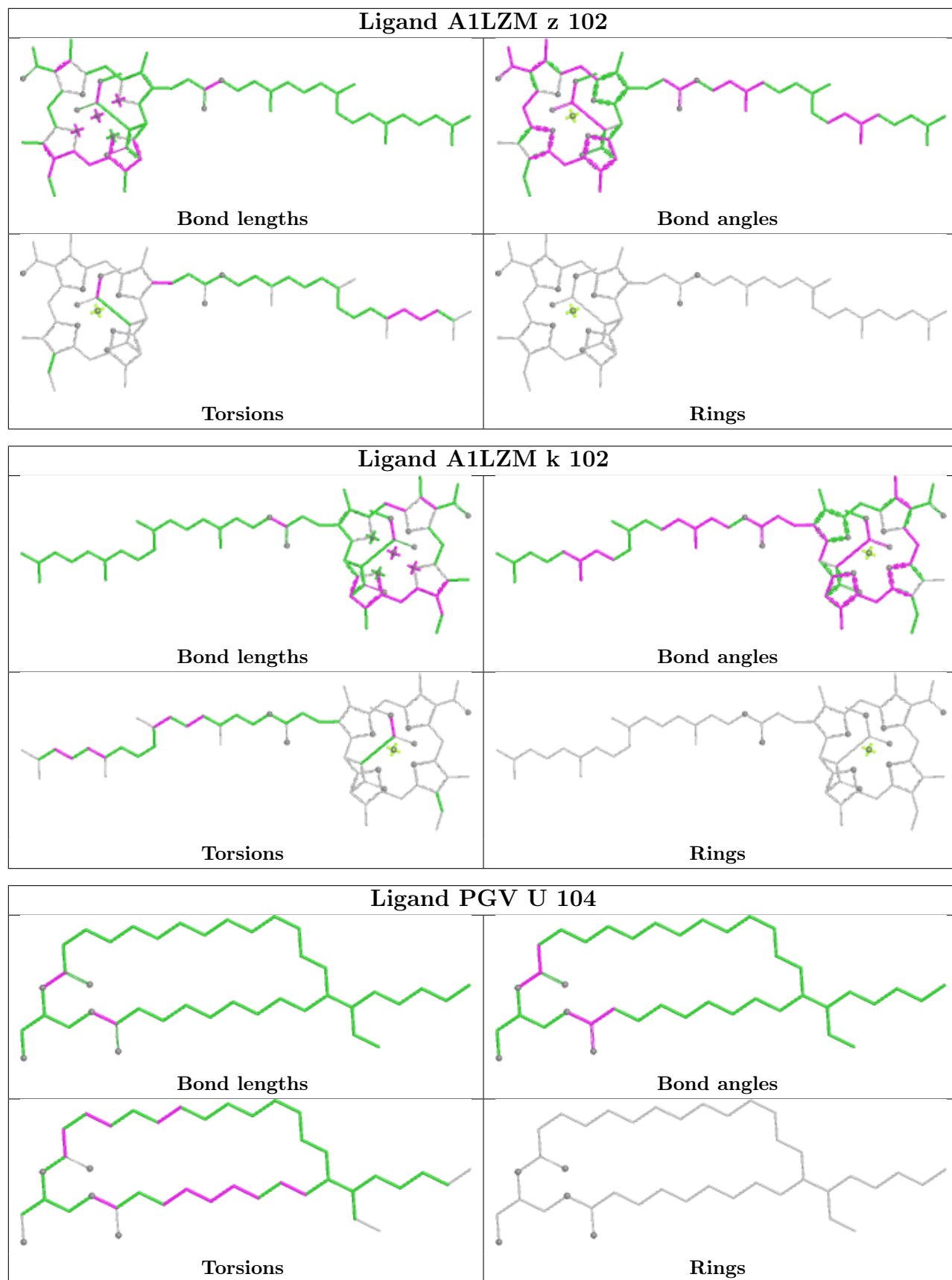




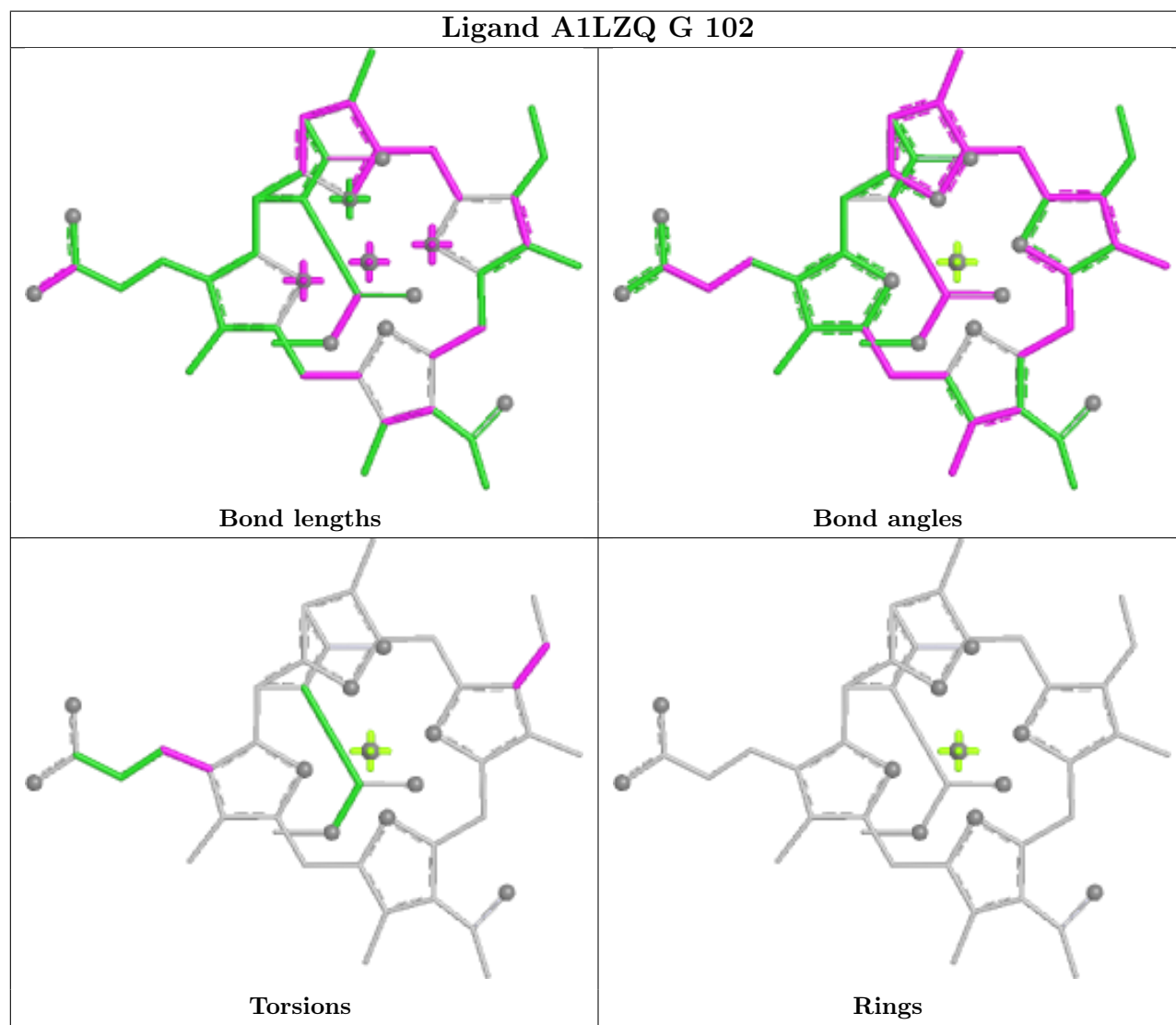
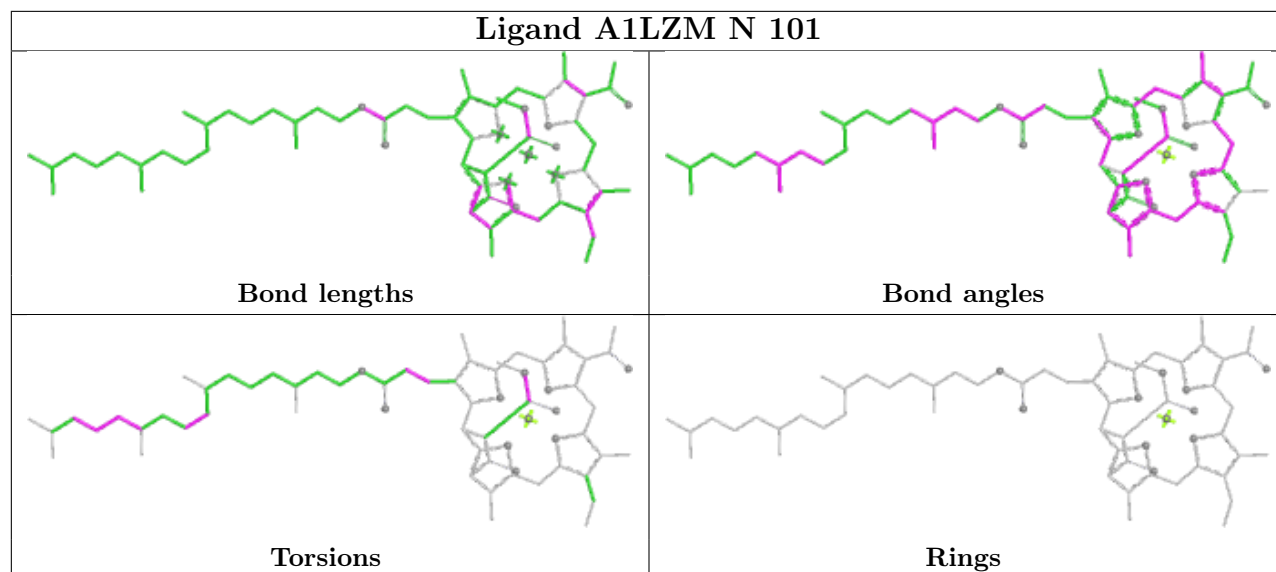


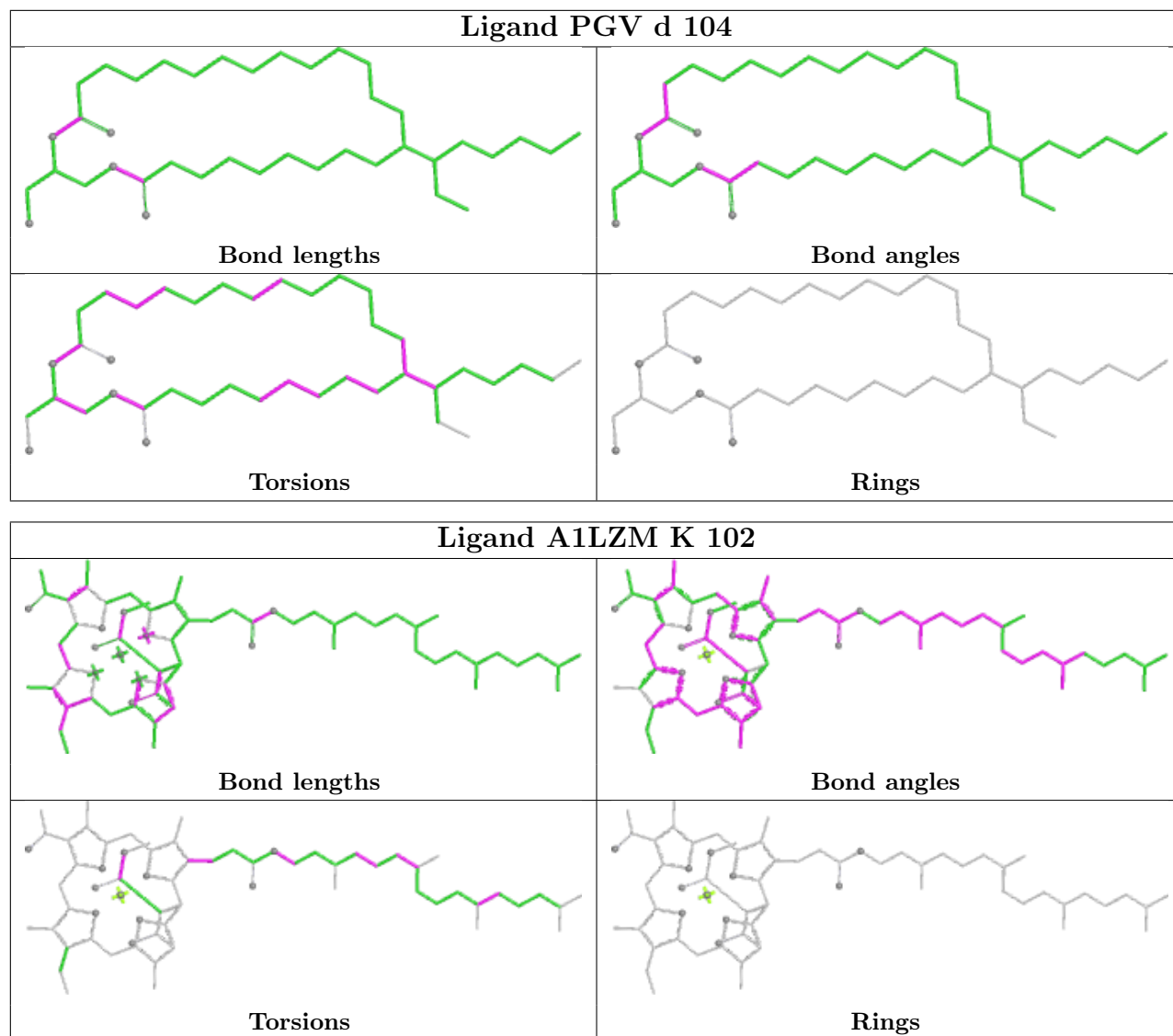


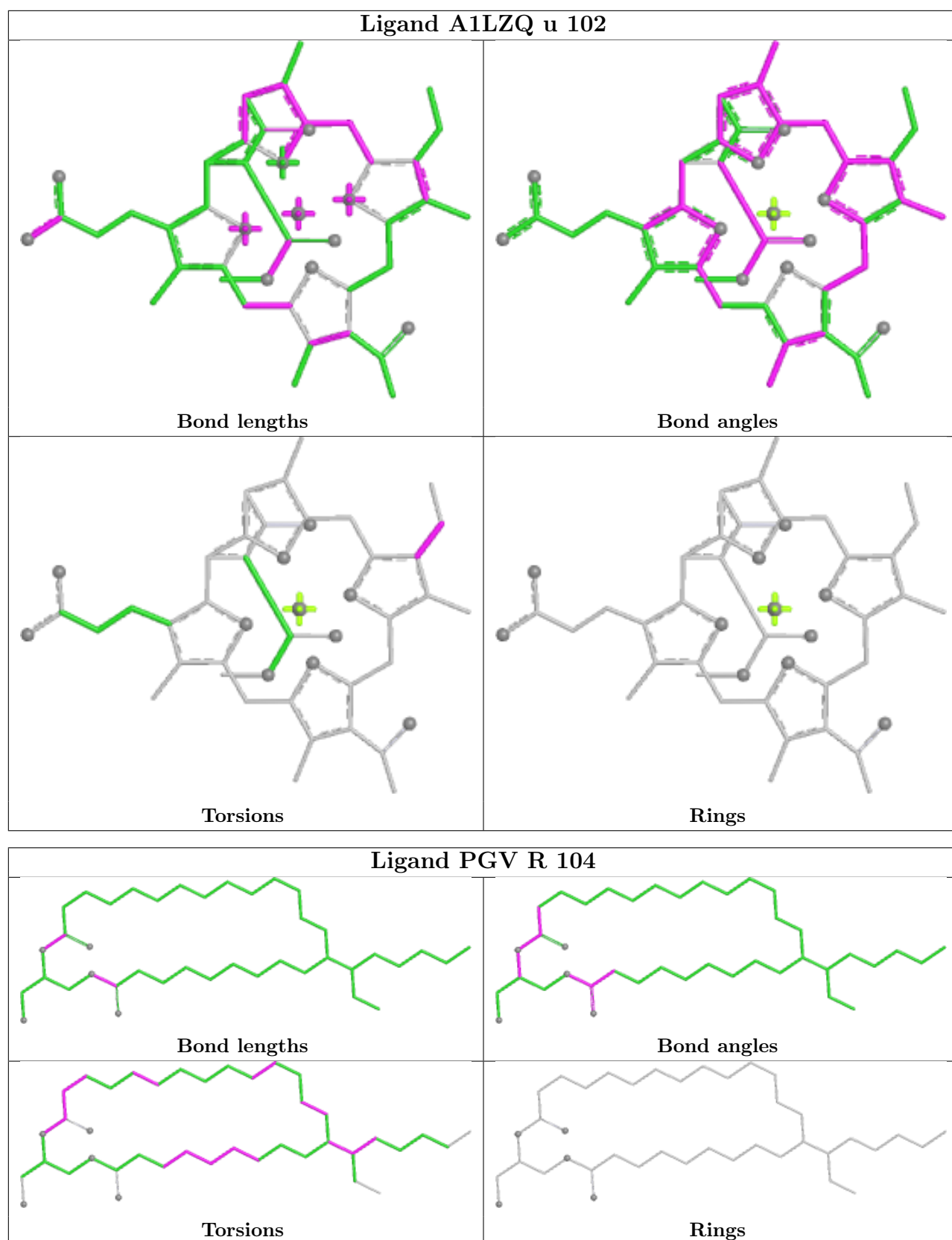


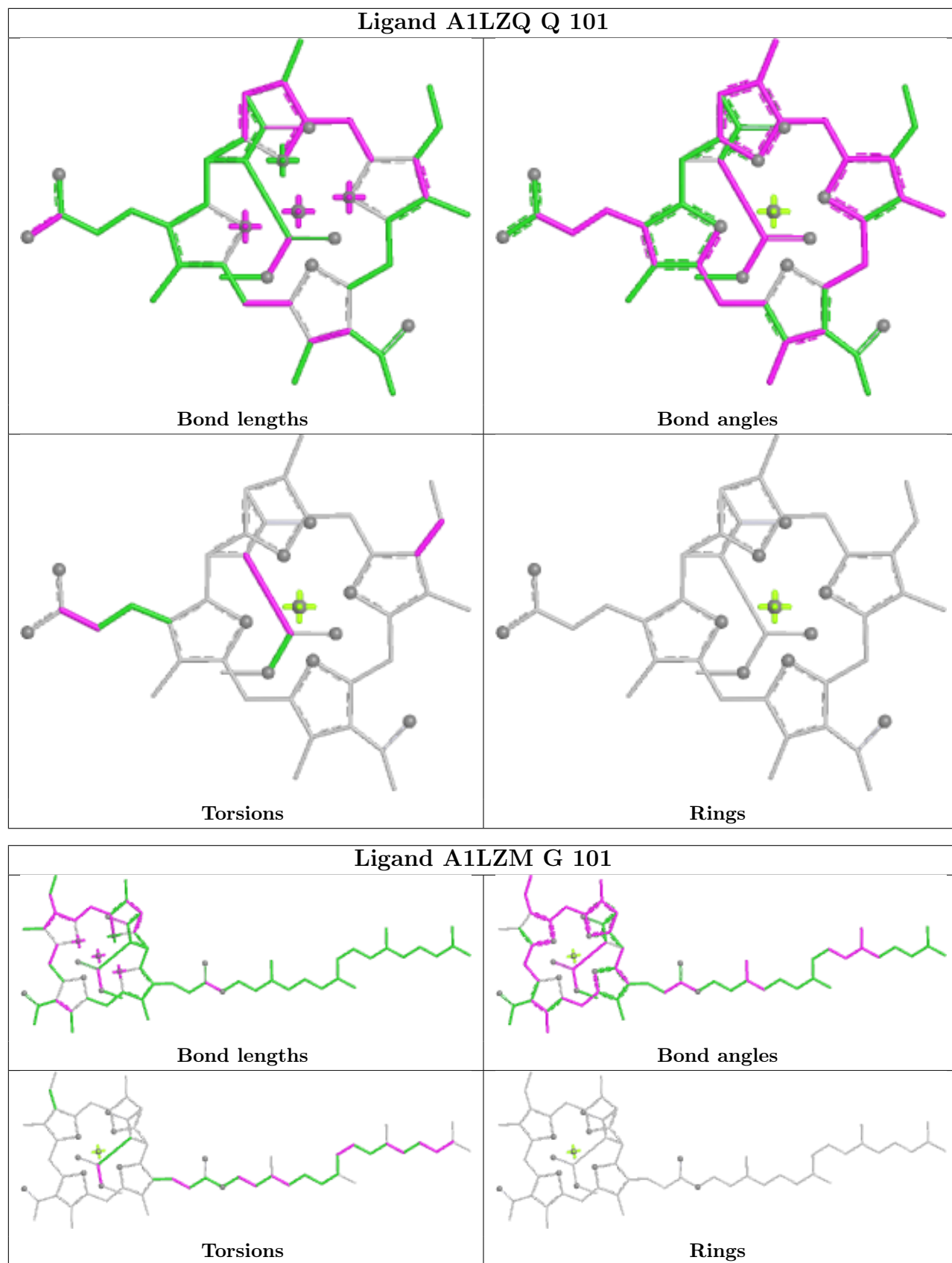


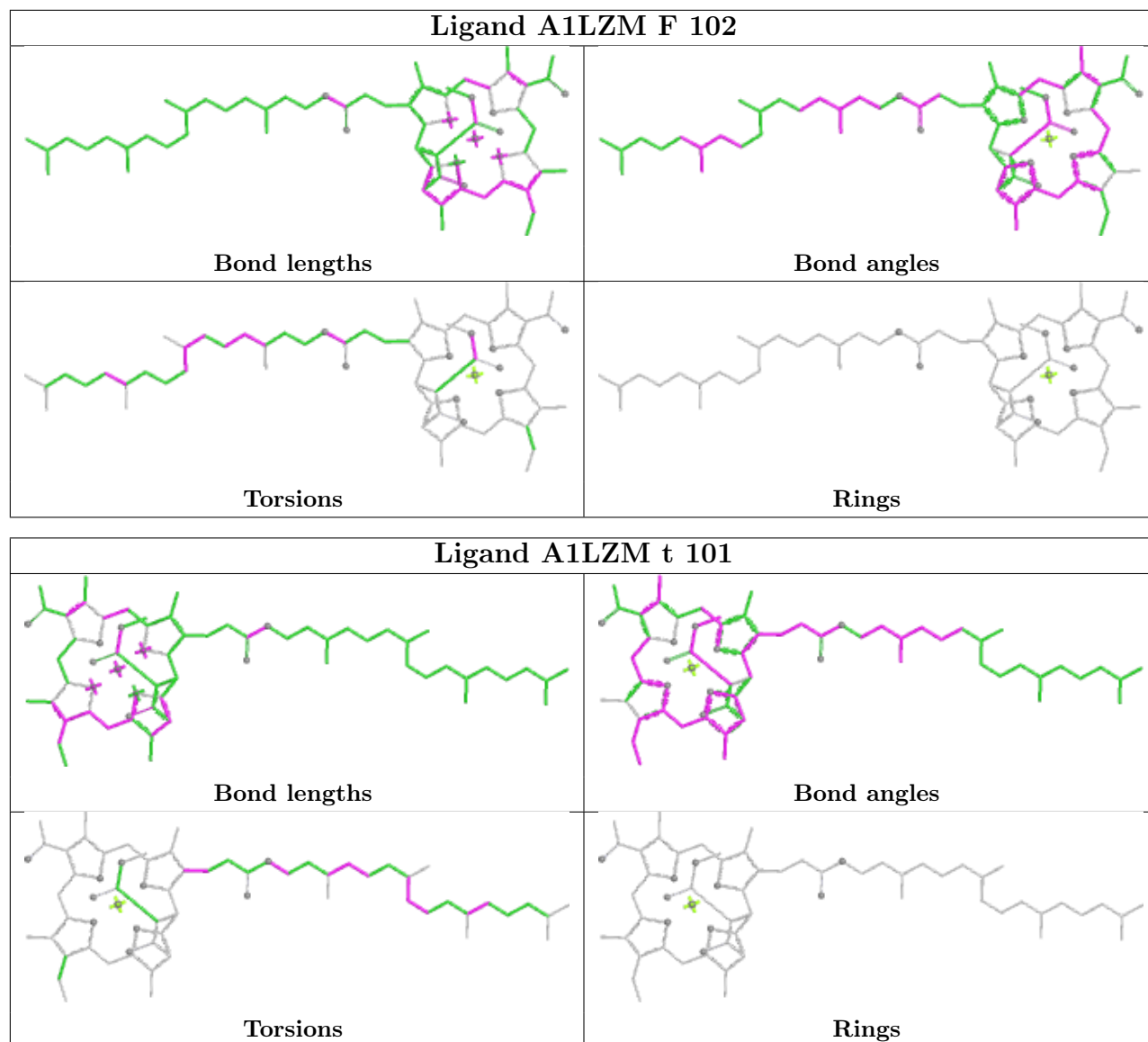


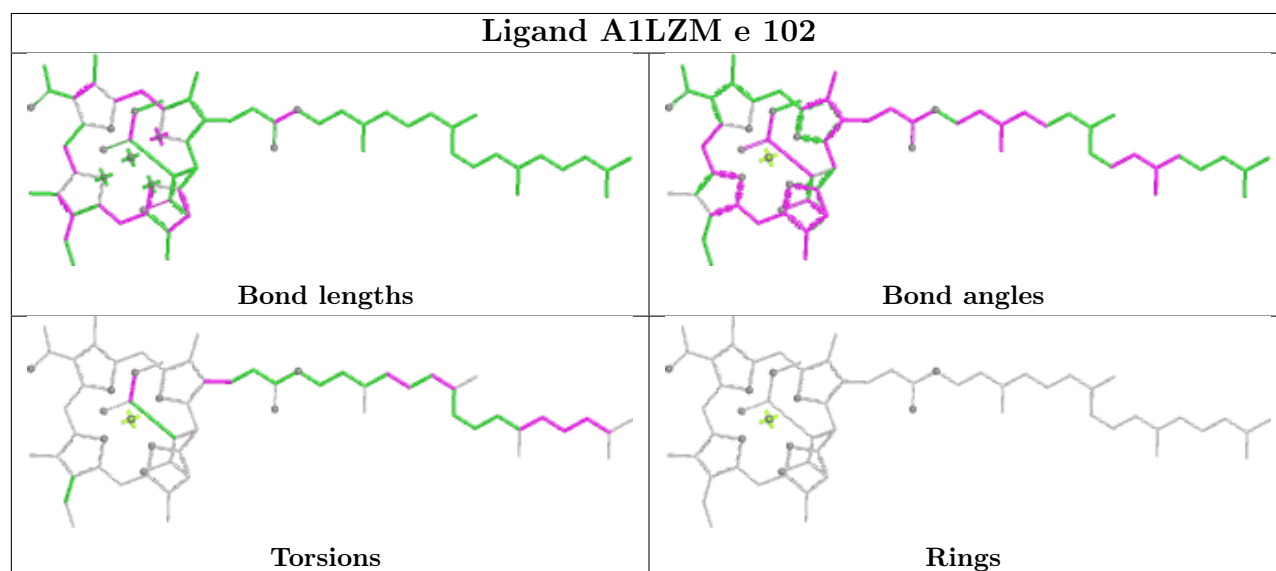
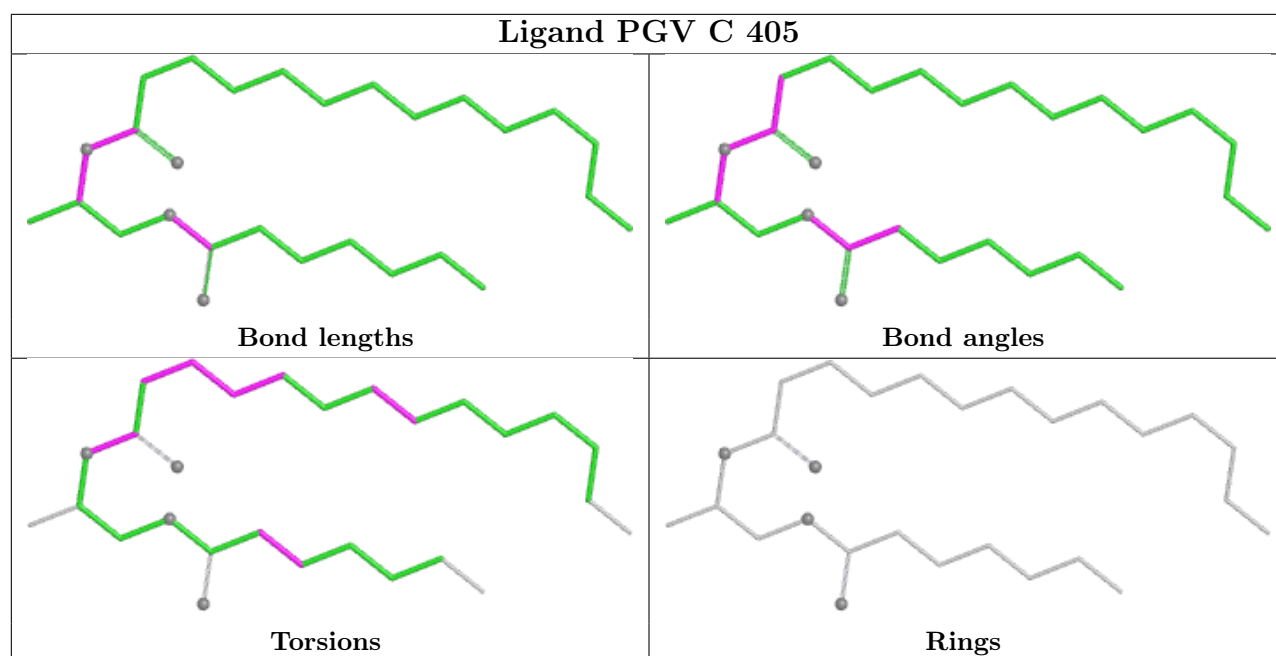


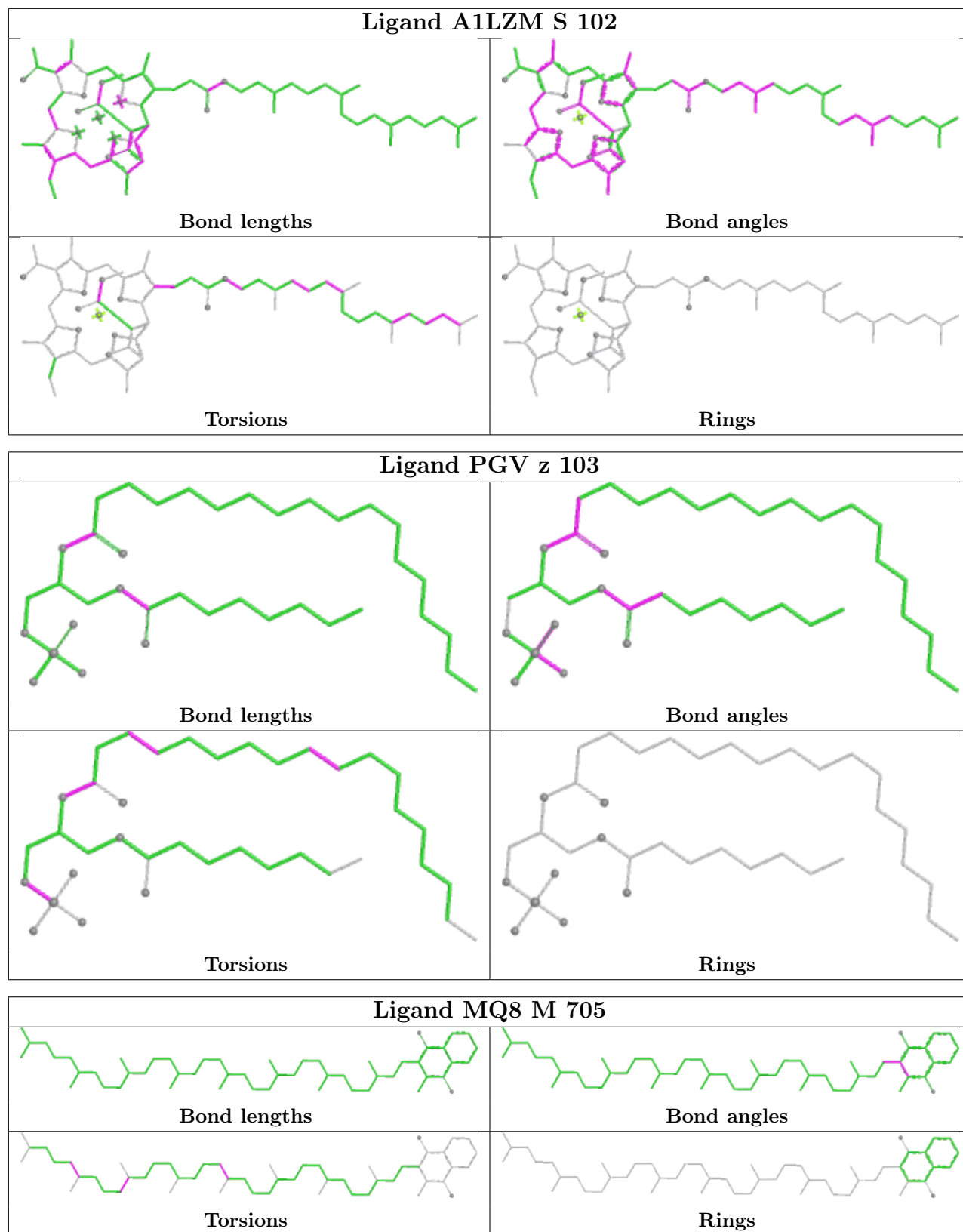


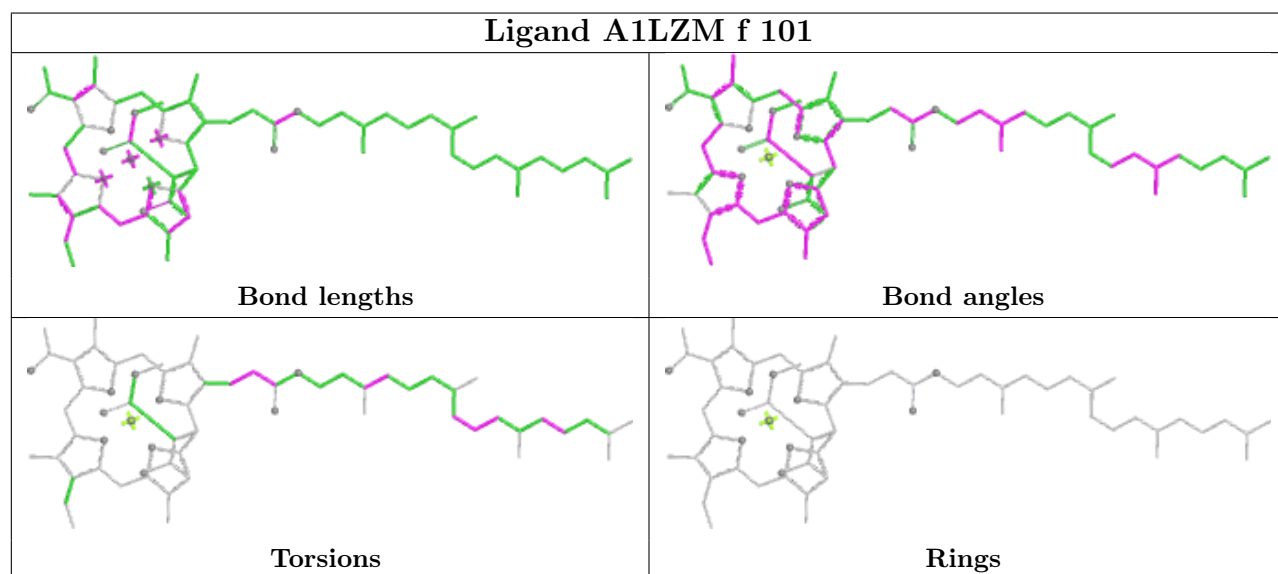
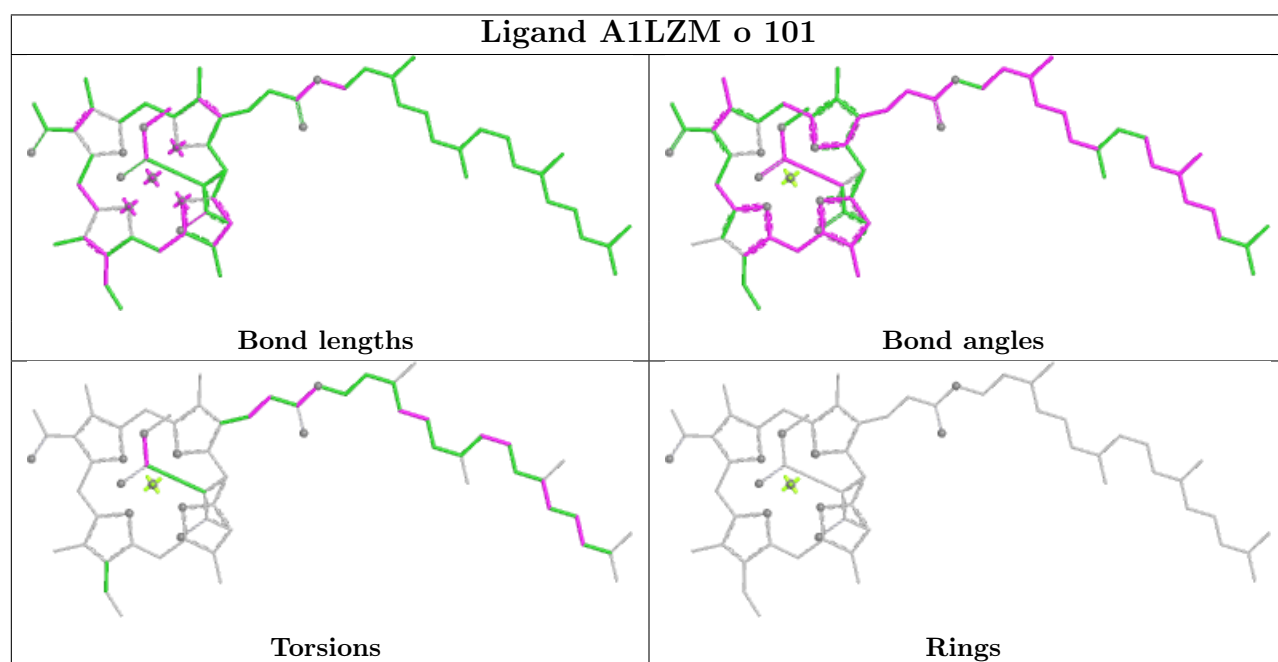
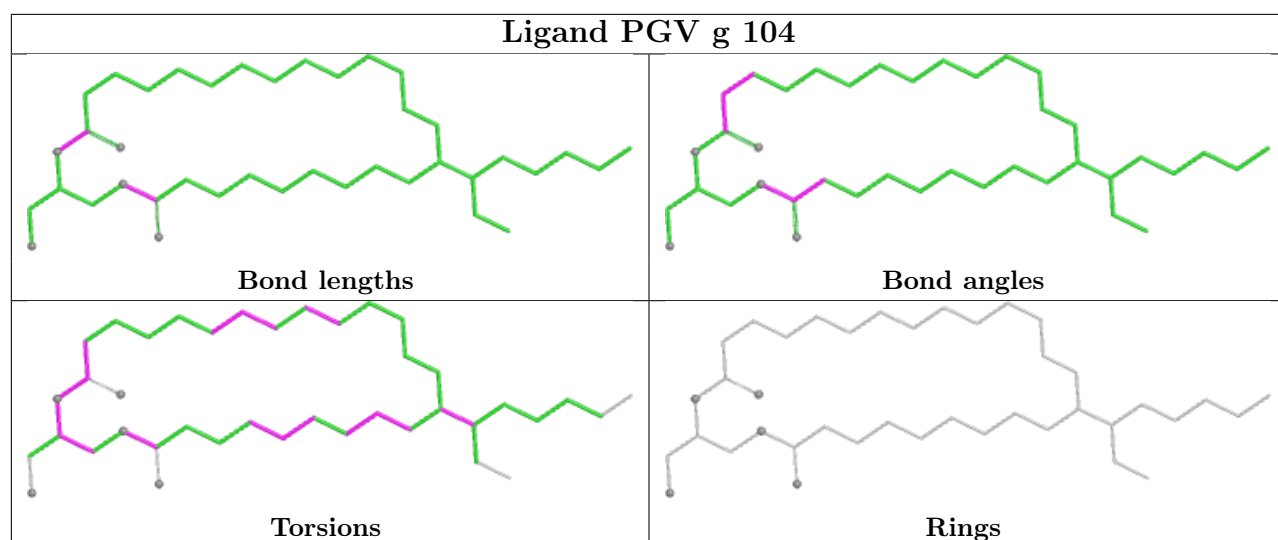




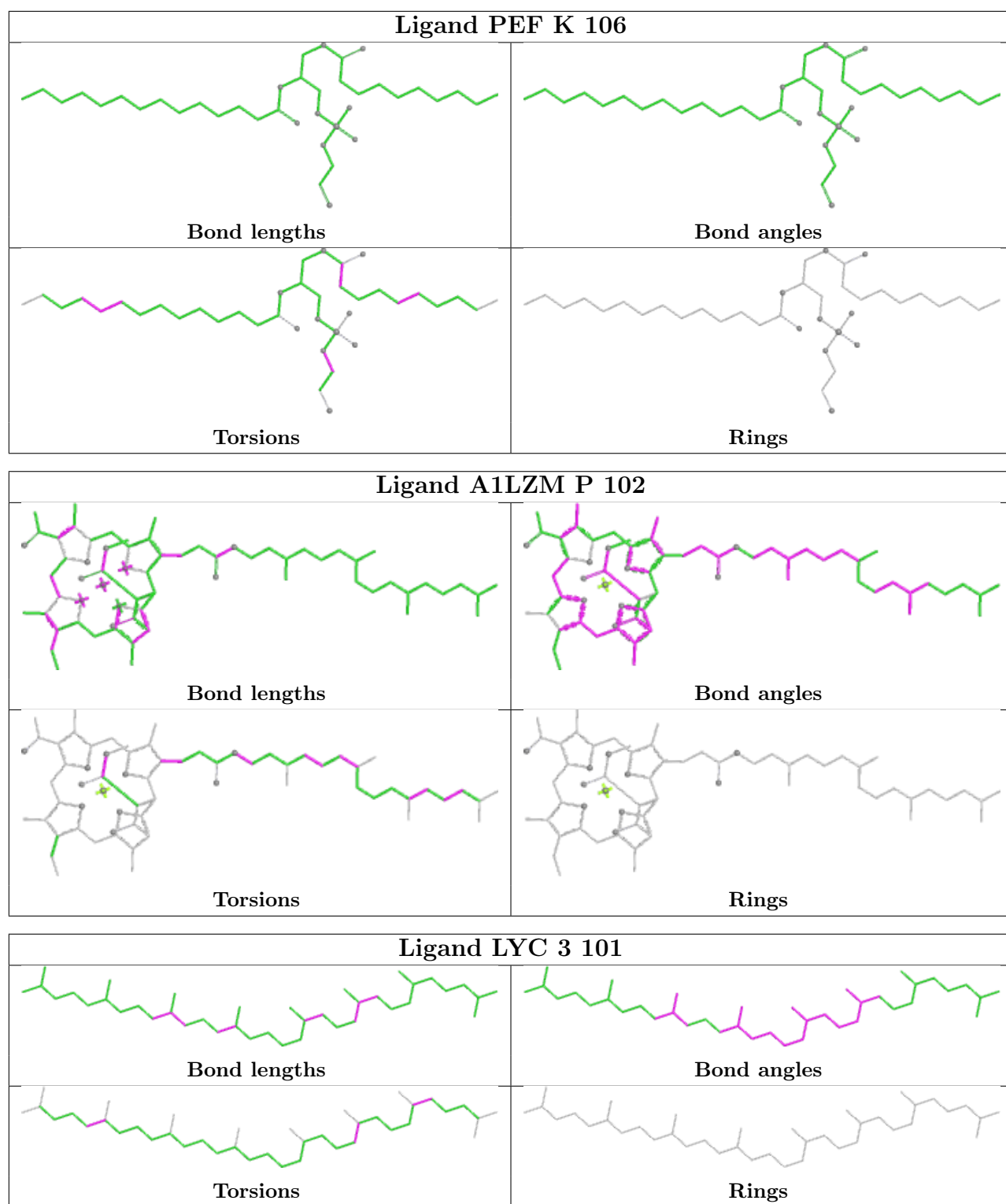


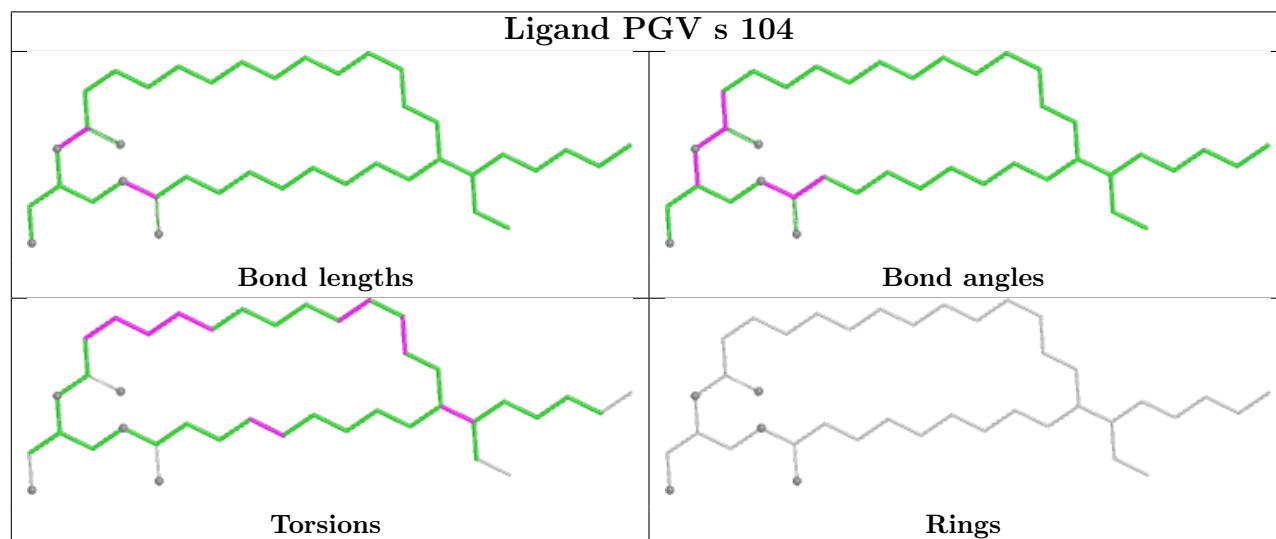
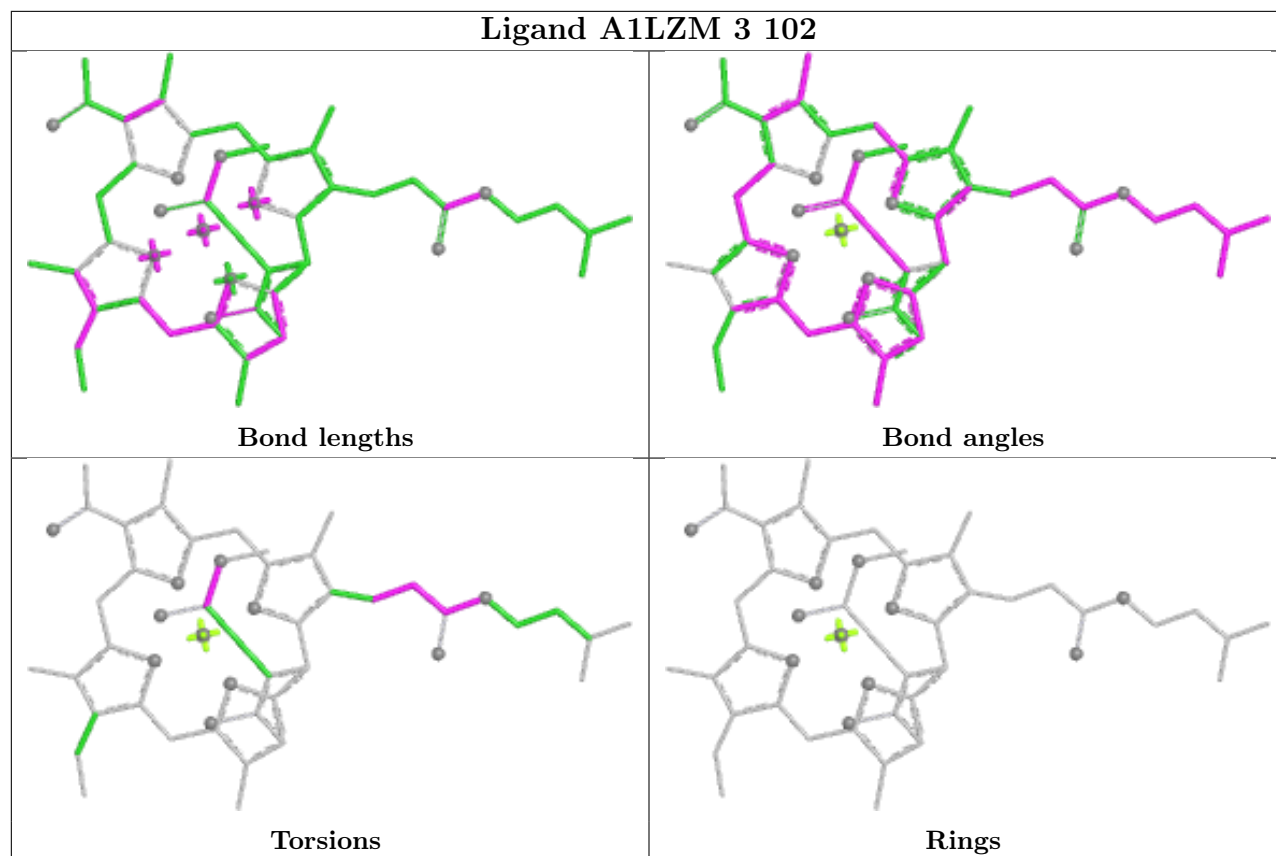


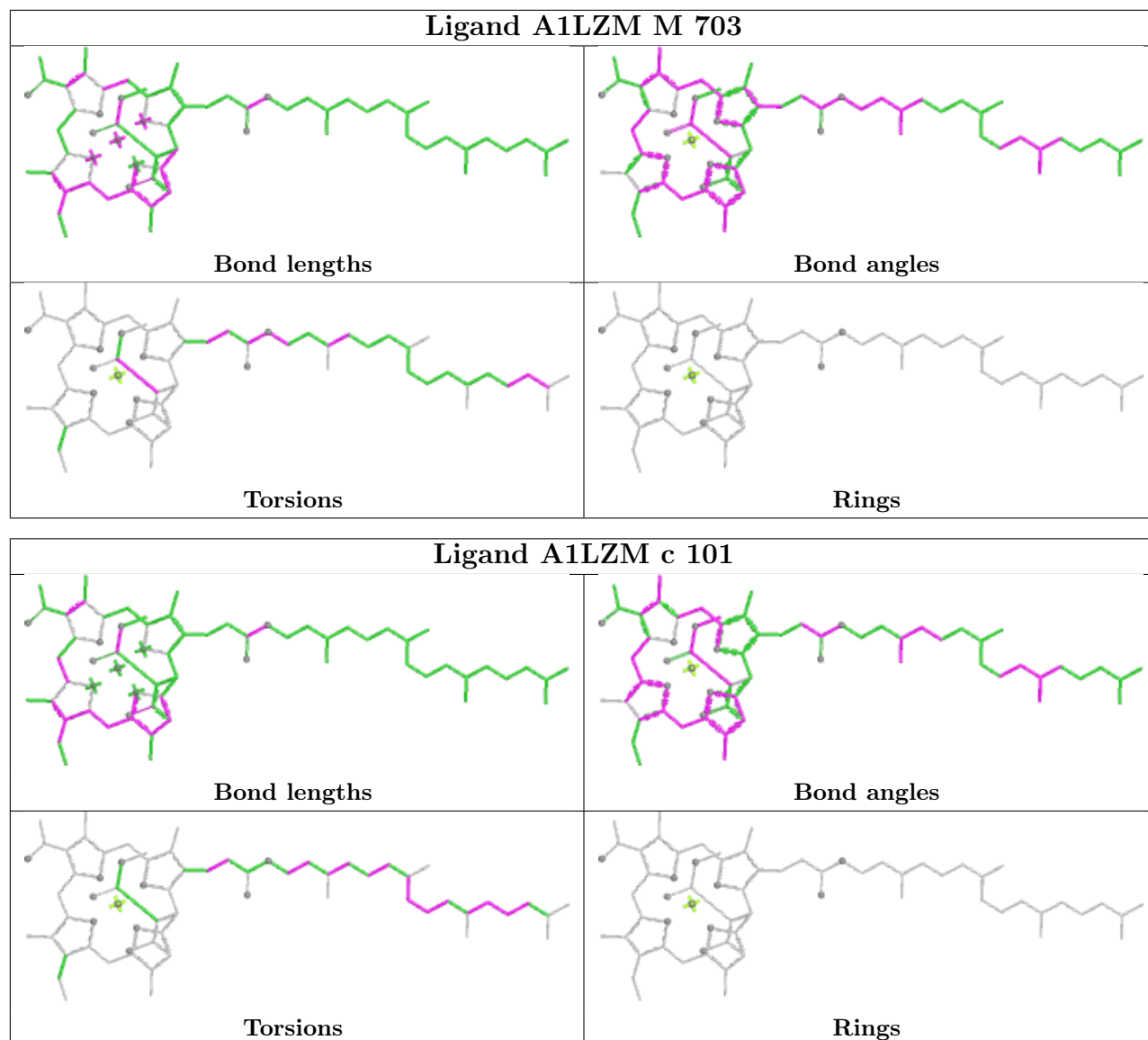


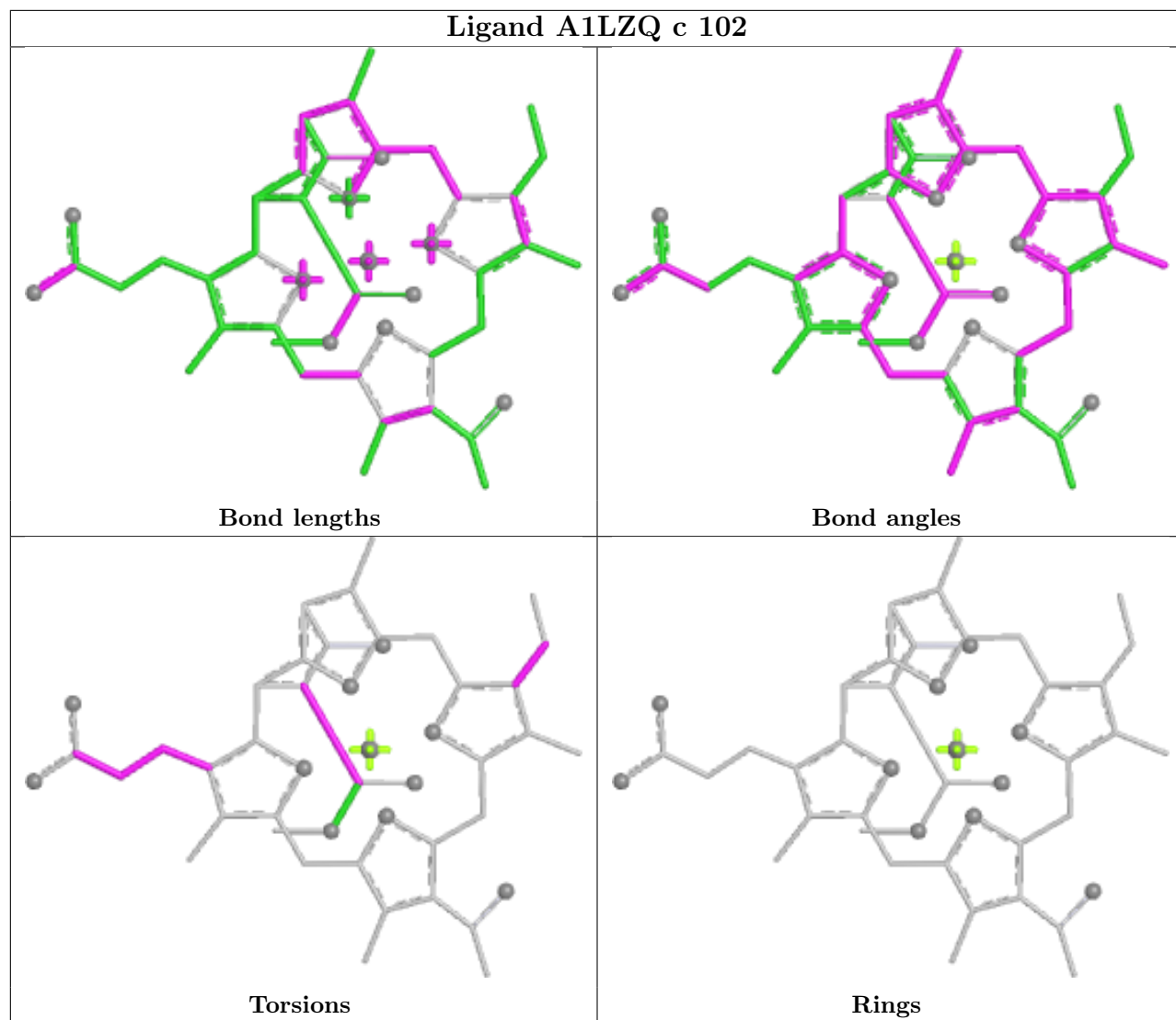


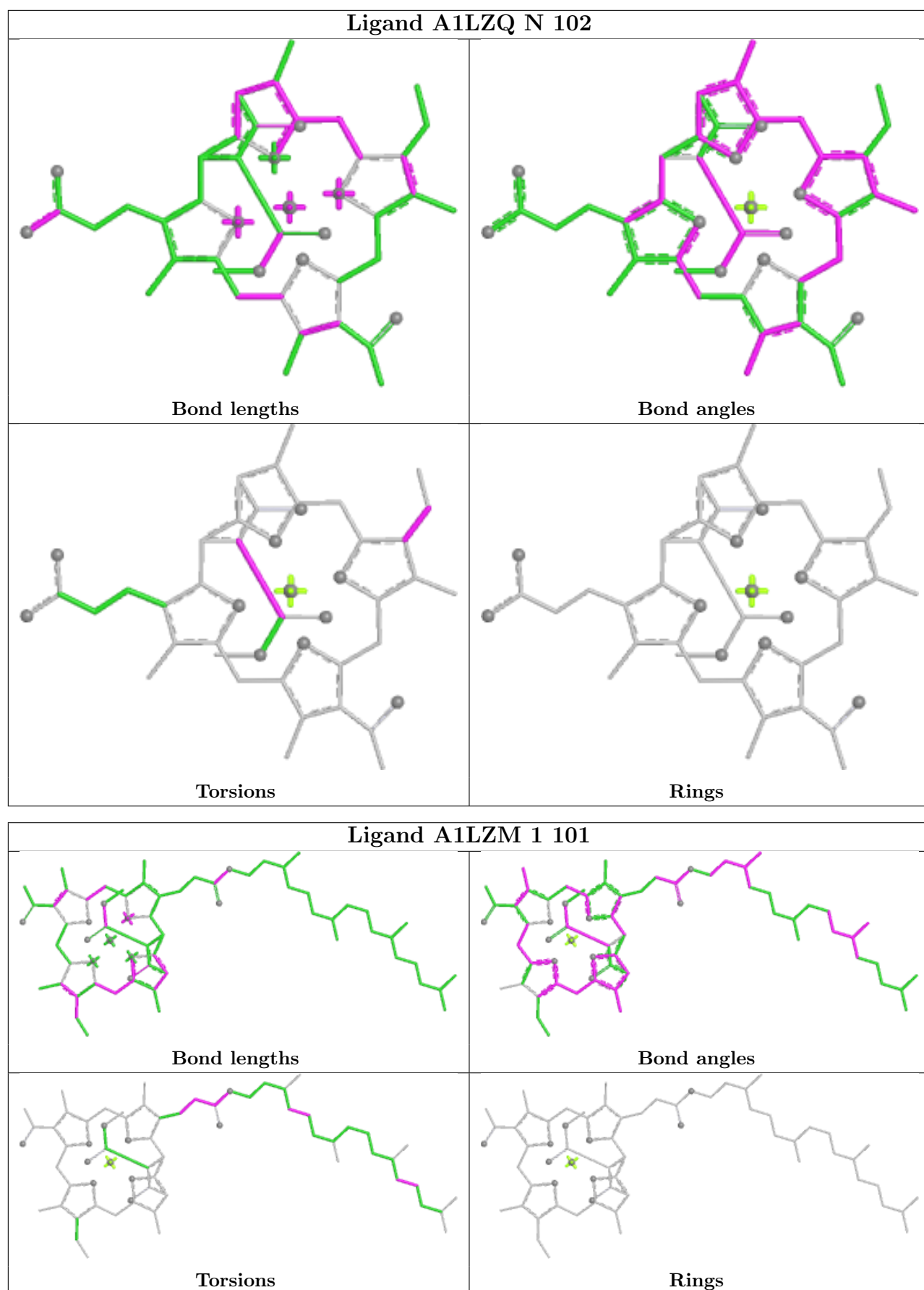


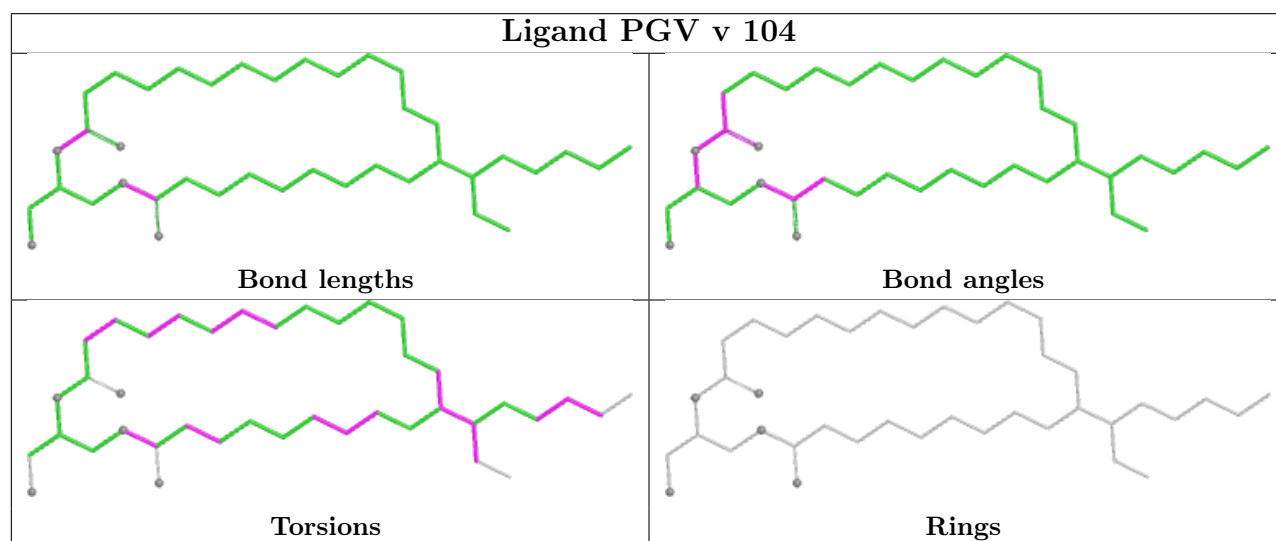
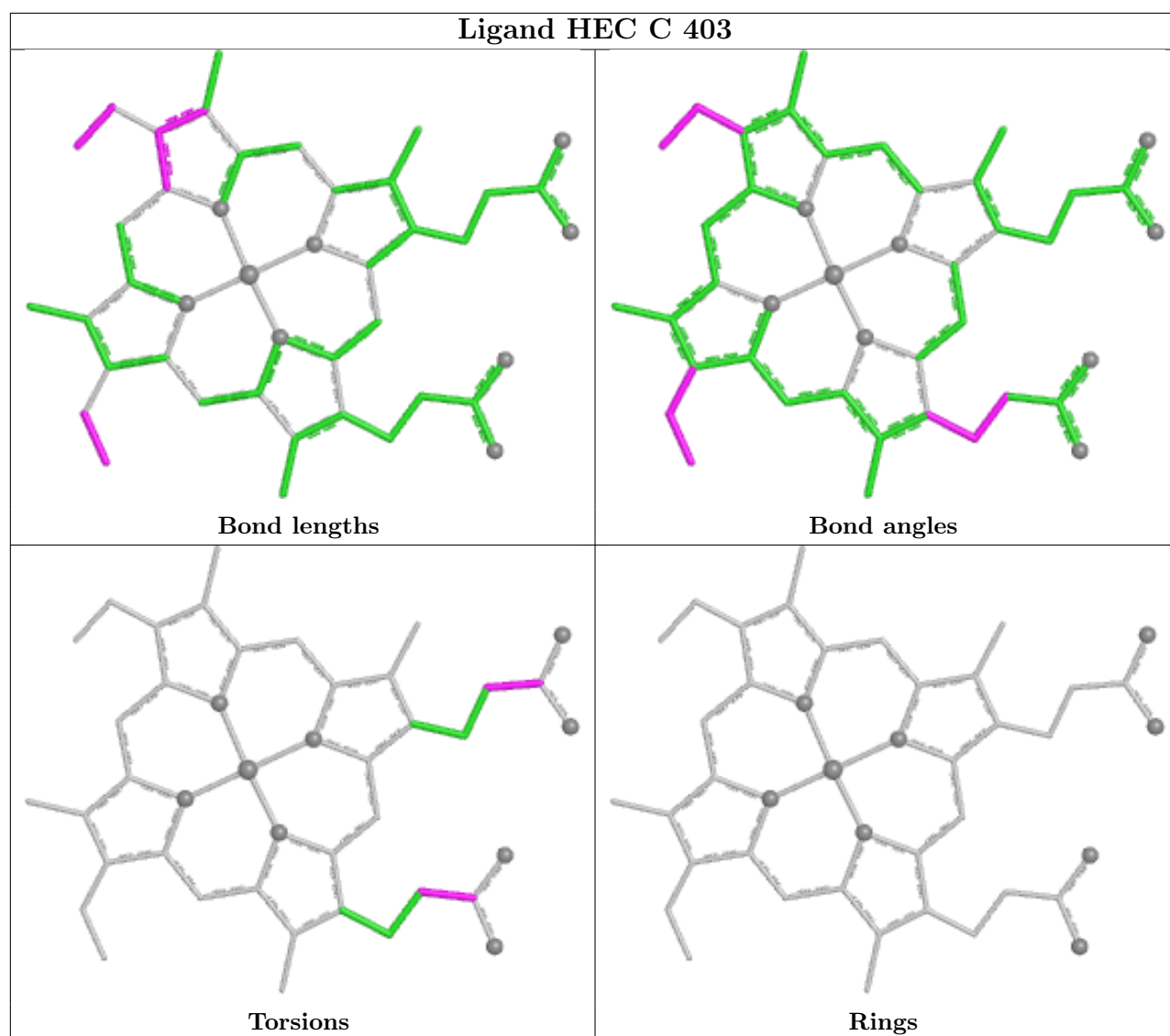


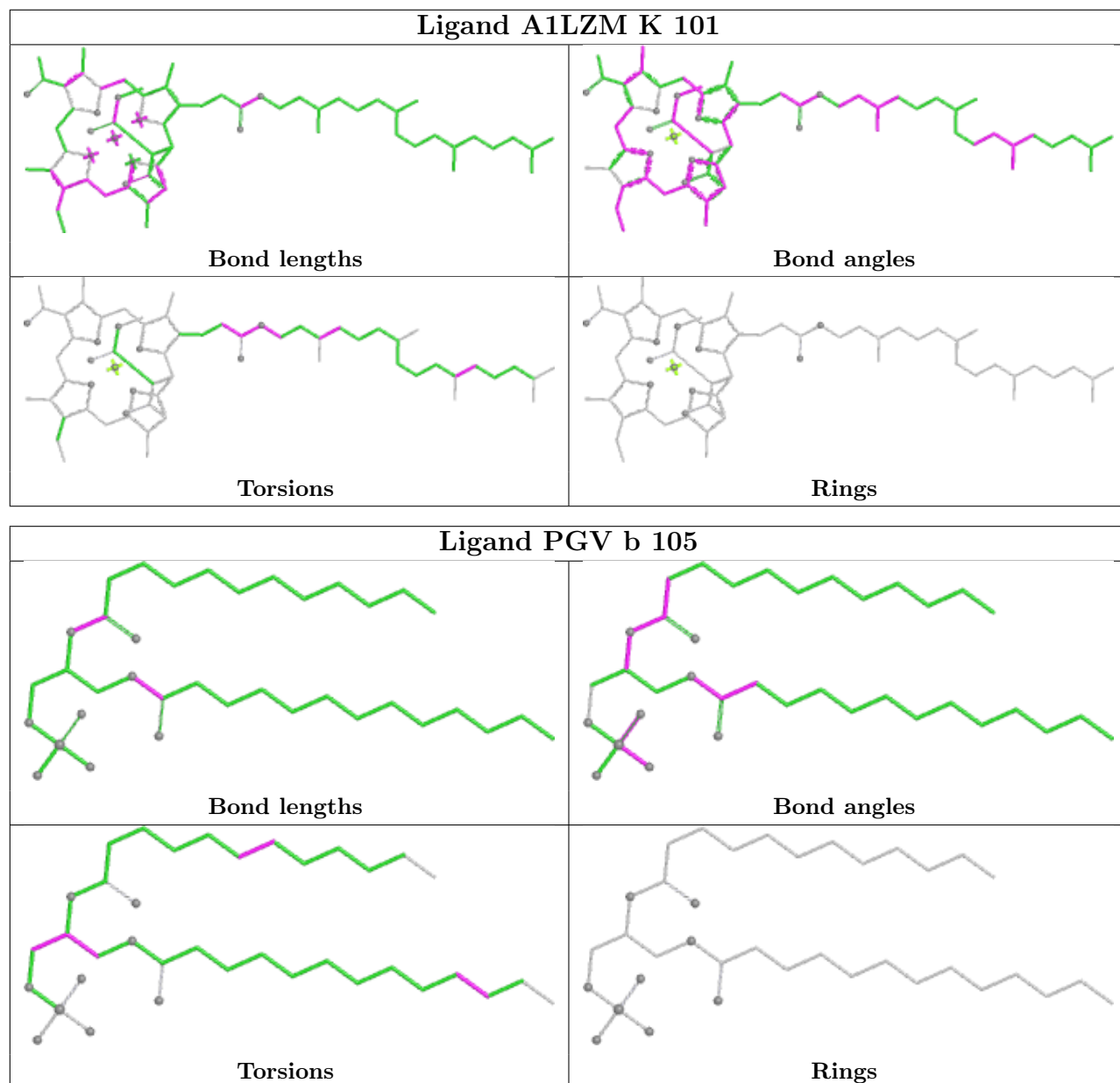


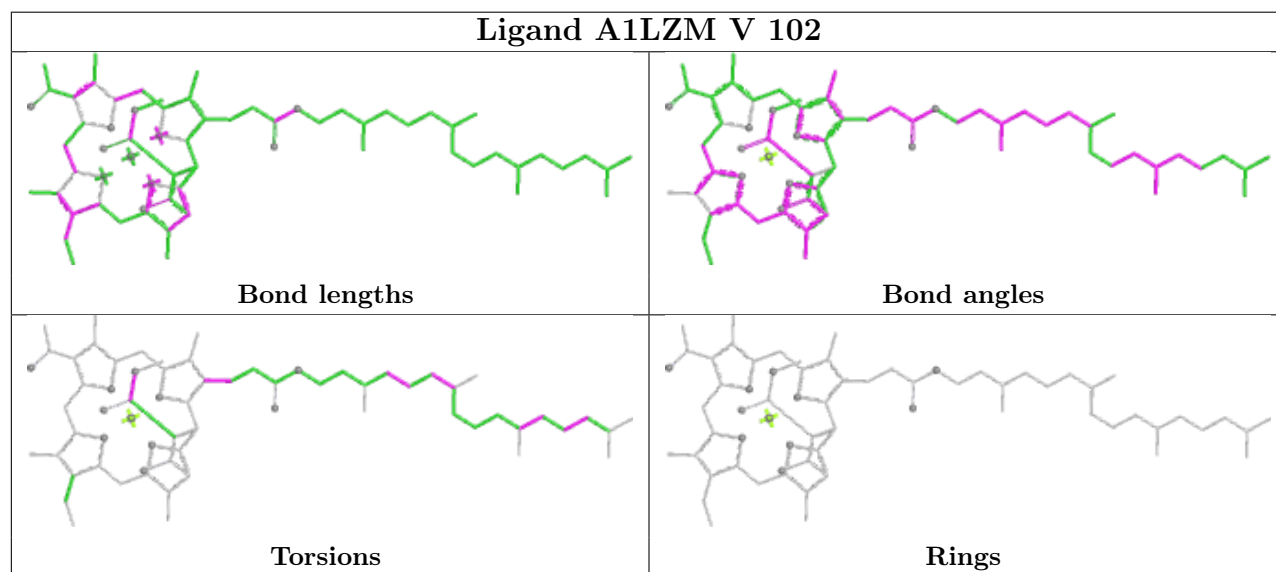
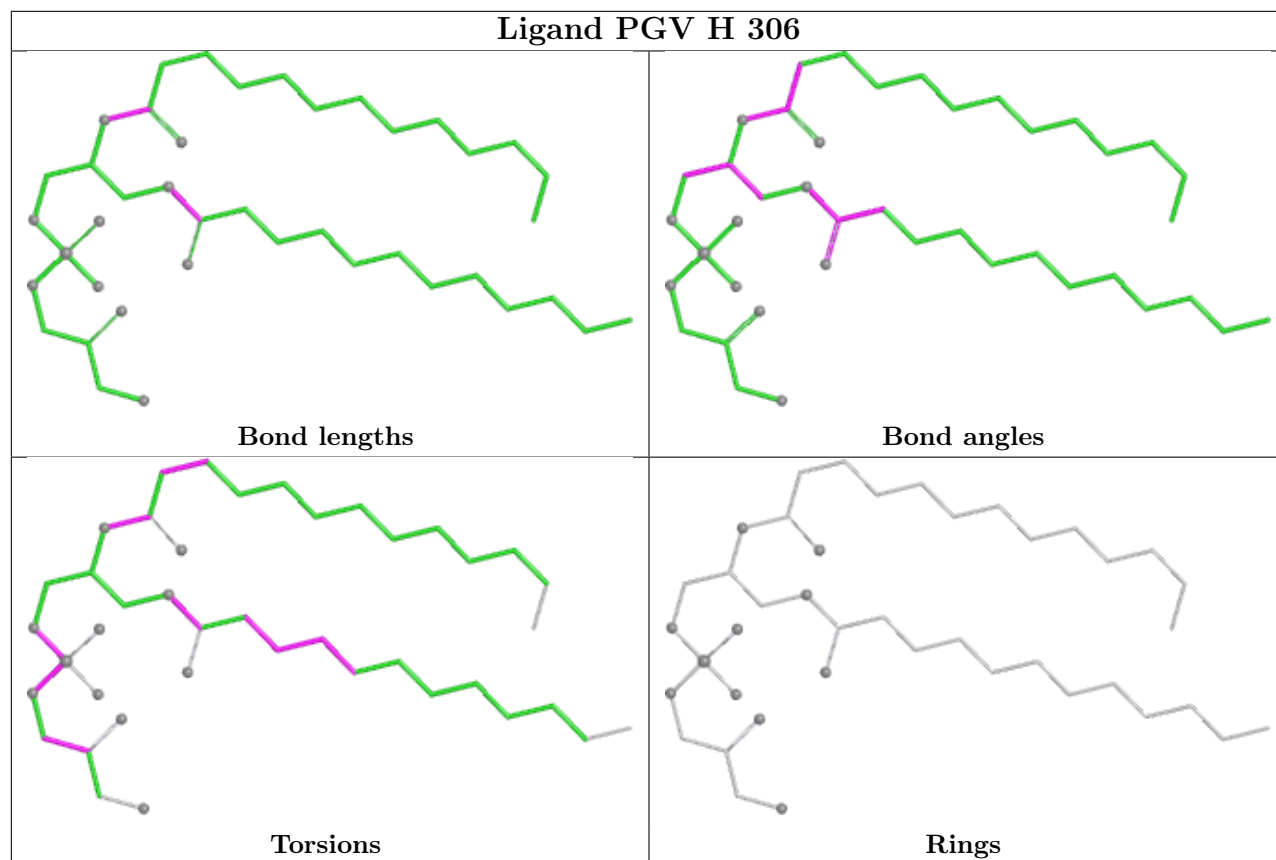




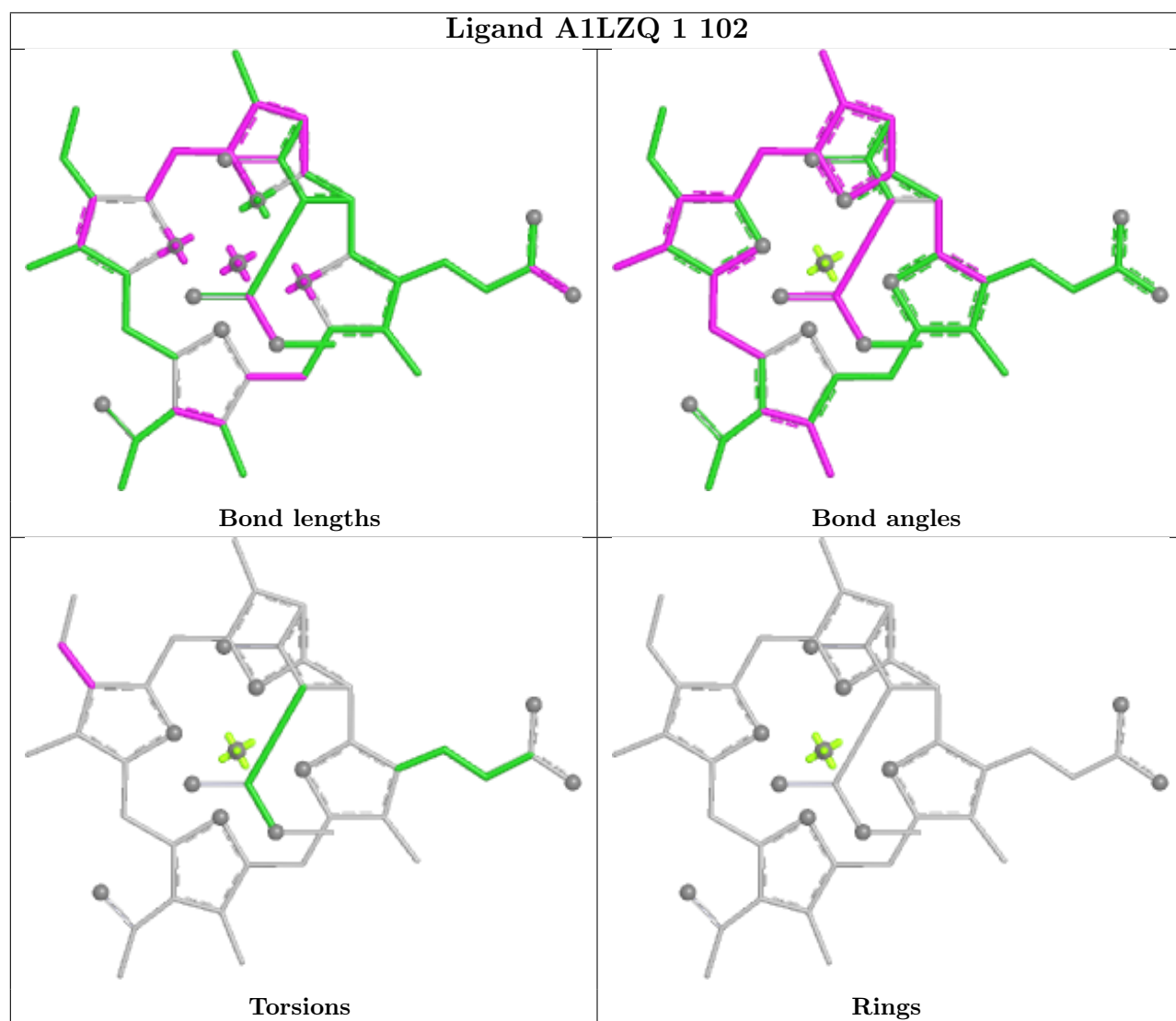
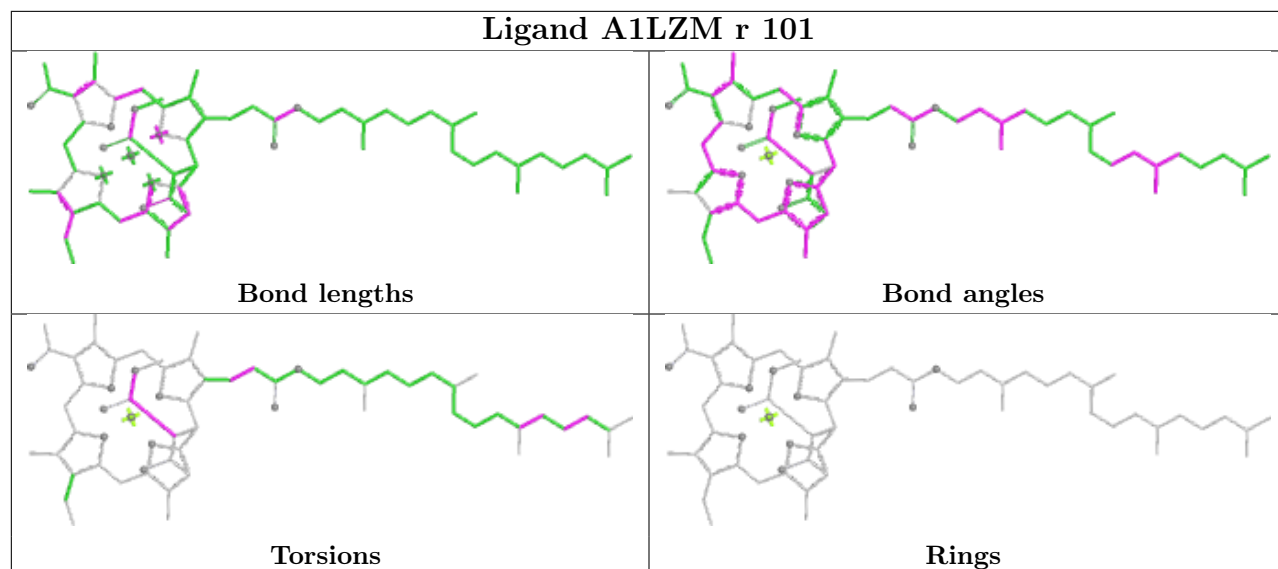


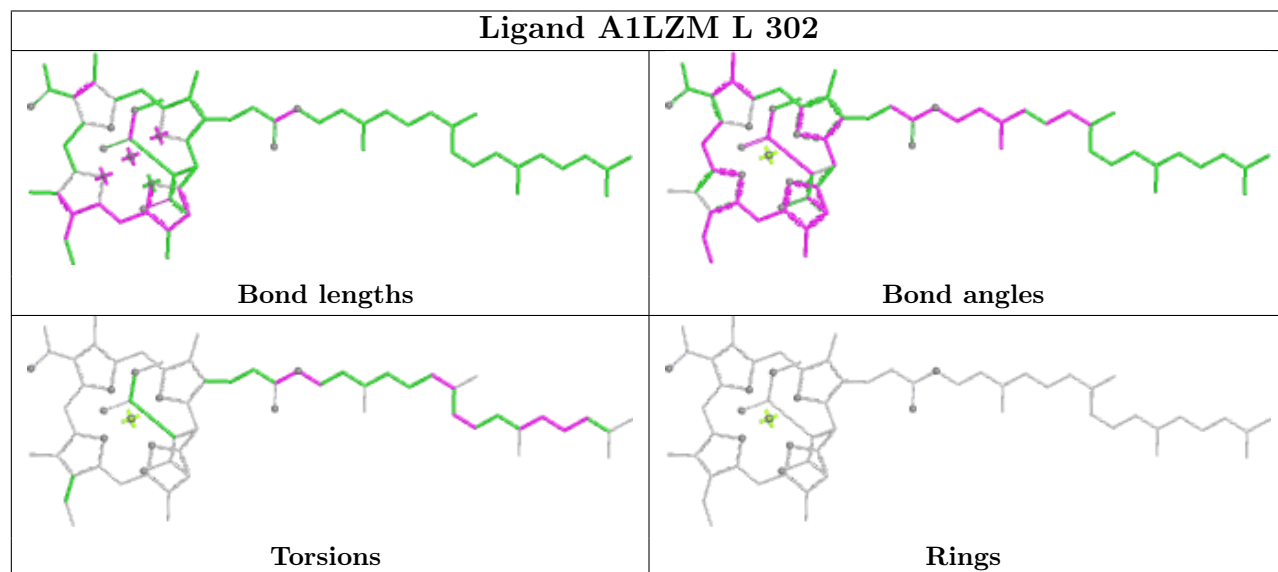
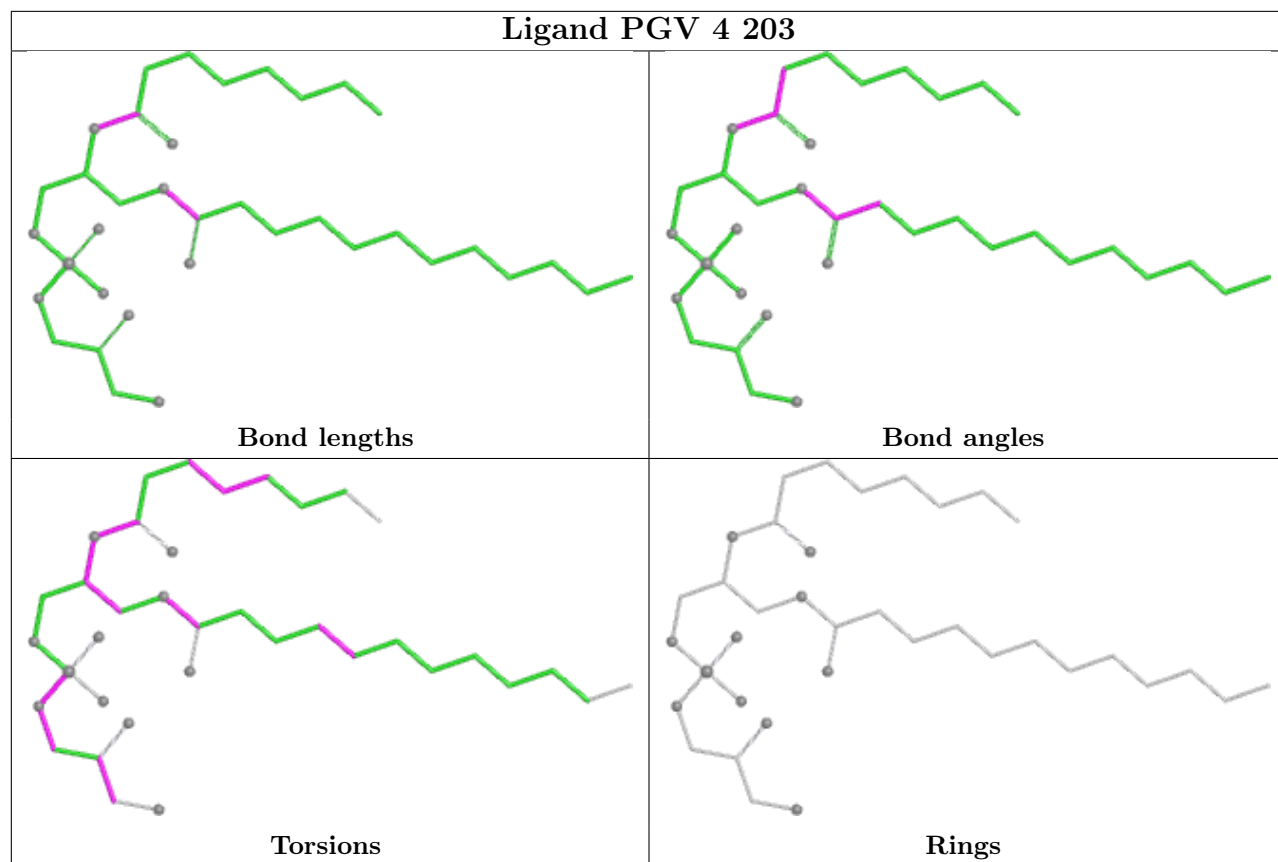


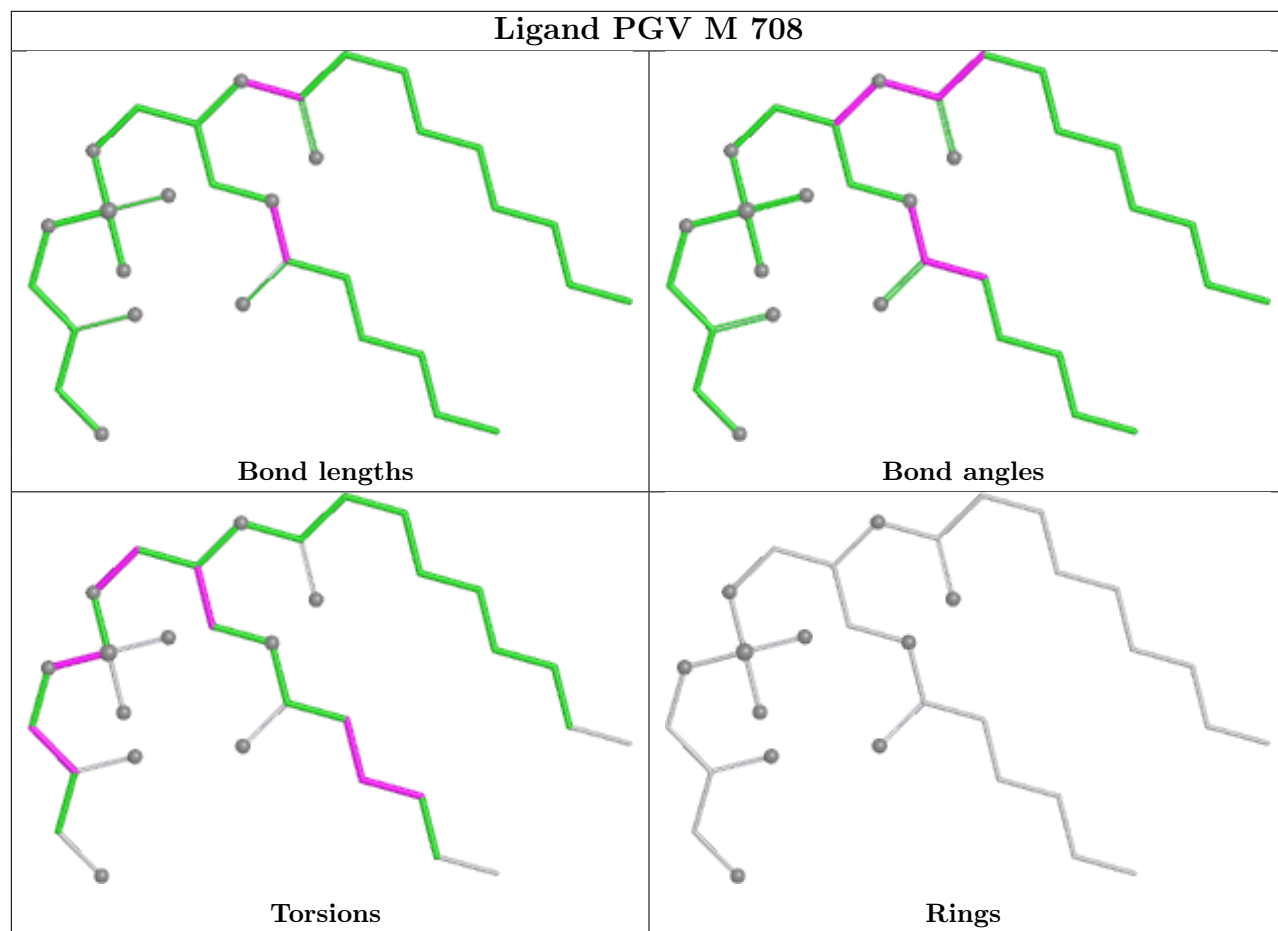


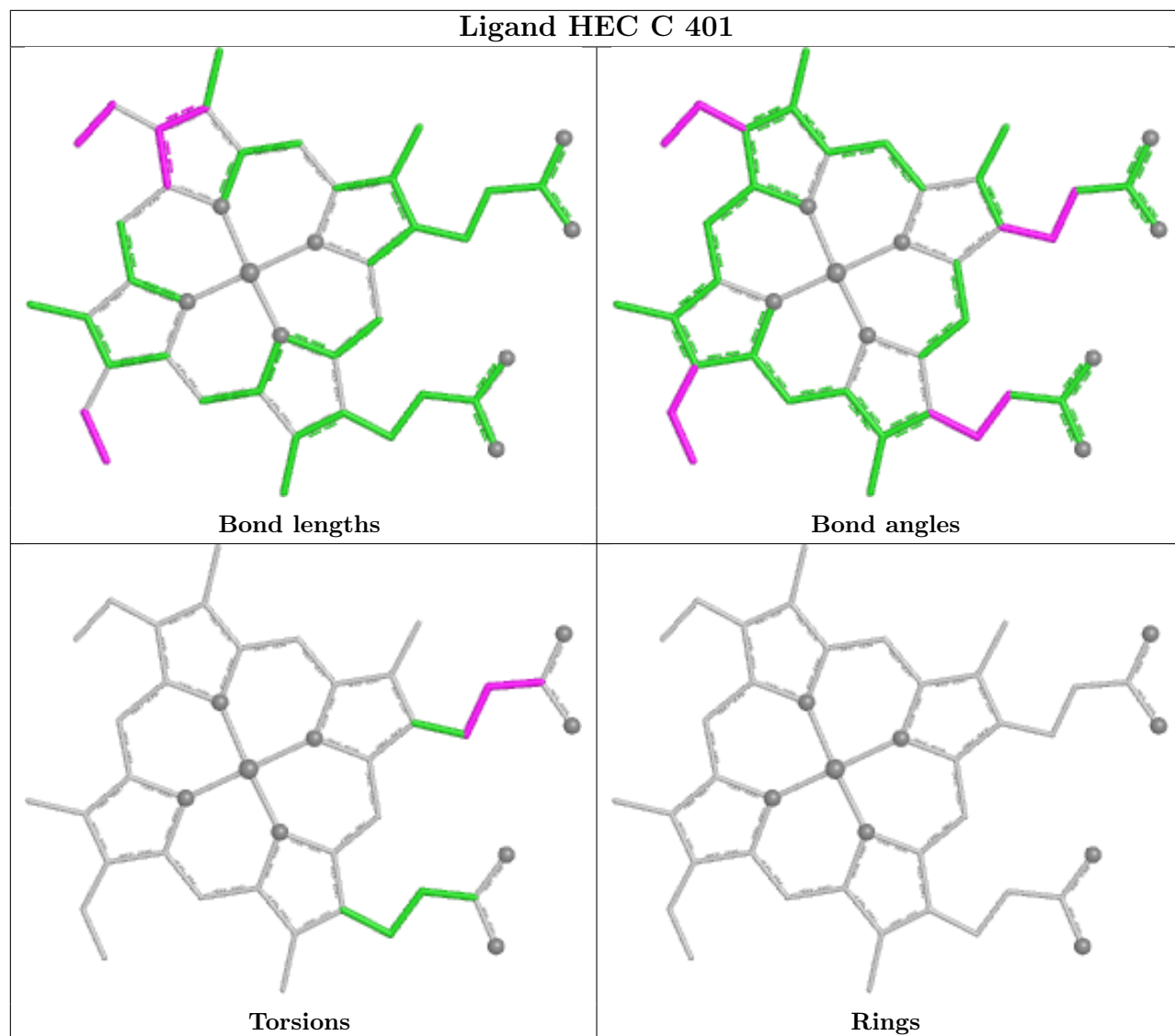


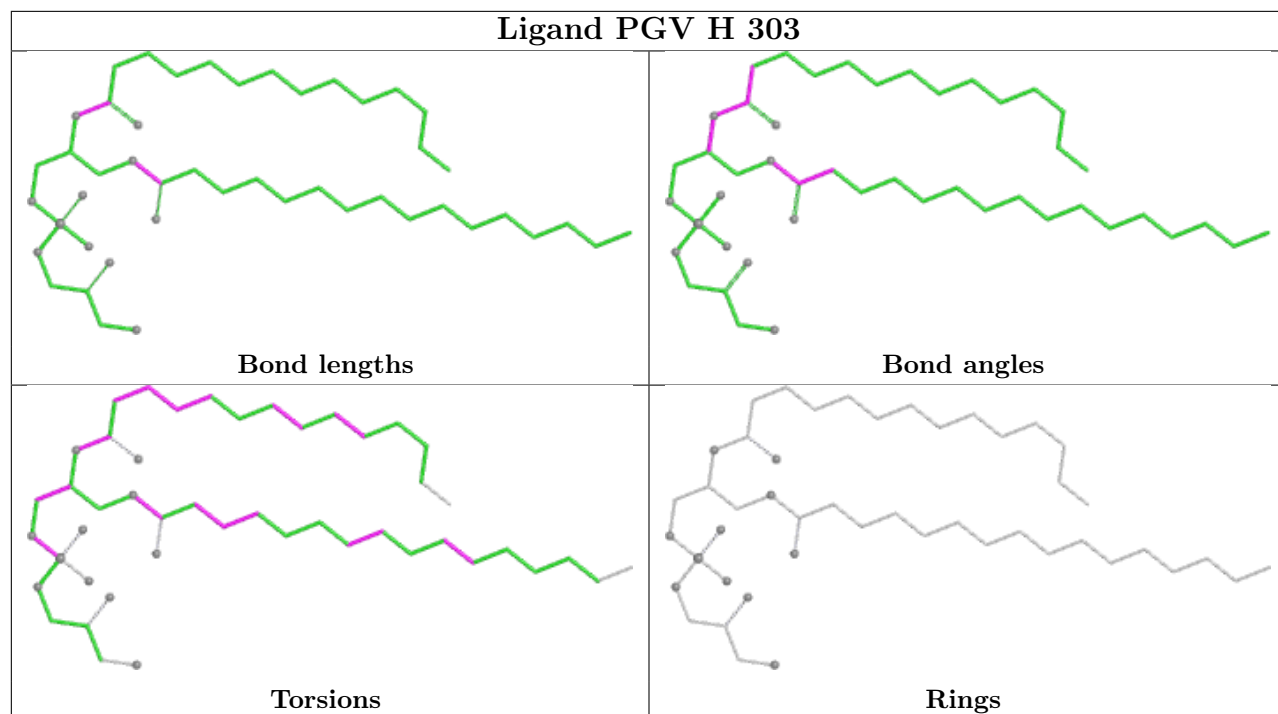


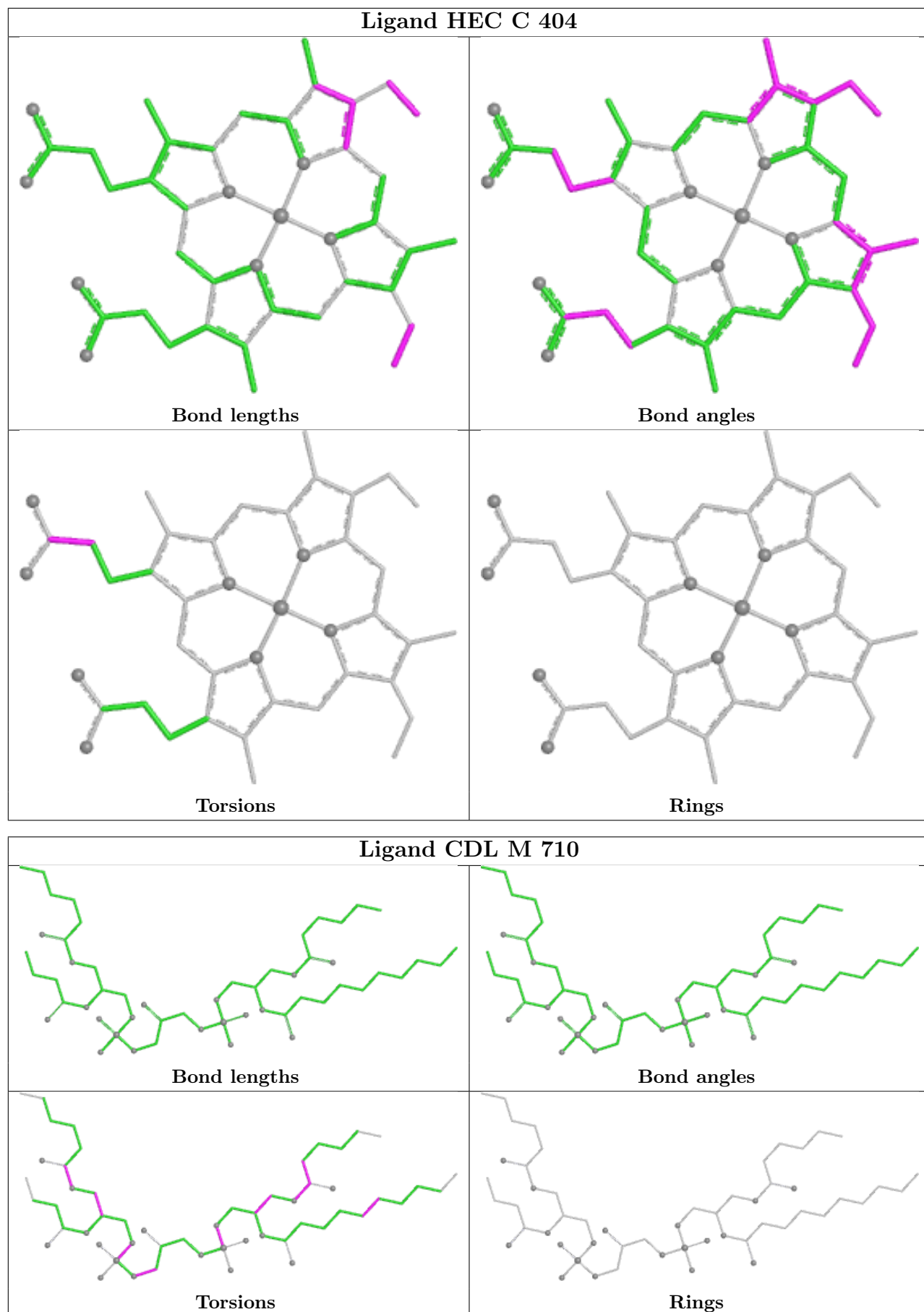


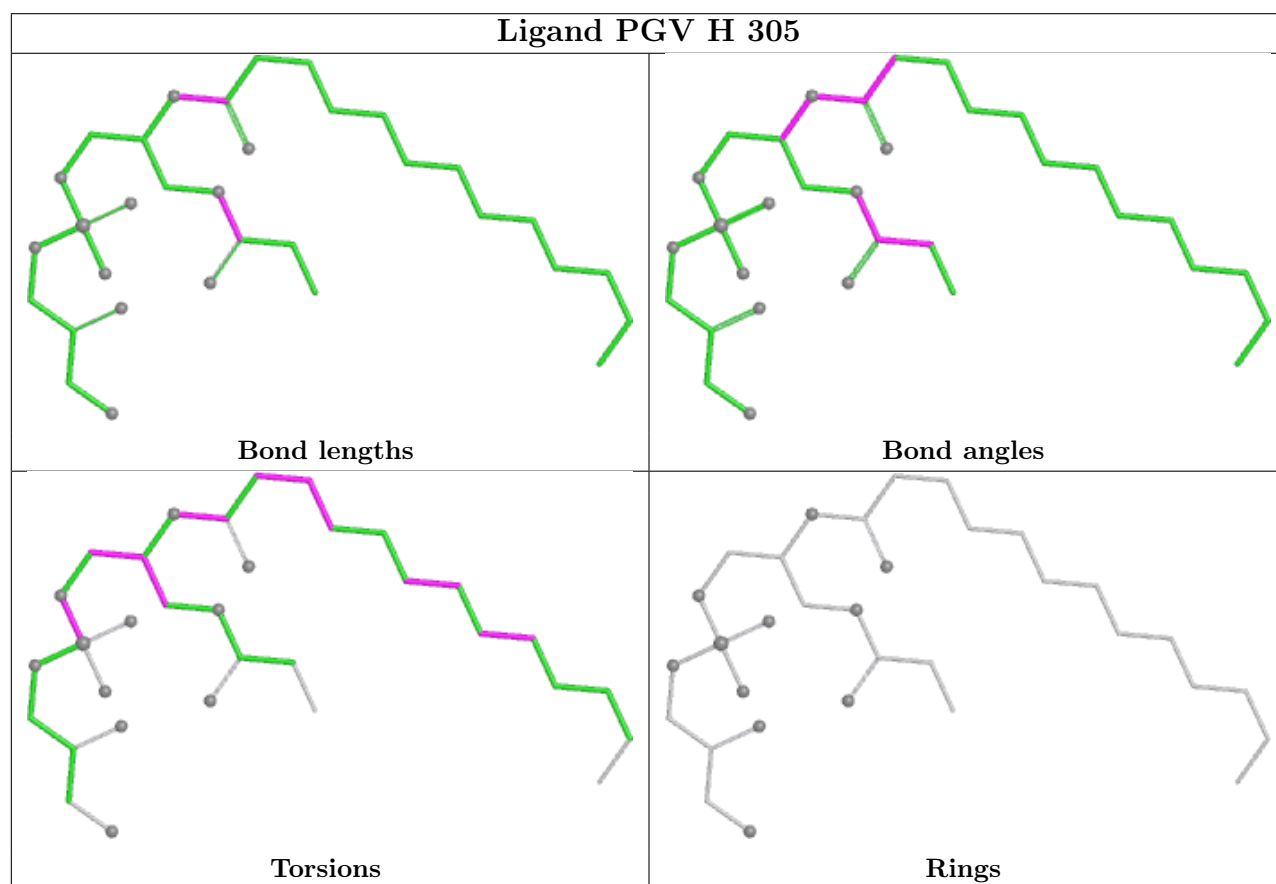
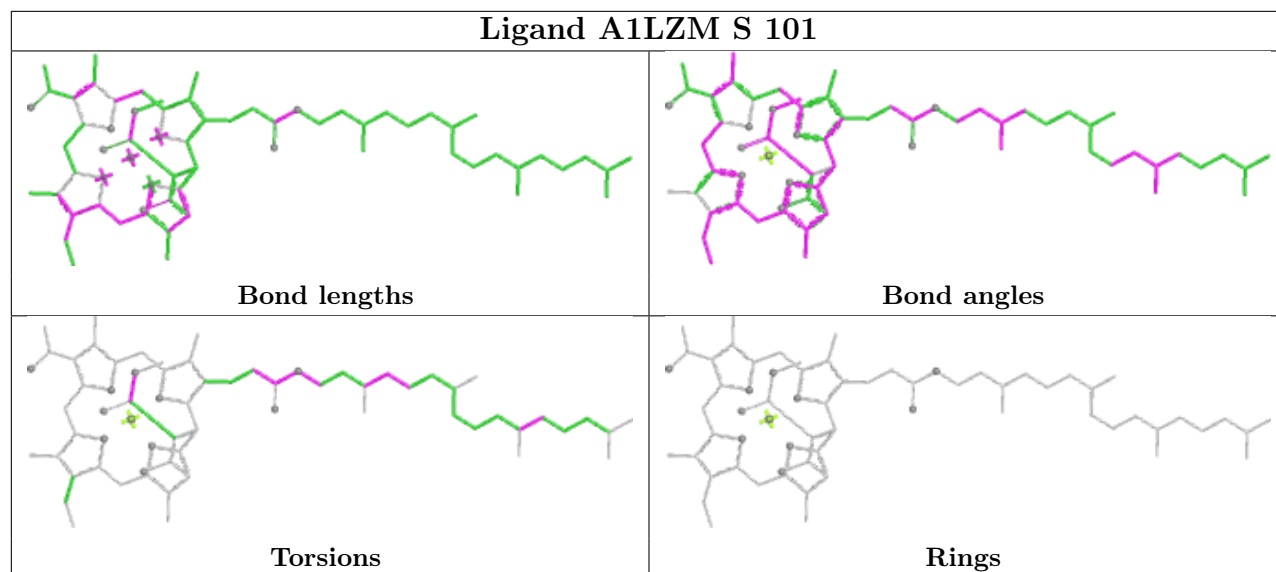


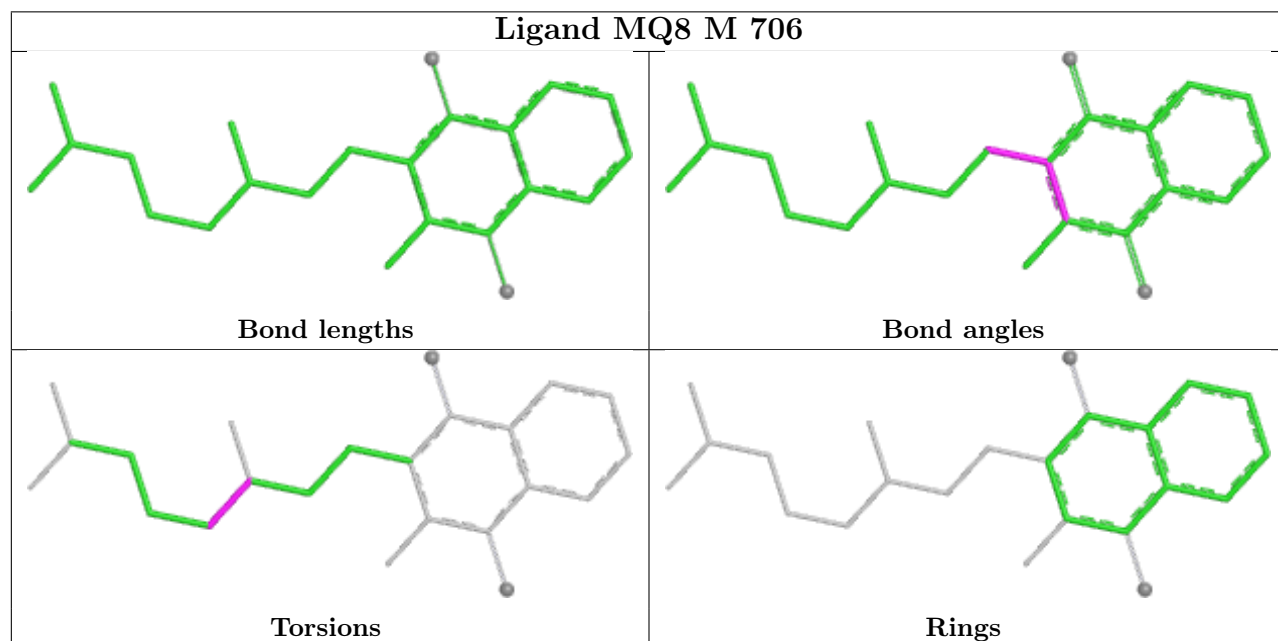
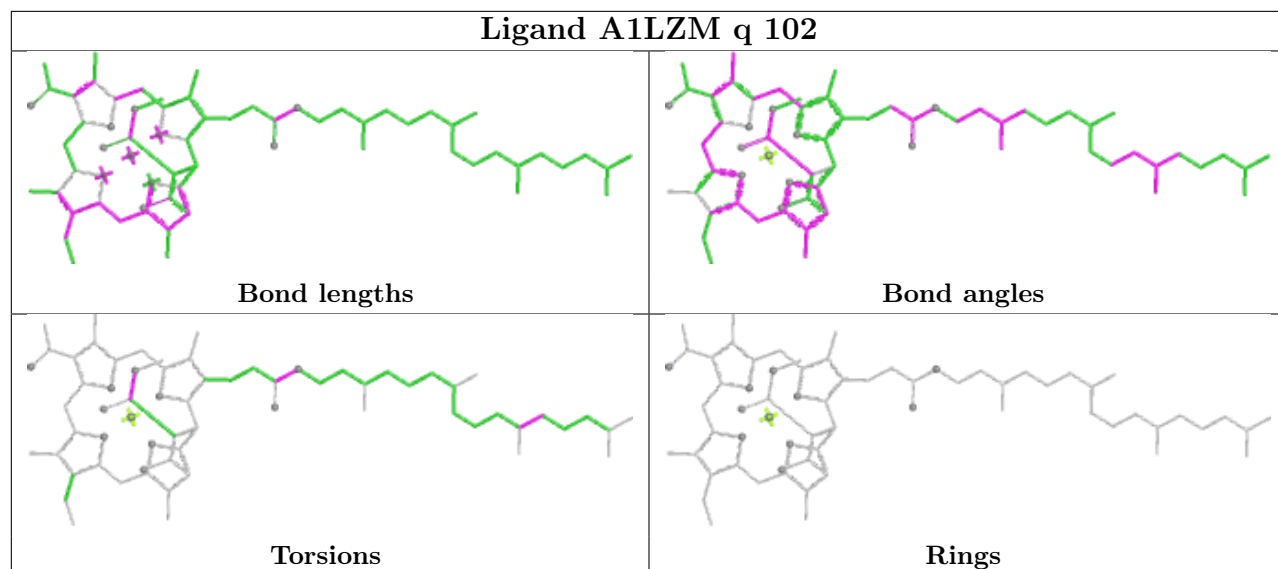




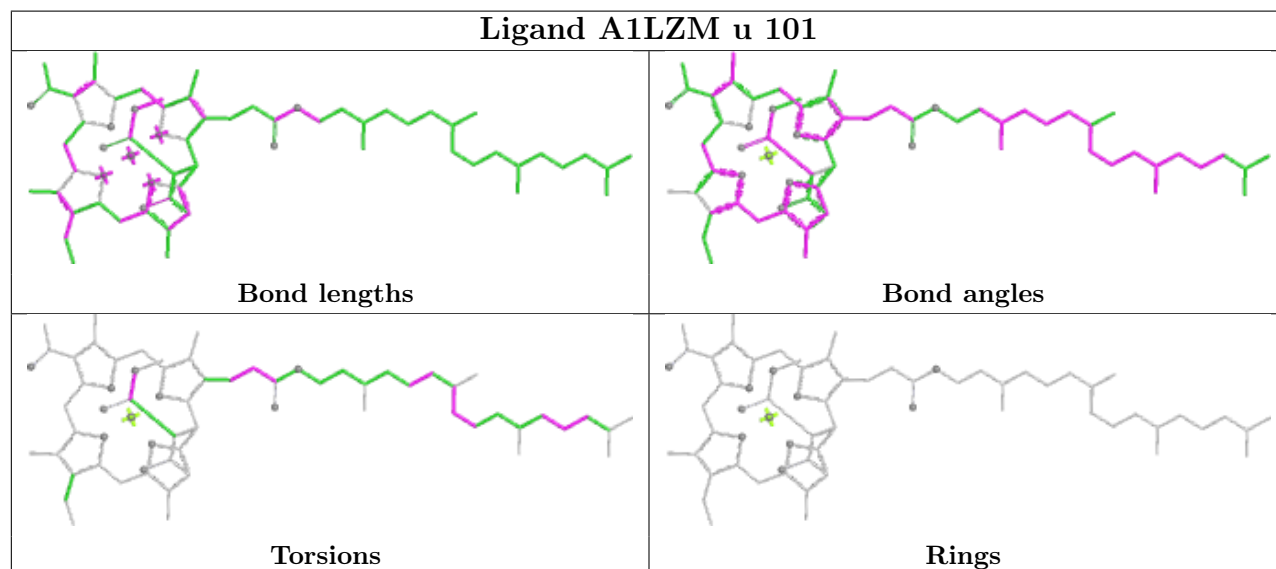
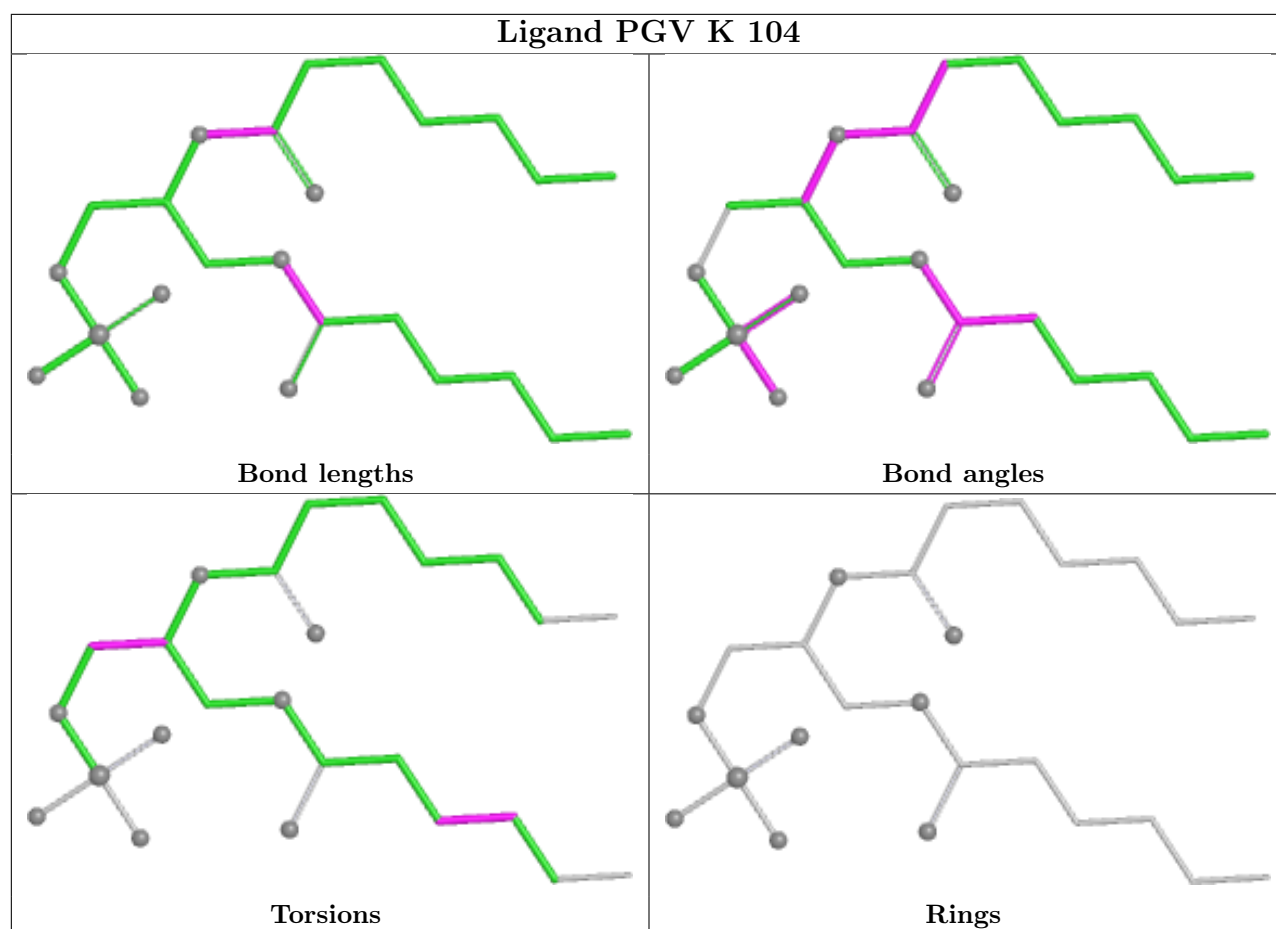


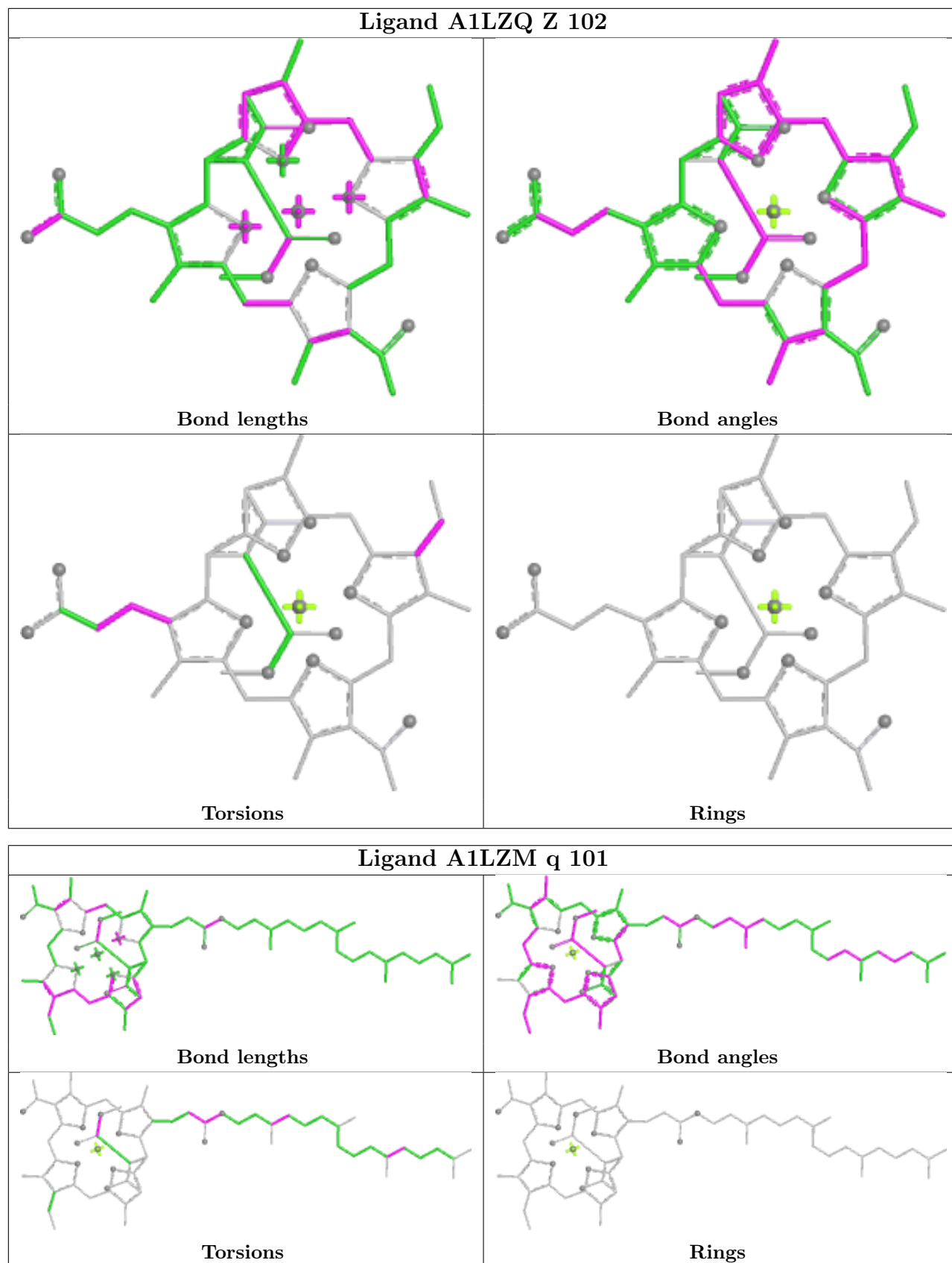


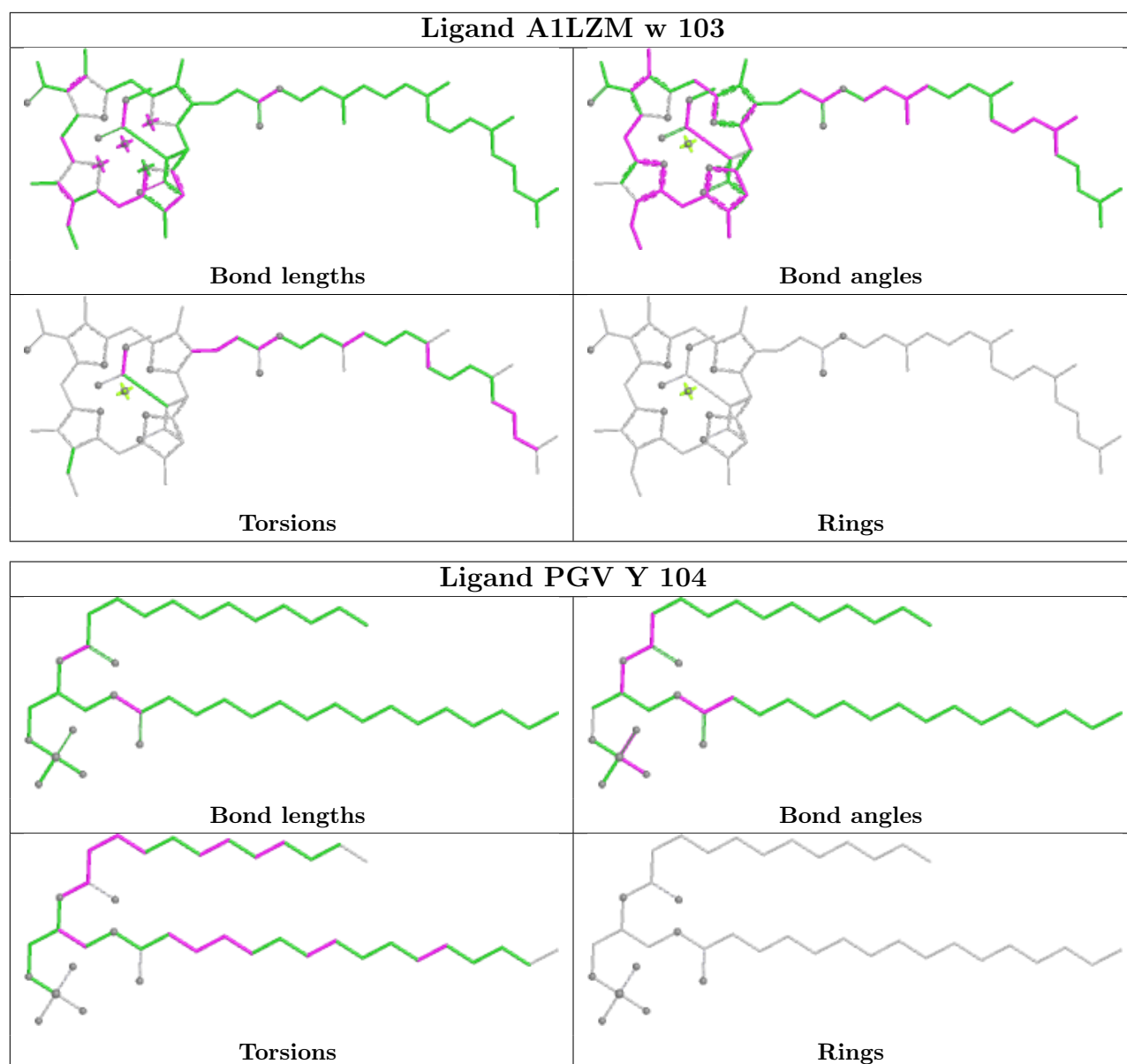


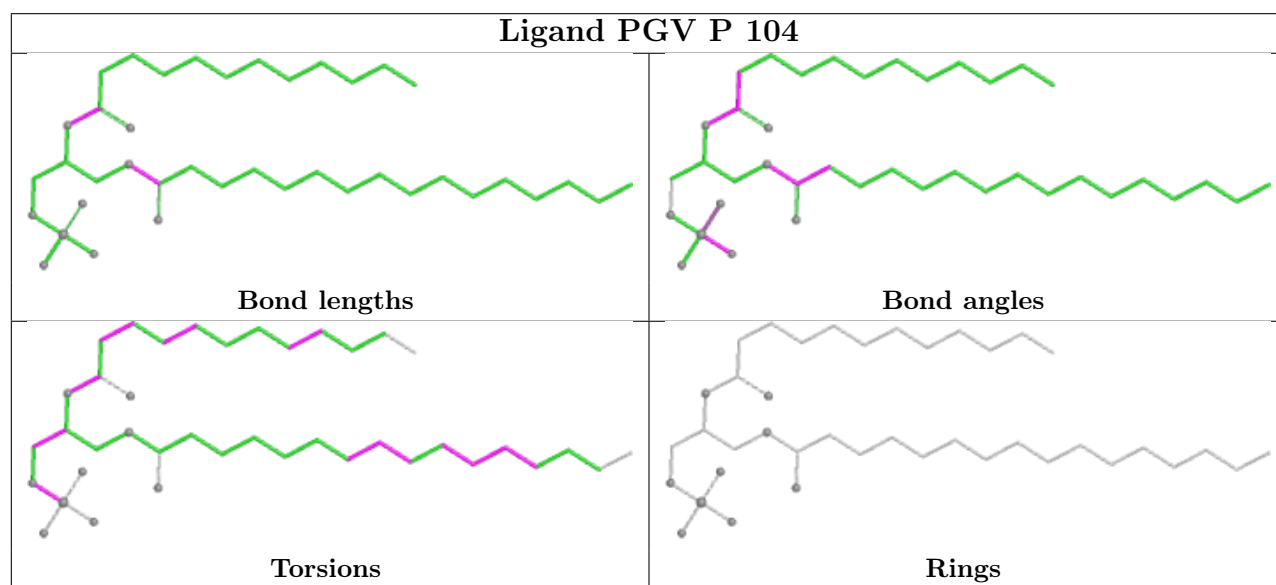
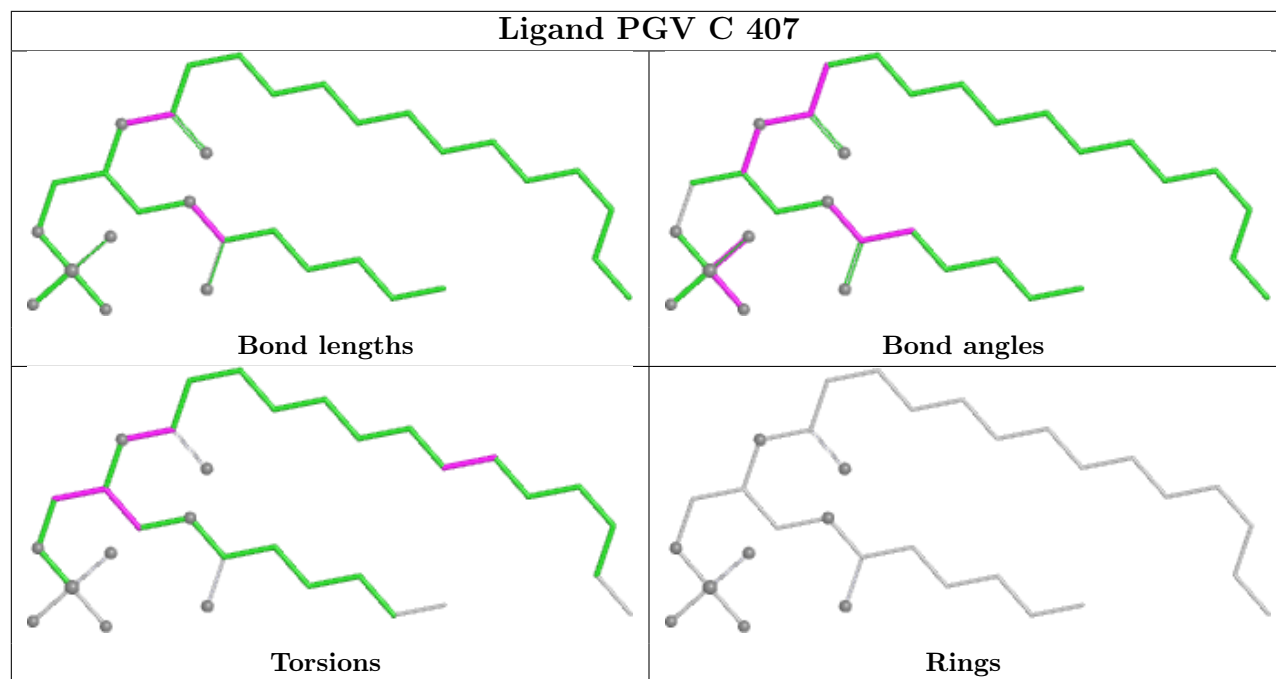


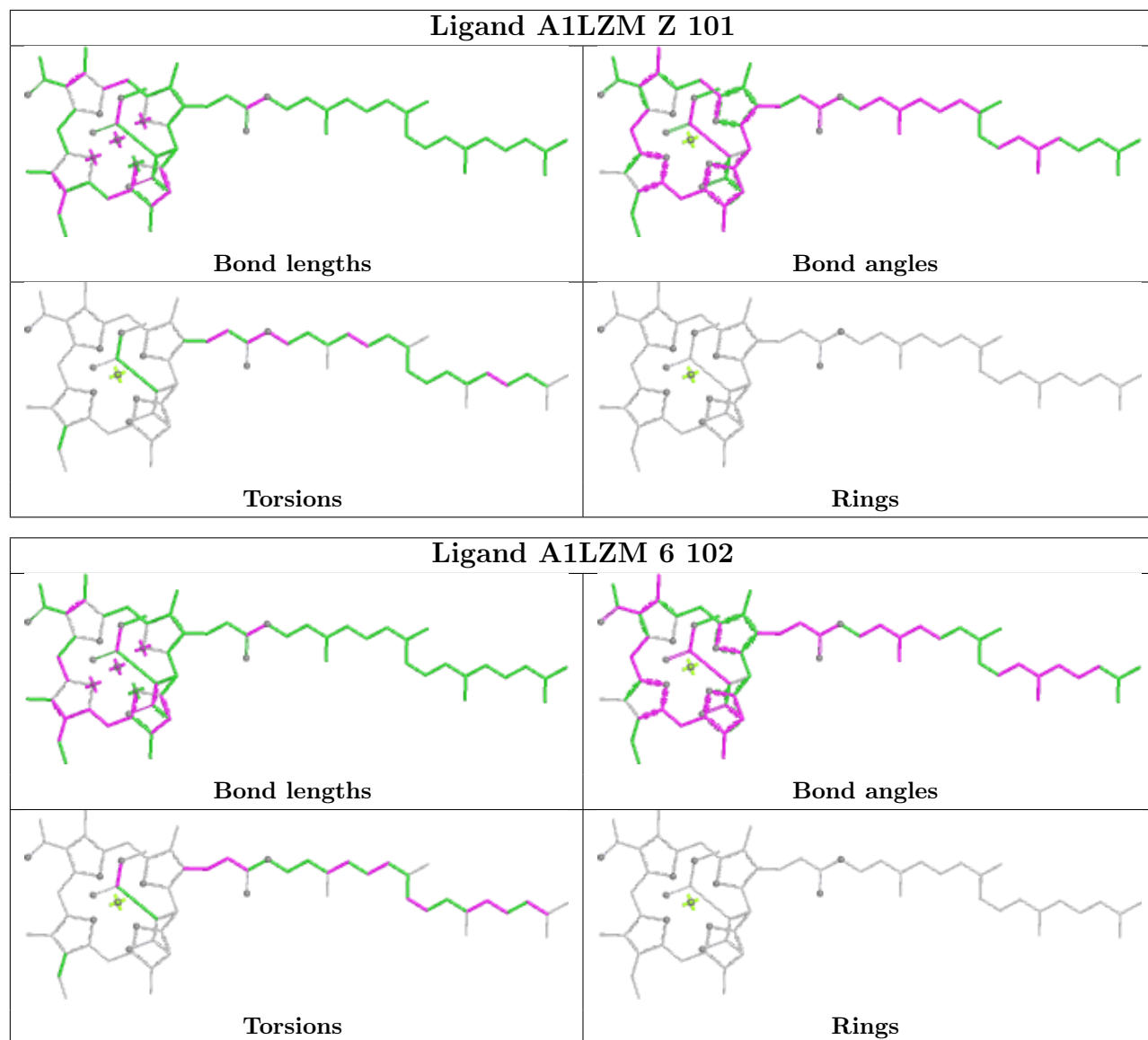


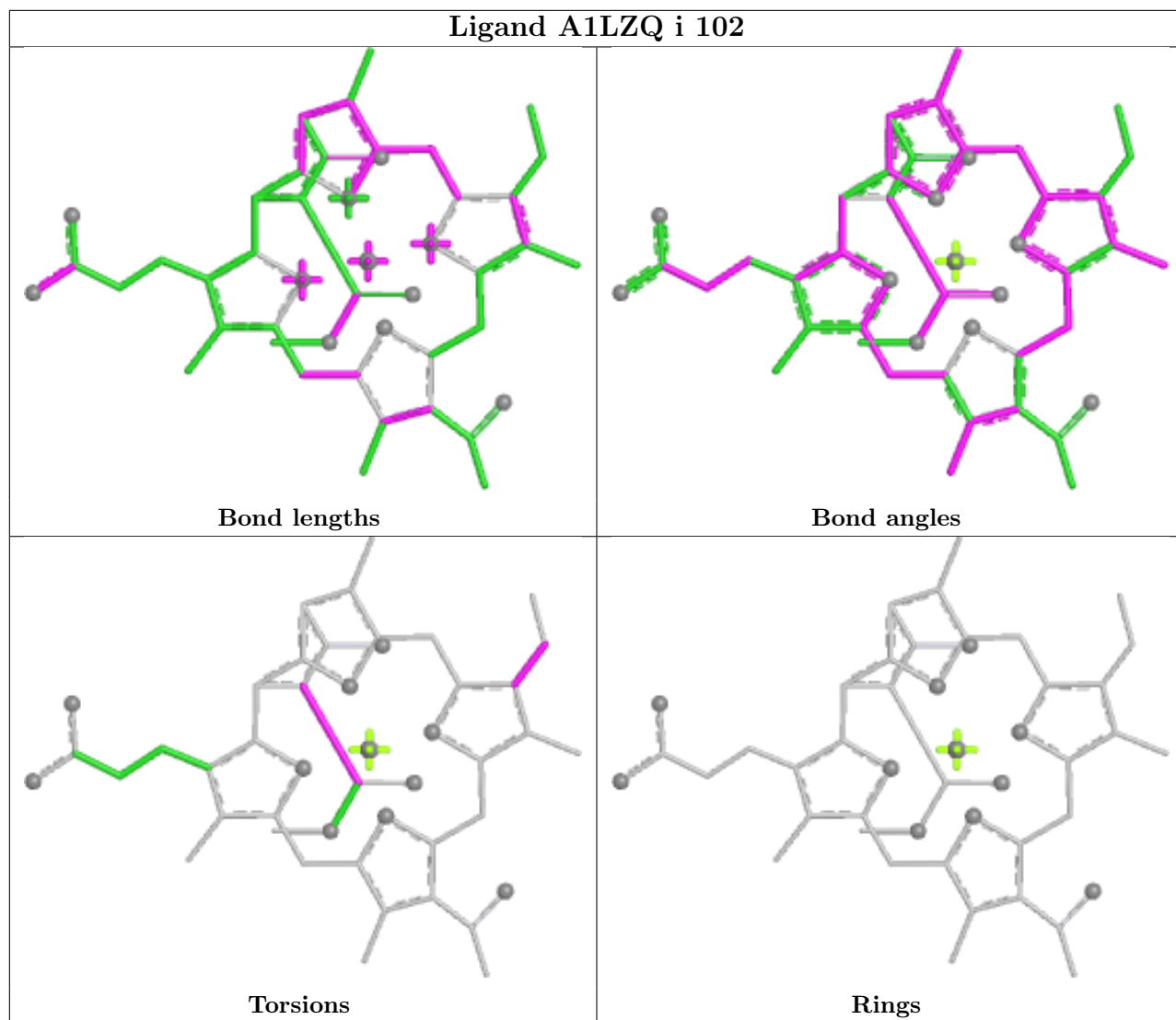


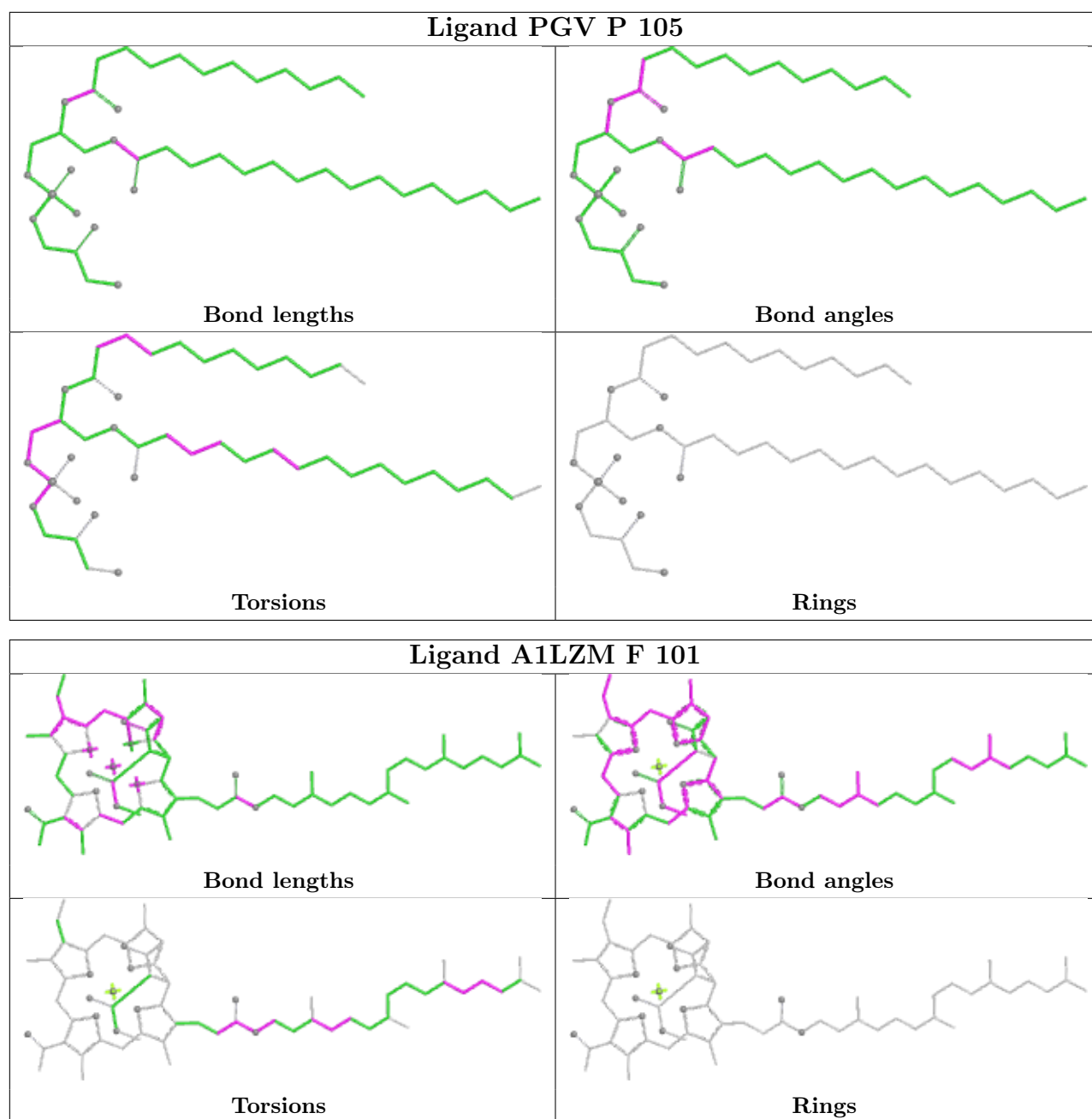


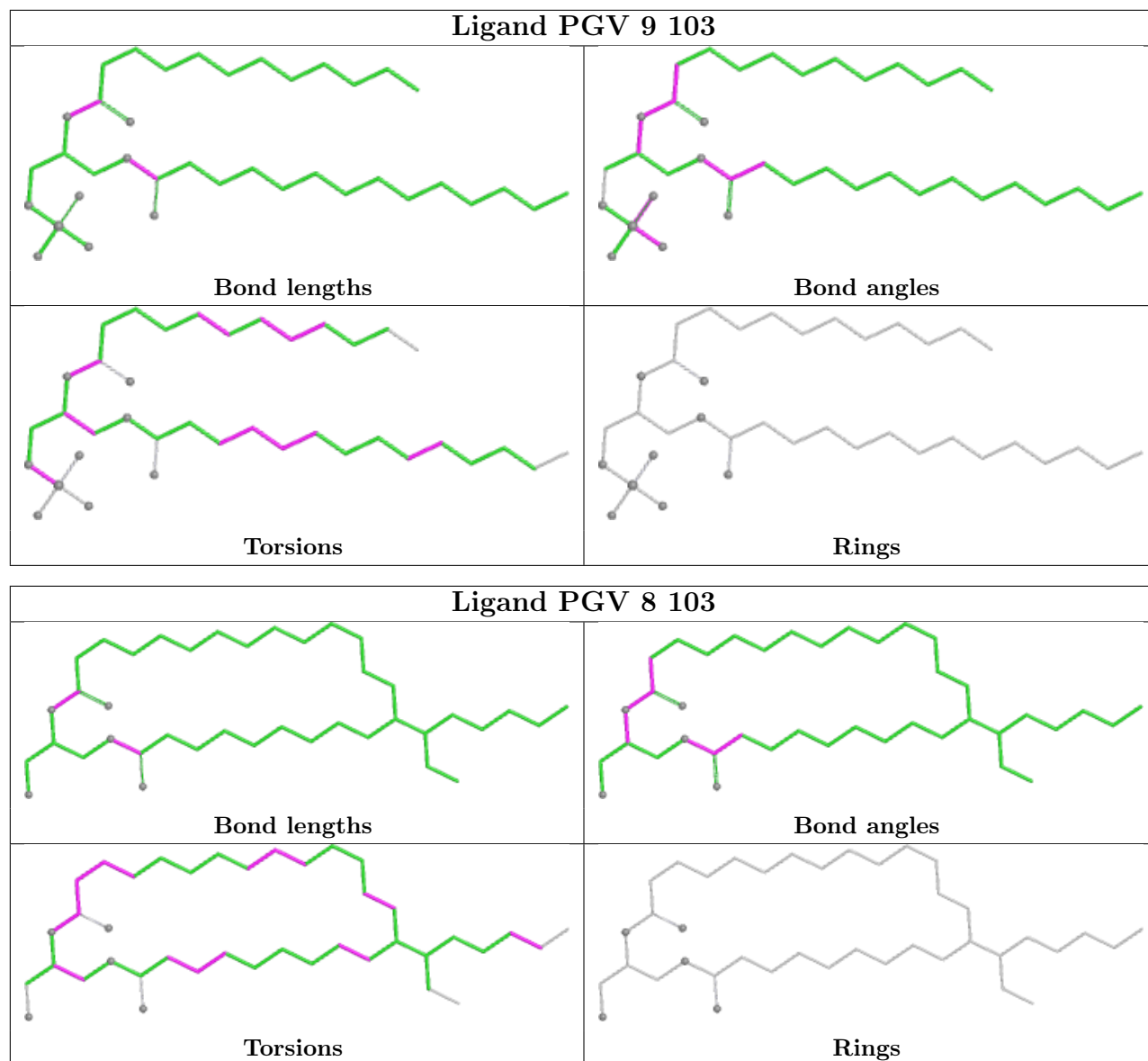




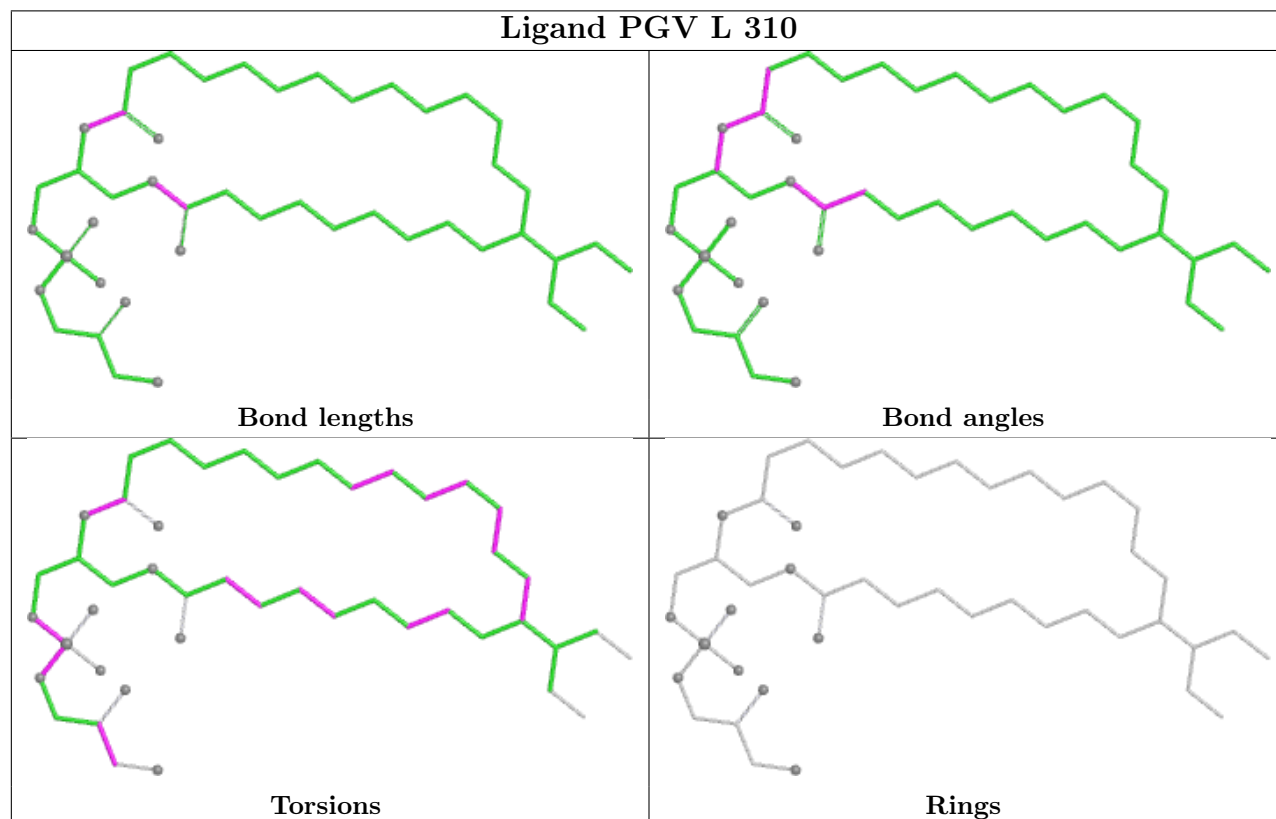
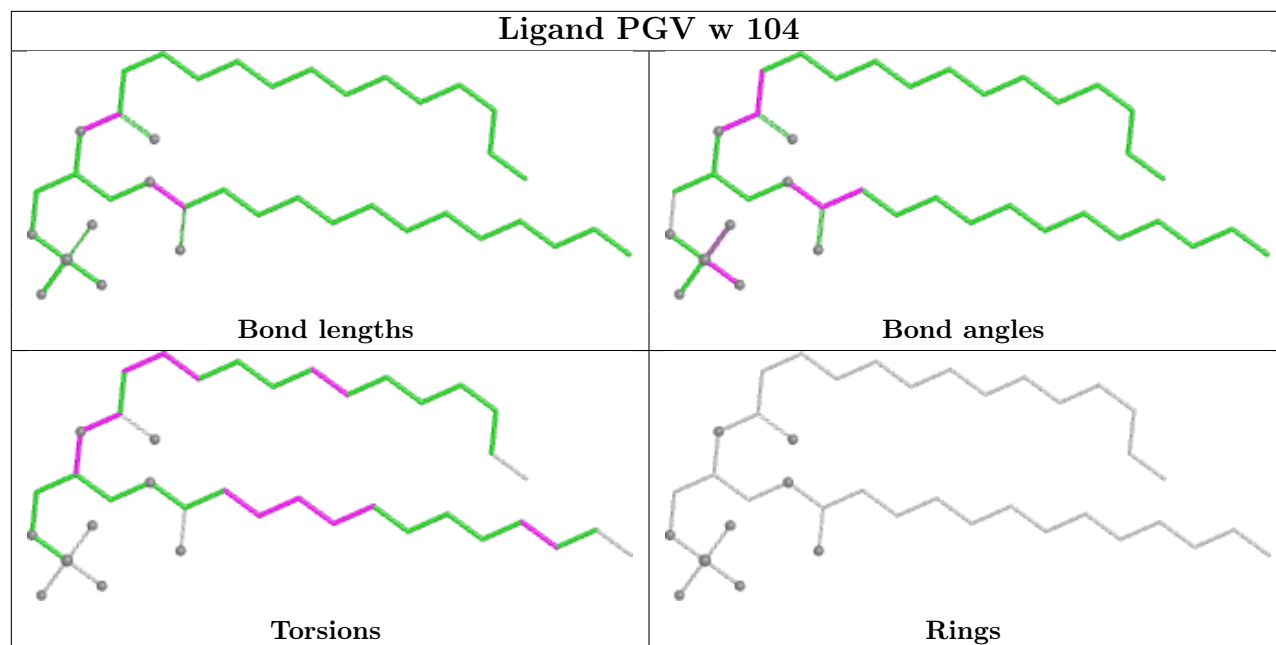


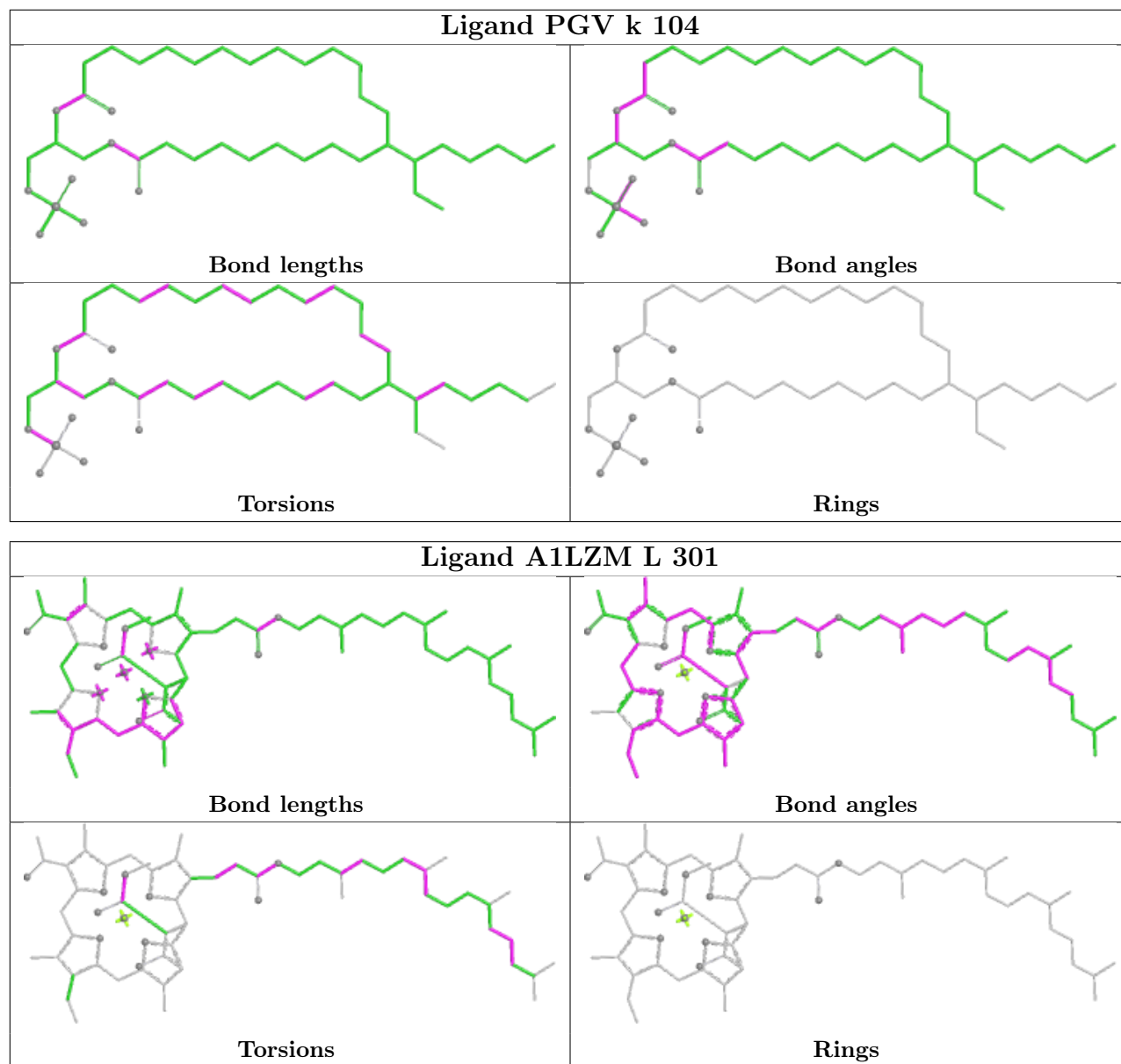


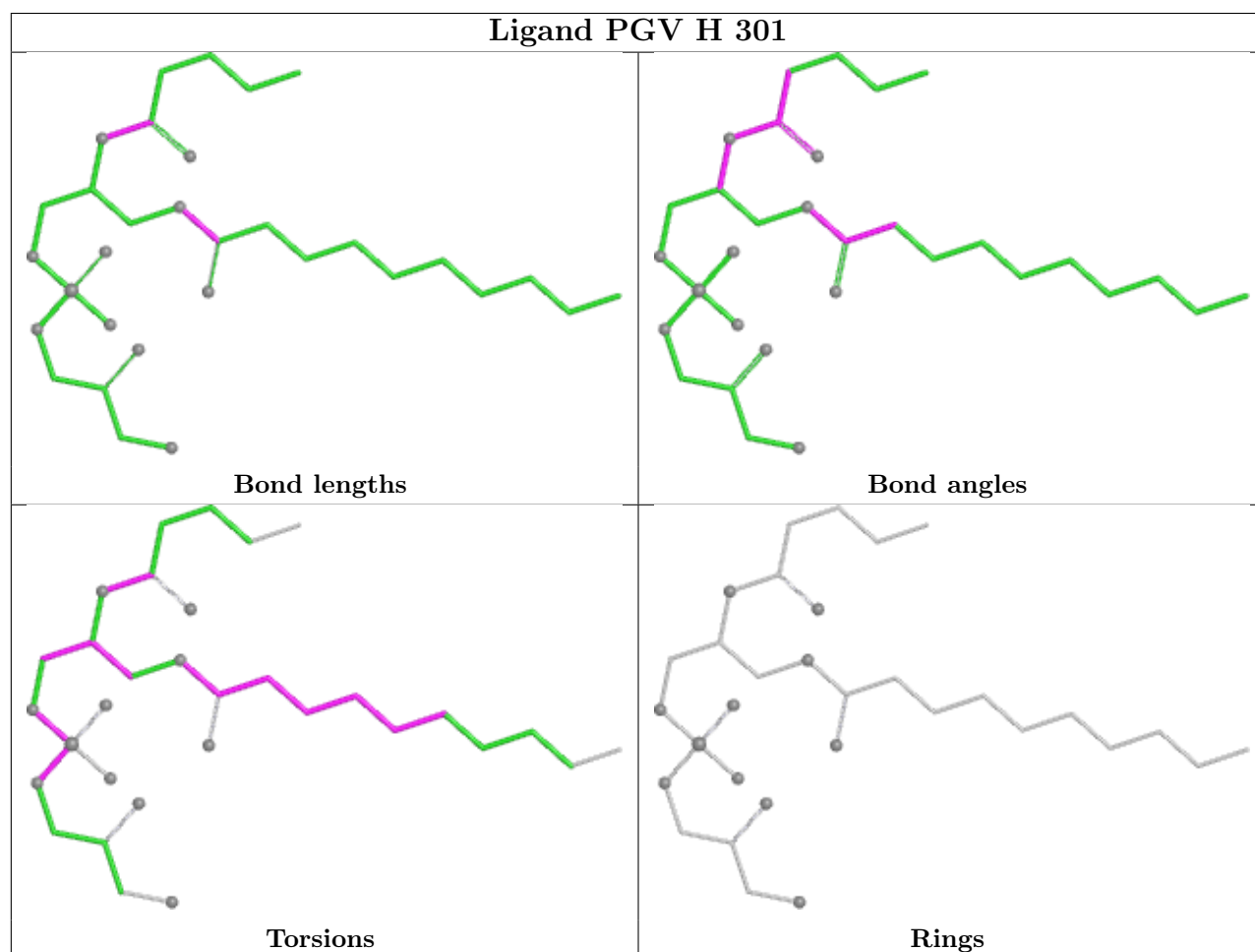
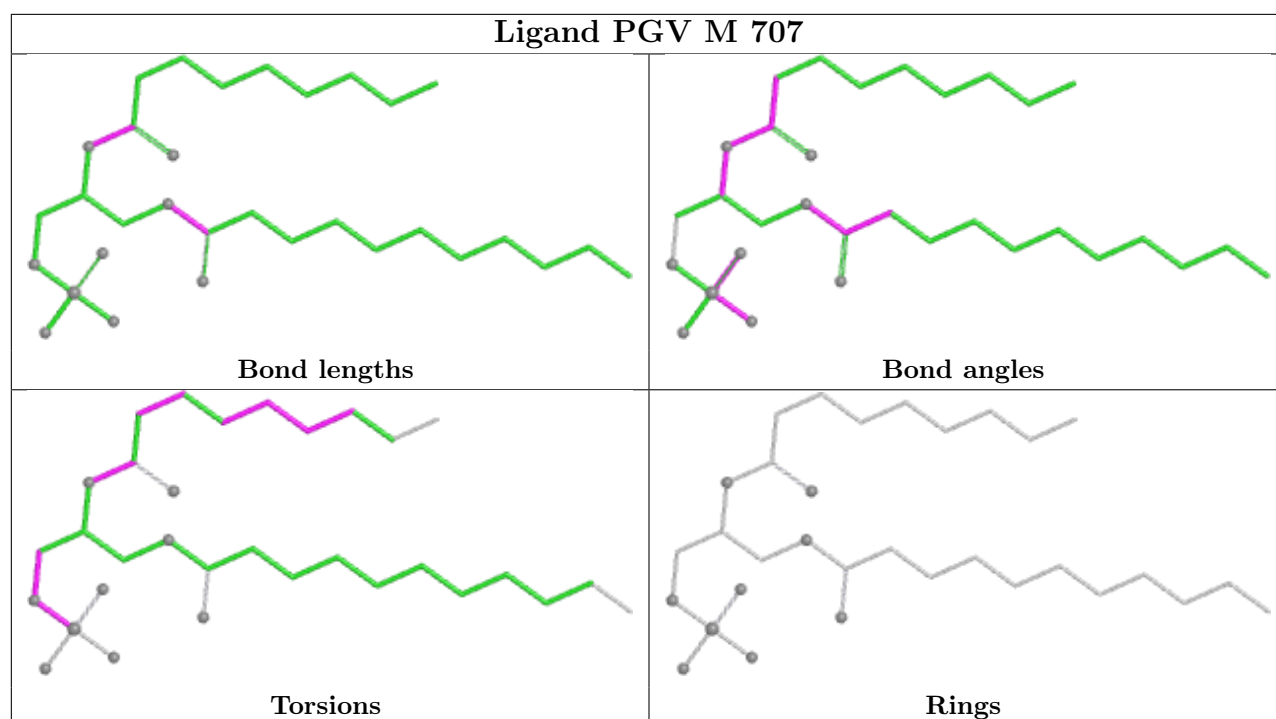


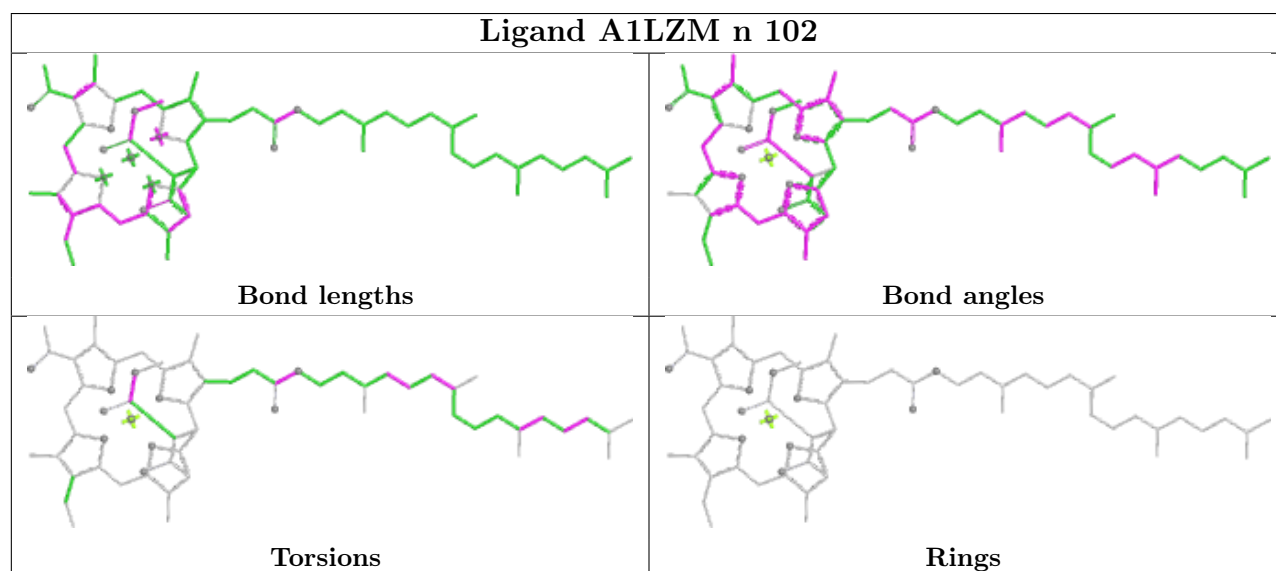
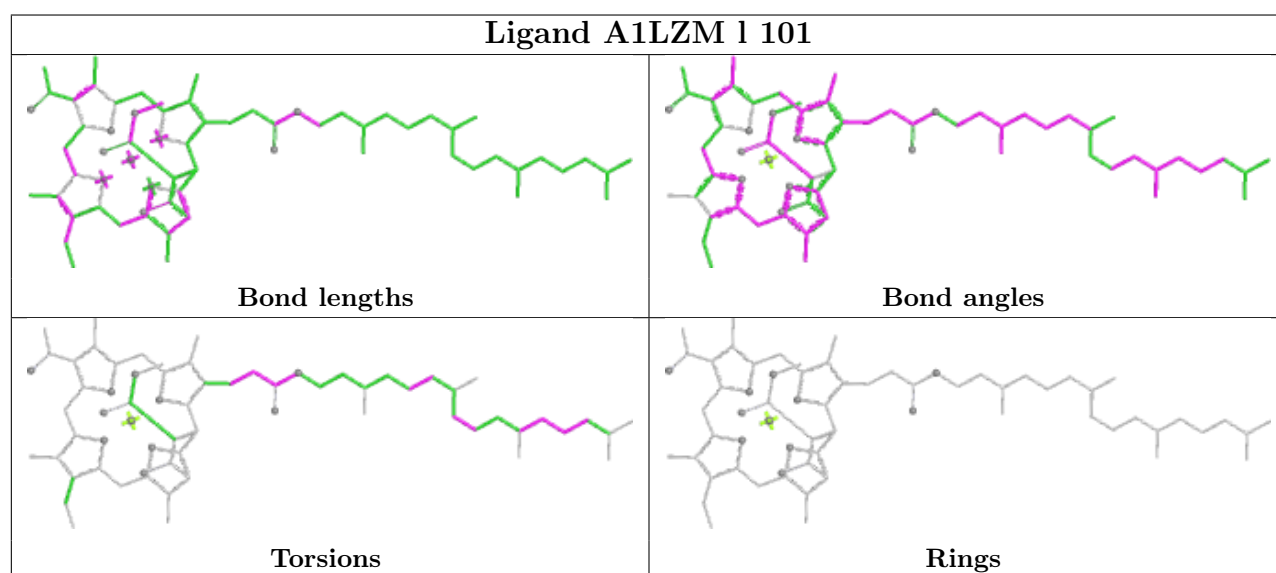
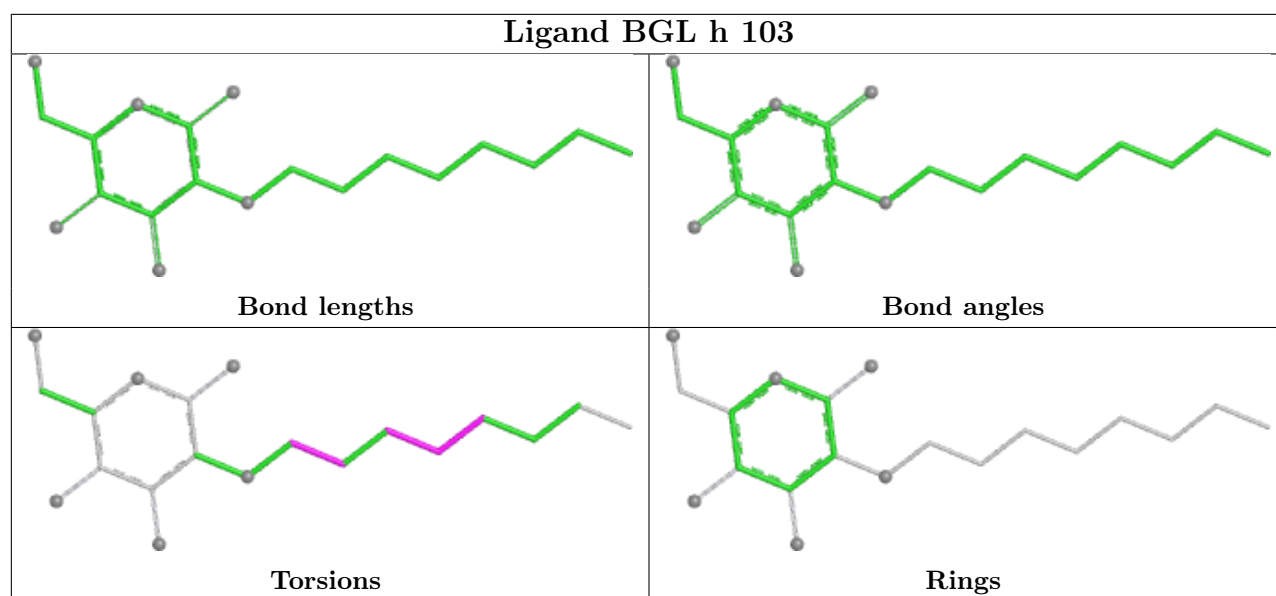


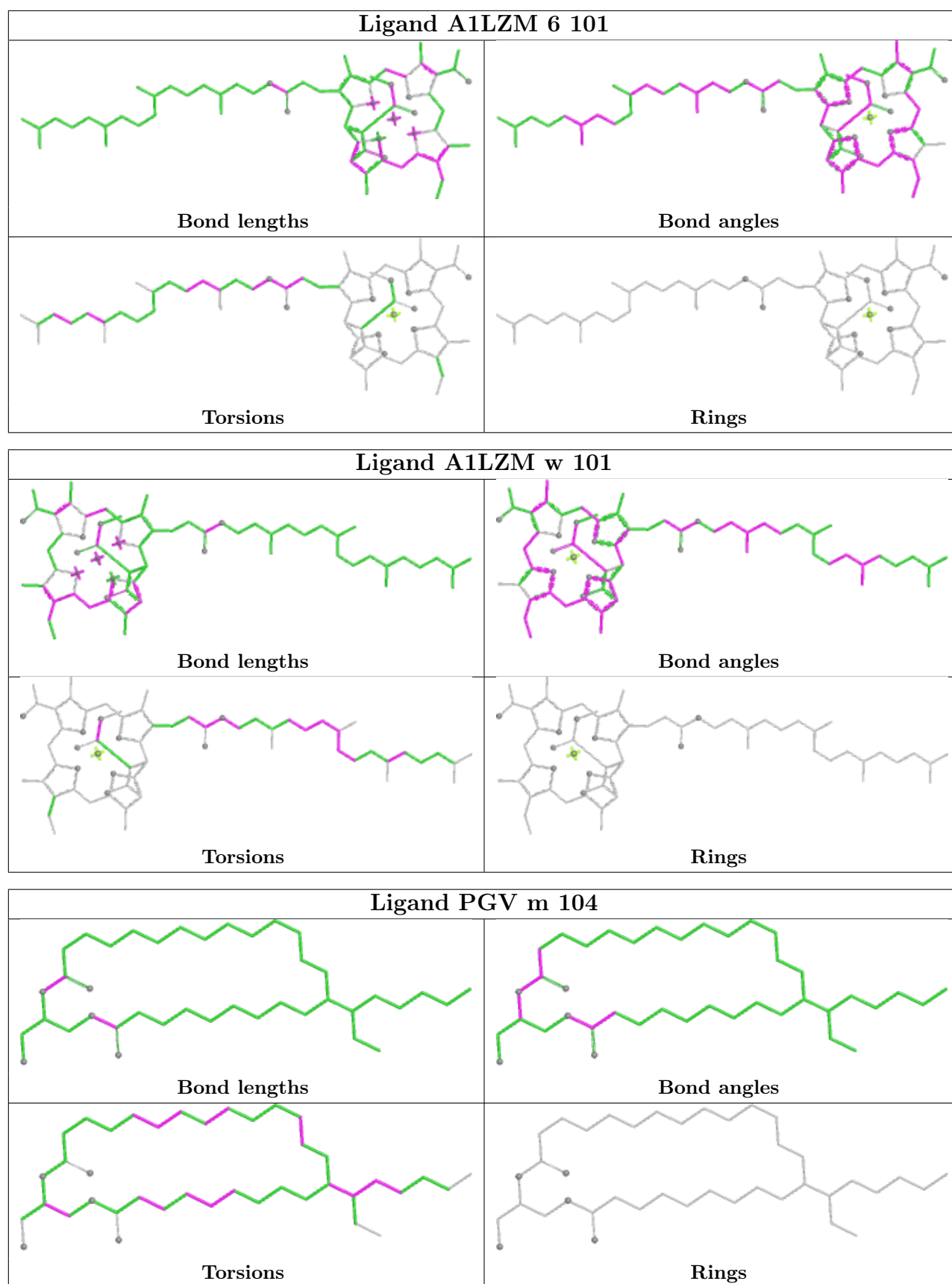


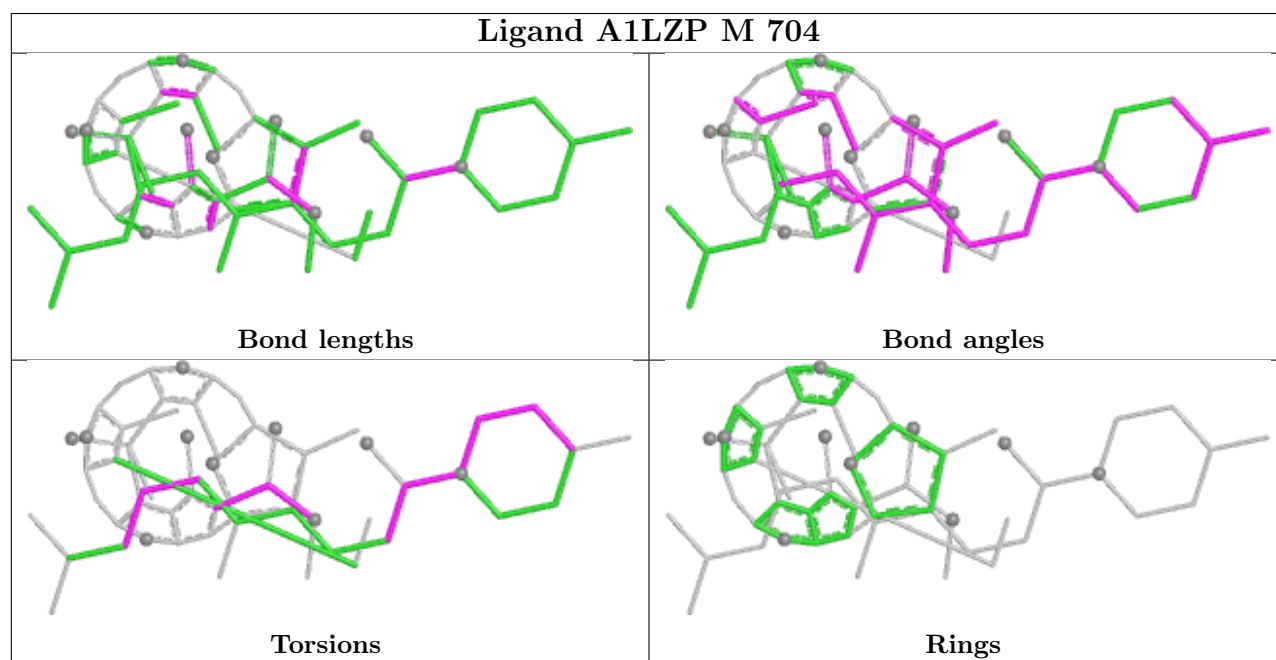
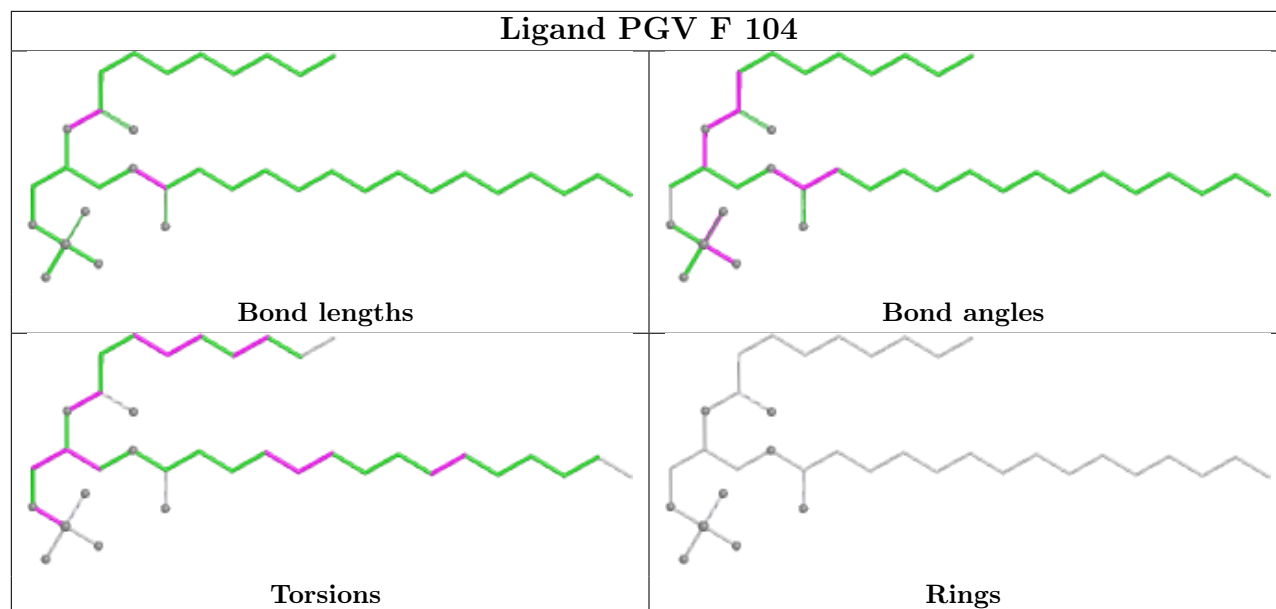


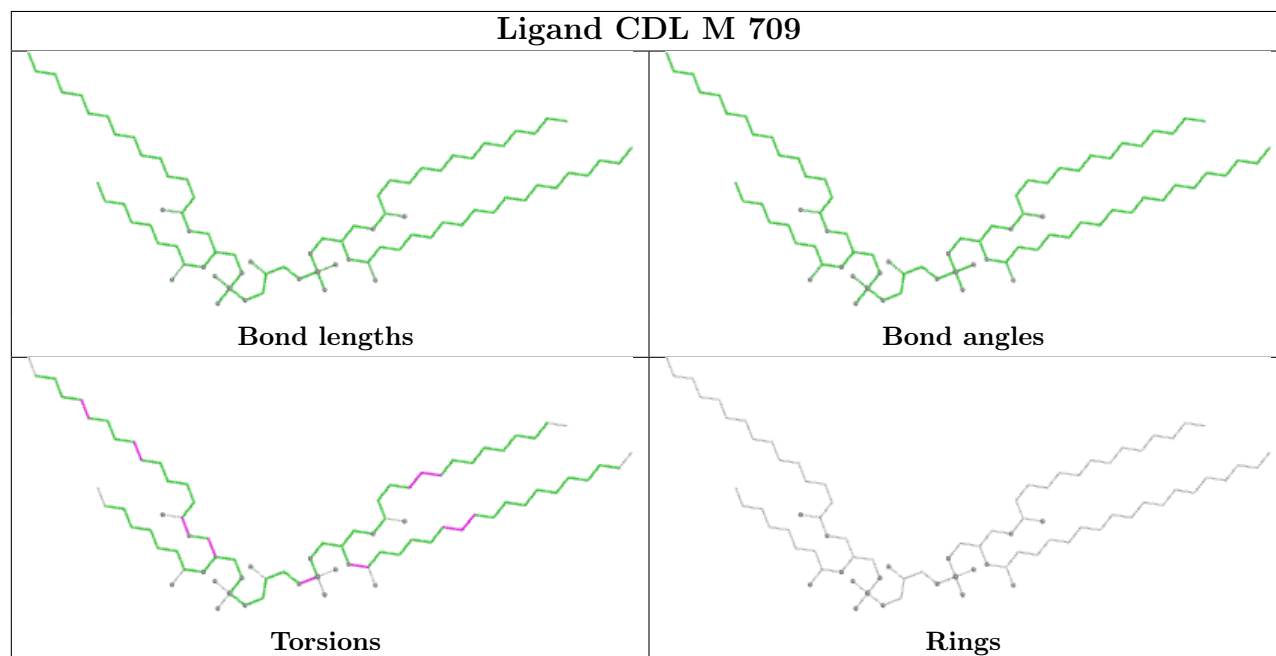
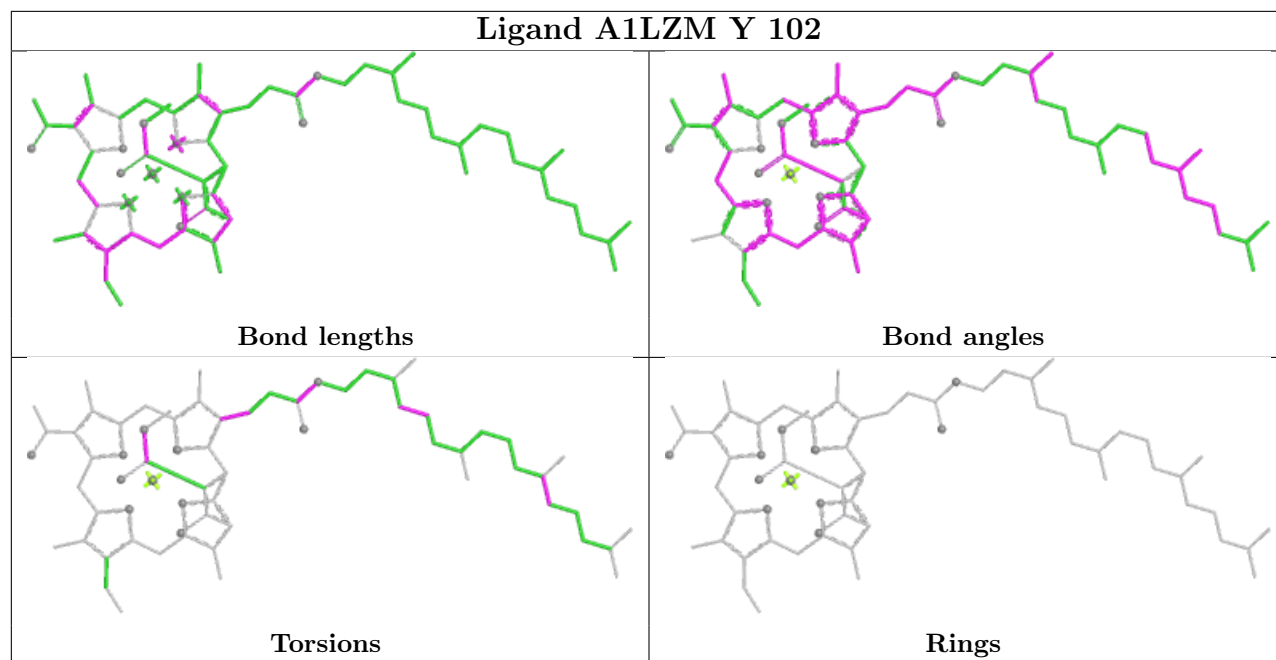


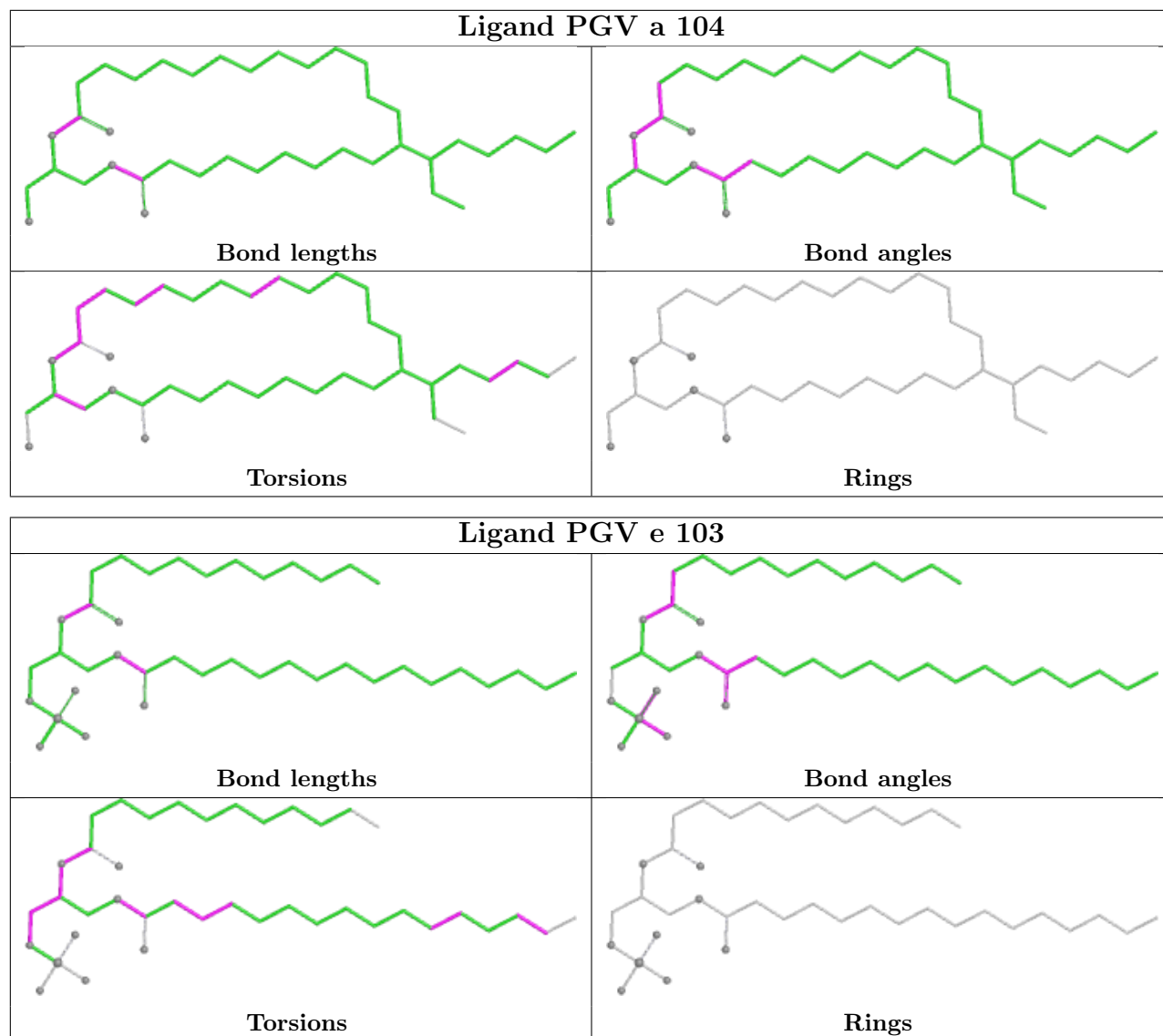




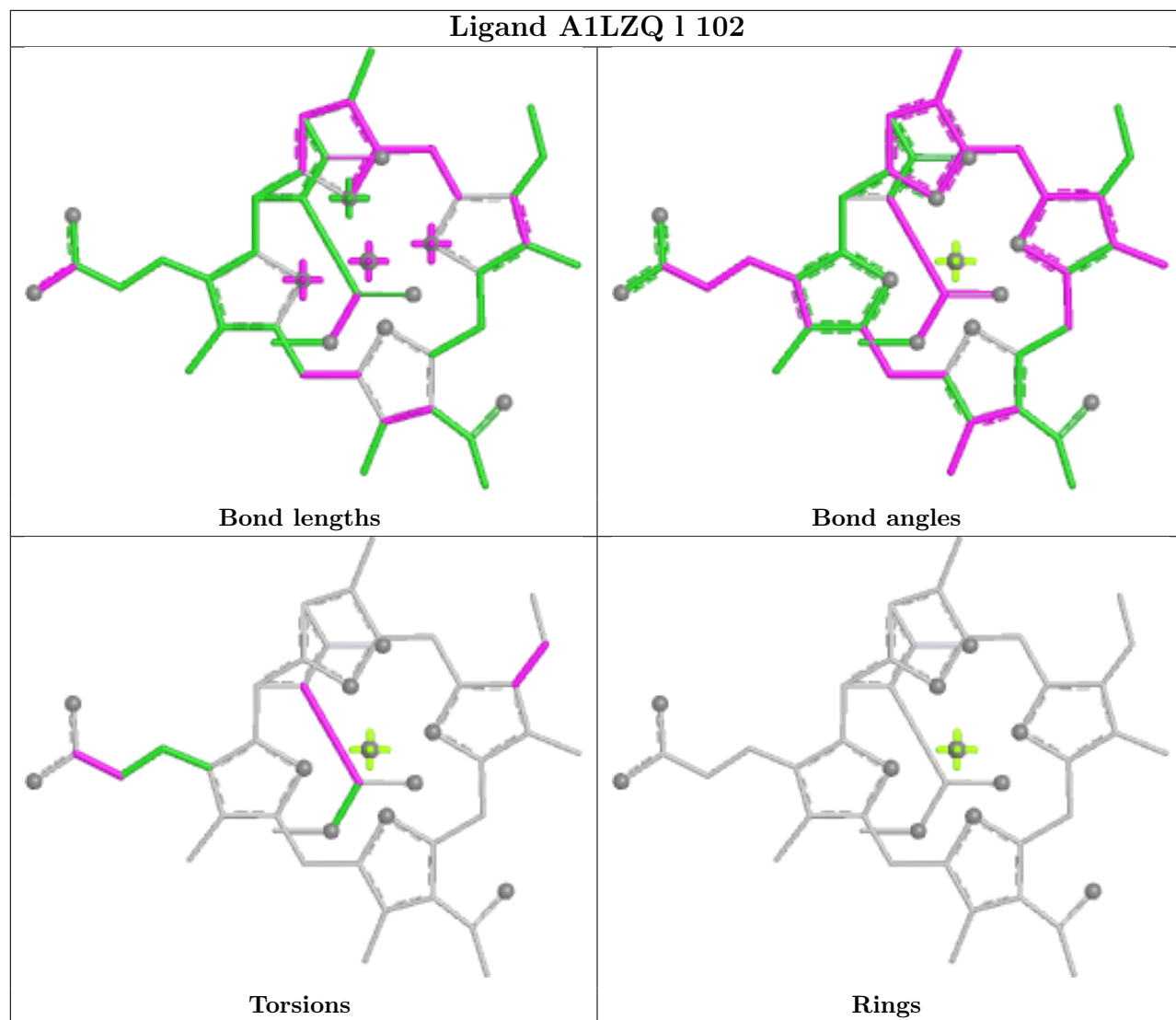


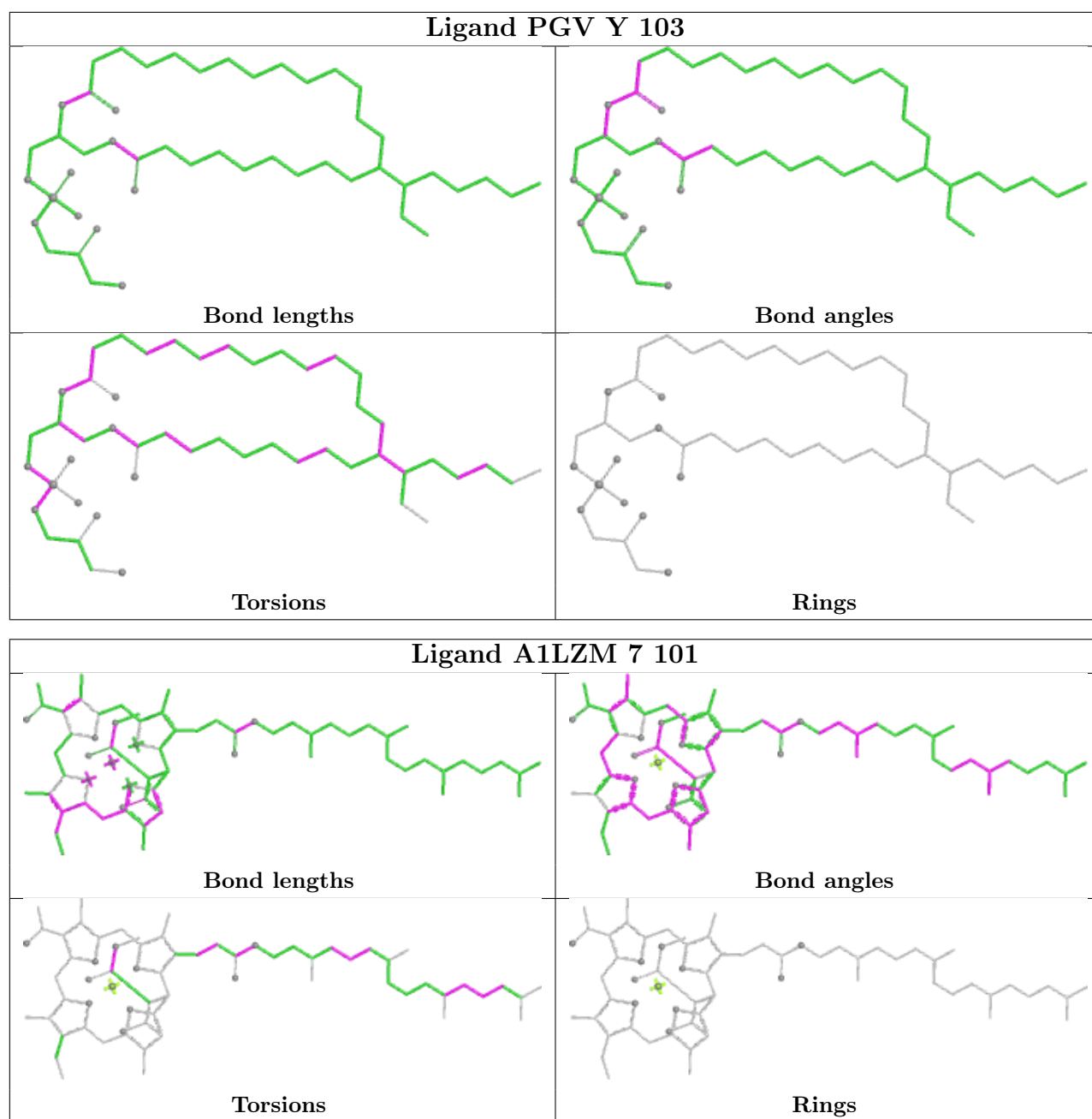


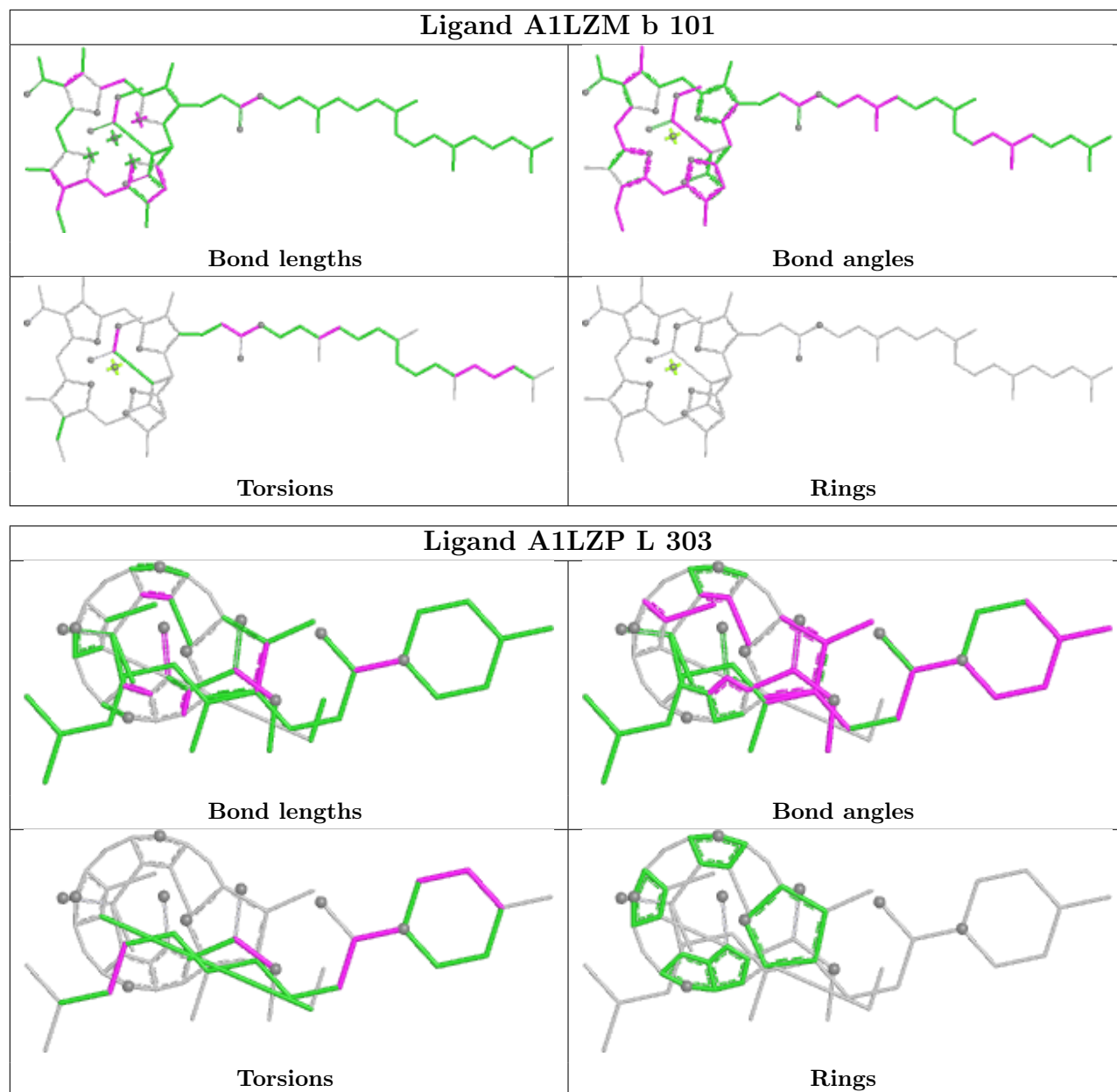


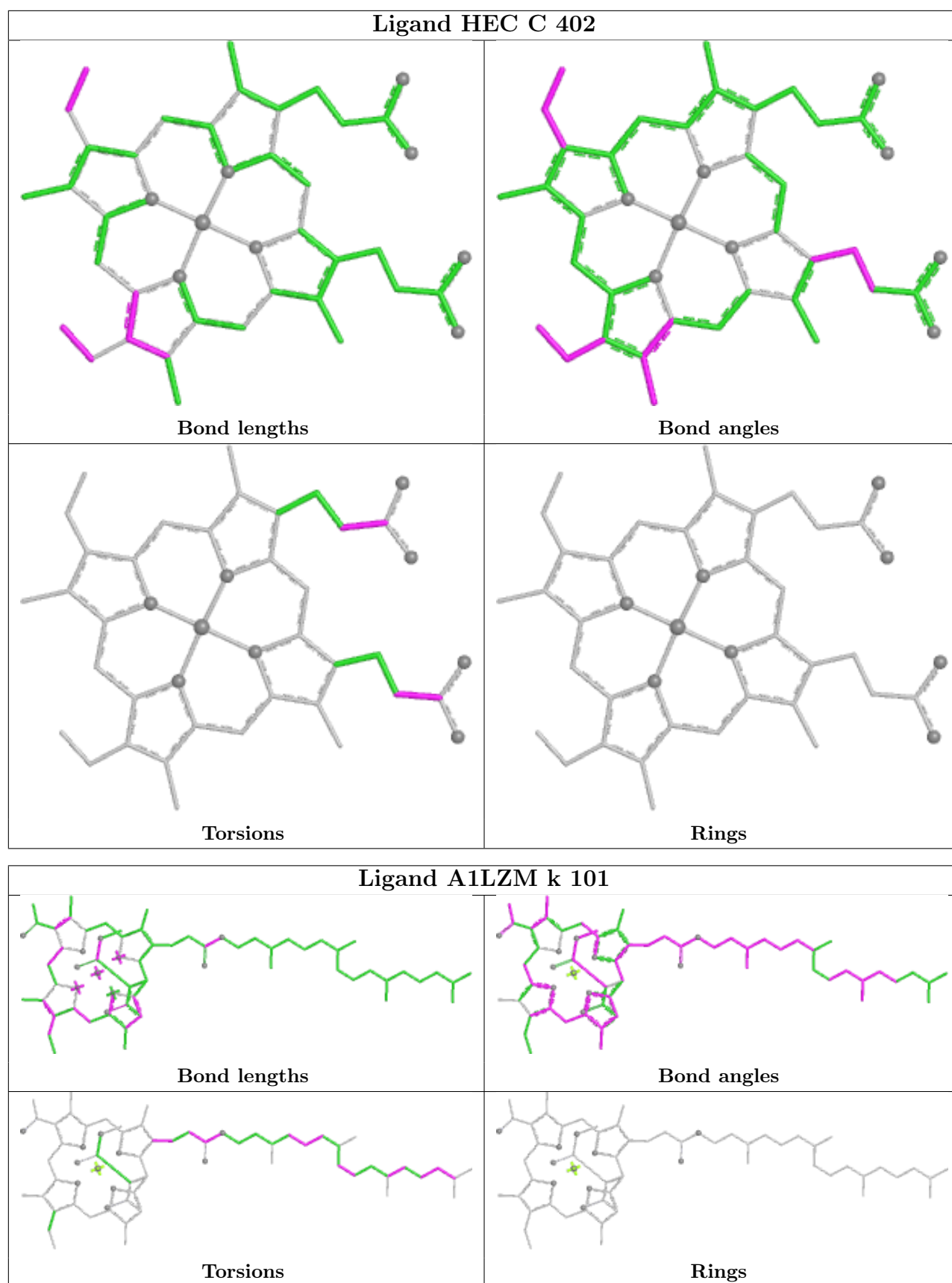


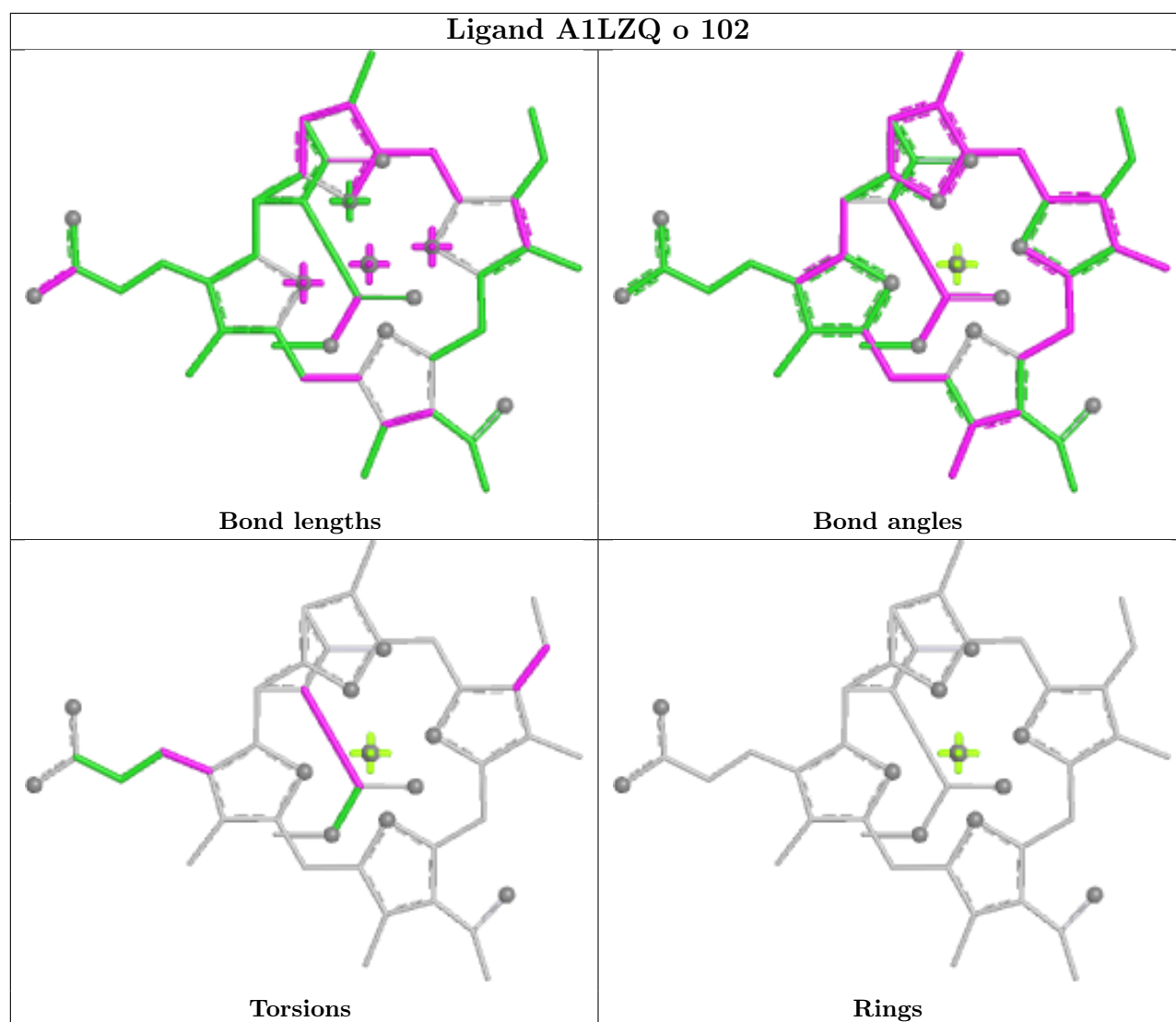












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

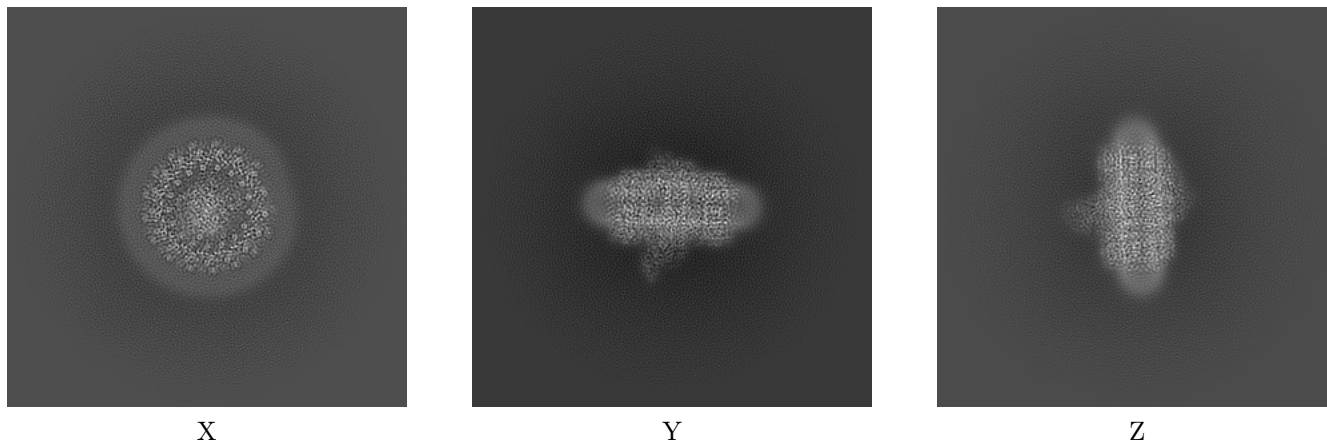
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-36907. These allow visual inspection of the internal detail of the map and identification of artifacts.

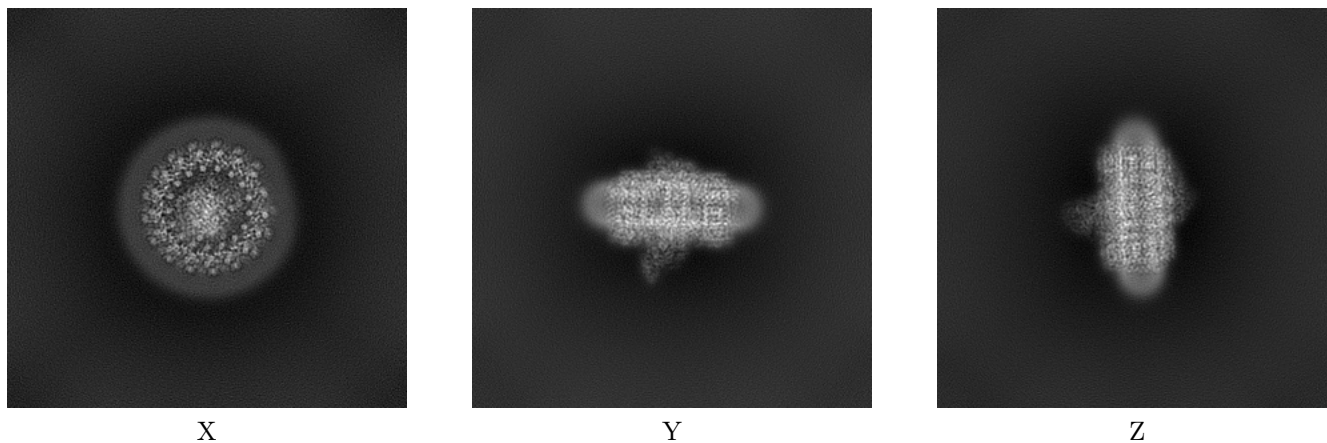
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

### 6.1 Orthogonal projections [i](#)

#### 6.1.1 Primary map



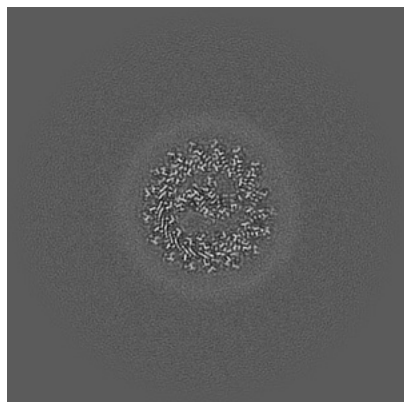
#### 6.1.2 Raw map



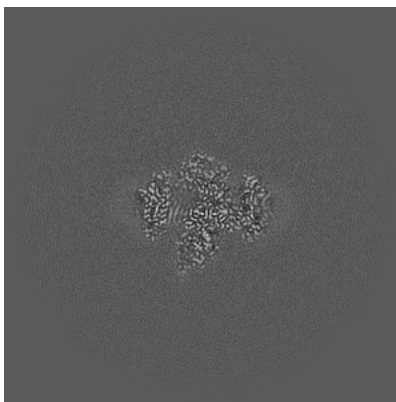
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

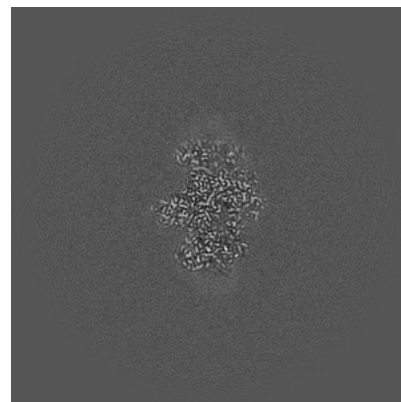
### 6.2.1 Primary map



X Index: 180

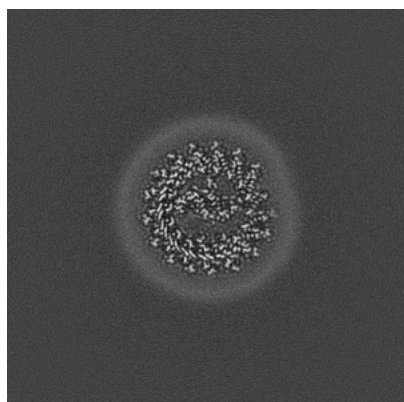


Y Index: 180

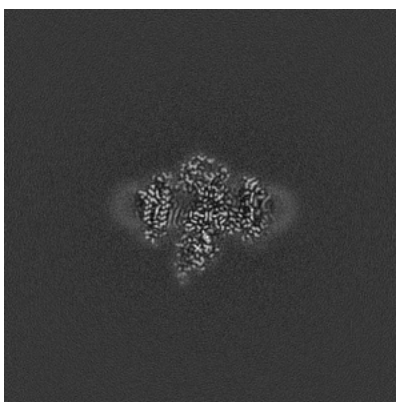


Z Index: 180

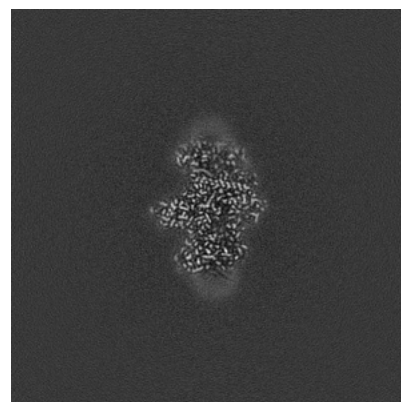
### 6.2.2 Raw map



X Index: 180



Y Index: 180



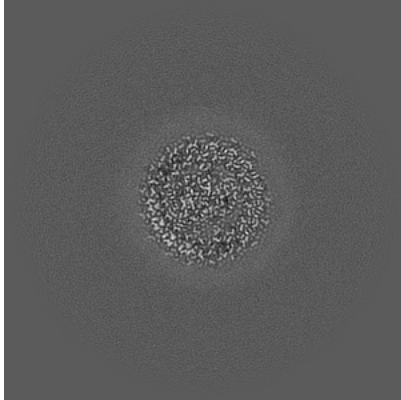
Z Index: 180

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

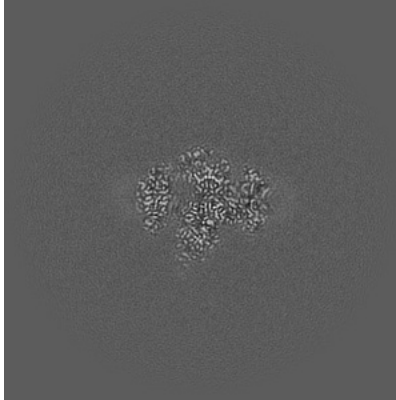


## 6.3 Largest variance slices [i](#)

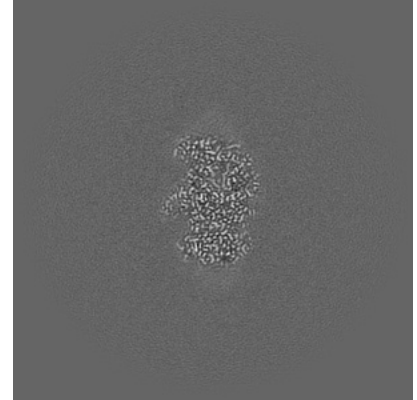
### 6.3.1 Primary map



X Index: 169

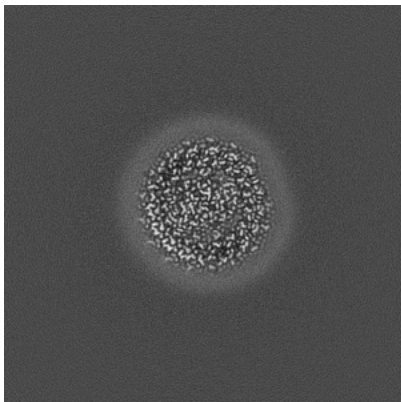


Y Index: 181

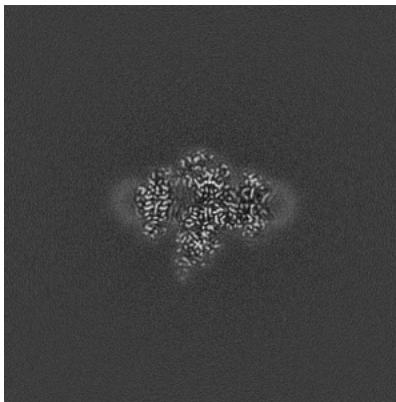


Z Index: 190

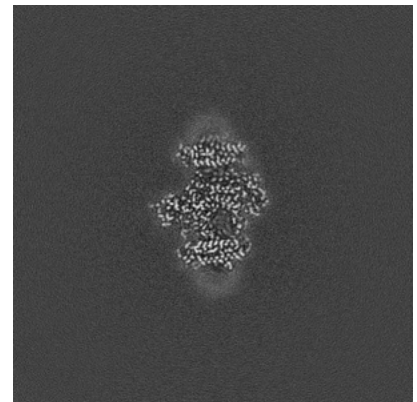
### 6.3.2 Raw map



X Index: 169



Y Index: 181



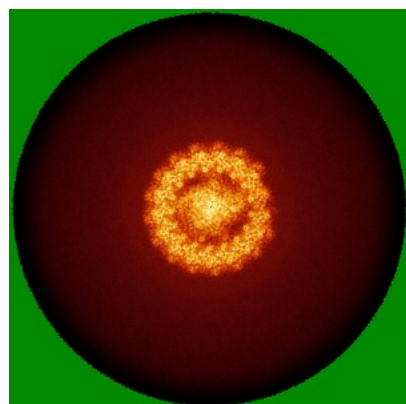
Z Index: 176

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

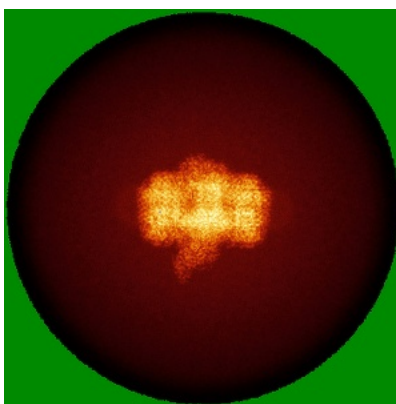


## 6.4 Orthogonal standard-deviation projections (False-color) [i](#)

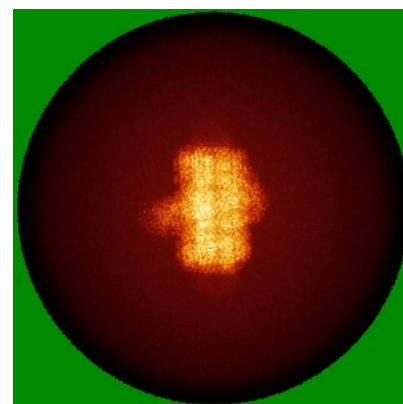
### 6.4.1 Primary map



X

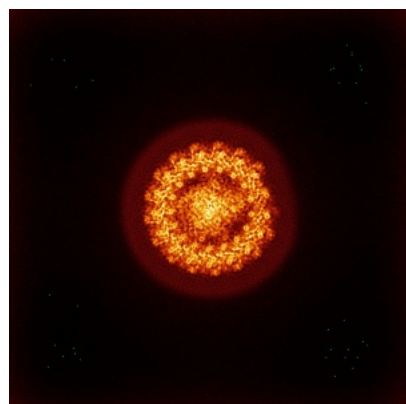


Y

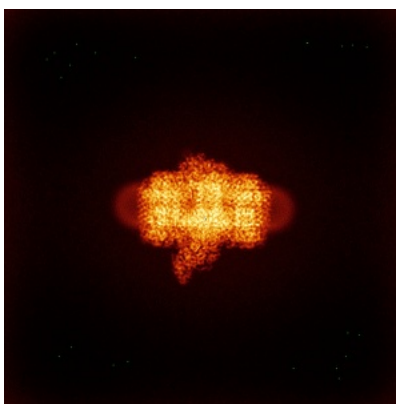


Z

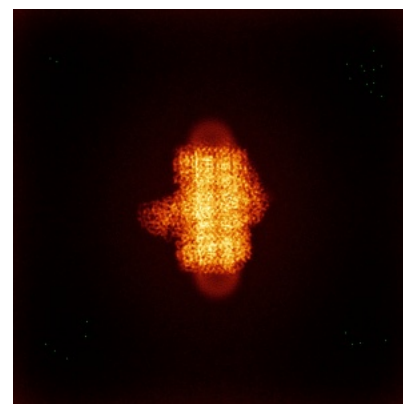
### 6.4.2 Raw map



X



Y



Z

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

## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.4. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map



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

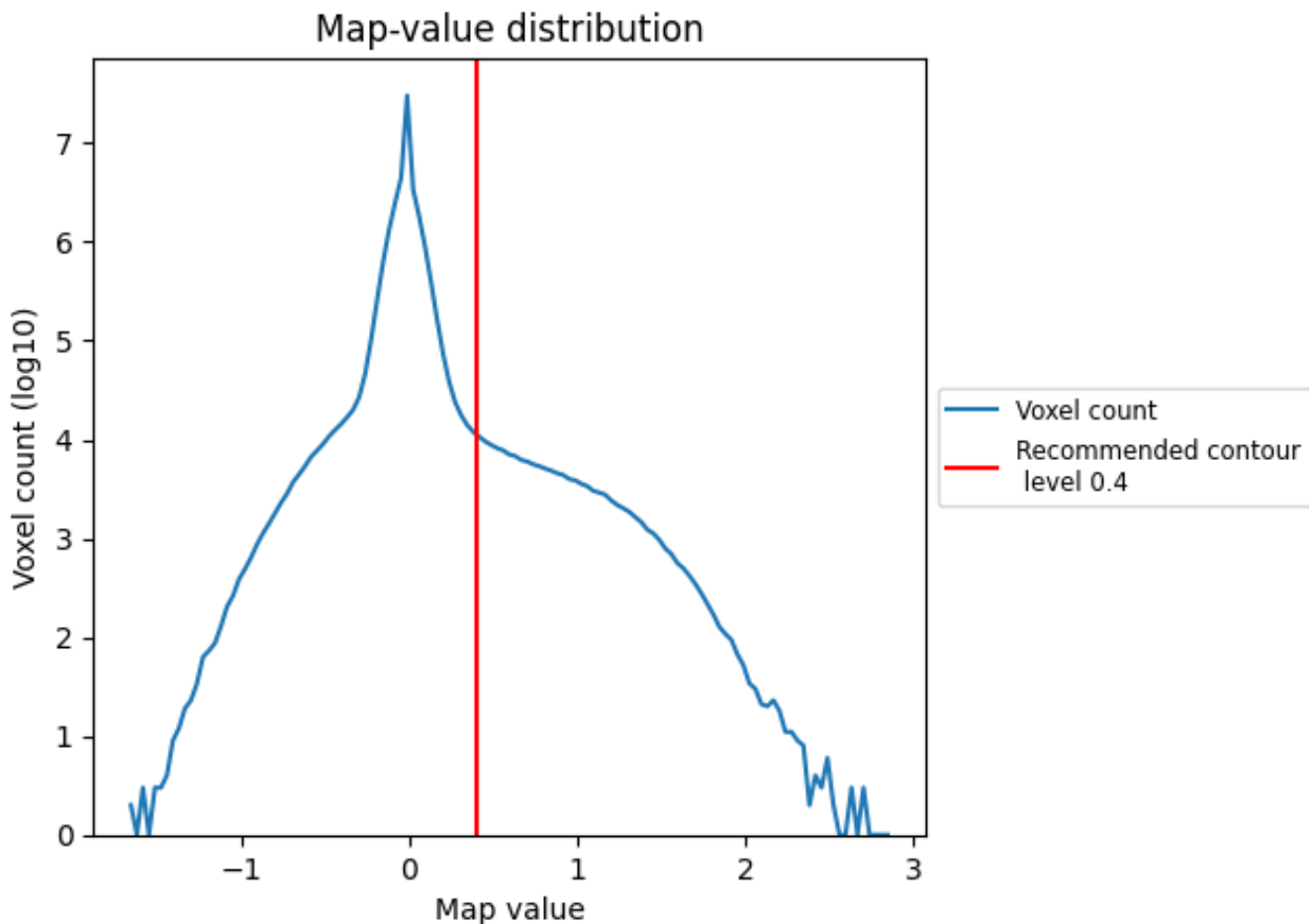
## 6.6 Mask visualisation [i](#)

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

## 7 Map analysis [i](#)

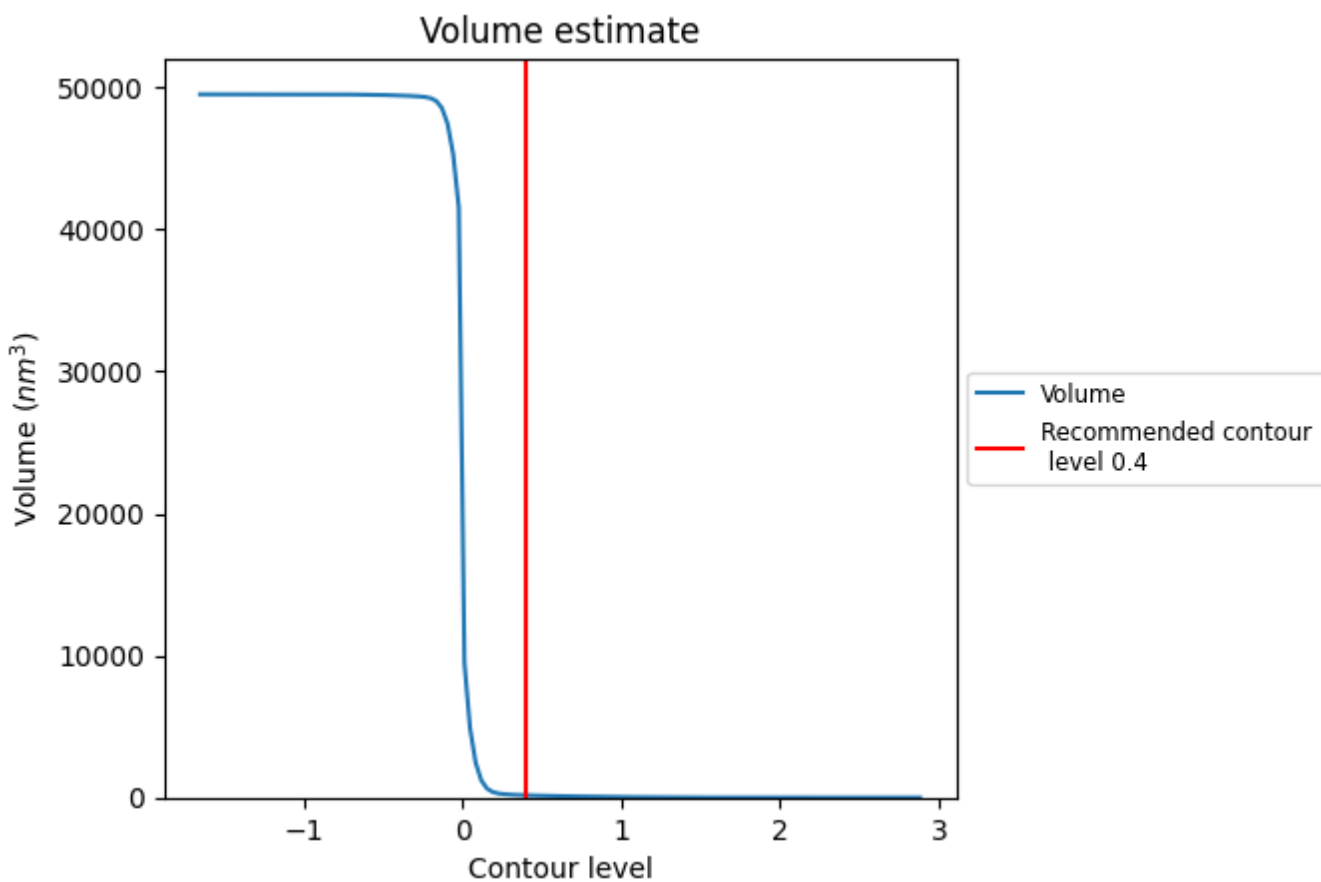
This section contains the results of statistical analysis of the map.

### 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.

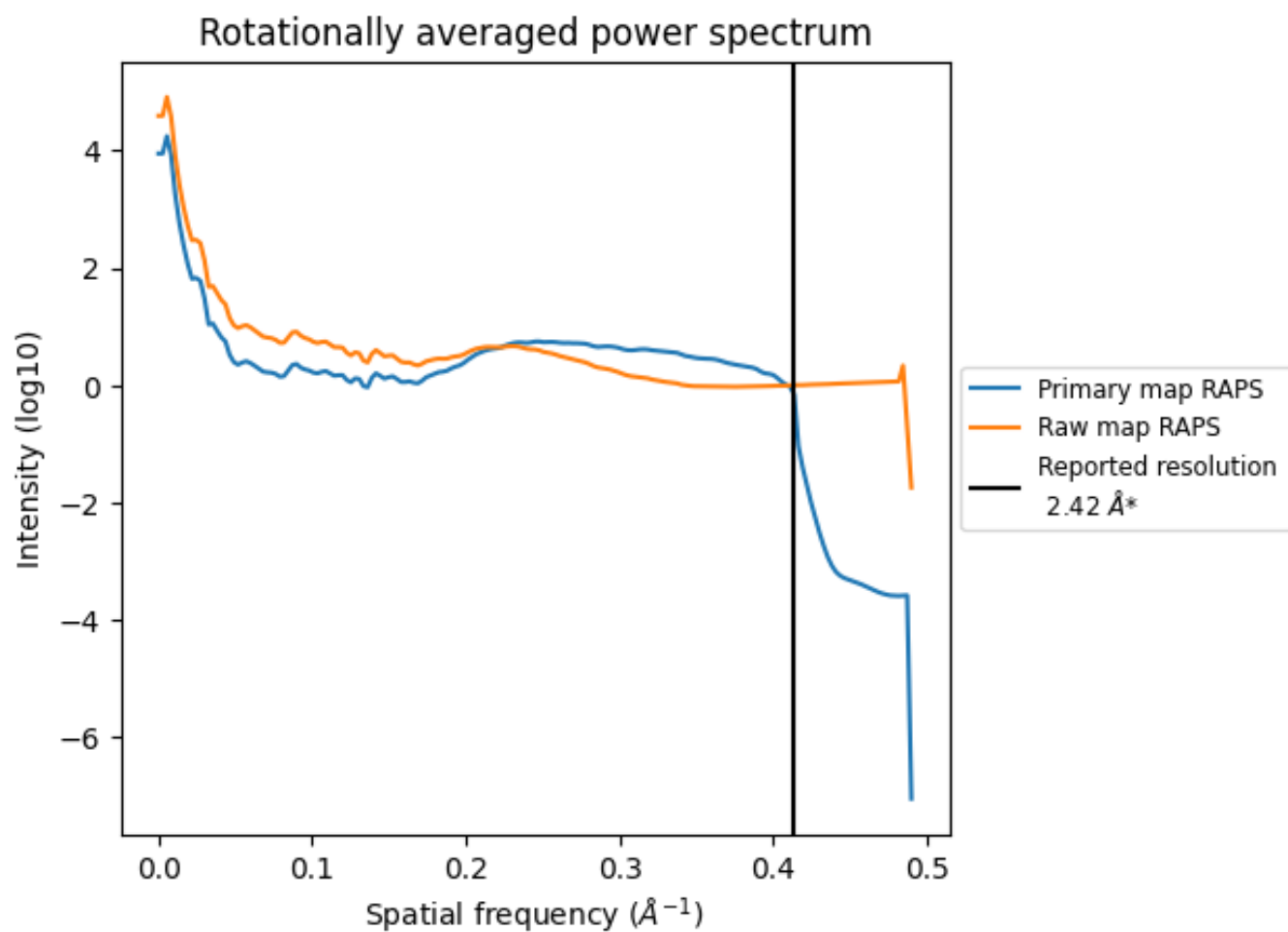
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 158 nm<sup>3</sup>; this corresponds to an approximate mass of 143 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](#)

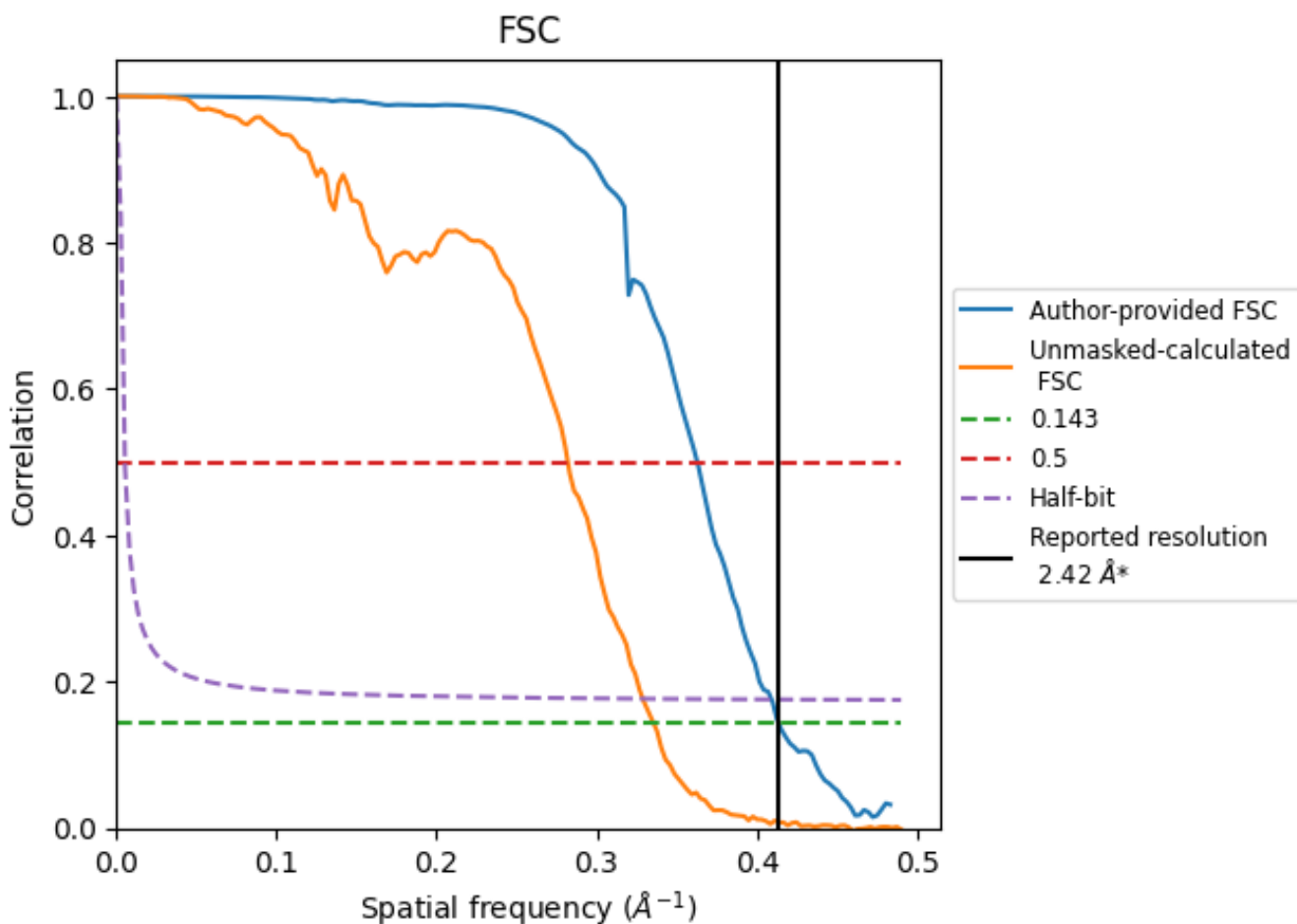


\*Reported resolution corresponds to spatial frequency of 0.413 Å<sup>-1</sup>

## 8 Fourier-Shell correlation [i](#)

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

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of 0.413 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

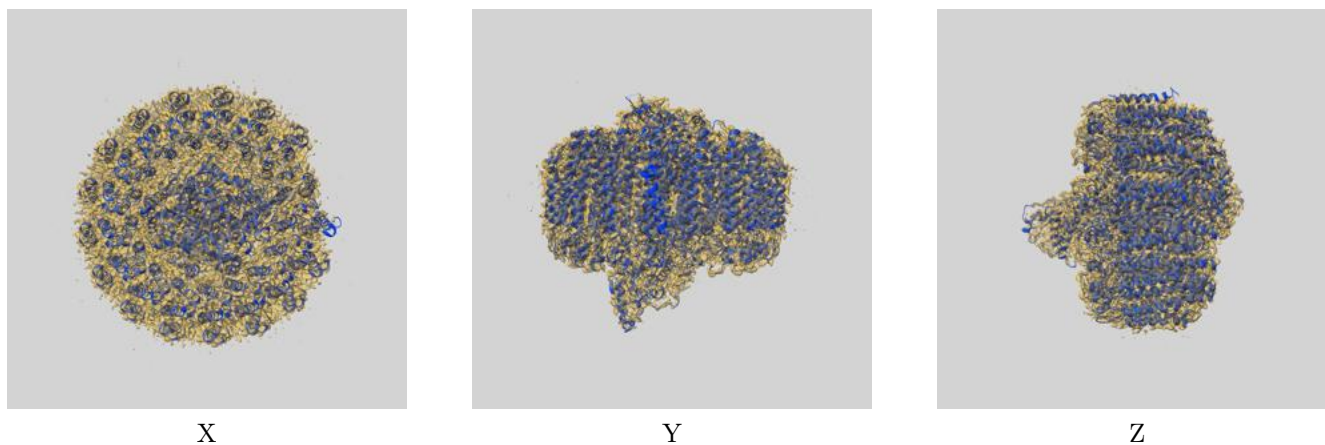
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.42	-	-
Author-provided FSC curve	2.42	2.76	2.44
Unmasked-calculated*	2.98	3.55	3.04

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 2.98 differs from the reported value 2.42 by more than 10 %

## 9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-36907 and PDB model 8K5O. Per-residue inclusion information can be found in section 3 on page 25.

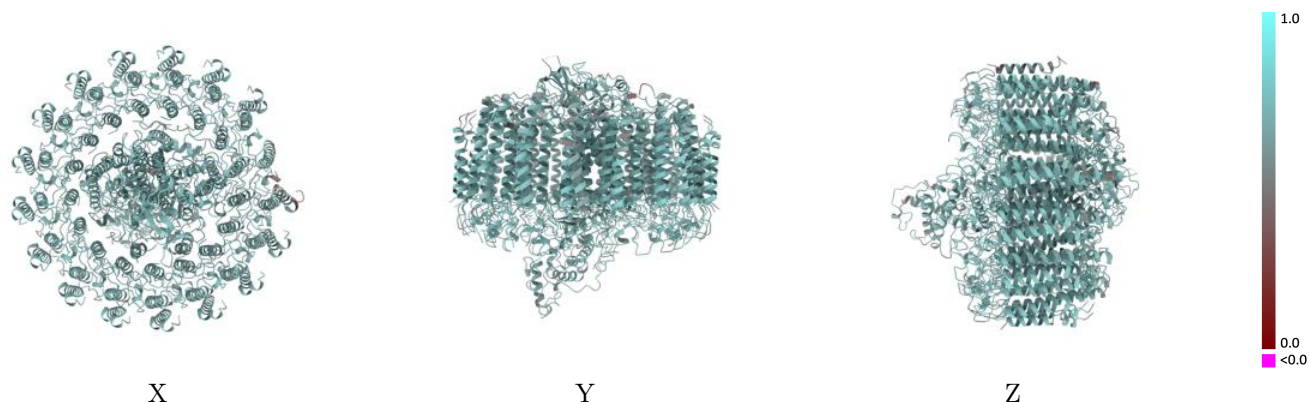
### 9.1 Map-model overlay [i](#)



The images above show the 3D surface view of the map at the recommended contour level 0.4 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.

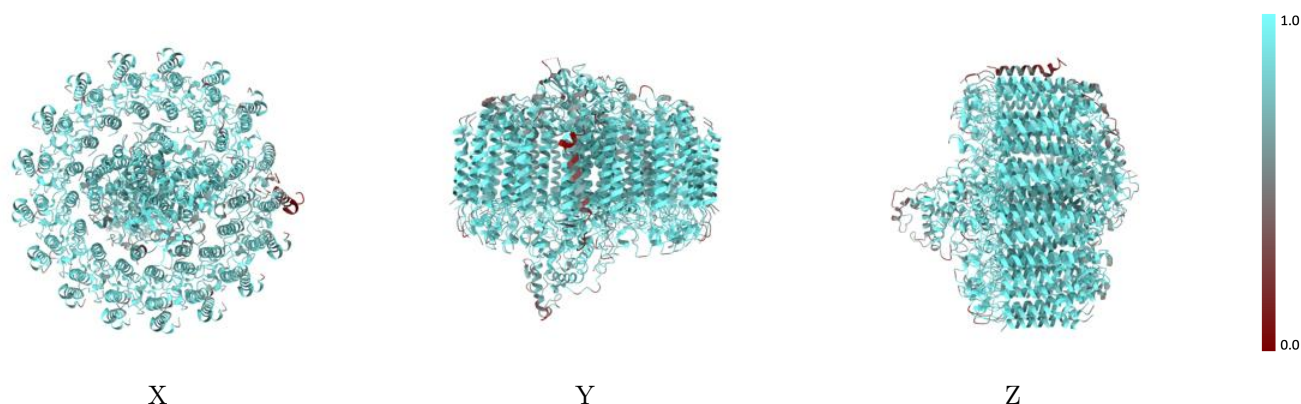


## 9.2 Q-score mapped to coordinate model [i](#)



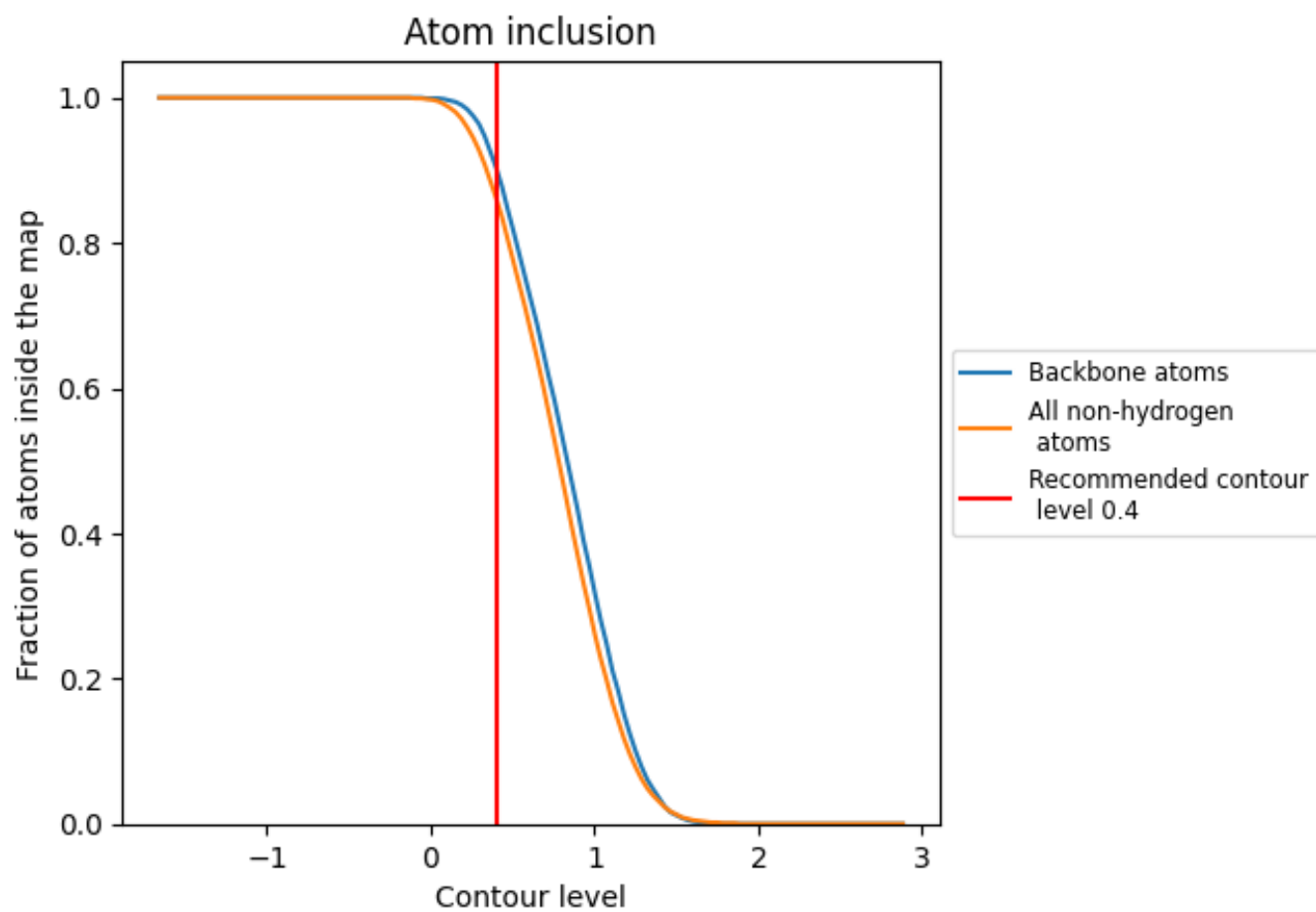
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.4).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 90% of all backbone atoms, 86% 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 (0.4) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8620	 0.6590
1	 0.8760	 0.6510
2	 0.8050	 0.6460
3	 0.9250	 0.6780
4	 0.7940	 0.6380
5	 0.3700	 0.5600
6	 0.7810	 0.6370
7	 0.7970	 0.6380
8	 0.7350	 0.6510
9	 0.7770	 0.6390
C	 0.8050	 0.6460
F	 0.8640	 0.6620
G	 0.8790	 0.6580
H	 0.8160	 0.6400
I	 0.7930	 0.6470
K	 0.8390	 0.6690
L	 0.9080	 0.6770
M	 0.9070	 0.6750
N	 0.8890	 0.6650
O	 0.7900	 0.6490
P	 0.8620	 0.6670
Q	 0.8780	 0.6630
R	 0.7770	 0.6380
S	 0.8940	 0.6630
T	 0.9100	 0.6570
U	 0.8180	 0.6400
V	 0.8970	 0.6660
W	 0.9080	 0.6640
X	 0.7760	 0.6450
Y	 0.8670	 0.6600
Z	 0.9180	 0.6690
a	 0.8120	 0.6500
b	 0.8750	 0.6630
c	 0.9080	 0.6640
d	 0.7990	 0.6540



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Chain	Atom inclusion	Q-score
e	 0.8950	 0.6640
f	 0.9230	 0.6640
g	 0.8170	 0.6480
h	 0.9010	 0.6660
i	 0.9150	 0.6650
j	 0.8000	 0.6560
k	 0.8700	 0.6650
l	 0.9230	 0.6700
m	 0.8080	 0.6550
n	 0.8840	 0.6620
o	 0.9110	 0.6660
p	 0.8070	 0.6450
q	 0.8810	 0.6640
r	 0.8980	 0.6660
s	 0.7700	 0.6480
t	 0.8830	 0.6660
u	 0.9130	 0.6640
v	 0.8030	 0.6550
w	 0.8890	 0.6650
x	 0.9120	 0.6660
y	 0.7360	 0.6360
z	 0.8990	 0.6640