



wwPDB EM Validation Summary Report ⓘ

Mar 8, 2026 – 05:25 PM UTC

PDB ID : 8PW5 / pdb_00008pw5
EMDB ID : EMD-17989
Title : CS respirasome from murine liver
Authors : Vercellino, I.; Sazanov, L.A.
Deposited on : 2023-07-19
Resolution : 3.60 Å(reported)
Based on initial models : 7o3c, 6g2j

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

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

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

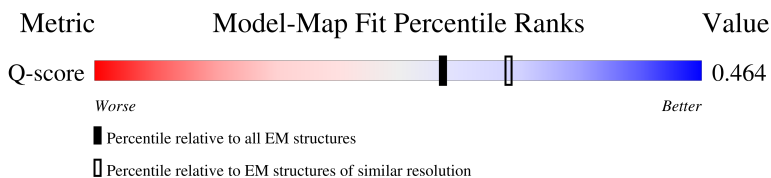
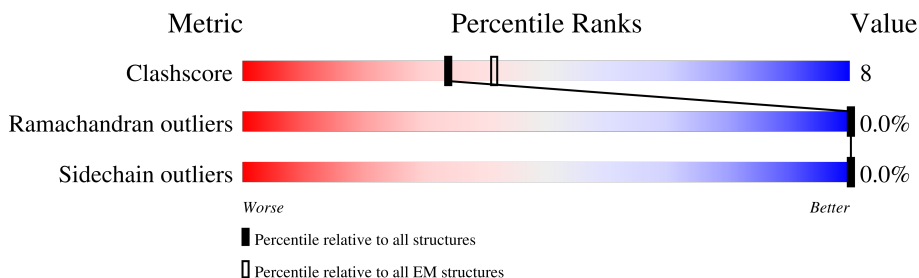
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.60 Å.

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



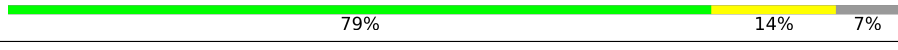
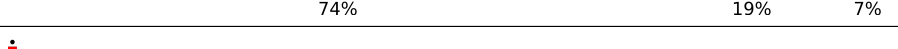
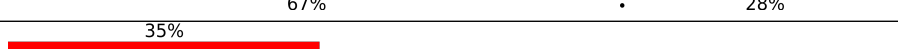
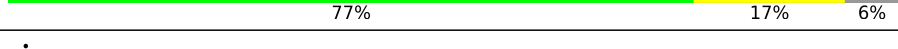
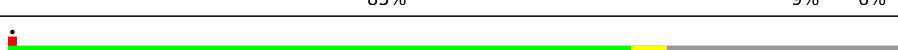
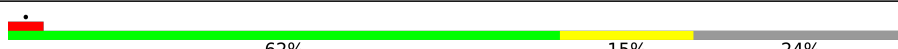
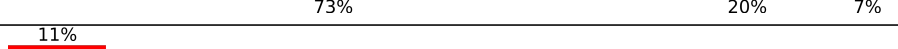
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	12797 (3.10 - 4.10)

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

Mol	Chain	Length	Quality of chain
1	g	111	 12% 43% 25% 32%
1	t	111	 12% 51% 17% 32%
2	m	69	 12% 35% 29% 36%
2	z	69	 12% 39% 23% 36%

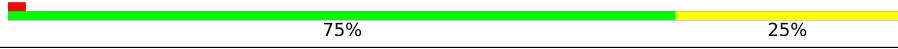
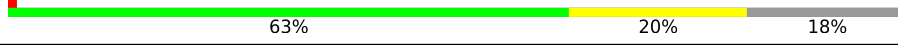
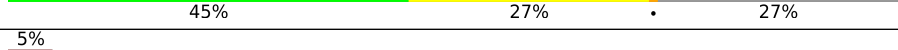
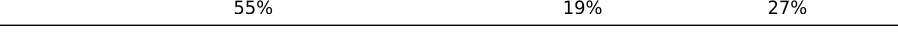
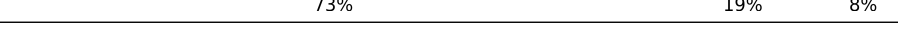
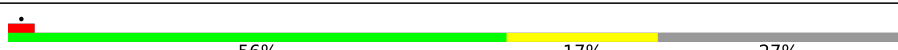
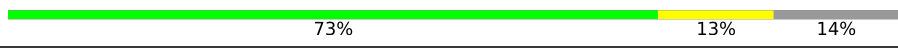
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Mol	Chain	Length	Quality of chain
3	A	480	
3	L	480	
4	B	453	
4	M	453	
5	C	381	
5	N	381	
6	D	325	
6	O	325	
7	E	274	
7	P	274	
7	T	274	
8	F	111	
8	Q	111	
9	G	82	
9	R	82	
10	H	89	
10	S	89	
11	J	64	
11	U	64	
12	K	56	
12	V	56	
13	I	113	
14	a	514	
14	n	514	
15	b	227	

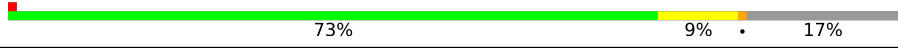
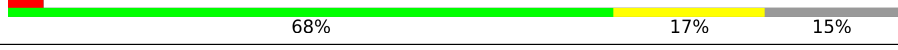
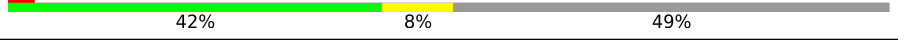
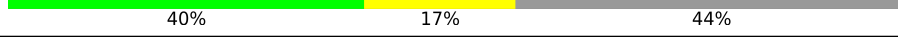
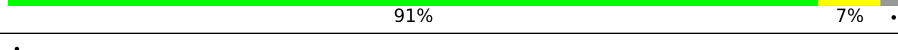
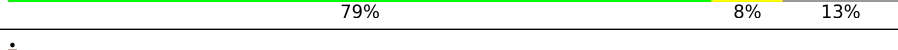
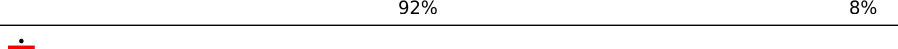
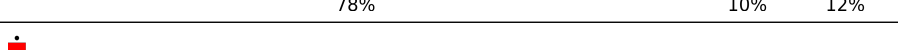
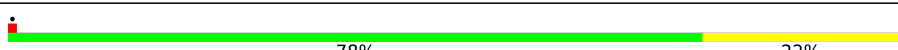
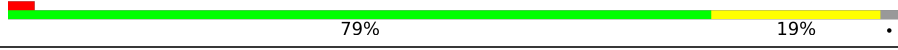
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Mol	Chain	Length	Quality of chain
15	o	227	
16	c	261	
16	p	261	
17	d	169	
17	q	169	
18	e	146	
18	r	146	
19	f	128	
19	s	128	
20	h	86	
20	u	86	
21	i	76	
21	v	76	
22	k	80	
22	x	80	
23	l	63	
23	y	63	
24	w	83	
25	6	224	
26	C1	263	
27	D1	463	
28	2	248	
29	1	464	
30	3	727	
31	9	212	

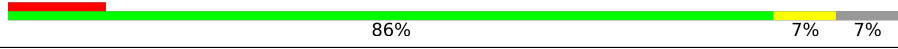
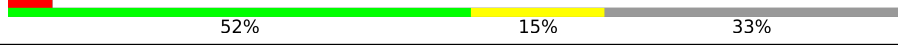
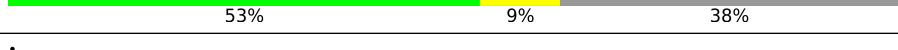
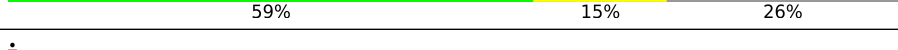
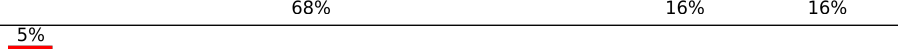
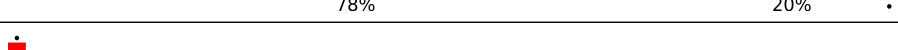
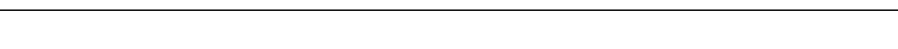
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Mol	Chain	Length	Quality of chain
32	P1	377	
33	Q1	175	
34	7	116	
35	S1	99	
36	T1	156	
36	U1	156	
37	V1	116	
38	W1	131	
39	q1	145	
40	r1	113	
41	s1	104	
42	A1	115	
43	H1	318	
44	J1	172	
45	K1	98	
46	L1	607	
47	M1	459	
48	N1	345	
49	O1	355	
50	X1	172	
51	Y1	141	
52	Z1	144	
53	a1	70	
54	b1	84	
55	c1	76	

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Mol	Chain	Length	Quality of chain
56	d1	120	
57	e1	106	
58	f1	57	
59	g1	151	
60	h1	189	
61	i1	128	
62	j1	105	
63	k1	104	
64	l1	186	
65	m1	129	
66	n1	179	
67	o1	137	
68	p1	176	

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
74	FES	P	201	-	-	X	-

2 Entry composition [i](#)

There are 87 unique types of molecules in this entry. The entry contains 130610 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 Cytochrome c oxidase subunit 6A1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	t	76	Total	C	N	O	S	0	0
			620	404	112	102	2		
1	g	76	Total	C	N	O	S	0	0
			620	404	112	102	2		

- Molecule 2 is a protein called Cytochrome c oxidase subunit 8A, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	m	44	Total	C	N	O	S	0	0
			343	220	59	61	3		
2	z	44	Total	C	N	O	S	0	0
			343	220	59	61	3		

- Molecule 3 is a protein called Cytochrome b-c1 complex subunit 1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	A	445	Total	C	N	O	S	0	0
			3459	2163	610	669	17		
3	L	445	Total	C	N	O	S	0	0
			3460	2163	610	670	17		

- Molecule 4 is a protein called Cytochrome b-c1 complex subunit 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	B	420	Total	C	N	O	S	0	0
			3154	1980	555	610	9		
4	M	420	Total	C	N	O	S	0	0
			3154	1980	555	610	9		

- Molecule 5 is a protein called Cytochrome b.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	C	380	Total	C	N	O	S	0	0
			3046	2052	473	499	22		
5	N	380	Total	C	N	O	S	0	0
			3046	2052	473	499	22		

- Molecule 6 is a protein called Cytochrome c1, heme protein, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	D	240	Total	C	N	O	S	0	0
			1909	1218	327	350	14		
6	O	240	Total	C	N	O	S	0	0
			1909	1218	327	350	14		

- Molecule 7 is a protein called Cytochrome b-c1 complex subunit Rieske, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	E	196	Total	C	N	O	S	0	0
			1167	705	219	237	6		
7	P	196	Total	C	N	O	S	0	0
			1164	702	219	237	6		
7	T	78	Total	C	N	O	S	0	0
			554	352	103	97	2		

- Molecule 8 is a protein called Cytochrome b-c1 complex subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	F	98	Total	C	N	O	S	0	0
			865	552	154	156	3		
8	Q	102	Total	C	N	O	S	0	0
			900	575	160	162	3		

- Molecule 9 is a protein called Cytochrome b-c1 complex subunit 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	G	77	Total	C	N	O	S	0	0
			654	424	120	109	1		
9	R	77	Total	C	N	O	S	0	0
			654	424	120	109	1		

- Molecule 10 is a protein called Cytochrome b-c1 complex subunit 6, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	H	66	Total	C	N	O	S	0	0
			545	333	101	106	5		
10	S	68	Total	C	N	O	S	0	0
			563	343	103	112	5		

- Molecule 11 is a protein called Cytochrome b-c1 complex subunit 9.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	J	60	Total	C	N	O		0	0
			495	323	86	86			
11	U	60	Total	C	N	O		0	0
			495	323	86	86			

- Molecule 12 is a protein called Cytochrome b-c1 complex subunit 10.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	K	52	Total	C	N	O	S	0	0
			430	287	76	66	1		
12	V	53	Total	C	N	O	S	0	0
			438	292	77	67	2		

- Molecule 13 is a protein called Cox7a2l protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	I	111	Total	C	N	O	S	0	0
			807	520	138	144	5		

- Molecule 14 is a protein called Cytochrome c oxidase subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	n	514	Total	C	N	O	S	0	0
			4021	2691	623	675	32		
14	a	514	Total	C	N	O	S	0	0
			4021	2691	623	675	32		

- Molecule 15 is a protein called Cytochrome c oxidase subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	o	227	Total	C	N	O	S	0	0
			1817	1180	282	336	19		
15	b	227	Total	C	N	O	S	0	0
			1817	1180	282	336	19		

- Molecule 16 is a protein called Cytochrome c oxidase subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	p	260	Total	C	N	O	S	0	0
			2118	1418	339	351	10		
16	c	259	Total	C	N	O	S	0	0
			2111	1414	338	349	10		

- Molecule 17 is a protein called Cytochrome c oxidase subunit 4 isoform 1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	q	139	Total	C	N	O	S	0	0
			1156	745	192	212	7		
17	d	139	Total	C	N	O	S	0	0
			1156	745	192	212	7		

- Molecule 18 is a protein called Cytochrome c oxidase subunit 5A, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	r	104	Total	C	N	O	S	0	0
			842	538	141	161	2		
18	e	103	Total	C	N	O	S	0	0
			833	533	140	158	2		

- Molecule 19 is a protein called Cytochrome c oxidase subunit 5B, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	s	94	Total	C	N	O	S	0	0
			721	449	126	138	8		
19	f	93	Total	C	N	O	S	0	0
			717	447	125	137	8		

- Molecule 20 is a protein called Cytochrome c oxidase subunit 6B1.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	u	79	Total	C	N	O	S	0	0
			654	416	116	117	5		
20	h	79	Total	C	N	O	S	0	0
			654	416	116	117	5		

- Molecule 21 is a protein called Cytochrome c oxidase subunit 6C.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	v	71	Total	C	N	O	S	0	0
			567	369	102	93	3		
21	i	72	Total	C	N	O	S	0	0
			572	372	103	94	3		

- Molecule 22 is a protein called Cytochrome c oxidase subunit 7B, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	x	49	Total	C	N	O	S	0	0
			383	248	65	68	2		
22	k	48	Total	C	N	O	S	0	0
			378	245	64	67	2		

- Molecule 23 is a protein called Cytochrome c oxidase subunit 7C, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	y	47	Total	C	N	O	S	0	0
			386	256	65	63	2		
23	l	46	Total	C	N	O	S	0	0
			380	253	64	61	2		

- Molecule 24 is a protein called Cytochrome c oxidase subunit 7A2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	w	57	Total	C	N	O	S	0	0
			435	283	71	78	3		

- Molecule 25 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 7, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	6	157	Total	C	N	O	S	0	0
			1258	802	227	215	14		

- Molecule 26 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 3, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	C1	208	Total	C	N	O	S	0	0
			1730	1116	297	314	3		

- Molecule 27 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	D1	430	Total	C	N	O	S	0	0
			3464	2215	595	630	24		

- Molecule 28 is a protein called NADH dehydrogenase [ubiquinone] flavoprotein 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	2	214	Total	C	N	O	S	0	0
			1660	1056	279	314	11		

- Molecule 29 is a protein called NADH dehydrogenase [ubiquinone] flavoprotein 1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	1	430	Total	C	N	O	S	0	0
			3321	2092	596	611	22		

- Molecule 30 is a protein called NADH-ubiquinone oxidoreductase 75 kDa subunit, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	3	690	Total	C	N	O	S	0	0
			5305	3326	921	1017	41		

- Molecule 31 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 8, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	9	178	Total	C	N	O	S	0	0
			1431	898	245	276	12		

- Molecule 32 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 9, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	P1	342	Total	C	N	O	S	0	0
			2748	1777	483	481	7		

- Molecule 33 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 4, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	Q1	126	Total	C	N	O	S	0	0
			1022	646	180	192	4		

- Molecule 34 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 6, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	7	96	Total	C	N	O	S	0	0
			758	470	141	144	3		

- Molecule 35 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex sub-unit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	S1	84	Total	C	N	O	S	0	0
			671	421	127	120	3		

- Molecule 36 is a protein called Acyl carrier protein, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	T1	79	Total	C	N	O	S	0	0
			637	410	95	127	5		
36	U1	88	Total	C	N	O	S	0	0
			706	453	104	144	5		

- Molecule 37 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex sub-unit 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	V1	113	Total	C	N	O	S	0	0
			923	602	153	165	3		

- Molecule 38 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex sub-unit 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	W1	114	Total	C	N	O	S	0	0
			970	619	180	165	6		

- Molecule 39 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex sub-unit 12.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	q1	145	Total	C	N	O	S	0	0
			1209	777	215	212	5		

- Molecule 40 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	r1	99	Total	C	N	O	S	0	0
			796	504	148	141	3		

- Molecule 41 is a protein called NADH dehydrogenase [ubiquinone] flavoprotein 3, mitochondrial.

Mol	Chain	Residues	Atoms				AltConf	Trace
41	s1	42	Total	C	N	O	0	0
			351	219	62	70		

- Molecule 42 is a protein called NADH-ubiquinone oxidoreductase chain 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	A1	115	Total	C	N	O	S	0	0
			932	633	132	160	7		

- Molecule 43 is a protein called NADH-ubiquinone oxidoreductase chain 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	H1	318	Total	C	N	O	S	0	0
			2540	1706	384	428	22		

- Molecule 44 is a protein called NADH-ubiquinone oxidoreductase chain 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	J1	172	Total	C	N	O	S	0	0
			1308	878	186	229	15		

- Molecule 45 is a protein called NADH-ubiquinone oxidoreductase chain 4L.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	K1	98	Total	C	N	O	S	0	0
			737	477	112	137	11		

- Molecule 46 is a protein called NADH-ubiquinone oxidoreductase chain 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	L1	606	Total	C	N	O	S	0	0
			4800	3182	746	827	45		

- Molecule 47 is a protein called NADH-ubiquinone oxidoreductase chain 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	M1	459	Total	C	N	O	S	0	0
			3632	2408	567	617	40		

- Molecule 48 is a protein called NADH-ubiquinone oxidoreductase chain 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	N1	345	Total	C	N	O	S	0	0
			2703	1795	417	454	37		

- Molecule 49 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 10, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	O1	320	Total	C	N	O	S	0	0
			2607	1674	431	492	10		

- Molecule 50 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	X1	171	Total	C	N	O	S	0	0
			1396	889	250	247	10		

- Molecule 51 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 11.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	Y1	140	Total	C	N	O	S	0	0
			1037	662	175	192	8		

- Molecule 52 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 13.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	Z1	141	Total	C	N	O	S	0	0
			1167	750	207	202	8		

- Molecule 53 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	a1	70	Total	C	N	O	S	0	0
			572	370	101	97	4		

- Molecule 54 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	b1	83	Total	C	N	O	S	0	0
			651	427	105	115	4		

- Molecule 55 is a protein called NADH dehydrogenase [ubiquinone] 1 subunit C1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
55	c1	48	Total	C	N	O	S	0	0
			398	261	69	67	1		

- Molecule 56 is a protein called NADH dehydrogenase [ubiquinone] 1 subunit C2.

Mol	Chain	Residues	Atoms					AltConf	Trace
56	d1	120	Total	C	N	O	S	0	0
			996	651	171	165	9		

- Molecule 57 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
57	e1	105	Total	C	N	O	S	0	0
			877	555	162	152	8		

- Molecule 58 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
58	f1	53	Total	C	N	O	S	0	0
			456	295	82	77	2		

- Molecule 59 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 11, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
59	g1	101	Total	C	N	O	S	0	0
			850	549	136	161	4		

- Molecule 60 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 5, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
60	h1	139	Total	C	N	O	S	0	0
			1166	764	195	204	3		

- Molecule 61 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
61	i1	106	Total	C	N	O	S	0	0
			897	584	157	152	4		

- Molecule 62 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
62	j1	65	Total	C	N	O	S	0	0
			562	370	93	98	1		

- Molecule 63 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
63	k1	77	Total	C	N	O	S	0	0
			626	414	106	104	2		

- Molecule 64 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 8, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
64	l1	157	Total	C	N	O	S	0	0
			1323	855	220	237	11		

- Molecule 65 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 4.

Mol	Chain	Residues	Atoms				AltConf	Trace
65	m1	126	Total	C	N	O	0	0
			1050	676	189	185		

- Molecule 66 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 9.

Mol	Chain	Residues	Atoms					AltConf	Trace
66	n1	178	Total	C	N	O	S	0	0
			1541	985	276	269	11		

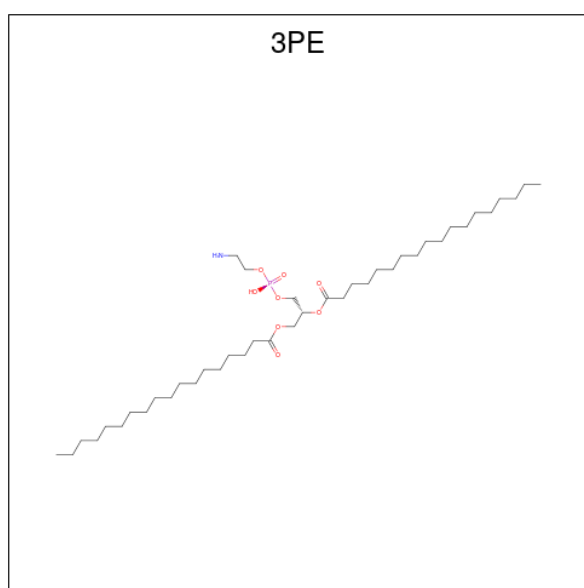
- Molecule 67 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
67	o1	118	Total	C	N	O	S	0	0
			1014	639	190	177	8		

- Molecule 68 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 10.

Mol	Chain	Residues	Atoms					AltConf	Trace
68	p1	170	Total	C	N	O	S	0	0
			1438	903	258	269	8		

- Molecule 69 is 1,2-Distearoyl-sn-glycerophosphoethanolamine (CCD ID: 3PE) (formula: $C_{41}H_{82}NO_8P$).



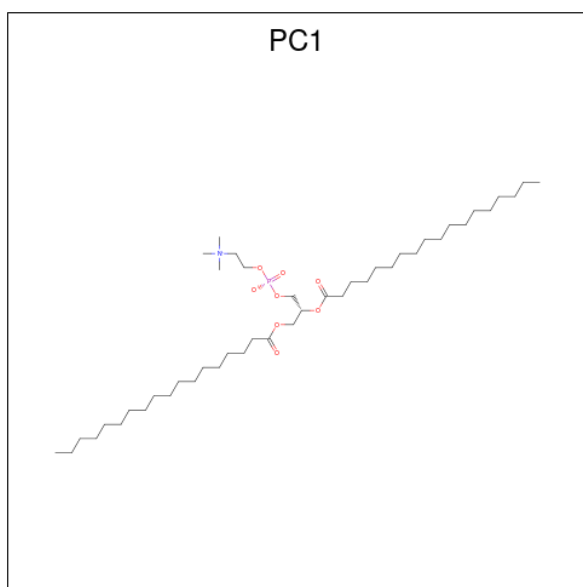
Mol	Chain	Residues	Atoms					AltConf
69	t	1	Total	C	N	O	P	0
			25	15	1	8	1	
69	z	1	Total	C	N	O	P	0
			26	16	1	8	1	
69	A	1	Total	C	N	O	P	0
			23	13	1	8	1	
69	C	1	Total	C	N	O	P	0
			35	25	1	8	1	
69	C	1	Total	C	N	O	P	0
			31	21	1	8	1	
69	E	1	Total	C	N	O	P	0
			32	22	1	8	1	
69	E	1	Total	C	N	O	P	0
			34	24	1	8	1	
69	G	1	Total	C	N	O	P	0
			51	41	1	8	1	
69	L	1	Total	C	N	O	P	0
			23	13	1	8	1	
69	N	1	Total	C	N	O	P	0
			37	27	1	8	1	
69	O	1	Total	C	N	O	P	0
			33	23	1	8	1	
69	R	1	Total	C	N	O	P	0
			30	20	1	8	1	
69	n	1	Total	C	N	O	P	0
			34	24	1	8	1	
69	n	1	Total	C	N	O	P	0
			28	18	1	8	1	
69	n	1	Total	C	N	O	P	0
			27	17	1	8	1	
69	o	1	Total	C	N	O	P	0
			29	19	1	8	1	
69	p	1	Total	C	N	O	P	0
			45	35	1	8	1	
69	v	1	Total	C	N	O	P	0
			28	18	1	8	1	
69	6	1	Total	C	N	O	P	0
			32	22	1	8	1	
69	r1	1	Total	C	N	O	P	0
			46	36	1	8	1	
69	H1	1	Total	C	N	O	P	0
			51	41	1	8	1	
69	K1	1	Total	C	N	O	P	0
			41	31	1	8	1	

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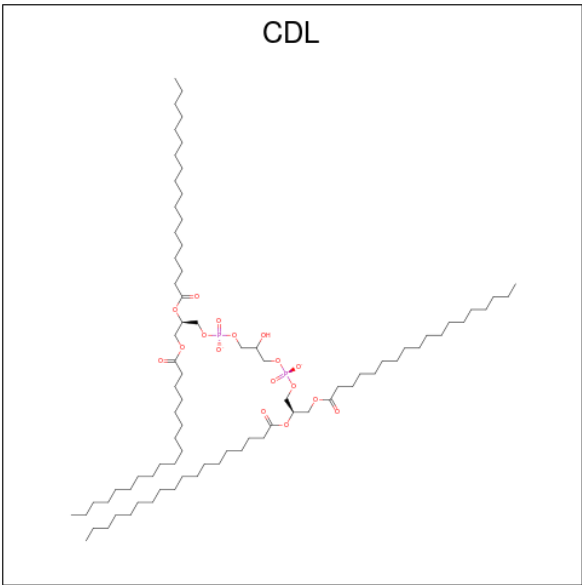
Mol	Chain	Residues	Atoms					AltConf
69	L1	1	Total	C	N	O	P	0
			51	41	1	8	1	
69	L1	1	Total	C	N	O	P	0
			51	41	1	8	1	
69	M1	1	Total	C	N	O	P	0
			51	41	1	8	1	
69	M1	1	Total	C	N	O	P	0
			51	41	1	8	1	
69	N1	1	Total	C	N	O	P	0
			38	28	1	8	1	
69	Y1	1	Total	C	N	O	P	0
			28	18	1	8	1	
69	Y1	1	Total	C	N	O	P	0
			42	32	1	8	1	
69	b1	1	Total	C	N	O	P	0
			43	33	1	8	1	
69	d1	1	Total	C	N	O	P	0
			31	21	1	8	1	
69	d1	1	Total	C	N	O	P	0
			32	22	1	8	1	
69	i1	1	Total	C	N	O	P	0
			42	32	1	8	1	
69	m1	1	Total	C	N	O	P	0
			36	26	1	8	1	
69	a	1	Total	C	N	O	P	0
			28	18	1	8	1	
69	a	1	Total	C	N	O	P	0
			27	17	1	8	1	
69	b	1	Total	C	N	O	P	0
			29	19	1	8	1	
69	c	1	Total	C	N	O	P	0
			45	35	1	8	1	
69	d	1	Total	C	N	O	P	0
			34	24	1	8	1	
69	g	1	Total	C	N	O	P	0
			25	15	1	8	1	
69	i	1	Total	C	N	O	P	0
			28	18	1	8	1	

- Molecule 70 is 1,2-DIACYL-SN-GLYCERO-3-PHOSPHOCHOLINE (CCD ID: PC1) (formula: C₄₄H₈₈NO₈P).



Mol	Chain	Residues	Atoms					AltConf
70	z	1	Total	C	N	O	P	0
			28	18	1	8	1	
70	J	1	Total	C	N	O	P	0
			35	25	1	8	1	
70	K	1	Total	C	N	O	P	0
			28	18	1	8	1	
70	L	1	Total	C	N	O	P	0
			24	14	1	8	1	
70	V	1	Total	C	N	O	P	0
			28	18	1	8	1	
70	I	1	Total	C	N	O	P	0
			50	40	1	8	1	
70	p	1	Total	C	N	O	P	0
			35	25	1	8	1	
70	6	1	Total	C	N	O	P	0
			43	33	1	8	1	
70	9	1	Total	C	N	O	P	0
			54	44	1	8	1	
70	9	1	Total	C	N	O	P	0
			47	37	1	8	1	
70	P1	1	Total	C	N	O	P	0
			31	21	1	8	1	
70	M1	1	Total	C	N	O	P	0
			54	44	1	8	1	
70	g	1	Total	C	N	O	P	0
			50	40	1	8	1	

- Molecule 71 is CARDIOLIPIN (CCD ID: CDL) (formula: $C_{81}H_{156}O_{17}P_2$).



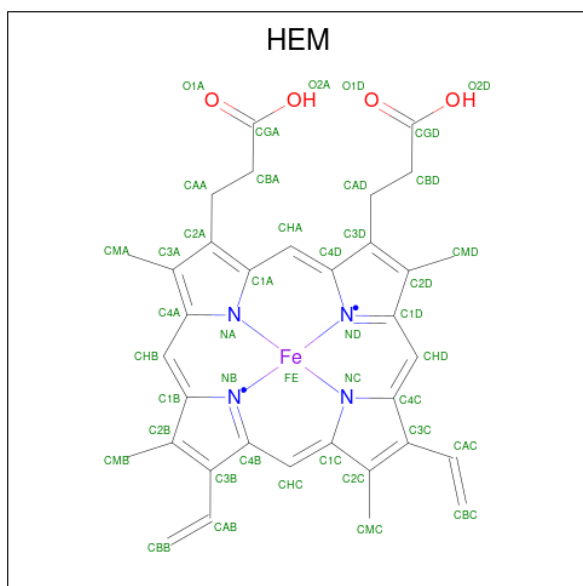
Mol	Chain	Residues	Atoms				AltConf
71	A	1	Total	C	O	P	0
			46	27	17	2	
71	D	1	Total	C	O	P	0
			56	37	17	2	
71	G	1	Total	C	O	P	0
			42	23	17	2	
71	L	1	Total	C	O	P	0
			46	27	17	2	
71	O	1	Total	C	O	P	0
			57	38	17	2	
71	R	1	Total	C	O	P	0
			41	22	17	2	
71	R	1	Total	C	O	P	0
			57	38	17	2	
71	R	1	Total	C	O	P	0
			72	53	17	2	
71	V	1	Total	C	O	P	0
			46	27	17	2	
71	r1	1	Total	C	O	P	0
			57	38	17	2	
71	H1	1	Total	C	O	P	0
			51	33	16	2	
71	L1	1	Total	C	O	P	0
			78	59	17	2	
71	L1	1	Total	C	O	P	0
			46	27	17	2	
71	N1	1	Total	C	O	P	0
			90	71	17	2	

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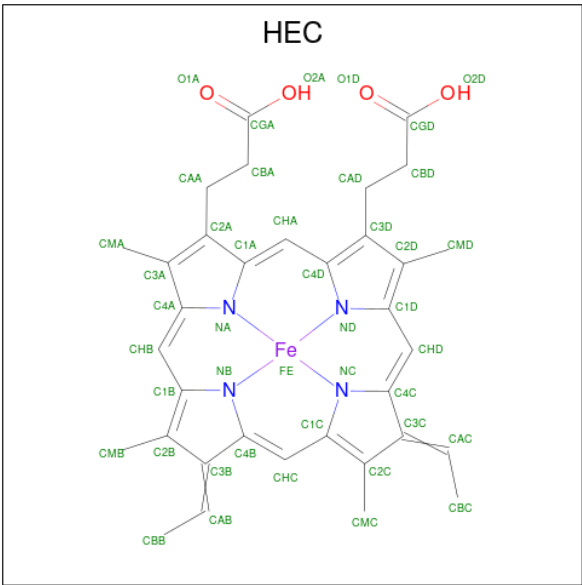
Mol	Chain	Residues	Atoms				AltConf
71	Y1	1	Total	C	O	P	0
			94	75	17	2	
71	d1	1	Total	C	O	P	0
			67	48	17	2	
71	h1	1	Total	C	O	P	0
			70	51	17	2	
71	g	1	Total	C	O	P	0
			38	20	16	2	

- Molecule 72 is PROTOPORPHYRIN IX CONTAINING FE (CCD ID: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).



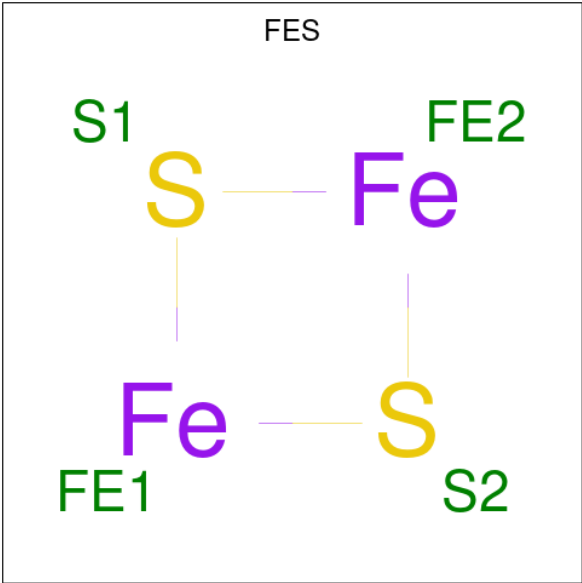
Mol	Chain	Residues	Atoms					AltConf
72	C	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
72	C	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
72	N	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
72	N	1	Total	C	Fe	N	O	0
			43	34	1	4	4	

- Molecule 73 is HEME C (CCD ID: HEC) (formula: $C_{34}H_{34}FeN_4O_4$).



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

- Molecule 74 is FE2/S2 (INORGANIC) CLUSTER (CCD ID: FES) (formula: Fe₂S₂).



Mol	Chain	Residues	Atoms			AltConf
74	E	1	Total	Fe	S	0
			4	2	2	
74	P	1	Total	Fe	S	0
			4	2	2	

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Mol	Chain	Residues	Atoms			AltConf
74	2	1	Total 4	Fe 2	S 2	0
74	3	1	Total 4	Fe 2	S 2	0

- | Mol | Chain | Residues | Atoms | AltConf |
|-----|-------|----------|-----------------|---------|
| 75 | n | 1 | Total Cu
1 1 | 0 |
| 75 | a | 1 | Total Cu
1 1 | 0 |

- | Mol | Chain | Residues | Atoms | AltConf |
|-----|-------|----------|-----------------|---------|
| 76 | n | 1 | Total Na
1 1 | 0 |
| 76 | a | 1 | Total Na
1 1 | 0 |

- # HEA

Mol	Chain	Residues	Atoms					AltConf
77	n	1	Total	C	Fe	N	O	0
			60	49	1	4	6	



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PROTEIN DATA BANK

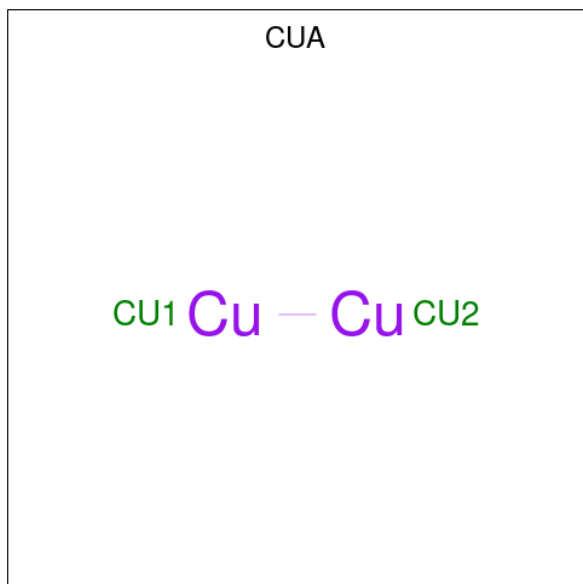
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Mol	Chain	Residues	Atoms					AltConf
77	n	1	Total 60	C 49	Fe 1	N 4	O 6	0
77	a	1	Total 60	C 49	Fe 1	N 4	O 6	0
77	a	1	Total 60	C 49	Fe 1	N 4	O 6	0

- Molecule 78 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
78	o	1	Total	Mg	0
			1	1	
78	O1	1	Total	Mg	0
			1	1	
78	a	1	Total	Mg	0
			1	1	

- Molecule 79 is DINUCLEAR COPPER ION (CCD ID: CUA) (formula: Cu₂).

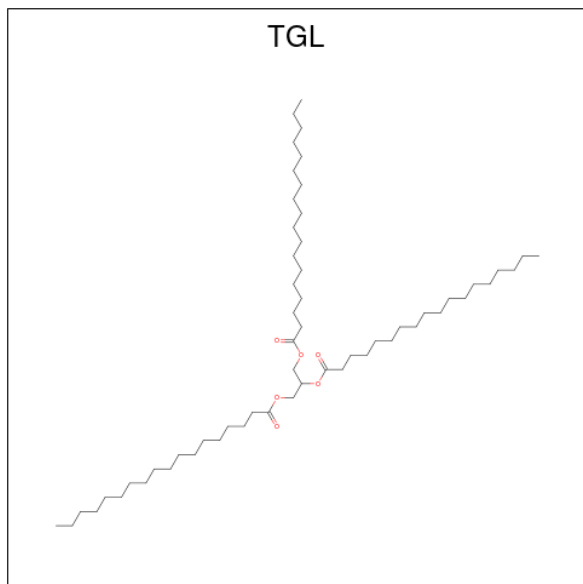


Mol	Chain	Residues	Atoms		AltConf
79	o	1	Total	Cu	0
			2	2	
79	b	1	Total	Cu	0
			2	2	

- Molecule 80 is ZINC ION (CCD ID: ZN) (formula: Zn).

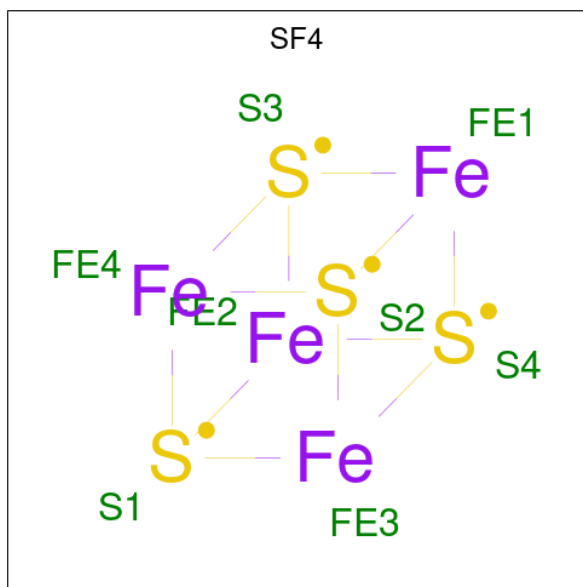
Mol	Chain	Residues	Atoms		AltConf
80	s	1	Total	Zn	0
			1	1	
80	7	1	Total	Zn	0
			1	1	
80	f	1	Total	Zn	0
			1	1	

- Molecule 81 is TRISTEAROYLGLYCEROL (CCD ID: TGL) (formula: $C_{57}H_{110}O_6$).



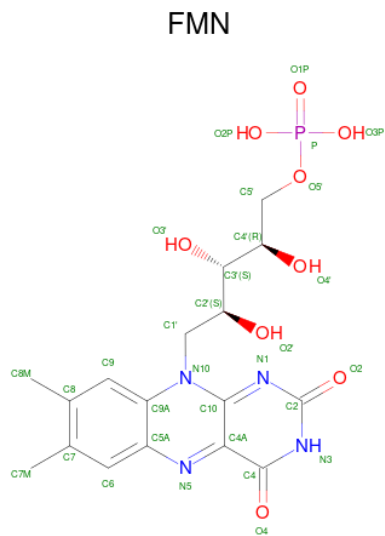
Mol	Chain	Residues	Atoms			AltConf
81	y	1	Total	C	O	0
			37	31	6	
81	l	1	Total	C	O	0
			37	31	6	

- Molecule 82 is IRON/SULFUR CLUSTER (CCD ID: SF4) (formula: Fe_4S_4).



Mol	Chain	Residues	Atoms			AltConf
82	6	1	Total	Fe	S	0
			8	4	4	
82	1	1	Total	Fe	S	0
			8	4	4	
82	3	1	Total	Fe	S	0
			8	4	4	
82	3	1	Total	Fe	S	0
			8	4	4	
82	9	1	Total	Fe	S	0
			8	4	4	
82	9	1	Total	Fe	S	0
			8	4	4	

- Molecule 83 is FLAVIN MONONUCLEOTIDE (CCD ID: FMN) (formula: C₁₇H₂₁N₄O₉P).

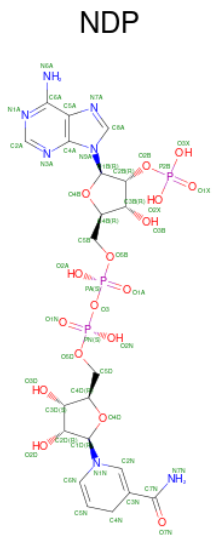


Mol	Chain	Residues	Atoms					AltConf
83	1	1	Total	C	N	O	P	0
			31	17	4	9	1	

- Molecule 84 is POTASSIUM ION (CCD ID: K) (formula: K).

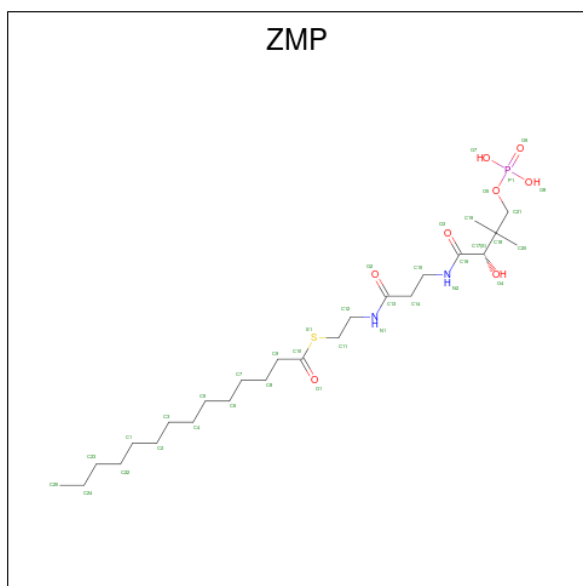
Mol	Chain	Residues	Atoms	AltConf
84	3	1	Total K 1 1	0

- Molecule 85 is NADPH DIHYDRO-NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (CCD ID: NDP) (formula: $\text{C}_{21}\text{H}_{30}\text{N}_7\text{O}_{17}\text{P}_3$).



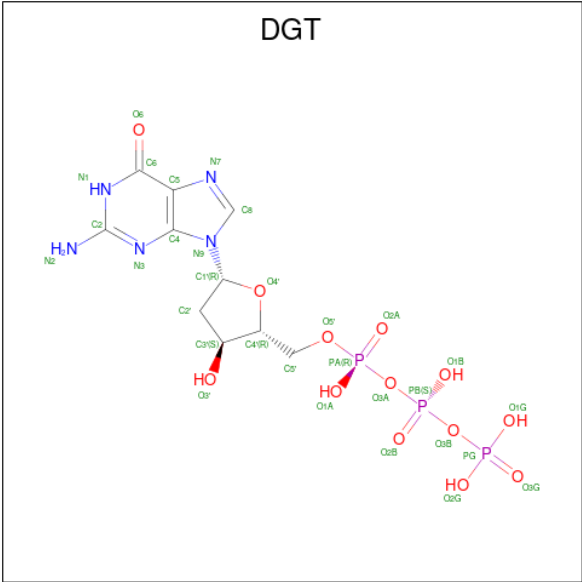
Mol	Chain	Residues	Atoms					AltConf
85	P1	1	Total	C	N	O	P	0
			48	21	7	17	3	

- Molecule 86 is S-[2-({N-[(2S)-2-hydroxy-3,3-dimethyl-4-(phosphonoxy)butanoyl]-beta-alanyl}amino)ethyl] tetradecanethioate (CCD ID: ZMP) (formula: C₂₅H₄₉N₂O₈PS).



Mol	Chain	Residues	Atoms						AltConf
86	W1	1	Total	C	N	O	P	S	0
			34	23	2	7	1	1	
86	n1	1	Total	C	N	O	P	S	0
			32	21	2	7	1	1	

- Molecule 87 is 2'-DEOXYGUANOSINE-5'-TRIPHOSPHATE (CCD ID: DGT) (formula: C₁₀H₁₆N₅O₁₃P₃).

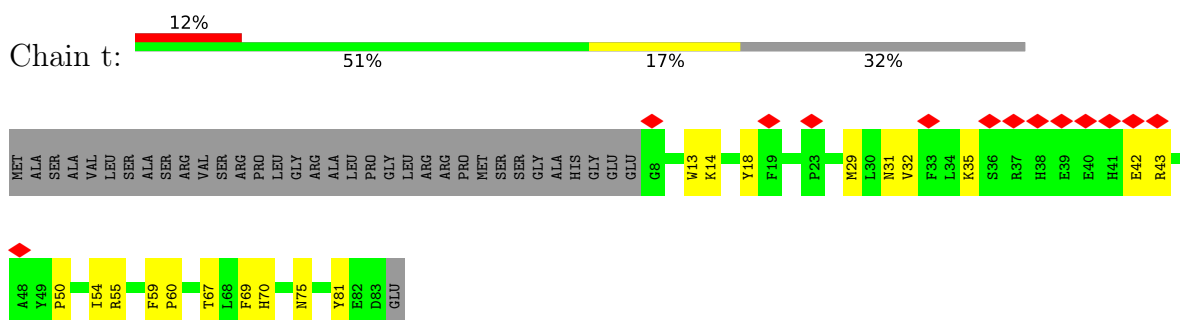


Mol	Chain	Residues	Atoms					AltConf
87	O1	1	Total	C	N	O	P	0
			31	10	5	13	3	

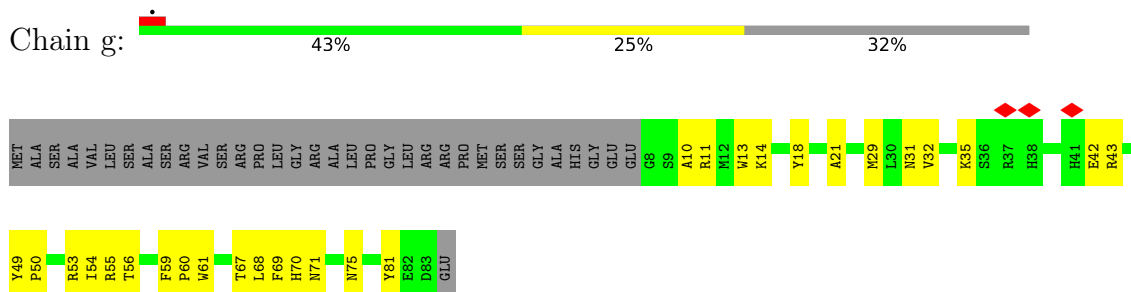
3 Residue-property plots [i](#)

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.

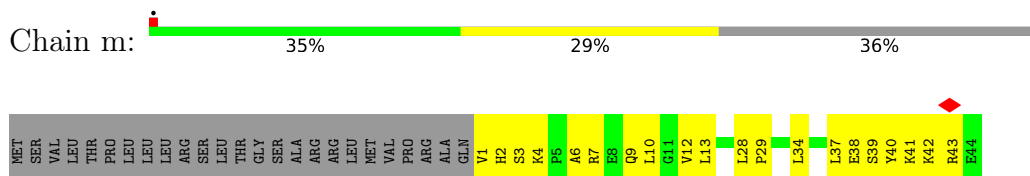
- Molecule 1: Cytochrome c oxidase subunit 6A1, mitochondrial



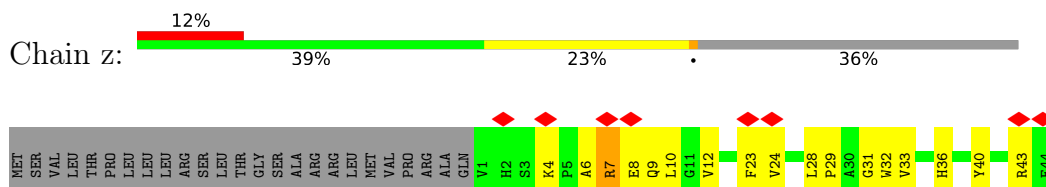
- Molecule 1: Cytochrome c oxidase subunit 6A1, mitochondrial



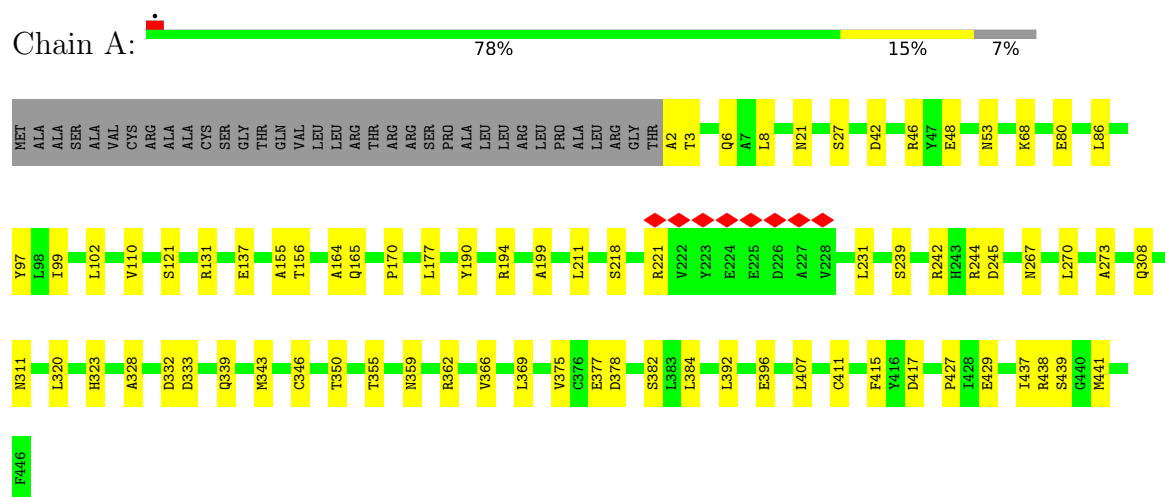
- Molecule 2: Cytochrome c oxidase subunit 8A, mitochondrial



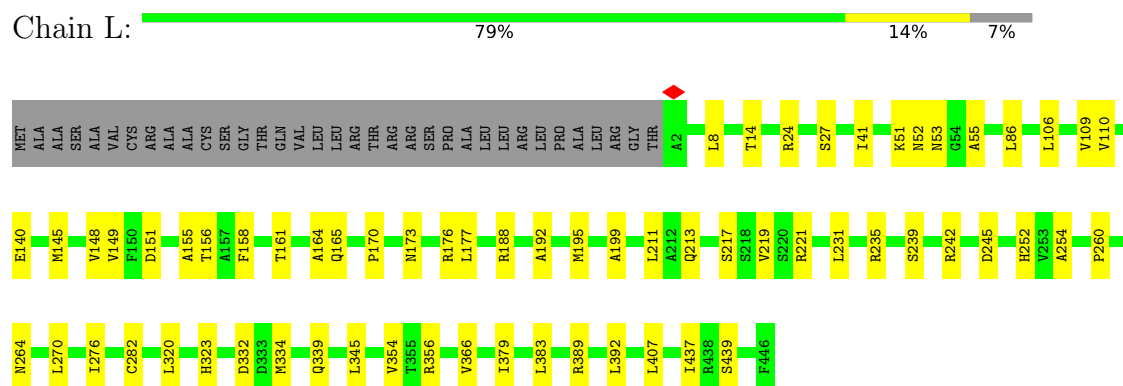
- Molecule 2: Cytochrome c oxidase subunit 8A, mitochondrial



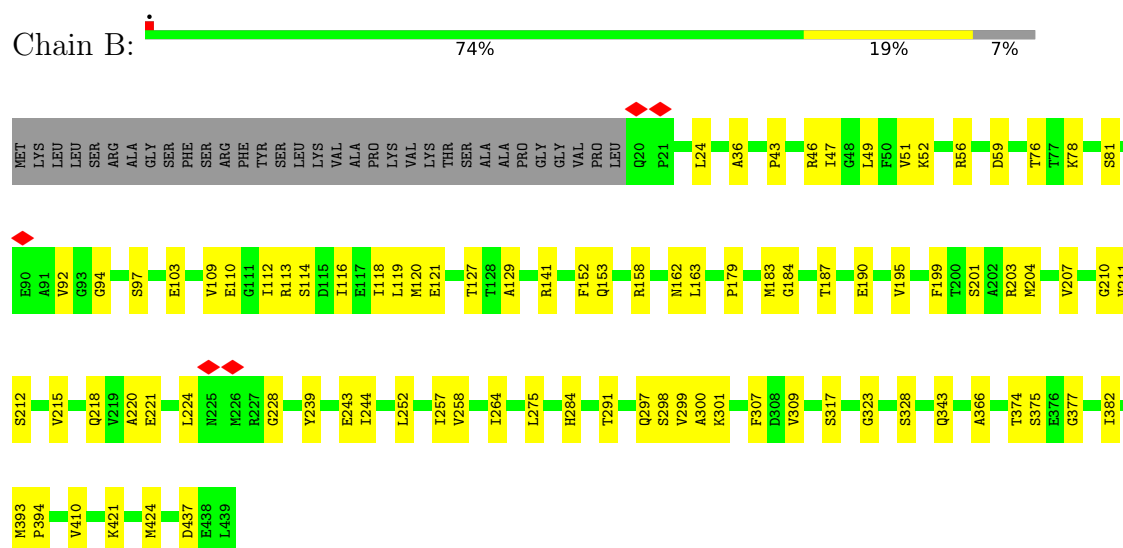
- Molecule 3: Cytochrome b-c1 complex subunit 1, mitochondrial



- Molecule 3: Cytochrome b-c1 complex subunit 1, mitochondrial

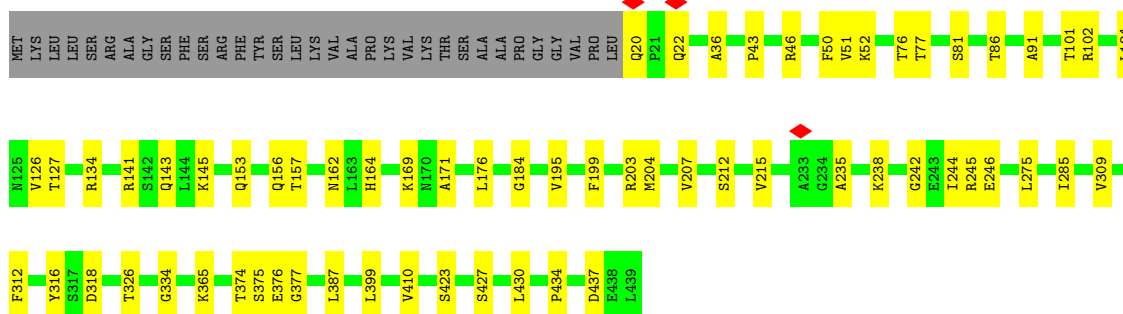


- Molecule 4: Cytochrome b-c1 complex subunit 2, mitochondrial



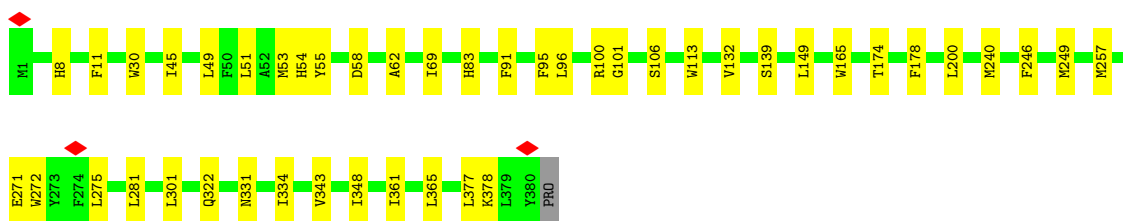
- Molecule 4: Cytochrome b-c1 complex subunit 2, mitochondrial

Chain M:  78% 14% 7%



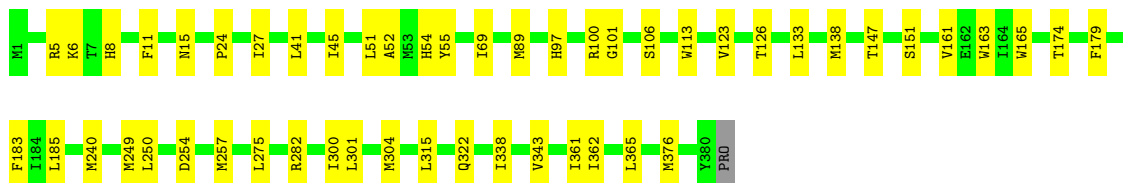
• Molecule 5: Cytochrome b

Chain C:  88% 12%



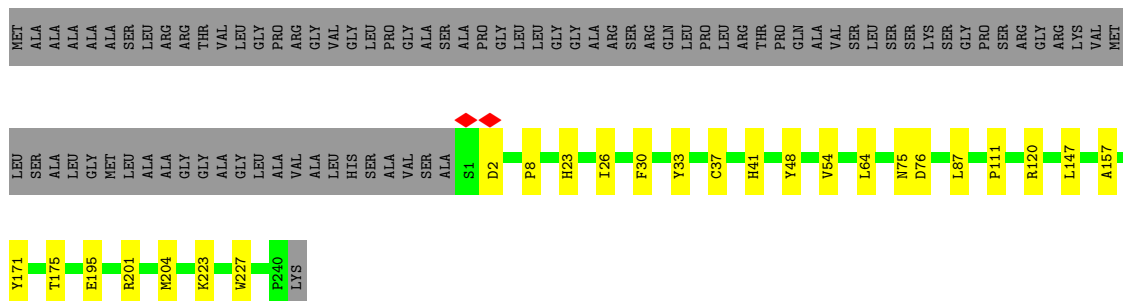
• Molecule 5: Cytochrome b

Chain N:  86% 13%



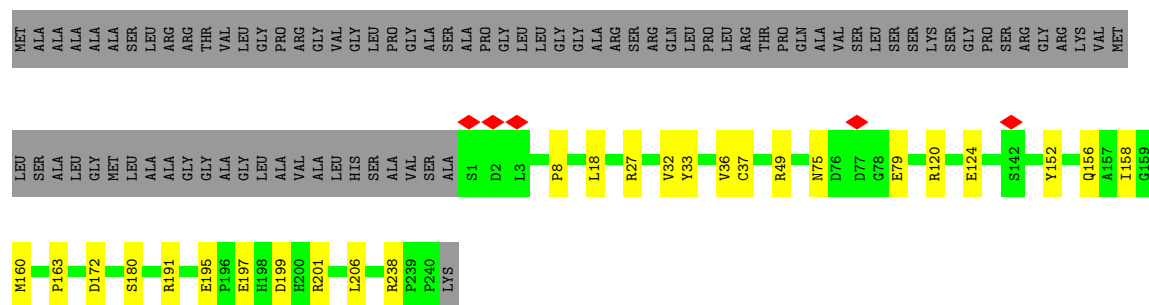
• Molecule 6: Cytochrome c1, heme protein, mitochondrial

Chain D:  66% 8% 26%

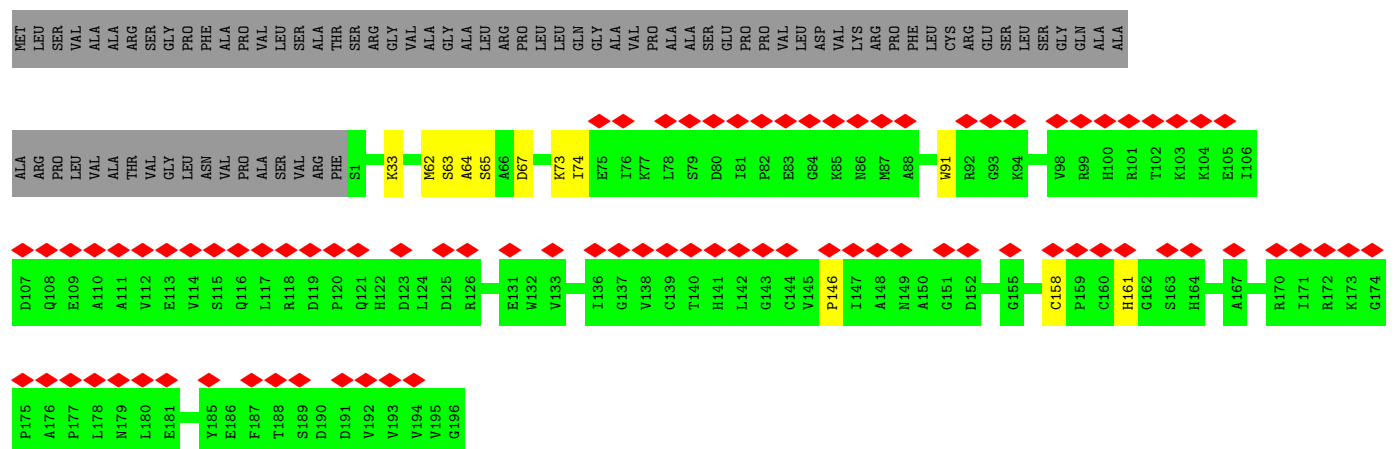


• Molecule 6: Cytochrome c1, heme protein, mitochondrial

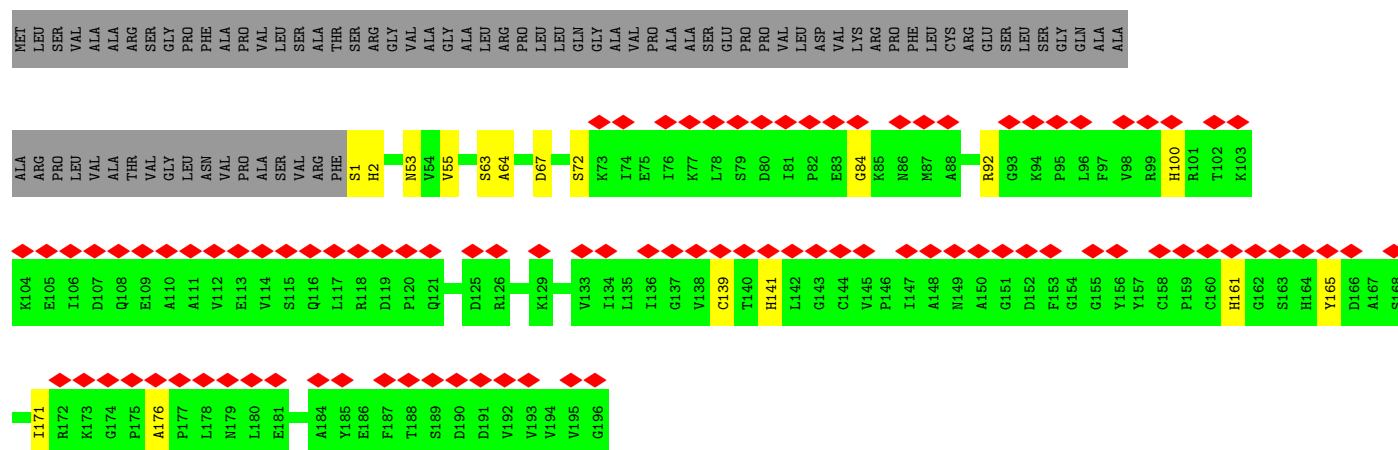
Chain O:  66% 8% 26%



- Molecule 7: Cytochrome b-c1 complex subunit Rieske, mitochondrial



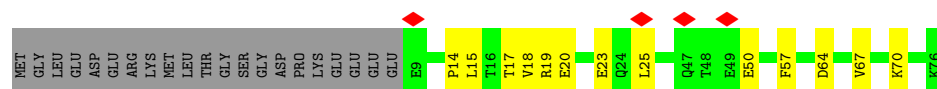
- Molecule 7: Cytochrome b-c1 complex subunit Rieske, mitochondrial



- Molecule 7: Cytochrome b-c1 complex subunit Rieske, mitochondrial



Chain S: 



- Molecule 11: Cytochrome b-c1 complex subunit 9

Chain J: 



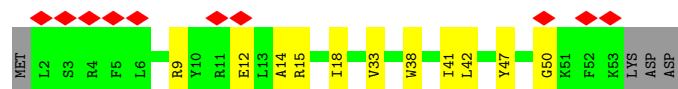
- Molecule 11: Cytochrome b-c1 complex subunit 9

Chain U: 



- Molecule 12: Cytochrome b-c1 complex subunit 10

Chain K: 



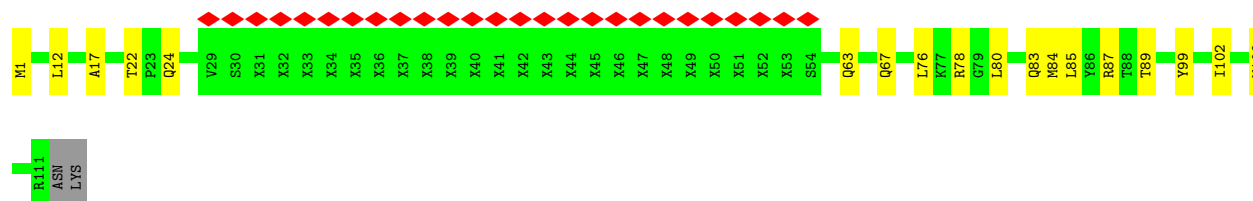
- Molecule 12: Cytochrome b-c1 complex subunit 10

Chain V: 



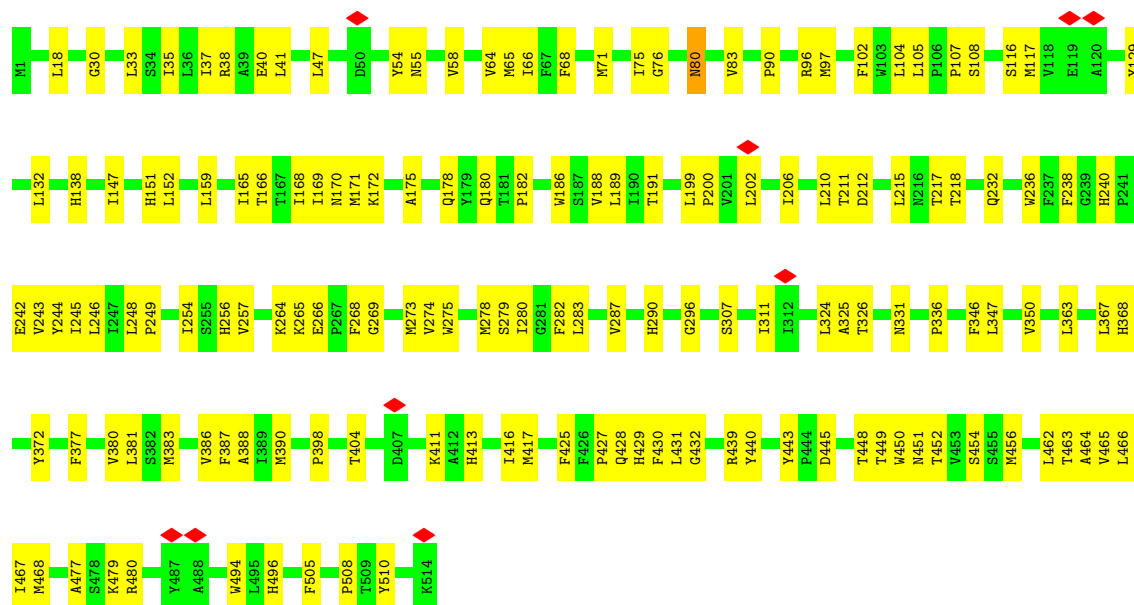
- Molecule 13: Cox7a2l protein

Chain I: 



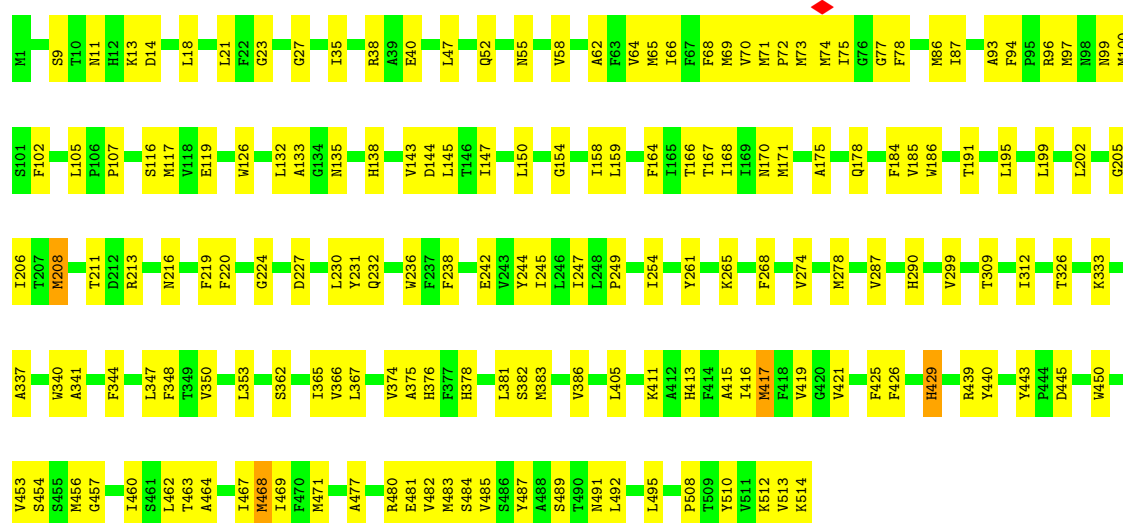
- Molecule 14: Cytochrome c oxidase subunit 1

Chain n: 



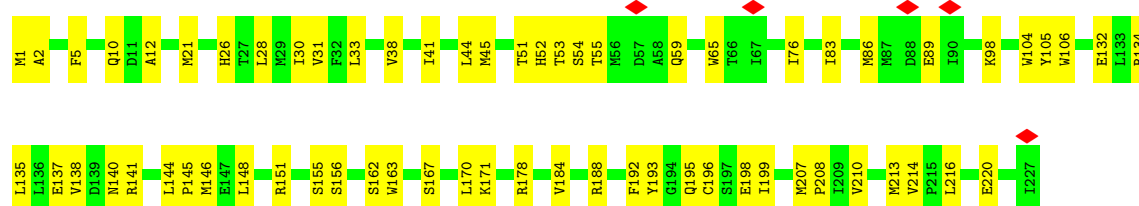
• Molecule 14: Cytochrome c oxidase subunit 1

Chain a: 67% 32%



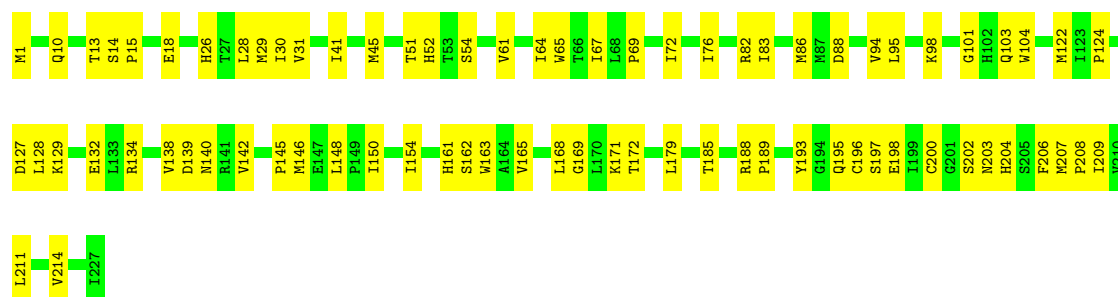
• Molecule 15: Cytochrome c oxidase subunit 2

Chain o: 71% 29%



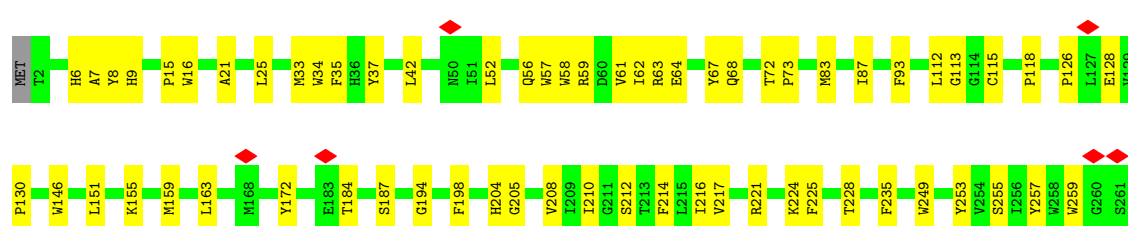
• Molecule 15: Cytochrome c oxidase subunit 2

Chain b:  67% 33%



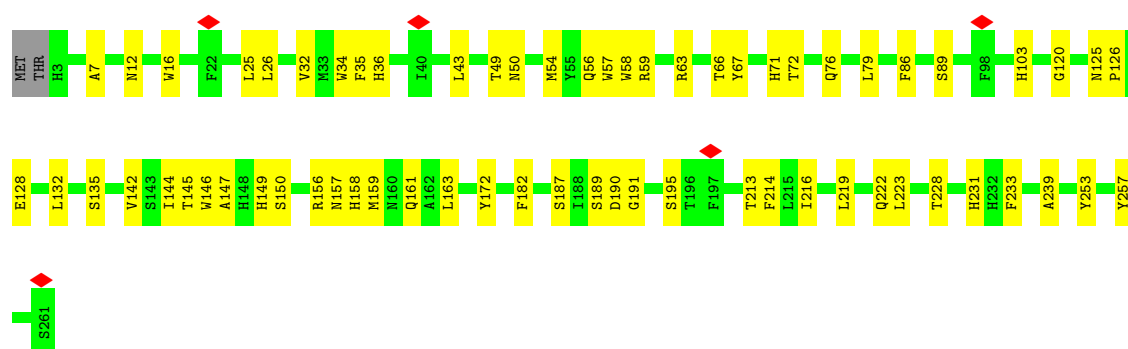
• Molecule 16: Cytochrome c oxidase subunit 3

Chain p:  75% 25%



• Molecule 16: Cytochrome c oxidase subunit 3

Chain c:  74% 25%



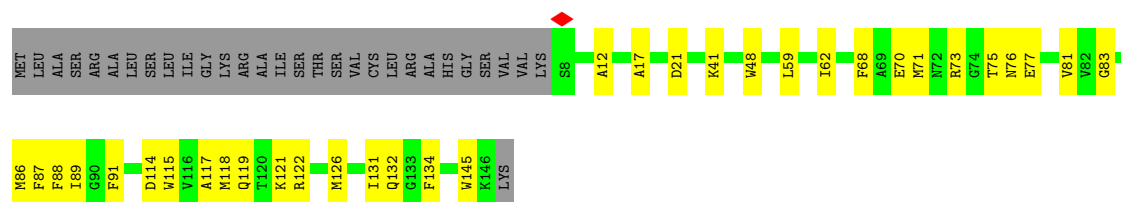
• Molecule 17: Cytochrome c oxidase subunit 4 isoform 1, mitochondrial

Chain q:  64% 18% 18%



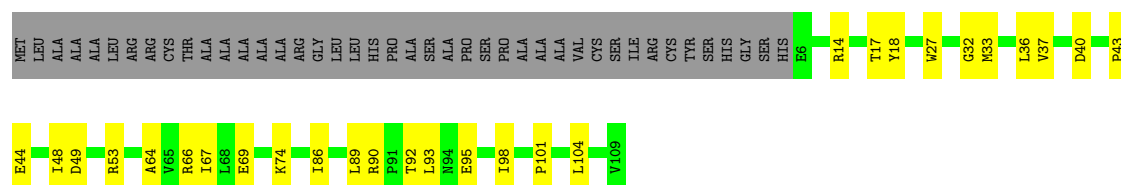
• Molecule 17: Cytochrome c oxidase subunit 4 isoform 1, mitochondrial

Chain d: 



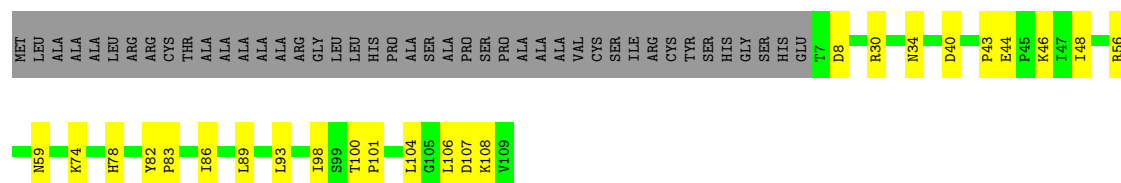
- Molecule 18: Cytochrome c oxidase subunit 5A, mitochondrial

Chain r: 



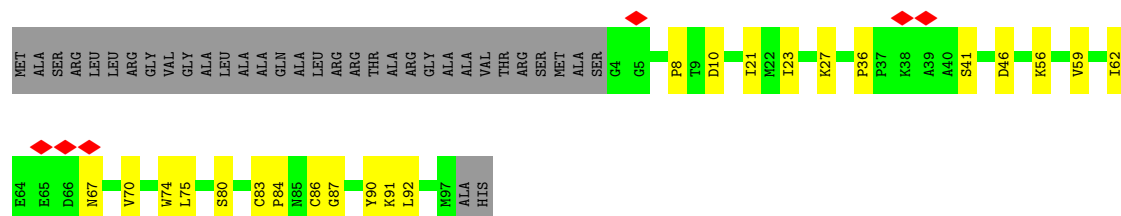
- Molecule 18: Cytochrome c oxidase subunit 5A, mitochondrial

Chain e: 



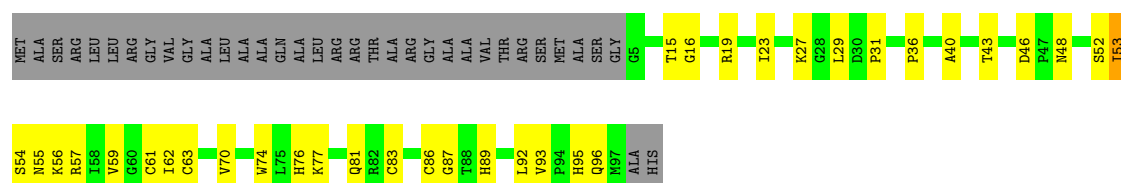
- Molecule 19: Cytochrome c oxidase subunit 5B, mitochondrial

Chain s: 



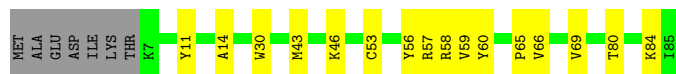
- Molecule 19: Cytochrome c oxidase subunit 5B, mitochondrial

Chain f: 



- Molecule 20: Cytochrome c oxidase subunit 6B1

Chain u: 



- Molecule 20: Cytochrome c oxidase subunit 6B1

Chain h: 



- Molecule 21: Cytochrome c oxidase subunit 6C

Chain v: 



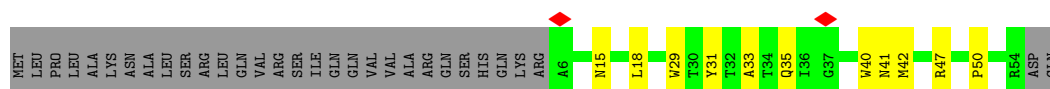
- Molecule 21: Cytochrome c oxidase subunit 6C

Chain i: 



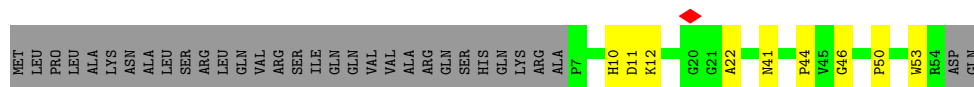
- Molecule 22: Cytochrome c oxidase subunit 7B, mitochondrial

Chain x: 



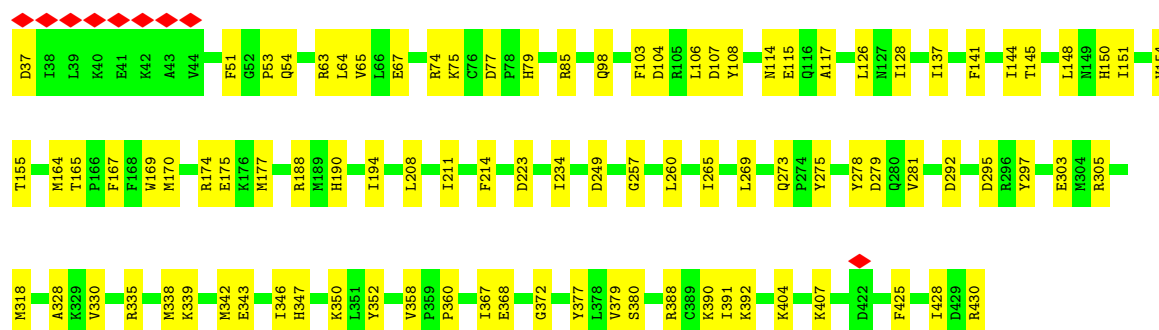
- Molecule 22: Cytochrome c oxidase subunit 7B, mitochondrial

Chain k: 



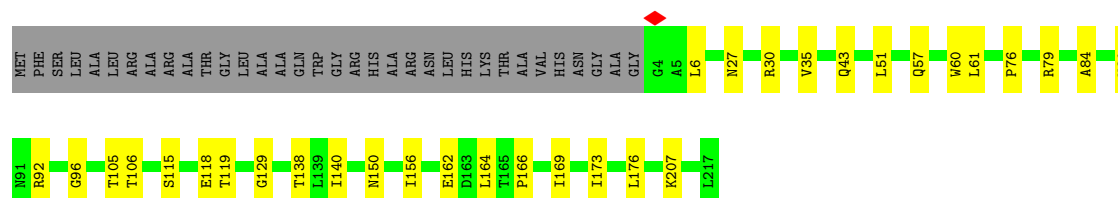
- Molecule 23: Cytochrome c oxidase subunit 7C, mitochondrial

Chain y: 



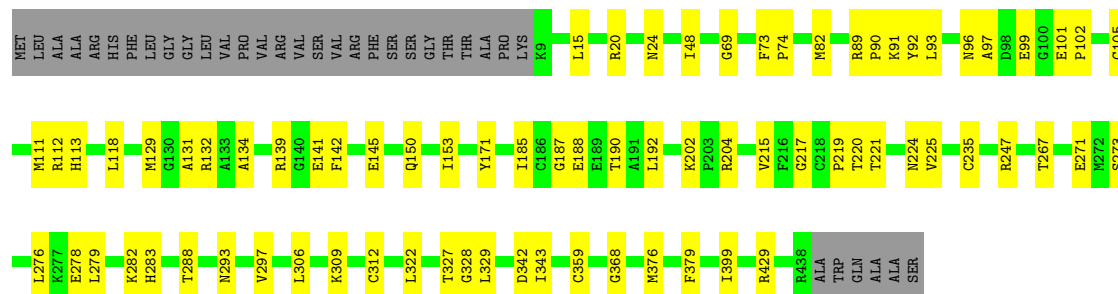
- Molecule 28: NADH dehydrogenase [ubiquinone] flavoprotein 2, mitochondrial

Chain 2: 73% 13% 14%



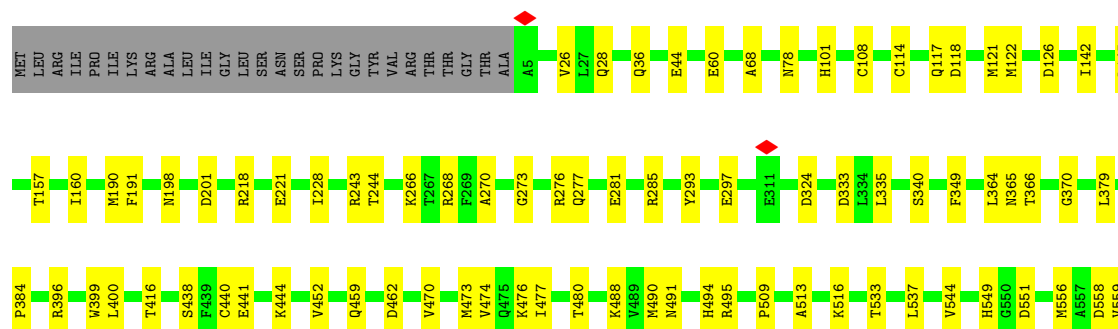
- Molecule 29: NADH dehydrogenase [ubiquinone] flavoprotein 1, mitochondrial

Chain 1: 76% 16% 7%



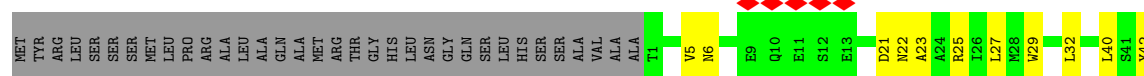
- Molecule 30: NADH-ubiquinone oxidoreductase 75 kDa subunit, mitochondrial

Chain 3: 81% 14% 5%

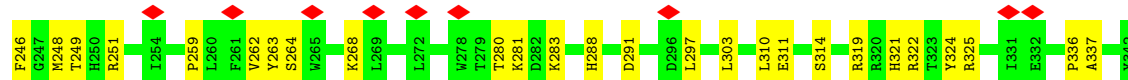
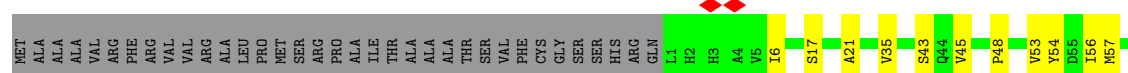




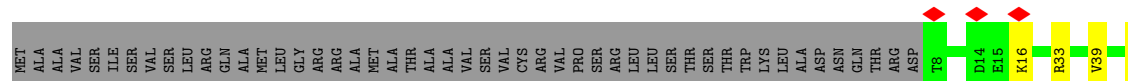
- Molecule 31: NADH dehydrogenase [ubiquinone] iron-sulfur protein 8, mitochondrial



- Molecule 32: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 9, mitochondrial



- Molecule 33: NADH dehydrogenase [ubiquinone] iron-sulfur protein 4, mitochondrial



- Molecule 34: NADH dehydrogenase [ubiquinone] iron-sulfur protein 6, mitochondrial

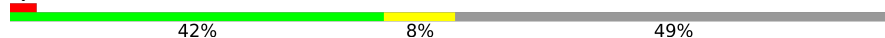


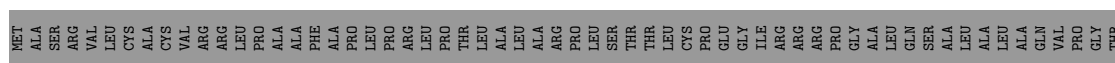
- Molecule 35: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 2

Chain S1:  68% 17% 15%

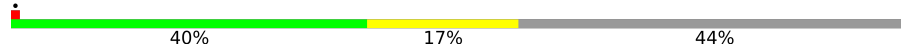


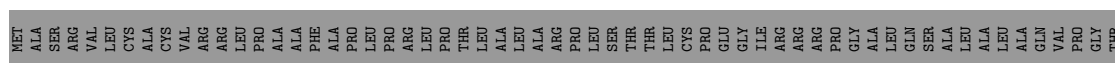
- Molecule 36: Acyl carrier protein, mitochondrial

Chain T1:  42% 8% 49%



- Molecule 36: Acyl carrier protein, mitochondrial

Chain U1:  40% 17% 44%



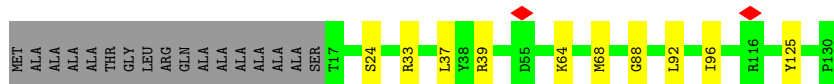
- Molecule 37: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 5

Chain V1:  91% 7% 2%



- Molecule 38: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 6

Chain W1:  79% 8% 13%

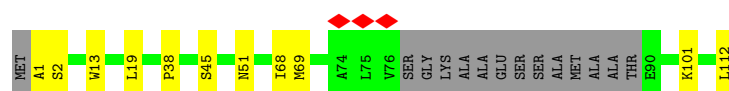
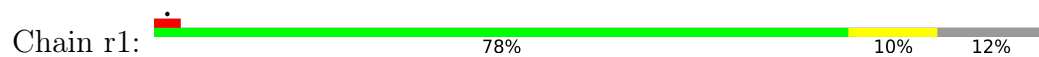


- Molecule 39: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 12

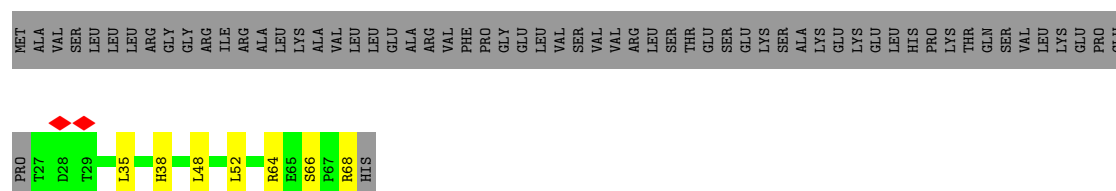
Chain q1:  92% 8% 0%



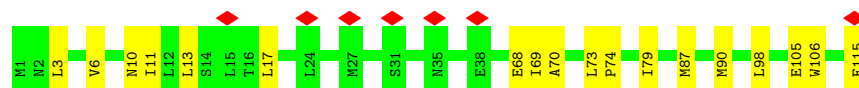
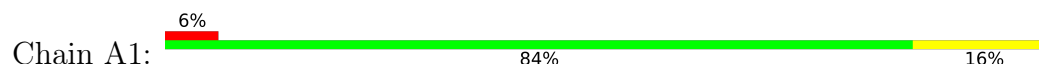
- Molecule 40: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 7



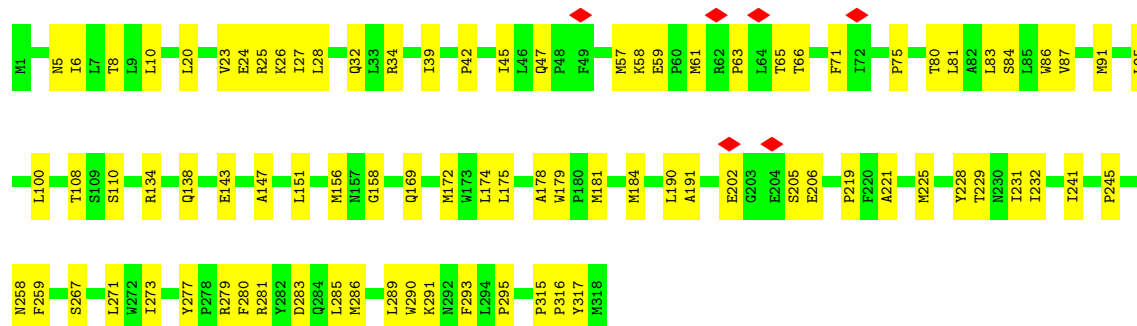
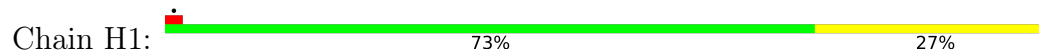
- Molecule 41: NADH dehydrogenase [ubiquinone] flavoprotein 3, mitochondrial



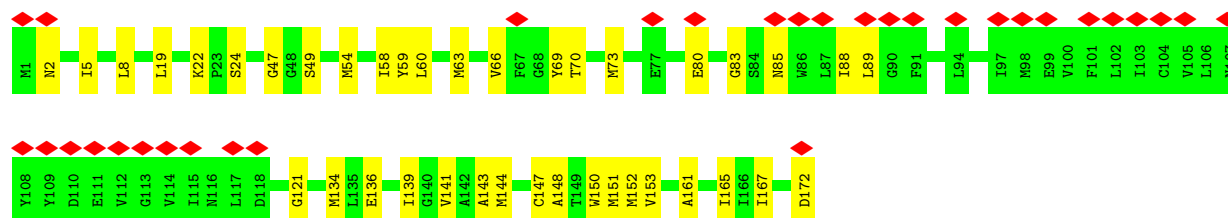
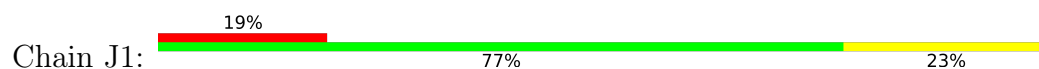
- Molecule 42: NADH-ubiquinone oxidoreductase chain 3



- Molecule 43: NADH-ubiquinone oxidoreductase chain 1



- Molecule 44: NADH-ubiquinone oxidoreductase chain 6



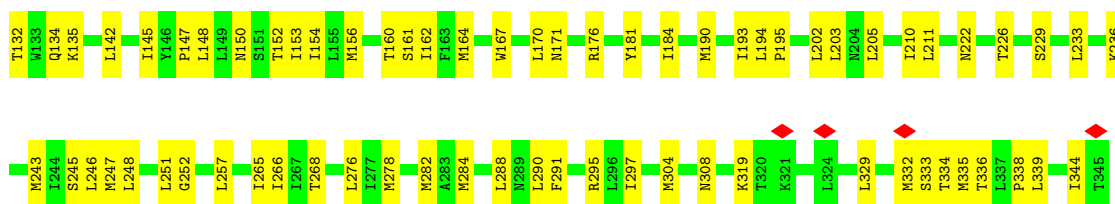
- Molecule 45: NADH-ubiquinone oxidoreductase chain 4L

M1		G18	M21	F22	R23	L26	M27	S28		L31	L38	S39	L40	T44	L49	M54	M57	P58	T59	P60		I63	A67	E70	L78	V79	K80		D88		G91	H94	L95	L96	O97		S99
----	--	-----	-----	-----	-----	-----	-----	-----	--	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	--	-----	-----	-----	-----	-----	-----	--	-----	--	-----	-----	-----	-----	-----	--	-----

T577	I454	T306	M1
T578	L457	S307	T5
N579	P473	L310	T8
I584	P474	K313	I11
L606	T431	K314	L15
GLU	F435	V315	L16
	T439	G318	F54
	I493	L324	N58
	L496	I329	I63
E503	E504	H332	H67
L504	L507	K336	T70
L507	N514	K341	S79
K515	A516	C342	F80
N517	P518	D352	K81
P518	F519	R357	F84
L525	L525	I362	T97
P530	L535	I365	I100
H534	R536	K366	L123
R536	P538	P367	F124
L542	L542	F368	L125
K547	T548	T369	I126
S549	L550	L378	T130
T551	L552	K383	L131
L552	D554	L386	T132
L553	L555	D393	S133
L555	T551	E397	A134
L557	L557	M418	N135
D554	L555	T419	M136
L555	L555	K420	M137
K560	T561	Y422	F138
T561	S565	I427	Q139
S565	M573	T431	I142
T574	T574	I441	V147
T575	T575		F152
			L153
			L154
			Y159
			G160
			R161
			F304
			K205
			A164

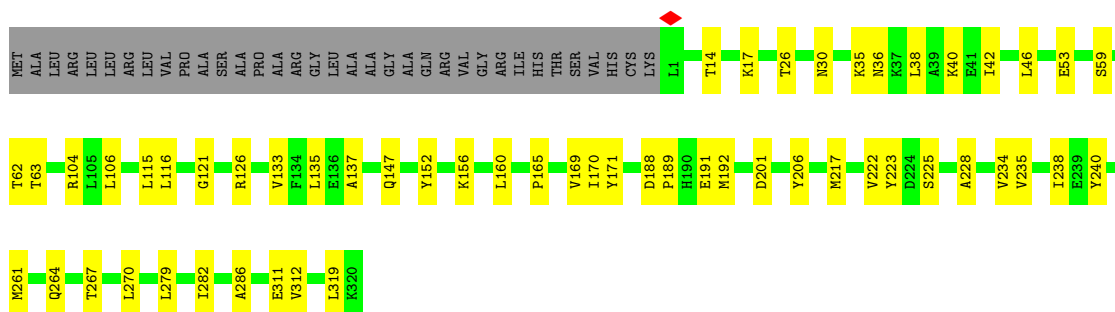
H422	M294	N138	M1
P428	A295	N139	L2
S429	L296	R142	P7
H430	T297	L150	L11
L431	A299	F151	L14
R432	S300	S157	L17
E433	M302	L164	N26
T435	T305	L165	L33
L436	M307	T173	I34
M437	S308	D187	S35
H440	F309	S191	L36
P443	M310	N192	Q44
L447	T313	W196	T45
I454	M316	L204	D46
T455	H319	M207	E47
T458	T322	P208	K50
M459	L329	L209	S53
	N333	L216	N54
	Y334	G227	S58
	E335	L230	D59
	R336	L231	L65
	I337	A232	I67
	W359	A233	P74
	P370	I234	L75
	I373	L235	M76
	N374	L236	L77
	L375	K237	N82
	L379	L238	M98
	F380	I244	L99
	I381	R245	I100
	T382	P252	I104
	M383	M257	L105
	I393	L264	I107
	M396	T272	M108
	G397	I275	T109
	I400	R278	E114
	T403	Q279	Y119
	G404	A287	L130
	M405		P135
	Y406		
	P416		

M1	I9	I13	I19	T20	M21	S22	S23	T24	M27	V31	S36	A39	P42	M43	L44	L45	M46	N49	P50	R51	S52	K58	L71	F86	M97	M100	A109	P110	F111	H112	L115	T119	G120	I121	I122	P123	M126	G127	L128	I131
----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------



- Molecule 49: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 10, mitochondrial

Chain O1: 74% 16% 10%



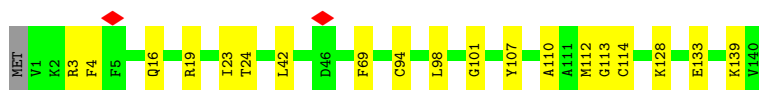
- Molecule 50: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 8

Chain X1: 83% 17%



- Molecule 51: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 11

Chain Y1: 86% 13%



- Molecule 52: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 13

Chain Z1: 79% 19%

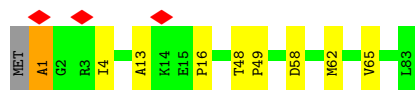
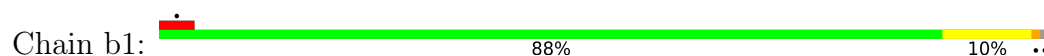


- Molecule 53: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 1

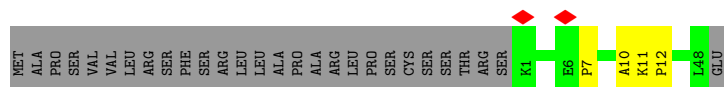
Chain a1: 84% 16%



- Molecule 54: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 3



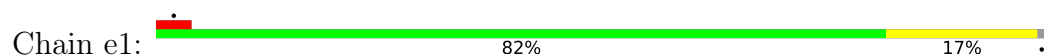
- Molecule 55: NADH dehydrogenase [ubiquinone] 1 subunit C1, mitochondrial



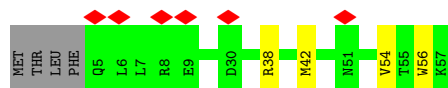
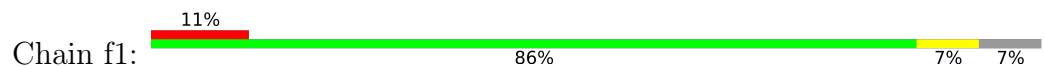
- Molecule 56: NADH dehydrogenase [ubiquinone] 1 subunit C2



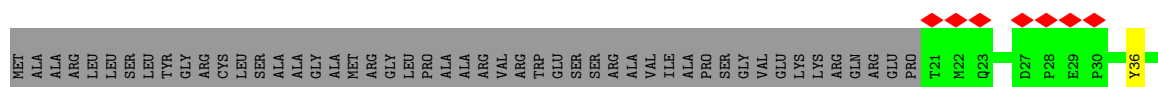
- Molecule 57: NADH dehydrogenase [ubiquinone] iron-sulfur protein 5



- Molecule 58: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 1

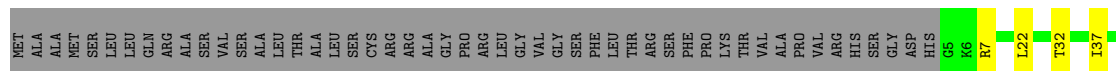


- Molecule 59: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 11, mitochondrial

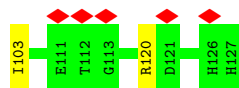
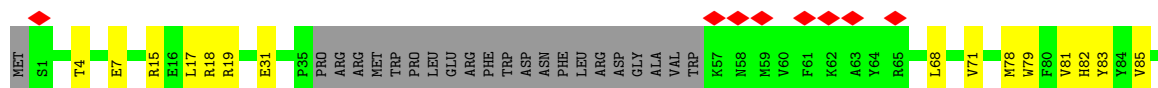




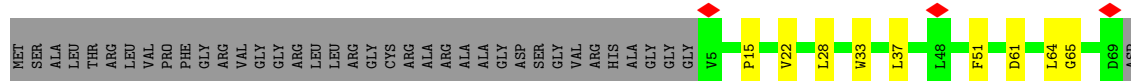
- Molecule 60: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 5, mitochondrial



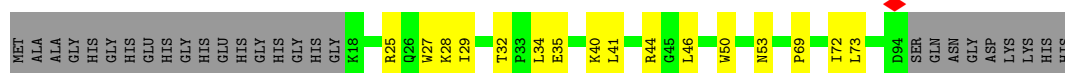
- Molecule 61: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 6



- Molecule 62: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 2, mitochondrial

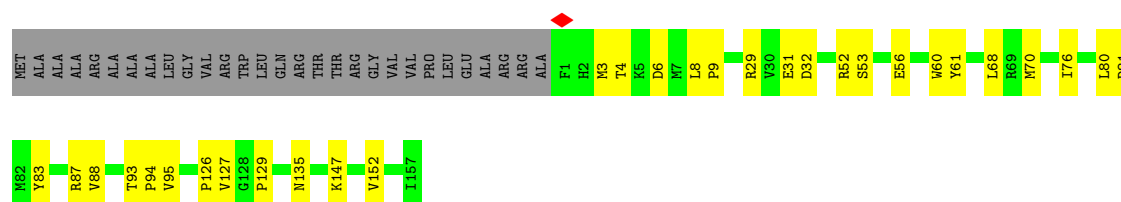


- Molecule 63: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 3

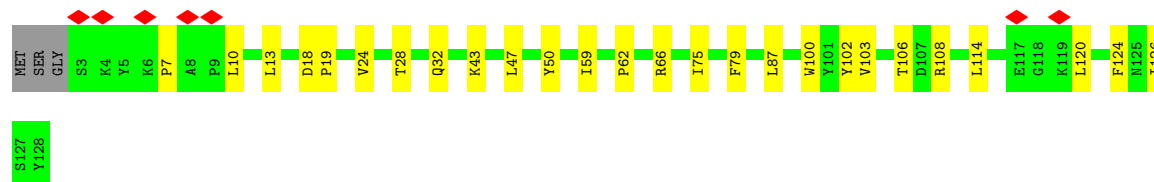
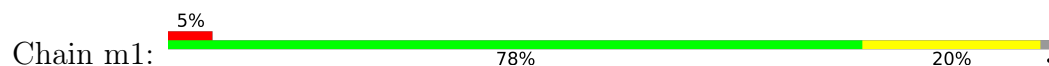


- Molecule 64: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 8, mitochondrial

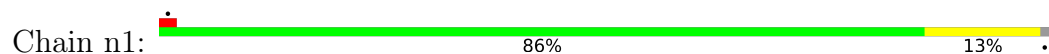




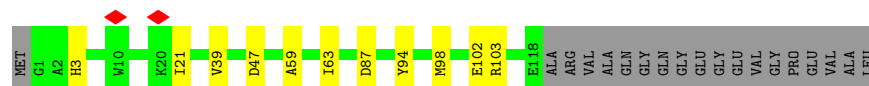
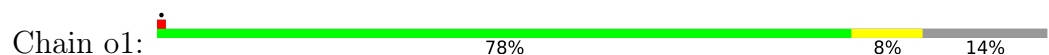
- Molecule 65: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 4



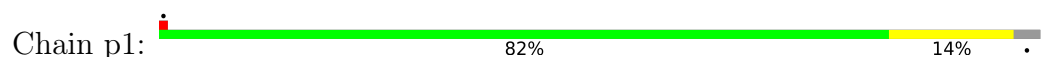
- Molecule 66: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 9



- Molecule 67: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 7



- Molecule 68: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 10



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	51488	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	80	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	81000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.144	Depositor
Minimum map value	0.000	Depositor
Average map value	0.002	Depositor
Map value standard deviation	0.007	Depositor
Recommended contour level	0.015	Depositor
Map size (Å)	299.97998, 218.35999, 262.87997	wwPDB
Map dimensions	283, 206, 248	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.06, 1.06, 1.06	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: CU, ZMP, FMN, HEA, SF4, ZN, K, CUA, NA, 2MR, NDP, AYA, TGL, DGT, HEM, FME, PC1, SAC, CDL, HEC, MG, FES, 3PE

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	g	0.83	0/646	1.20	1/882 (0.1%)
1	t	0.83	0/646	1.20	1/882 (0.1%)
2	m	0.98	0/350	1.11	0/472
2	z	0.99	0/350	1.11	0/472
3	A	0.17	0/3529	0.43	0/4793
3	L	0.17	0/3530	0.40	1/4793 (0.0%)
4	B	0.16	0/3205	0.36	0/4332
4	M	0.15	0/3205	0.35	0/4332
5	C	0.21	0/3147	0.48	0/4297
5	N	0.21	0/3147	0.47	0/4297
6	D	0.17	0/1968	0.42	0/2674
6	O	0.17	0/1968	0.39	0/2674
7	E	0.14	0/1176	0.36	0/1609
7	P	0.16	0/1173	0.37	0/1605
7	T	0.15	0/565	0.44	0/772
8	F	0.18	0/885	0.46	0/1184
8	Q	0.17	0/922	0.40	0/1234
9	G	0.22	0/673	0.51	0/909
9	R	0.22	0/673	0.50	0/909
10	H	0.25	0/552	0.70	1/739 (0.1%)
10	S	0.25	0/570	0.61	0/763
11	J	0.19	0/509	0.45	0/687
11	U	0.21	0/509	0.49	0/687
12	K	0.19	0/446	0.49	0/609
12	V	0.20	0/454	0.52	0/619
13	I	0.21	0/709	0.60	0/955
14	a	0.27	0/4162	0.66	4/5686 (0.1%)
14	n	0.26	0/4162	0.56	0/5686
15	b	0.25	0/1863	0.67	0/2542
15	o	0.23	0/1863	0.56	1/2542 (0.0%)
16	c	0.21	0/2195	0.54	0/3000

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
16	p	0.22	0/2202	0.54	0/3010
17	d	0.19	0/1190	0.59	0/1609
17	q	0.23	0/1190	0.57	0/1609
18	e	0.25	0/851	0.64	0/1155
18	r	0.21	0/860	0.55	0/1167
19	f	0.22	0/734	0.61	1/996 (0.1%)
19	s	0.20	0/738	0.52	0/1001
20	h	0.26	0/674	0.81	0/910
20	u	0.23	0/674	0.63	0/910
21	i	0.28	0/584	0.86	3/778 (0.4%)
21	v	0.25	0/579	0.64	0/771
22	k	0.18	0/391	0.43	0/533
22	x	0.22	0/396	0.55	0/541
23	l	0.22	0/393	0.57	0/527
23	y	0.25	0/399	0.55	0/535
24	w	0.17	0/444	0.45	0/598
25	6	0.24	0/1289	0.57	0/1744
26	C1	0.16	0/1780	0.37	0/2424
27	D1	0.22	0/3540	0.45	0/4795
28	2	0.18	0/1700	0.42	0/2316
29	1	0.19	0/3396	0.46	0/4586
30	3	0.18	0/5392	0.40	0/7305
31	9	0.22	0/1461	0.41	0/1974
32	P1	0.18	0/2823	0.45	0/3828
33	Q1	0.16	0/1045	0.34	0/1411
34	7	0.16	0/773	0.35	0/1041
35	S1	0.20	0/682	0.51	0/920
36	T1	0.19	0/646	0.51	0/869
36	U1	0.21	0/718	0.51	0/970
37	V1	0.16	0/945	0.31	0/1281
38	W1	0.19	0/993	0.42	0/1335
39	q1	0.17	0/1251	0.38	0/1702
40	r1	0.17	0/806	0.34	0/1090
41	s1	0.15	0/360	0.50	0/489
42	A1	0.25	0/948	0.53	0/1295
43	H1	0.28	0/2607	0.59	0/3564
44	J1	0.22	0/1330	0.52	0/1810
45	K1	0.25	0/738	0.51	0/1002
46	L1	0.23	0/4913	0.51	0/6686
47	M1	0.24	0/3709	0.52	0/5052
48	N1	0.23	0/2755	0.53	0/3751
49	O1	0.16	0/2674	0.39	0/3626
50	X1	0.17	0/1434	0.44	0/1937

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
51	Y1	0.17	0/1061	0.43	0/1439
52	Z1	0.17	0/1198	0.37	0/1616
53	a1	0.22	0/585	0.45	0/788
54	b1	0.15	0/666	0.39	0/914
55	c1	0.14	0/409	0.37	0/555
56	d1	0.17	0/1028	0.42	0/1387
57	e1	0.18	0/900	0.41	0/1199
58	f1	0.17	0/468	0.45	0/630
59	g1	0.15	0/878	0.41	0/1196
60	h1	0.18	0/1201	0.45	0/1626
61	i1	0.15	0/917	0.35	0/1243
62	j1	0.19	0/587	0.49	0/804
63	k1	0.19	0/646	0.47	0/873
64	l1	0.16	0/1379	0.43	0/1882
65	m1	0.22	0/1079	0.52	0/1463
66	n1	0.18	0/1596	0.38	0/2162
67	o1	0.18	0/1039	0.44	0/1394
68	p1	0.16	0/1471	0.36	0/1988
All	All	0.23	0/129867	0.50	13/176249 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
2	m	0	2
2	z	0	1
All	All	0	3

There are no bond length outliers.

The worst 5 of 13 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
14	a	468	MET	CG-SD-CE	6.78	115.81	100.90
21	i	64	GLU	CA-C-N	-6.31	112.56	122.65
21	i	64	GLU	C-N-CA	-6.31	112.56	122.65
14	a	417	MET	CB-CG-SD	-6.22	94.05	112.70
19	f	53	ILE	N-CA-C	-5.62	108.37	113.71

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	m	43	ARG	Sidechain
2	m	7	ARG	Sidechain
2	z	7	ARG	Sidechain

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	g	620	0	597	121	0
1	t	620	0	597	27	0
2	m	343	0	356	26	0
2	z	343	0	356	42	0
3	A	3459	0	3367	47	0
3	L	3460	0	3367	43	0
4	B	3154	0	3158	54	0
4	M	3154	0	3158	41	0
5	C	3046	0	3112	41	0
5	N	3046	0	3112	40	0
6	D	1909	0	1854	16	0
6	O	1909	0	1854	18	0
7	E	1167	0	842	14	0
7	P	1164	0	833	13	0
7	T	554	0	590	12	0
8	F	865	0	854	11	0
8	Q	900	0	887	6	0
9	G	654	0	656	12	0
9	R	654	0	656	7	0
10	H	545	0	531	2	0
10	S	563	0	541	14	0
11	J	495	0	489	8	0
11	U	495	0	489	7	0
12	K	430	0	431	9	0
12	V	438	0	443	11	0
13	I	807	0	736	21	0
14	a	4021	0	3997	149	0
14	n	4021	0	3997	131	0
15	b	1817	0	1822	58	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
15	o	1817	0	1822	50	0
16	c	2111	0	2047	104	0
16	p	2118	0	2054	61	0
17	d	1156	0	1112	27	0
17	q	1156	0	1112	23	0
18	e	833	0	832	19	0
18	r	842	0	838	19	0
19	f	717	0	695	24	0
19	s	721	0	698	19	0
20	h	654	0	622	27	0
20	u	654	0	622	11	0
21	i	572	0	596	15	0
21	v	567	0	591	13	0
22	k	378	0	363	11	0
22	x	383	0	367	9	0
23	l	380	0	378	10	0
23	y	386	0	386	14	0
24	w	435	0	446	11	0
25	6	1258	0	1268	28	0
26	C1	1730	0	1686	22	0
27	D1	3464	0	3416	69	0
28	2	1660	0	1653	18	0
29	1	3321	0	3278	55	0
30	3	5305	0	5330	70	0
31	9	1431	0	1383	31	0
32	P1	2748	0	2768	43	0
33	Q1	1022	0	1023	13	0
34	7	758	0	731	7	0
35	S1	671	0	688	11	0
36	T1	637	0	640	10	0
36	U1	706	0	699	20	0
37	V1	923	0	965	5	0
38	W1	970	0	991	6	0
39	q1	1209	0	1170	9	0
40	r1	796	0	831	9	0
41	s1	351	0	331	5	0
42	A1	932	0	967	19	0
43	H1	2540	0	2626	69	0
44	J1	1308	0	1319	36	0
45	K1	737	0	768	24	0
46	L1	4800	0	4985	105	0
47	M1	3632	0	3853	87	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
48	N1	2703	0	2902	77	0
49	O1	2607	0	2566	35	0
50	X1	1396	0	1385	22	0
51	Y1	1037	0	1025	13	0
52	Z1	1167	0	1166	24	0
53	a1	572	0	583	7	0
54	b1	651	0	653	8	0
55	c1	398	0	401	2	0
56	d1	996	0	1001	13	0
57	e1	877	0	871	15	0
58	f1	456	0	452	3	0
59	g1	850	0	783	20	0
60	h1	1166	0	1166	14	0
61	i1	897	0	902	15	0
62	j1	562	0	515	8	0
63	k1	626	0	620	11	0
64	l1	1323	0	1216	23	0
65	m1	1050	0	1061	21	0
66	n1	1541	0	1473	20	0
67	o1	1014	0	1002	10	0
68	p1	1438	0	1404	26	0
69	6	32	0	38	1	0
69	A	23	0	20	2	0
69	C	66	0	80	3	0
69	E	66	0	80	2	0
69	G	51	0	82	1	0
69	H1	51	0	82	2	0
69	K1	41	0	59	0	0
69	L	23	0	20	1	0
69	L1	102	0	164	6	0
69	M1	102	0	164	6	0
69	N	37	0	48	1	0
69	N1	38	0	50	1	0
69	O	33	0	40	1	0
69	R	30	0	34	2	0
69	Y1	70	0	88	2	0
69	a	55	0	58	3	0
69	b	29	0	32	1	0
69	b1	43	0	60	1	0
69	c	45	0	67	5	0
69	d	34	0	42	2	0
69	d1	63	0	74	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
69	g	25	0	24	11	0
69	i	28	0	30	0	0
69	il	42	0	61	1	0
69	m1	36	0	46	0	0
69	n	89	0	100	3	0
69	o	29	0	32	2	0
69	p	45	0	67	6	0
69	r1	46	0	66	1	0
69	t	25	0	24	11	0
69	v	28	0	30	1	0
69	z	26	0	26	2	0
70	6	43	0	63	2	0
70	9	101	0	159	4	0
70	I	50	0	77	0	0
70	J	35	0	44	0	0
70	K	28	0	30	1	0
70	L	24	0	22	0	0
70	M1	54	0	88	4	0
70	P1	31	0	36	1	0
70	V	28	0	30	0	0
70	g	50	0	77	3	0
70	p	35	0	44	1	0
70	z	28	0	30	20	0
71	A	46	0	36	0	0
71	D	56	0	56	1	0
71	G	42	0	28	1	0
71	H1	51	0	52	1	0
71	L	46	0	36	1	0
71	L1	124	0	136	5	0
71	N1	90	0	133	5	0
71	O	57	0	58	0	0
71	R	170	0	175	5	0
71	V	46	0	36	2	0
71	Y1	94	0	141	2	0
71	d1	67	0	81	1	0
71	g	38	0	22	7	0
71	h1	70	0	87	4	0
71	r1	57	0	58	3	0
72	C	86	0	60	6	0
72	N	86	0	60	4	0
73	D	43	0	29	1	0
73	O	43	0	30	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
74	2	4	0	0	0	0
74	3	4	0	0	0	0
74	E	4	0	0	0	0
74	P	4	0	0	2	0
75	a	1	0	0	0	0
75	n	1	0	0	0	0
76	a	1	0	0	0	0
76	n	1	0	0	0	0
77	a	120	0	108	8	0
77	n	120	0	108	9	0
78	O1	1	0	0	0	0
78	a	1	0	0	0	0
78	o	1	0	0	0	0
79	b	2	0	0	0	0
79	o	2	0	0	0	0
80	7	1	0	0	0	0
80	f	1	0	0	0	0
80	s	1	0	0	0	0
81	l	37	0	49	1	0
81	y	37	0	49	1	0
82	1	8	0	0	0	0
82	3	16	0	0	0	0
82	6	8	0	0	0	0
82	9	16	0	0	1	0
83	1	31	0	19	2	0
84	3	1	0	0	0	0
85	P1	48	0	26	1	0
86	W1	34	0	40	0	0
86	n1	32	0	36	2	0
87	O1	31	0	12	1	0
All	All	130610	0	130128	2135	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 8.

The worst 5 of 2135 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
14:n:240:HIS:NE2	14:n:244:TYR:CE2	1.69	1.60
1:g:50:PRO:CG	20:h:75:ARG:CZ	1.80	1.59
1:g:50:PRO:HG2	20:h:75:ARG:NH1	1.13	1.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:C:91:PHE:HB3	5:C:272:TRP:CH2	1.54	1.41
1:g:11:ARG:HH21	71:g:301:CDL:CA6	1.28	1.41

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all 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	g	74/111 (67%)	69 (93%)	5 (7%)	0	100	100
1	t	74/111 (67%)	69 (93%)	5 (7%)	0	100	100
2	m	42/69 (61%)	41 (98%)	1 (2%)	0	100	100
2	z	42/69 (61%)	40 (95%)	2 (5%)	0	100	100
3	A	443/480 (92%)	426 (96%)	17 (4%)	0	100	100
3	L	443/480 (92%)	429 (97%)	14 (3%)	0	100	100
4	B	418/453 (92%)	409 (98%)	9 (2%)	0	100	100
4	M	418/453 (92%)	403 (96%)	15 (4%)	0	100	100
5	C	378/381 (99%)	366 (97%)	12 (3%)	0	100	100
5	N	378/381 (99%)	366 (97%)	12 (3%)	0	100	100
6	D	238/325 (73%)	233 (98%)	5 (2%)	0	100	100
6	O	238/325 (73%)	231 (97%)	7 (3%)	0	100	100
7	E	194/274 (71%)	186 (96%)	8 (4%)	0	100	100
7	P	194/274 (71%)	186 (96%)	8 (4%)	0	100	100
7	T	76/274 (28%)	72 (95%)	4 (5%)	0	100	100
8	F	96/111 (86%)	96 (100%)	0	0	100	100
8	Q	100/111 (90%)	100 (100%)	0	0	100	100
9	G	75/82 (92%)	73 (97%)	2 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
9	R	75/82 (92%)	73 (97%)	2 (3%)	0	100	100
10	H	64/89 (72%)	64 (100%)	0	0	100	100
10	S	66/89 (74%)	63 (96%)	3 (4%)	0	100	100
11	J	58/64 (91%)	57 (98%)	1 (2%)	0	100	100
11	U	58/64 (91%)	56 (97%)	2 (3%)	0	100	100
12	K	50/56 (89%)	49 (98%)	1 (2%)	0	100	100
12	V	51/56 (91%)	50 (98%)	1 (2%)	0	100	100
13	I	86/113 (76%)	82 (95%)	4 (5%)	0	100	100
14	a	512/514 (100%)	491 (96%)	20 (4%)	1 (0%)	43	72
14	n	512/514 (100%)	489 (96%)	23 (4%)	0	100	100
15	b	225/227 (99%)	212 (94%)	13 (6%)	0	100	100
15	o	225/227 (99%)	211 (94%)	14 (6%)	0	100	100
16	c	257/261 (98%)	249 (97%)	8 (3%)	0	100	100
16	p	258/261 (99%)	251 (97%)	7 (3%)	0	100	100
17	d	137/169 (81%)	128 (93%)	9 (7%)	0	100	100
17	q	137/169 (81%)	127 (93%)	10 (7%)	0	100	100
18	e	101/146 (69%)	100 (99%)	1 (1%)	0	100	100
18	r	102/146 (70%)	99 (97%)	3 (3%)	0	100	100
19	f	91/128 (71%)	84 (92%)	7 (8%)	0	100	100
19	s	92/128 (72%)	86 (94%)	6 (6%)	0	100	100
20	h	77/86 (90%)	73 (95%)	3 (4%)	1 (1%)	9	39
20	u	77/86 (90%)	74 (96%)	3 (4%)	0	100	100
21	i	70/76 (92%)	66 (94%)	4 (6%)	0	100	100
21	v	69/76 (91%)	63 (91%)	6 (9%)	0	100	100
22	k	46/80 (58%)	44 (96%)	2 (4%)	0	100	100
22	x	47/80 (59%)	45 (96%)	2 (4%)	0	100	100
23	l	44/63 (70%)	41 (93%)	3 (7%)	0	100	100
23	y	45/63 (71%)	45 (100%)	0	0	100	100
24	w	55/83 (66%)	55 (100%)	0	0	100	100
25	6	155/224 (69%)	148 (96%)	7 (4%)	0	100	100
26	C1	206/263 (78%)	200 (97%)	6 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
27	D1	427/463 (92%)	412 (96%)	15 (4%)	0	100	100
28	2	212/248 (86%)	201 (95%)	11 (5%)	0	100	100
29	1	428/464 (92%)	409 (96%)	19 (4%)	0	100	100
30	3	688/727 (95%)	666 (97%)	22 (3%)	0	100	100
31	9	176/212 (83%)	172 (98%)	4 (2%)	0	100	100
32	P1	340/377 (90%)	326 (96%)	14 (4%)	0	100	100
33	Q1	124/175 (71%)	120 (97%)	4 (3%)	0	100	100
34	7	94/116 (81%)	92 (98%)	2 (2%)	0	100	100
35	S1	82/99 (83%)	75 (92%)	7 (8%)	0	100	100
36	T1	77/156 (49%)	76 (99%)	1 (1%)	0	100	100
36	U1	86/156 (55%)	85 (99%)	1 (1%)	0	100	100
37	V1	111/116 (96%)	108 (97%)	3 (3%)	0	100	100
38	W1	112/131 (86%)	107 (96%)	5 (4%)	0	100	100
39	q1	143/145 (99%)	139 (97%)	4 (3%)	0	100	100
40	r1	95/113 (84%)	92 (97%)	3 (3%)	0	100	100
41	s1	40/104 (38%)	38 (95%)	2 (5%)	0	100	100
42	A1	113/115 (98%)	110 (97%)	3 (3%)	0	100	100
43	H1	316/318 (99%)	296 (94%)	20 (6%)	0	100	100
44	J1	170/172 (99%)	158 (93%)	12 (7%)	0	100	100
45	K1	96/98 (98%)	93 (97%)	3 (3%)	0	100	100
46	L1	604/607 (100%)	567 (94%)	37 (6%)	0	100	100
47	M1	457/459 (100%)	439 (96%)	18 (4%)	0	100	100
48	N1	343/345 (99%)	332 (97%)	11 (3%)	0	100	100
49	O1	318/355 (90%)	300 (94%)	18 (6%)	0	100	100
50	X1	169/172 (98%)	163 (96%)	6 (4%)	0	100	100
51	Y1	138/141 (98%)	136 (99%)	2 (1%)	0	100	100
52	Z1	139/144 (96%)	137 (99%)	2 (1%)	0	100	100
53	a1	68/70 (97%)	67 (98%)	1 (2%)	0	100	100
54	b1	81/84 (96%)	77 (95%)	4 (5%)	0	100	100
55	c1	46/76 (60%)	45 (98%)	1 (2%)	0	100	100
56	d1	118/120 (98%)	116 (98%)	2 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
57	e1	103/106 (97%)	100 (97%)	3 (3%)	0	100	100
58	f1	51/57 (90%)	50 (98%)	1 (2%)	0	100	100
59	g1	99/151 (66%)	95 (96%)	4 (4%)	0	100	100
60	h1	137/189 (72%)	132 (96%)	5 (4%)	0	100	100
61	i1	102/128 (80%)	96 (94%)	6 (6%)	0	100	100
62	j1	63/105 (60%)	61 (97%)	2 (3%)	0	100	100
63	k1	75/104 (72%)	73 (97%)	2 (3%)	0	100	100
64	l1	155/186 (83%)	152 (98%)	3 (2%)	0	100	100
65	m1	124/129 (96%)	120 (97%)	4 (3%)	0	100	100
66	n1	176/179 (98%)	171 (97%)	5 (3%)	0	100	100
67	o1	116/137 (85%)	109 (94%)	7 (6%)	0	100	100
68	p1	168/176 (96%)	166 (99%)	2 (1%)	0	100	100
All	All	15749/18172 (87%)	15149 (96%)	598 (4%)	2 (0%)	100	100

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
20	h	8	ILE
14	a	376	HIS

5.3.2 Protein sidechains ⓘ

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	g	66/92 (72%)	66 (100%)	0	100	100
1	t	66/92 (72%)	66 (100%)	0	100	100
2	m	39/61 (64%)	39 (100%)	0	100	100
2	z	39/61 (64%)	39 (100%)	0	100	100
3	A	372/398 (94%)	372 (100%)	0	100	100
3	L	372/398 (94%)	372 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	B	330/356 (93%)	330 (100%)	0	100	100
4	M	330/356 (93%)	330 (100%)	0	100	100
5	C	332/333 (100%)	331 (100%)	1 (0%)	86	83
5	N	332/333 (100%)	332 (100%)	0	100	100
6	D	205/260 (79%)	205 (100%)	0	100	100
6	O	205/260 (79%)	205 (100%)	0	100	100
7	E	69/224 (31%)	69 (100%)	0	100	100
7	P	68/224 (30%)	67 (98%)	1 (2%)	57	70
7	T	58/224 (26%)	58 (100%)	0	100	100
8	F	90/99 (91%)	90 (100%)	0	100	100
8	Q	94/99 (95%)	94 (100%)	0	100	100
9	G	70/74 (95%)	70 (100%)	0	100	100
9	R	70/74 (95%)	70 (100%)	0	100	100
10	H	63/83 (76%)	63 (100%)	0	100	100
10	S	65/83 (78%)	65 (100%)	0	100	100
11	J	51/55 (93%)	51 (100%)	0	100	100
11	U	51/55 (93%)	51 (100%)	0	100	100
12	K	42/46 (91%)	42 (100%)	0	100	100
12	V	43/46 (94%)	43 (100%)	0	100	100
13	I	73/75 (97%)	73 (100%)	0	100	100
14	a	425/425 (100%)	425 (100%)	0	100	100
14	n	425/425 (100%)	424 (100%)	1 (0%)	87	85
15	b	210/210 (100%)	210 (100%)	0	100	100
15	o	210/210 (100%)	210 (100%)	0	100	100
16	c	225/227 (99%)	225 (100%)	0	100	100
16	p	226/227 (100%)	226 (100%)	0	100	100
17	d	122/146 (84%)	122 (100%)	0	100	100
17	q	122/146 (84%)	122 (100%)	0	100	100
18	e	90/118 (76%)	90 (100%)	0	100	100
18	r	91/118 (77%)	91 (100%)	0	100	100
19	f	80/101 (79%)	80 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
19	s	80/101 (79%)	80 (100%)	0	100	100
20	h	70/76 (92%)	70 (100%)	0	100	100
20	u	70/76 (92%)	70 (100%)	0	100	100
21	i	54/57 (95%)	54 (100%)	0	100	100
21	v	54/57 (95%)	54 (100%)	0	100	100
22	k	39/67 (58%)	39 (100%)	0	100	100
22	x	39/67 (58%)	39 (100%)	0	100	100
23	l	39/55 (71%)	39 (100%)	0	100	100
23	y	40/55 (73%)	40 (100%)	0	100	100
24	w	43/67 (64%)	43 (100%)	0	100	100
25	6	133/185 (72%)	133 (100%)	0	100	100
26	C1	190/227 (84%)	190 (100%)	0	100	100
27	D1	370/394 (94%)	370 (100%)	0	100	100
28	2	184/206 (89%)	184 (100%)	0	100	100
29	1	345/370 (93%)	345 (100%)	0	100	100
30	3	580/610 (95%)	580 (100%)	0	100	100
31	9	152/178 (85%)	152 (100%)	0	100	100
32	P1	299/325 (92%)	299 (100%)	0	100	100
33	Q1	113/153 (74%)	113 (100%)	0	100	100
34	7	81/96 (84%)	80 (99%)	1 (1%)	63	73
35	S1	74/80 (92%)	74 (100%)	0	100	100
36	T1	73/135 (54%)	73 (100%)	0	100	100
36	U1	81/135 (60%)	81 (100%)	0	100	100
37	V1	101/102 (99%)	101 (100%)	0	100	100
38	W1	108/114 (95%)	108 (100%)	0	100	100
39	q1	131/131 (100%)	131 (100%)	0	100	100
40	r1	88/96 (92%)	88 (100%)	0	100	100
41	s1	41/95 (43%)	41 (100%)	0	100	100
42	A1	103/103 (100%)	103 (100%)	0	100	100
43	H1	279/279 (100%)	279 (100%)	0	100	100
44	J1	137/137 (100%)	137 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
45	K1	87/87 (100%)	87 (100%)	0	100	100
46	L1	548/549 (100%)	548 (100%)	0	100	100
47	M1	414/414 (100%)	414 (100%)	0	100	100
48	N1	307/307 (100%)	307 (100%)	0	100	100
49	O1	284/309 (92%)	284 (100%)	0	100	100
50	X1	153/154 (99%)	153 (100%)	0	100	100
51	Y1	105/106 (99%)	105 (100%)	0	100	100
52	Z1	122/123 (99%)	122 (100%)	0	100	100
53	a1	60/60 (100%)	60 (100%)	0	100	100
54	b1	72/73 (99%)	72 (100%)	0	100	100
55	c1	42/67 (63%)	42 (100%)	0	100	100
56	d1	107/107 (100%)	107 (100%)	0	100	100
57	e1	93/94 (99%)	93 (100%)	0	100	100
58	f1	49/53 (92%)	49 (100%)	0	100	100
59	g1	92/129 (71%)	92 (100%)	0	100	100
60	h1	123/162 (76%)	123 (100%)	0	100	100
61	i1	99/119 (83%)	99 (100%)	0	100	100
62	j1	61/87 (70%)	61 (100%)	0	100	100
63	k1	60/78 (77%)	60 (100%)	0	100	100
64	l1	142/161 (88%)	142 (100%)	0	100	100
65	m1	112/114 (98%)	112 (100%)	0	100	100
66	n1	163/164 (99%)	163 (100%)	0	100	100
67	o1	109/121 (90%)	109 (100%)	0	100	100
68	p1	155/158 (98%)	155 (100%)	0	100	100
All	All	13571/15439 (88%)	13567 (100%)	4 (0%)	100	100

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

Mol	Chain	Res	Type
5	C	271	GLU
7	P	53	ASN
14	n	80	ASN
34	7	36	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 130 such sidechains are listed below:

Mol	Chain	Res	Type
15	b	161	HIS
16	c	160	ASN
27	D1	50	ASN
26	C1	124	HIS
16	c	222	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

11 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
42	FME	A1	1	42	8,9,10	0.98	0	8,9,11	0.82	0
48	FME	N1	1	48	8,9,10	0.99	0	8,9,11	1.05	1 (12%)
40	AYA	r1	1	40	6,7,8	1.27	1 (16%)	6,8,10	1.14	1 (16%)
27	2MR	D1	85	27	10,12,13	2.66	2 (20%)	5,13,15	2.84	2 (40%)
43	FME	H1	1	43	8,9,10	1.00	0	8,9,11	0.88	0
54	AYA	b1	1	54	6,7,8	1.25	1 (16%)	6,8,10	1.17	1 (16%)
47	FME	M1	1	47	8,9,10	1.00	0	8,9,11	0.78	0
45	FME	K1	1	45	8,9,10	0.96	0	8,9,11	1.54	2 (25%)
61	SAC	i1	1	61	7,8,9	1.03	0	7,9,11	0.94	0
44	FME	J1	1	44	8,9,10	0.99	0	8,9,11	0.85	0
46	FME	L1	1	46	8,9,10	0.96	0	8,9,11	0.91	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
42	FME	A1	1	42	-	1/7/9/11	-
48	FME	N1	1	48	-	2/7/9/11	-
40	AYA	r1	1	40	-	0/5/6/8	-
27	2MR	D1	85	27	-	4/10/13/15	-
43	FME	H1	1	43	-	3/7/9/11	-
54	AYA	b1	1	54	-	0/5/6/8	-
47	FME	M1	1	47	-	2/7/9/11	-
45	FME	K1	1	45	-	3/7/9/11	-
61	SAC	i1	1	61	-	2/7/8/10	-
44	FME	J1	1	44	-	4/7/9/11	-
46	FME	L1	1	46	-	4/7/9/11	-

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
27	D1	85	2MR	CZ-NE	5.93	1.46	1.34
27	D1	85	2MR	CZ-NH2	5.41	1.44	1.33
40	r1	1	AYA	CA-N	-2.42	1.43	1.46
54	b1	1	AYA	CA-N	-2.23	1.44	1.46

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
27	D1	85	2MR	CD-NE-CZ	4.87	132.50	123.36
27	D1	85	2MR	NE-CZ-NH2	-3.72	116.07	119.48
45	K1	1	FME	C-CA-N	3.40	116.06	109.50
40	r1	1	AYA	CB-CA-N	2.60	112.61	109.68
54	b1	1	AYA	CB-CA-N	2.48	112.47	109.68

There are no chirality outliers.

5 of 25 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
27	D1	85	2MR	O-C-CA-CB
43	H1	1	FME	N-CA-CB-CG
44	J1	1	FME	C-CA-CB-CG
44	J1	1	FME	O-C-CA-CB
45	K1	1	FME	O1-CN-N-CA

There are no ring outliers.

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
48	N1	1	FME	1	0
54	b1	1	AYA	2	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 112 ligands modelled in this entry, 11 are monoatomic - leaving 101 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
79	CUA	o	303	15	0,1,1	-	-	-		
69	3PE	c	301	-	44,44,50	0.31	0	47,49,55	0.33	0
72	HEM	N	401	5	50,50,50	1.38	5 (10%)	67,82,82	1.32	5 (7%)
69	3PE	C	404	-	30,30,50	0.38	0	33,35,55	0.35	0
70	PC1	I	201	-	49,49,53	0.32	0	55,57,61	0.54	1 (1%)
69	3PE	R	104	-	29,29,50	0.38	0	32,34,55	0.35	0
69	3PE	m1	601	-	35,35,50	0.35	0	38,40,55	0.31	0
69	3PE	t	101	-	24,24,50	0.44	0	27,29,55	0.61	1 (3%)
73	HEC	D	301	6	46,50,50	1.82	7 (15%)	58,82,82	1.95	6 (10%)
70	PC1	L	503	-	23,23,53	0.44	0	29,31,61	0.63	0
69	3PE	C	403	-	34,34,50	0.36	0	37,39,55	0.33	0
70	PC1	M1	501	-	53,53,53	0.29	0	59,61,61	0.37	0
69	3PE	L	501	-	22,22,50	0.43	0	25,27,55	0.39	0
82	SF4	3	801	30	0,12,12	-	-	-		
71	CDL	g	301	-	34,37,99	0.37	0	37,47,111	0.54	1 (2%)
70	PC1	P1	502	-	30,30,53	0.40	0	36,38,61	0.60	0
69	3PE	Y1	403	-	41,41,50	0.33	0	44,46,55	0.32	0
71	CDL	A	502	-	45,45,99	0.43	0	51,57,111	0.36	0
69	3PE	M1	502	-	50,50,50	0.30	0	53,55,55	0.30	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
69	3PE	M1	503	-	50,50,50	0.30	0	53,55,55	0.27	0
69	3PE	N	403	-	36,36,50	0.35	0	39,41,55	0.32	0
74	FES	3	803	30	0,4,4	-	-	-		
69	3PE	r1	201	-	45,45,50	0.32	0	48,50,55	0.30	0
72	HEM	C	402	5	50,50,50	1.36	8 (16%)	67,82,82	1.14	3 (4%)
69	3PE	Y1	402	-	27,27,50	0.39	0	30,32,55	0.37	0
82	SF4	3	802	30	0,12,12	-	-	-		
79	CUA	b	302	15	0,1,1	-	-	-		
70	PC1	p	302	-	34,34,53	0.36	0	40,42,61	0.34	0
71	CDL	d1	201	-	66,66,99	0.36	0	72,78,111	0.31	0
81	TGL	y	601	-	36,36,62	0.23	0	39,39,65	0.18	0
72	HEM	C	401	5	50,50,50	1.33	5 (10%)	67,82,82	1.24	4 (5%)
69	3PE	6	202	-	31,31,50	0.37	0	34,36,55	0.34	0
82	SF4	1	502	29	0,12,12	-	-	-		
70	PC1	g	302	-	49,49,53	0.30	0	55,57,61	0.30	0
82	SF4	6	201	25	0,12,12	-	-	-		
72	HEM	N	402	5	50,50,50	1.40	7 (14%)	67,82,82	1.26	6 (8%)
77	HEA	a	604	14	67,67,67	1.35	6 (8%)	81,103,103	2.25	29 (35%)
69	3PE	b	301	-	28,28,50	0.39	0	31,33,55	0.37	0
74	FES	E	201	7	0,4,4	-	-	-		
69	3PE	N1	402	-	37,37,50	0.35	0	40,42,55	0.34	0
74	FES	2	301	28	0,4,4	-	-	-		
71	CDL	L	502	-	45,45,99	0.44	0	51,57,111	0.52	1 (1%)
70	PC1	J	101	-	34,34,53	0.35	0	40,42,61	0.36	0
71	CDL	V	101	-	45,45,99	0.34	0	51,57,111	0.46	0
71	CDL	N1	401	-	89,89,99	0.31	0	95,101,111	0.39	1 (1%)
71	CDL	R	103	-	71,71,99	0.35	0	77,83,111	0.43	1 (1%)
71	CDL	L1	703	-	45,45,99	0.42	0	51,57,111	0.35	0
71	CDL	O	301	-	56,56,99	0.38	0	62,68,111	0.33	0
71	CDL	R	102	-	56,56,99	0.39	0	62,68,111	0.48	1 (1%)
70	PC1	z	101	-	27,27,53	0.40	0	33,35,61	0.37	0
69	3PE	o	302	-	28,28,50	0.39	0	31,33,55	0.38	0
69	3PE	H1	401	-	50,50,50	0.31	0	53,55,55	0.48	1 (1%)
69	3PE	a	605	-	27,27,50	0.40	0	30,32,55	0.47	0
69	3PE	z	102	-	25,25,50	0.41	0	28,30,55	0.39	0
69	3PE	v	101	-	27,27,50	0.40	0	30,32,55	0.34	0
69	3PE	i1	201	-	41,41,50	0.32	0	44,46,55	0.31	0
69	3PE	O	302	-	32,32,50	0.37	0	35,37,55	0.34	0
71	CDL	G	101	-	41,41,99	0.44	0	47,53,111	0.36	0
69	3PE	a	606	-	26,26,50	0.40	0	29,31,55	0.37	0
69	3PE	d	201	-	33,33,50	0.37	0	36,38,55	0.55	1 (2%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
69	3PE	p	301	-	44,44,50	0.32	0	47,49,55	0.30	0
82	SF4	9	201	31	0,12,12	-	-	-		
86	ZMP	n1	201	-	26,31,36	0.72	1 (3%)	30,38,45	0.94	1 (3%)
69	3PE	G	102	-	50,50,50	0.30	0	53,55,55	0.28	0
69	3PE	n	606	-	27,27,50	0.40	0	30,32,55	0.42	0
69	3PE	d1	202	-	30,30,50	0.37	0	33,35,55	0.34	0
85	NDP	P1	501	-	51,52,52	0.33	0	71,80,80	0.42	0
69	3PE	E	202	-	31,31,50	0.37	0	34,36,55	0.33	0
71	CDL	L1	702	-	77,77,99	0.33	0	83,89,111	0.29	0
69	3PE	i	101	-	27,27,50	0.39	0	30,32,55	0.34	0
70	PC1	6	203	-	42,42,53	0.34	0	48,50,61	0.49	0
69	3PE	K1	201	-	40,40,50	0.33	0	43,45,55	0.30	0
69	3PE	L1	704	-	50,50,50	0.31	0	53,55,55	0.29	0
69	3PE	A	501	-	22,22,50	0.45	0	25,27,55	0.68	0
69	3PE	E	203	-	33,33,50	0.36	0	36,38,55	0.33	0
87	DGT	O1	401	78	32,33,33	0.29	0	48,52,52	0.30	0
70	PC1	K	101	-	27,27,53	0.39	0	33,35,61	0.48	0
71	CDL	Y1	401	-	93,93,99	0.30	0	99,105,111	0.28	0
74	FES	P	201	7	0,4,4	-	-	-		
81	TGL	l	601	-	36,36,62	0.23	0	39,39,65	0.16	0
71	CDL	r1	202	-	56,56,99	0.39	0	62,68,111	0.48	1 (1%)
69	3PE	L1	701	-	50,50,50	0.31	0	53,55,55	0.47	0
69	3PE	g	303	-	24,24,50	0.43	0	27,29,55	0.65	1 (3%)
77	HEA	n	604	14	67,67,67	1.37	6 (8%)	81,103,103	2.36	30 (37%)
71	CDL	D	302	-	55,55,99	0.39	0	61,67,111	0.33	0
71	CDL	h1	201	-	69,69,99	0.36	0	75,81,111	0.43	0
71	CDL	R	101	-	40,40,99	0.45	0	46,52,111	0.54	0
70	PC1	9	203	-	53,53,53	0.30	0	59,61,61	0.46	0
77	HEA	n	603	14	67,67,67	1.35	7 (10%)	81,103,103	2.31	25 (30%)
71	CDL	H1	402	-	50,50,99	0.42	0	55,61,111	0.36	0
69	3PE	n	607	-	26,26,50	0.40	0	29,31,55	0.36	0
69	3PE	n	605	-	33,33,50	0.38	0	36,38,55	0.57	1 (2%)
70	PC1	V	102	-	27,27,53	0.40	0	33,35,61	0.37	0
86	ZMP	W1	201	-	28,33,36	0.67	1 (3%)	32,40,45	0.93	1 (3%)
77	HEA	a	603	14	67,67,67	1.41	6 (8%)	81,103,103	2.31	28 (34%)
69	3PE	b1	101	-	42,42,50	0.33	0	45,47,55	0.36	0
73	HEC	O	303	6	46,50,50	1.84	5 (10%)	58,82,82	1.93	4 (6%)
69	3PE	d1	203	-	31,31,50	0.37	0	34,36,55	0.37	0
83	FMN	1	501	-	33,33,33	0.27	0	48,50,50	0.36	0
82	SF4	9	202	31	0,12,12	-	-	-		
70	PC1	9	204	-	46,46,53	0.32	0	52,54,61	0.31	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
69	3PE	c	301	-	-	10/48/48/54	-
72	HEM	N	401	5	-	2/14/54/54	-
69	3PE	C	404	-	-	4/34/34/54	-
70	PC1	I	201	-	-	9/53/53/57	-
69	3PE	R	104	-	-	5/33/33/54	-
69	3PE	m1	601	-	-	12/39/39/54	-
69	3PE	t	101	-	-	6/28/28/54	-
73	HEC	D	301	6	-	6/14/54/54	-
70	PC1	L	503	-	-	9/27/27/57	-
69	3PE	C	403	-	-	9/38/38/54	-
70	PC1	M1	501	-	-	8/57/57/57	-
69	3PE	L	501	-	-	6/26/26/54	-
82	SF4	3	801	30	-	-	0/6/5/5
71	CDL	g	301	-	-	8/41/45/110	-
70	PC1	P1	502	-	-	15/34/34/57	-
69	3PE	Y1	403	-	-	5/45/45/54	-
71	CDL	A	502	-	-	12/56/56/110	-
69	3PE	M1	502	-	-	17/54/54/54	-
69	3PE	M1	503	-	-	13/54/54/54	-
69	3PE	N	403	-	-	7/40/40/54	-
74	FES	3	803	30	-	-	0/1/1/1
69	3PE	r1	201	-	-	9/49/49/54	-
72	HEM	C	402	5	-	1/14/54/54	-
69	3PE	Y1	402	-	-	4/31/31/54	-
82	SF4	3	802	30	-	-	0/6/5/5
70	PC1	p	302	-	-	10/38/38/57	-
71	CDL	d1	201	-	-	15/77/77/110	-
81	TGL	y	601	-	-	3/39/39/65	-
72	HEM	C	401	5	-	1/14/54/54	-
69	3PE	6	202	-	-	4/35/35/54	-
82	SF4	1	502	29	-	-	0/6/5/5
70	PC1	g	302	-	-	6/53/53/57	-
82	SF4	6	201	25	-	-	0/6/5/5

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
72	HEM	N	402	5	-	4/14/54/54	-
77	HEA	a	604	14	-	14/36/76/76	-
69	3PE	b	301	-	-	8/32/32/54	-
74	FES	E	201	7	-	-	0/1/1/1
69	3PE	N1	402	-	-	5/41/41/54	-
74	FES	2	301	28	-	-	0/1/1/1
71	CDL	L	502	-	-	7/56/56/110	-
70	PC1	J	101	-	-	7/38/38/57	-
71	CDL	V	101	-	-	15/55/55/110	-
71	CDL	N1	401	-	-	20/100/100/110	-
71	CDL	R	103	-	-	19/82/82/110	-
71	CDL	L1	703	-	-	14/56/56/110	-
71	CDL	O	301	-	-	14/67/67/110	-
71	CDL	R	102	-	-	16/67/67/110	-
70	PC1	z	101	-	-	4/31/31/57	-
69	3PE	o	302	-	-	10/32/32/54	-
69	3PE	H1	401	-	-	9/54/54/54	-
69	3PE	a	605	-	-	3/31/31/54	-
69	3PE	z	102	-	-	1/29/29/54	-
69	3PE	v	101	-	-	7/31/31/54	-
69	3PE	il	201	-	-	6/45/45/54	-
69	3PE	O	302	-	-	9/36/36/54	-
71	CDL	G	101	-	-	13/52/52/110	-
69	3PE	a	606	-	-	8/30/30/54	-
69	3PE	d	201	-	-	5/37/37/54	-
69	3PE	p	301	-	-	12/48/48/54	-
82	SF4	9	201	31	-	-	0/6/5/5
86	ZMP	n1	201	-	-	19/36/38/43	-
69	3PE	G	102	-	-	8/54/54/54	-
69	3PE	n	606	-	-	8/31/31/54	-
69	3PE	d1	202	-	-	8/34/34/54	-
85	NDP	P1	501	-	-	4/34/77/77	0/5/5/5
69	3PE	E	202	-	-	8/35/35/54	-
71	CDL	L1	702	-	-	15/88/88/110	-
69	3PE	i	101	-	-	8/31/31/54	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
70	PC1	6	203	-	-	12/46/46/57	-
69	3PE	K1	201	-	-	11/44/44/54	-
69	3PE	L1	704	-	-	7/54/54/54	-
69	3PE	A	501	-	-	9/26/26/54	-
69	3PE	E	203	-	-	9/37/37/54	-
87	DGT	O1	401	78	-	2/22/34/34	0/3/3/3
70	PC1	K	101	-	-	5/31/31/57	-
71	CDL	Y1	401	-	-	11/104/104/110	-
81	TGL	l	601	-	-	0/39/39/65	-
74	FES	P	201	7	-	-	0/1/1/1
71	CDL	r1	202	-	-	12/67/67/110	-
69	3PE	L1	701	-	-	8/54/54/54	-
69	3PE	g	303	-	-	9/28/28/54	-
77	HEA	n	604	14	-	9/36/76/76	-
71	CDL	D	302	-	-	19/66/66/110	-
71	CDL	h1	201	-	-	21/80/80/110	-
71	CDL	R	101	-	-	13/51/51/110	-
70	PC1	9	203	-	-	10/57/57/57	-
77	HEA	n	603	14	-	12/36/76/76	-
71	CDL	H1	402	-	-	10/59/59/110	-
69	3PE	n	607	-	-	7/30/30/54	-
69	3PE	n	605	-	-	9/37/37/54	-
70	PC1	V	102	-	-	4/31/31/57	-
86	ZMP	W1	201	-	-	6/38/40/43	-
77	HEA	a	603	14	-	15/36/76/76	-
69	3PE	b1	101	-	-	10/46/46/54	-
73	HEC	O	303	6	-	8/14/54/54	-
69	3PE	d1	203	-	-	6/35/35/54	-
83	FMN	1	501	-	-	5/18/18/18	0/3/3/3
82	SF4	9	202	31	-	-	0/6/5/5
70	PC1	9	204	-	-	10/50/50/57	-

The worst 5 of 64 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
73	O	303	HEC	CAC-C3C	6.27	1.55	1.35

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
73	D	301	HEC	CAC-C3C	6.17	1.55	1.35
73	O	303	HEC	CAB-C3B	6.04	1.54	1.35
73	D	301	HEC	CAB-C3B	5.84	1.54	1.35
73	D	301	HEC	C3D-C2D	5.72	1.53	1.38

The worst 5 of 154 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
73	D	301	HEC	CBC-CAC-C3C	-8.99	109.47	127.43
73	O	303	HEC	CBB-CAB-C3B	-8.60	110.24	127.43
73	O	303	HEC	CBC-CAC-C3C	-8.49	110.47	127.43
73	D	301	HEC	CBB-CAB-C3B	-8.16	111.11	127.43
77	a	603	HEA	C3A-C2A-C1A	-7.03	100.39	107.05

There are no chirality outliers.

5 of 793 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
69	t	101	3PE	C11-O13-P-O11
69	t	101	3PE	C11-O13-P-O12
69	t	101	3PE	C11-O13-P-O14
69	t	101	3PE	O13-C11-C12-N
69	z	102	3PE	O13-C11-C12-N

There are no ring outliers.

76 monomers are involved in 191 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
69	c	301	3PE	5	0
72	N	401	HEM	2	0
69	C	404	3PE	2	0
69	R	104	3PE	2	0
69	t	101	3PE	11	0
73	D	301	HEC	1	0
69	C	403	3PE	1	0
70	M1	501	PC1	4	0
69	L	501	3PE	1	0
71	g	301	CDL	7	0
70	P1	502	PC1	1	0
69	Y1	403	3PE	1	0
69	M1	502	3PE	4	0

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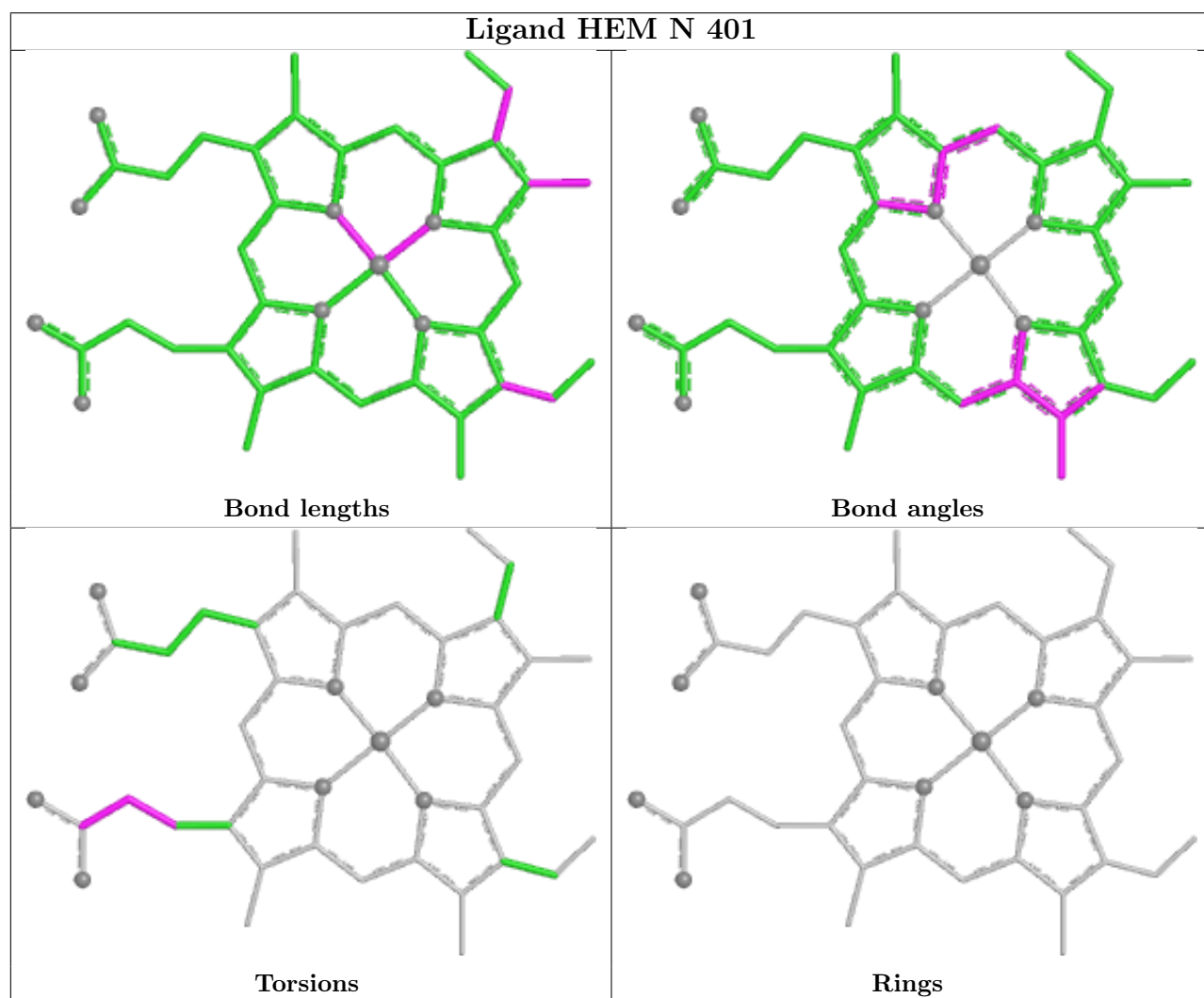
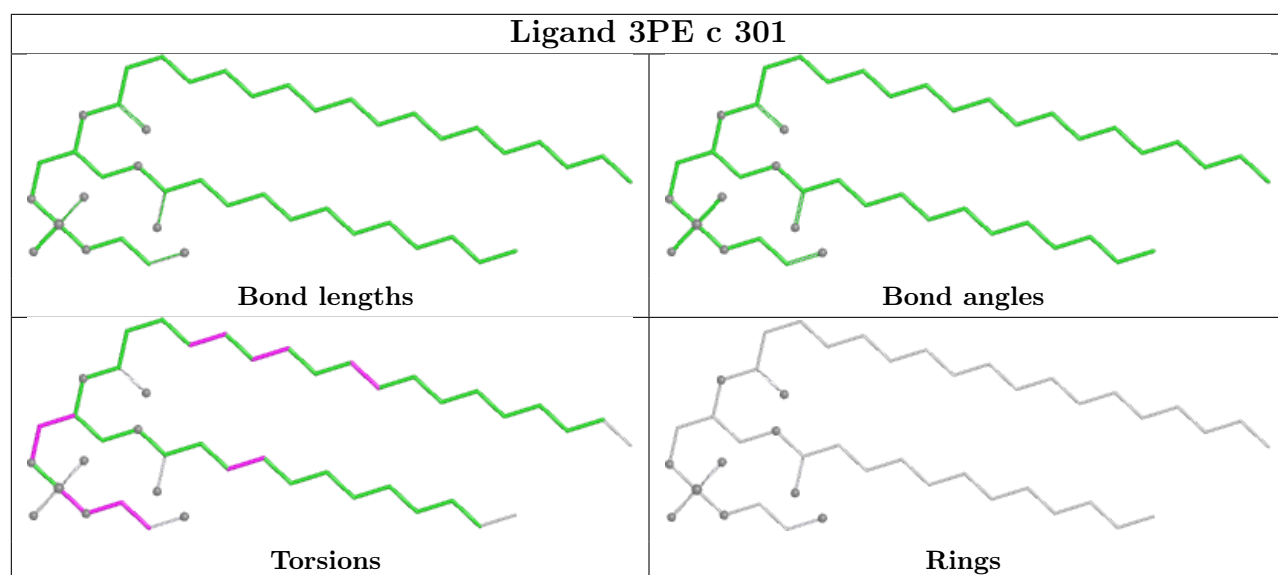
Mol	Chain	Res	Type	Clashes	Symm-Clashes
69	M1	503	3PE	2	0
69	N	403	3PE	1	0
69	r1	201	3PE	1	0
72	C	402	HEM	3	0
69	Y1	402	3PE	1	0
70	p	302	PC1	1	0
71	d1	201	CDL	1	0
81	y	601	TGL	1	0
72	C	401	HEM	3	0
69	6	202	3PE	1	0
70	g	302	PC1	3	0
72	N	402	HEM	2	0
77	a	604	HEA	5	0
69	b	301	3PE	1	0
69	N1	402	3PE	1	0
71	L	502	CDL	1	0
71	V	101	CDL	2	0
71	N1	401	CDL	5	0
71	R	103	CDL	4	0
71	L1	703	CDL	3	0
71	R	102	CDL	1	0
70	z	101	PC1	20	0
69	o	302	3PE	2	0
69	H1	401	3PE	2	0
69	a	605	3PE	1	0
69	z	102	3PE	2	0
69	v	101	3PE	1	0
69	i1	201	3PE	1	0
69	O	302	3PE	1	0
71	G	101	CDL	1	0
69	a	606	3PE	2	0
69	d	201	3PE	2	0
69	p	301	3PE	6	0
82	9	201	SF4	1	0
86	n1	201	ZMP	2	0
69	G	102	3PE	1	0
69	n	606	3PE	2	0
69	d1	202	3PE	1	0
85	P1	501	NDP	1	0
69	E	202	3PE	2	0
71	L1	702	CDL	2	0
70	6	203	PC1	2	0

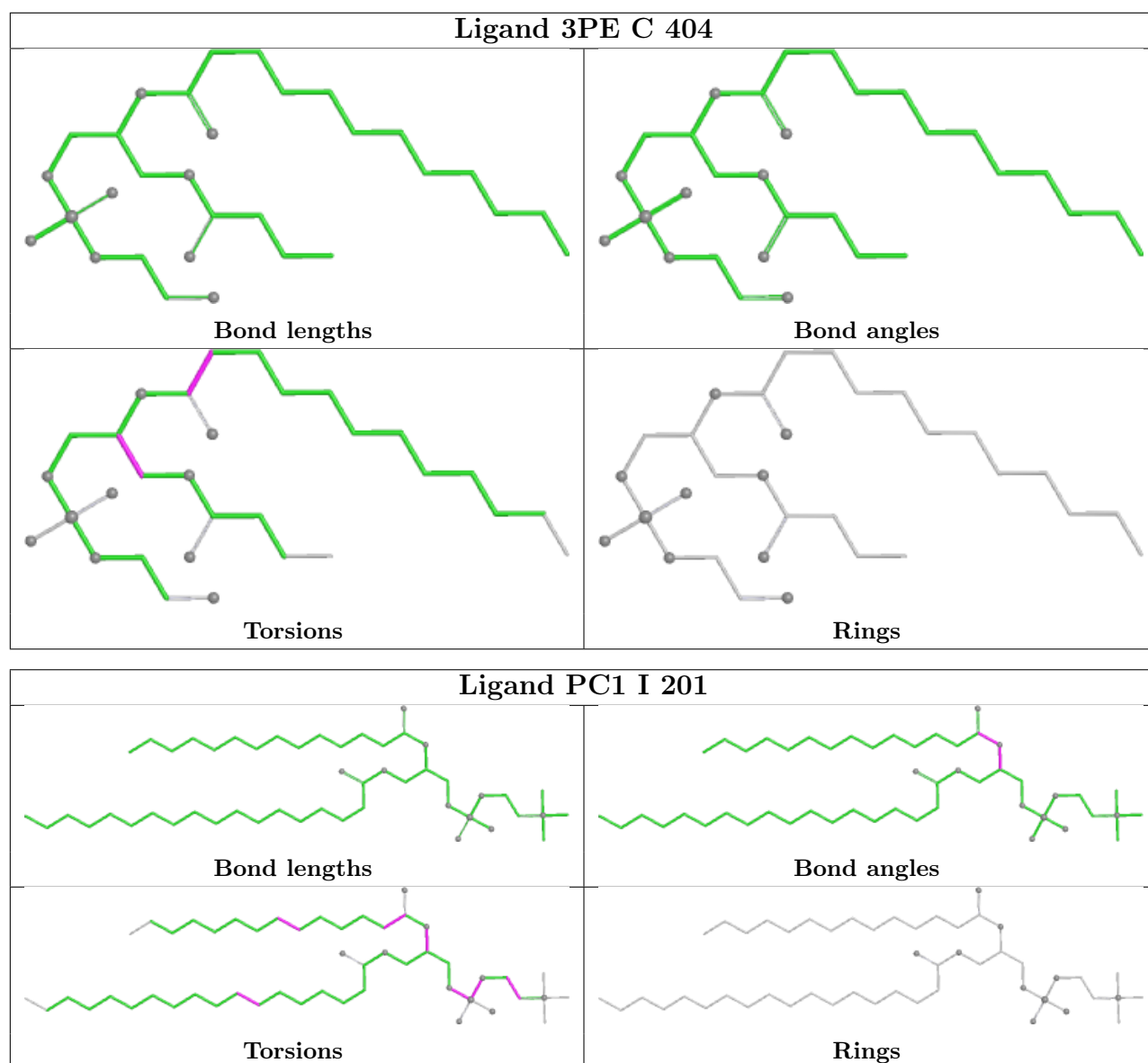
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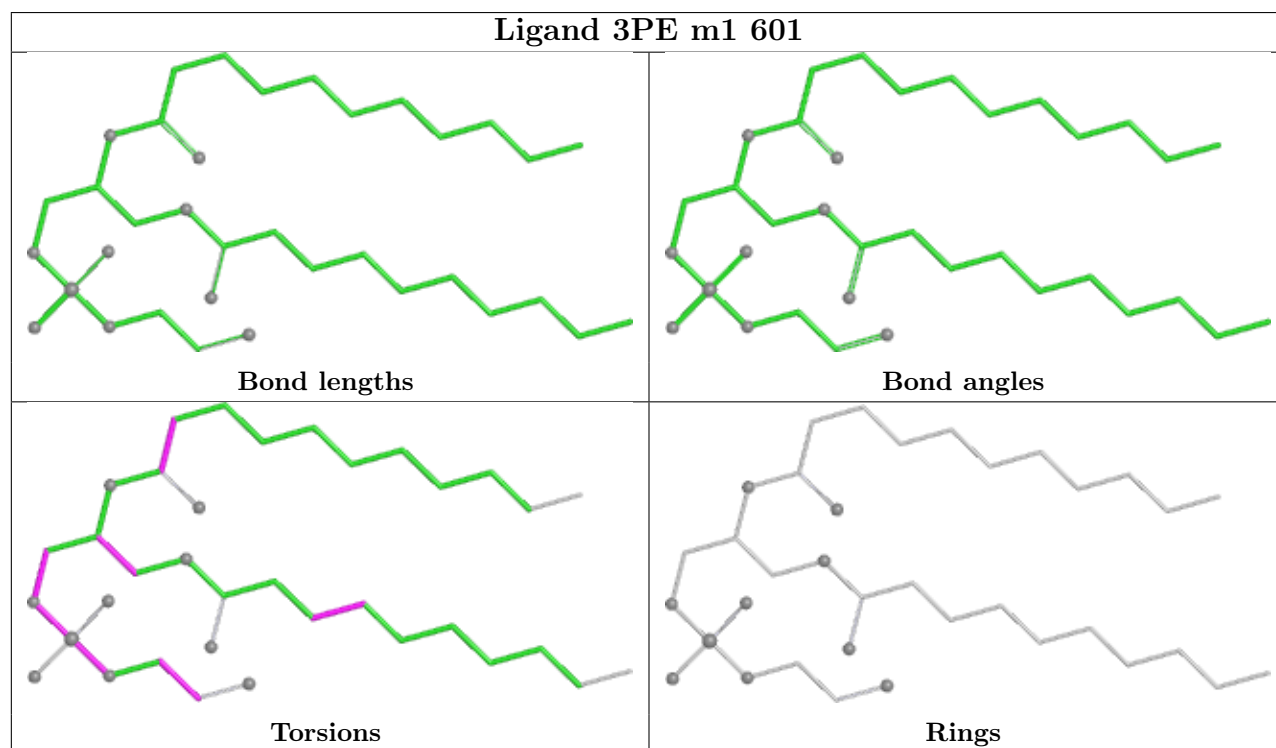
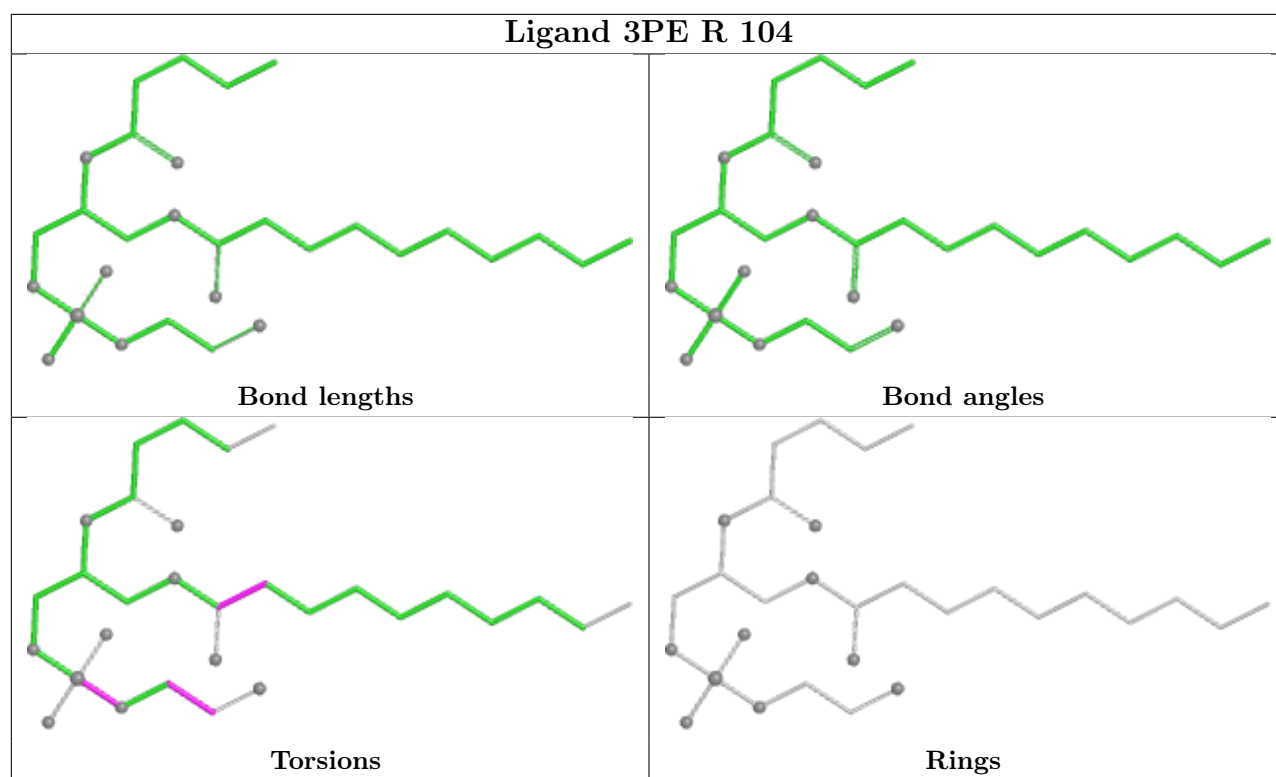
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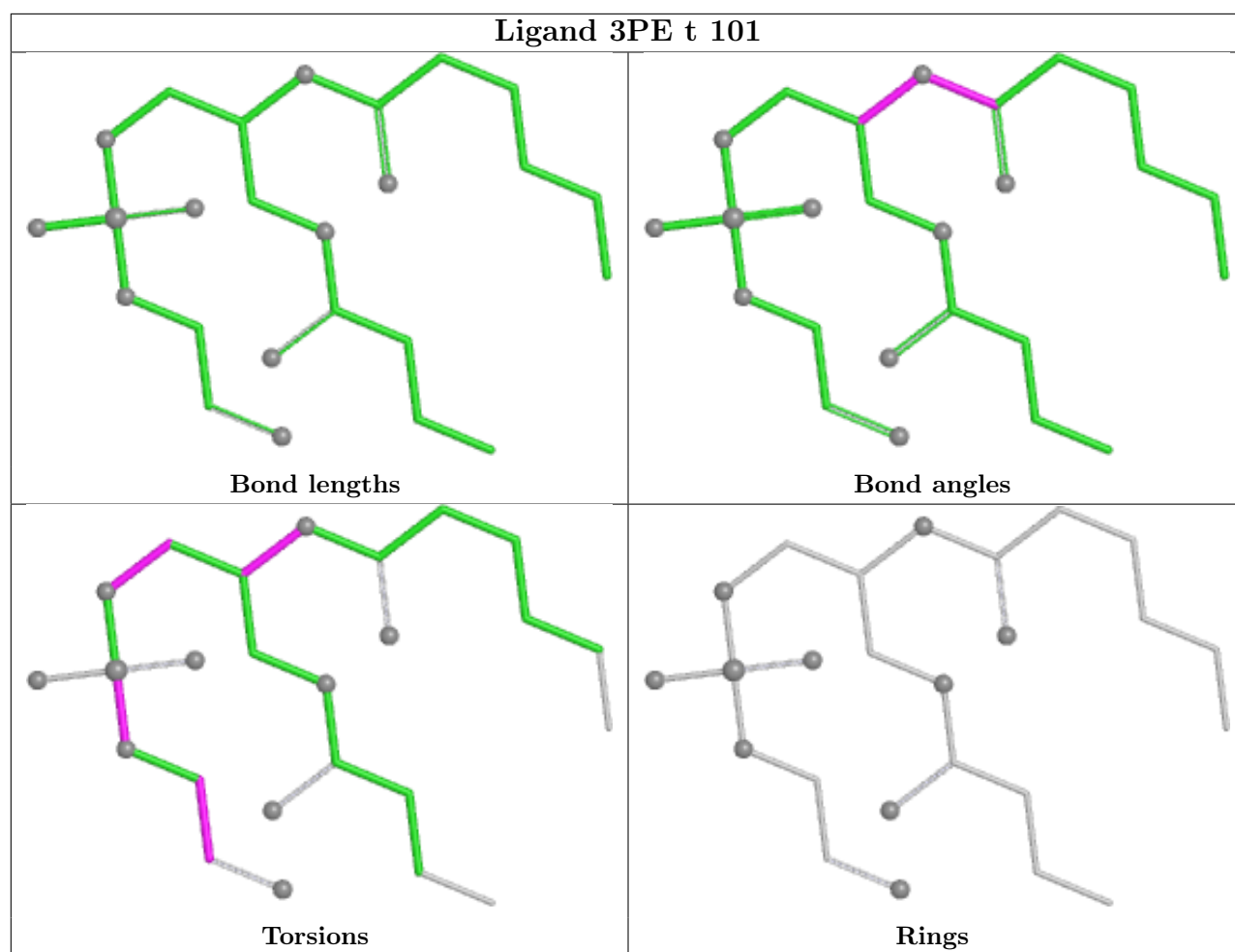
Mol	Chain	Res	Type	Clashes	Symm-Clashes
69	L1	704	3PE	3	0
69	A	501	3PE	2	0
87	O1	401	DGT	1	0
70	K	101	PC1	1	0
71	Y1	401	CDL	2	0
74	P	201	FES	2	0
81	l	601	TGL	1	0
71	r1	202	CDL	3	0
69	L1	701	3PE	3	0
69	g	303	3PE	11	0
77	n	604	HEA	5	0
71	D	302	CDL	1	0
71	h1	201	CDL	4	0
70	9	203	PC1	1	0
77	n	603	HEA	4	0
71	H1	402	CDL	1	0
69	n	607	3PE	1	0
77	a	603	HEA	3	0
69	b1	101	3PE	1	0
83	1	501	FMN	2	0
70	9	204	PC1	3	0

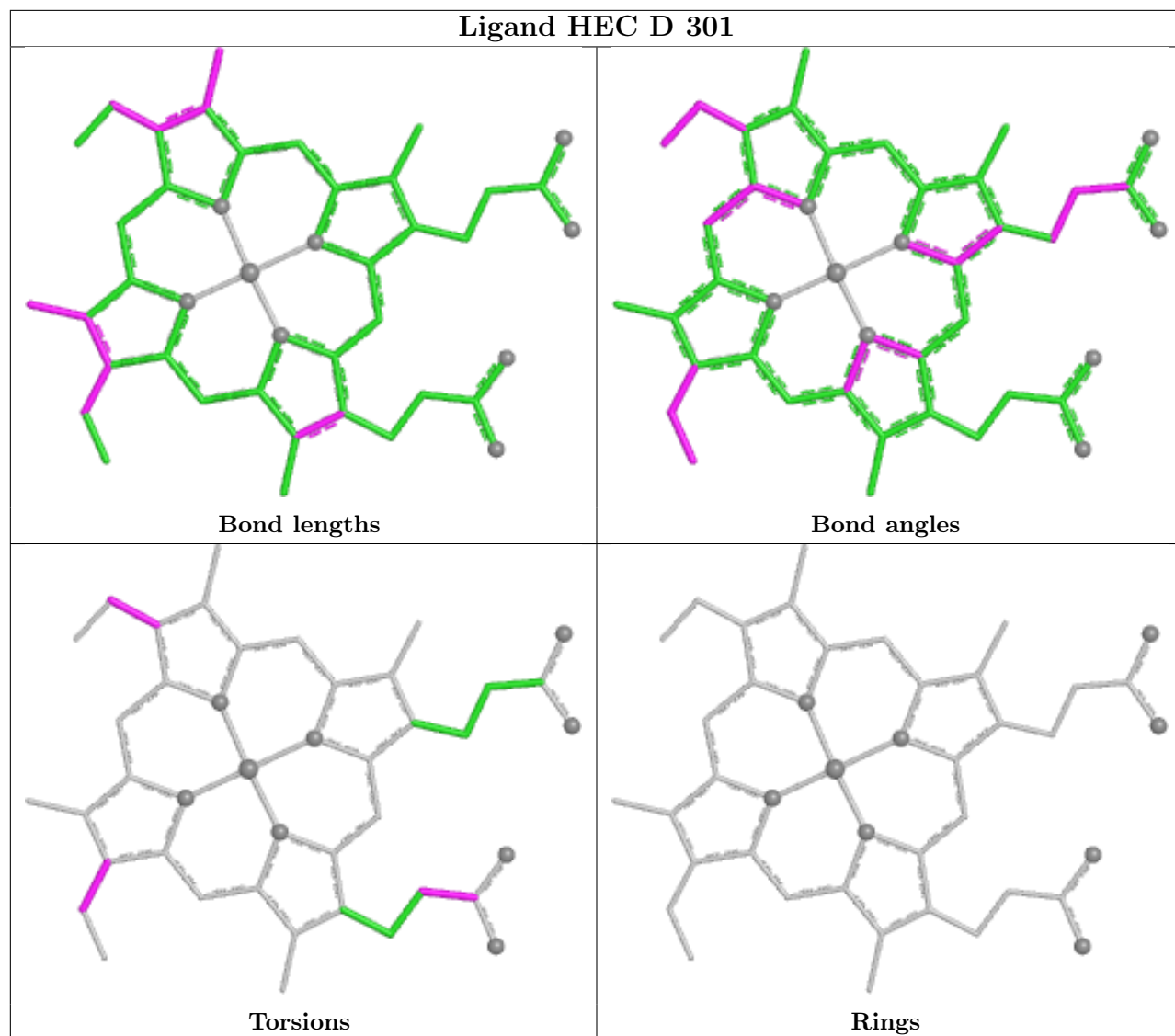
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

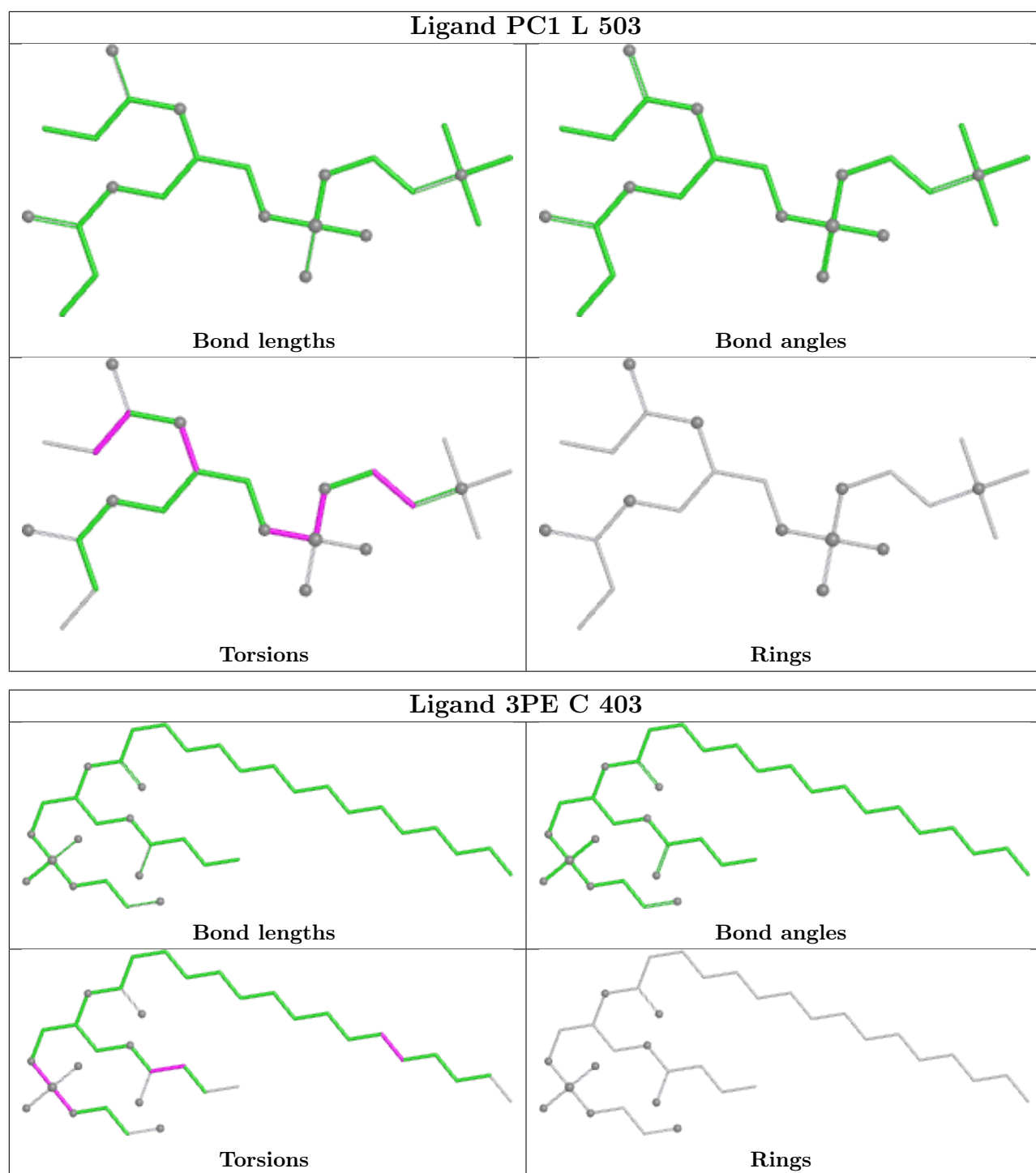


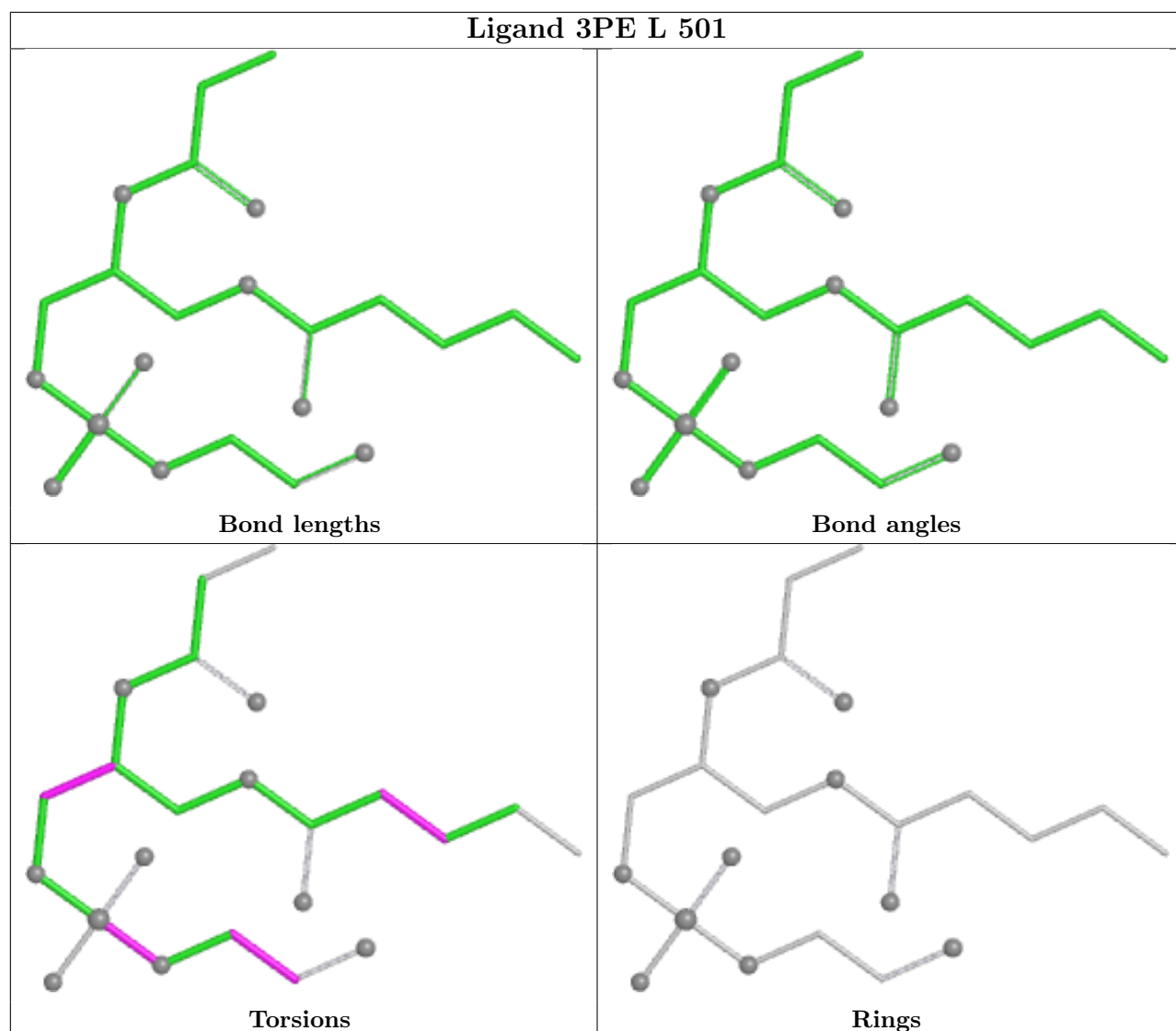
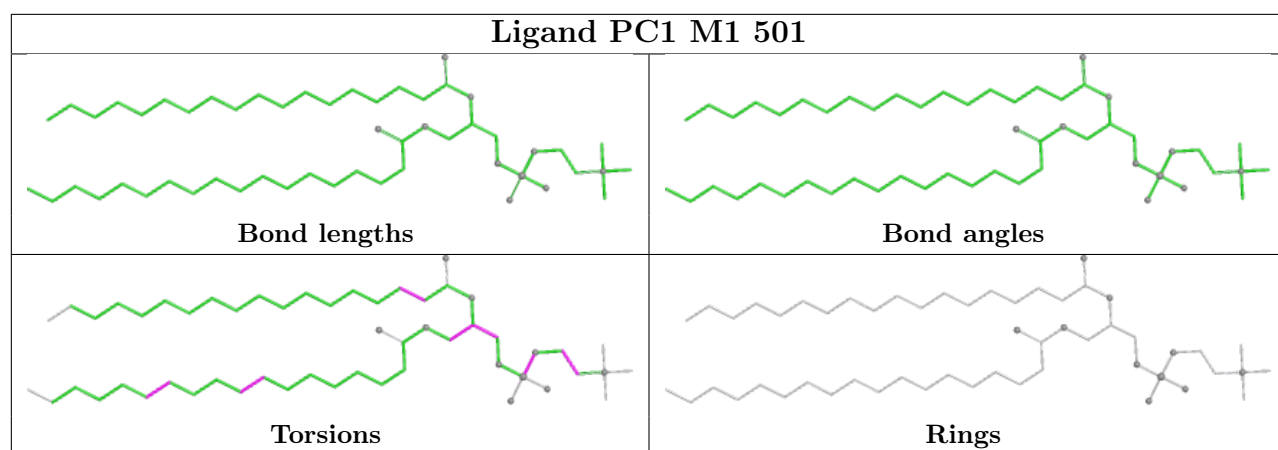


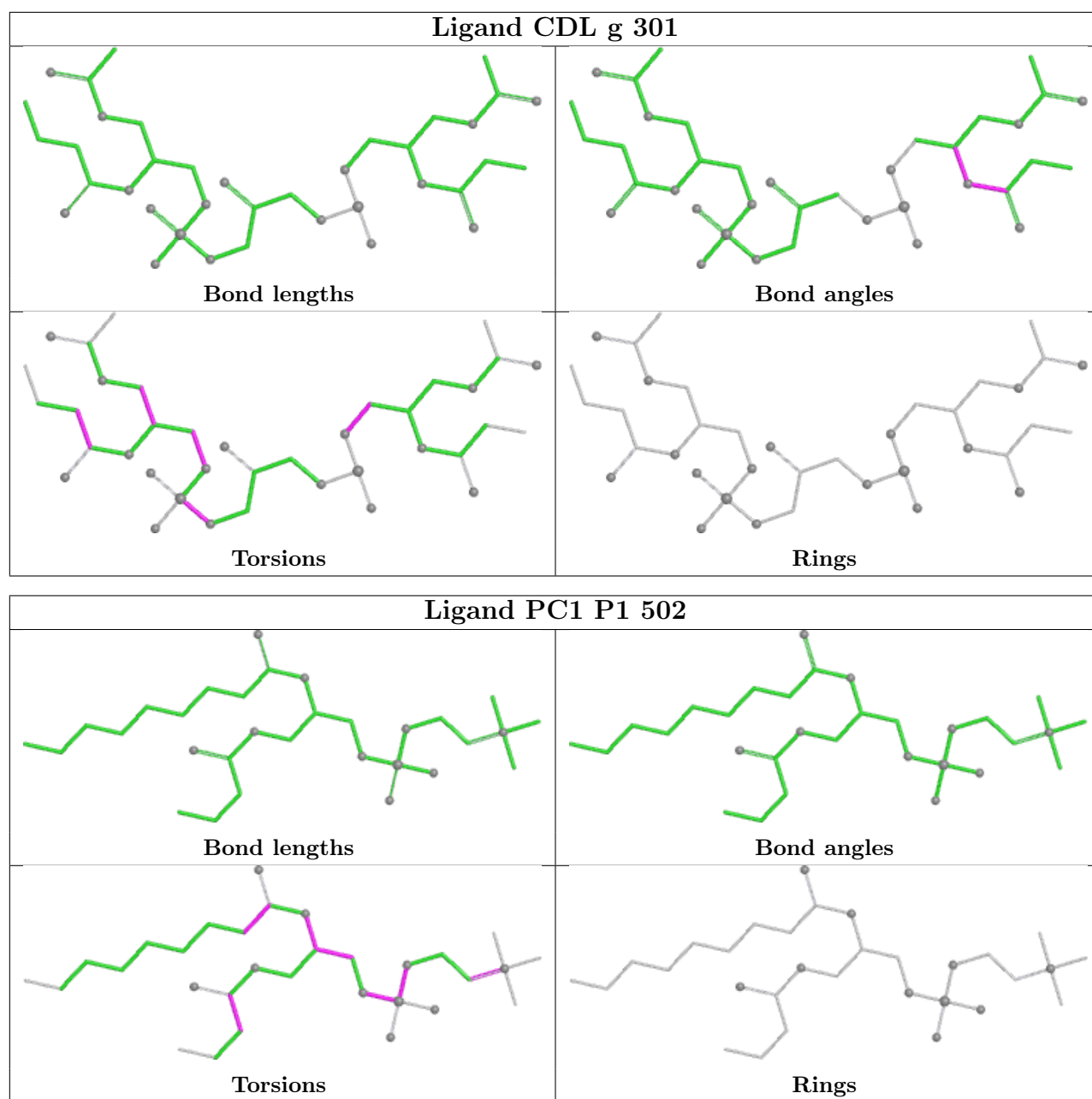


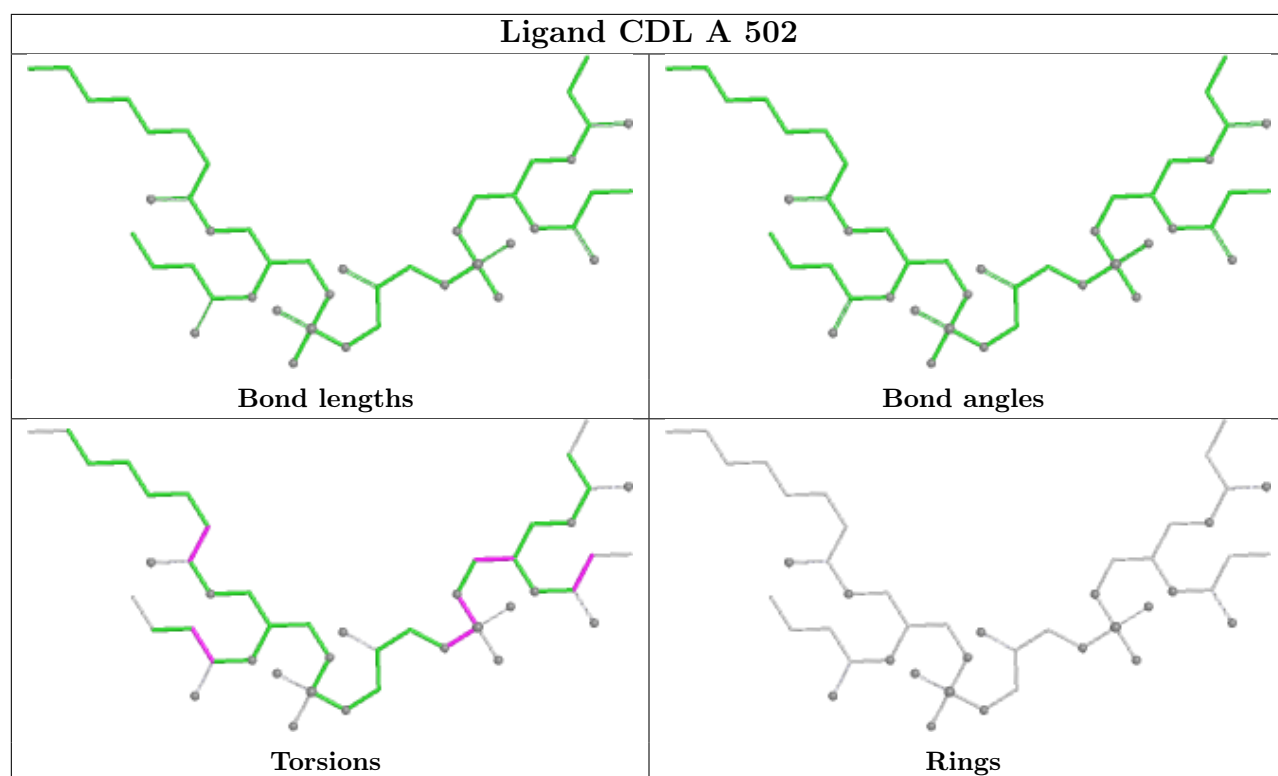
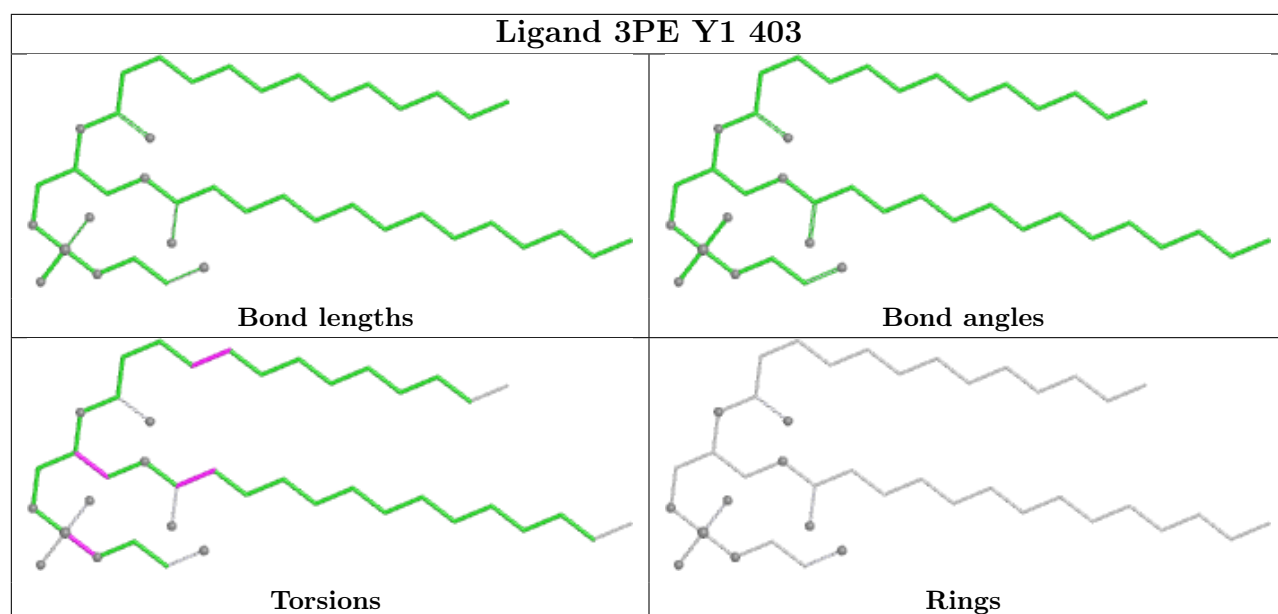


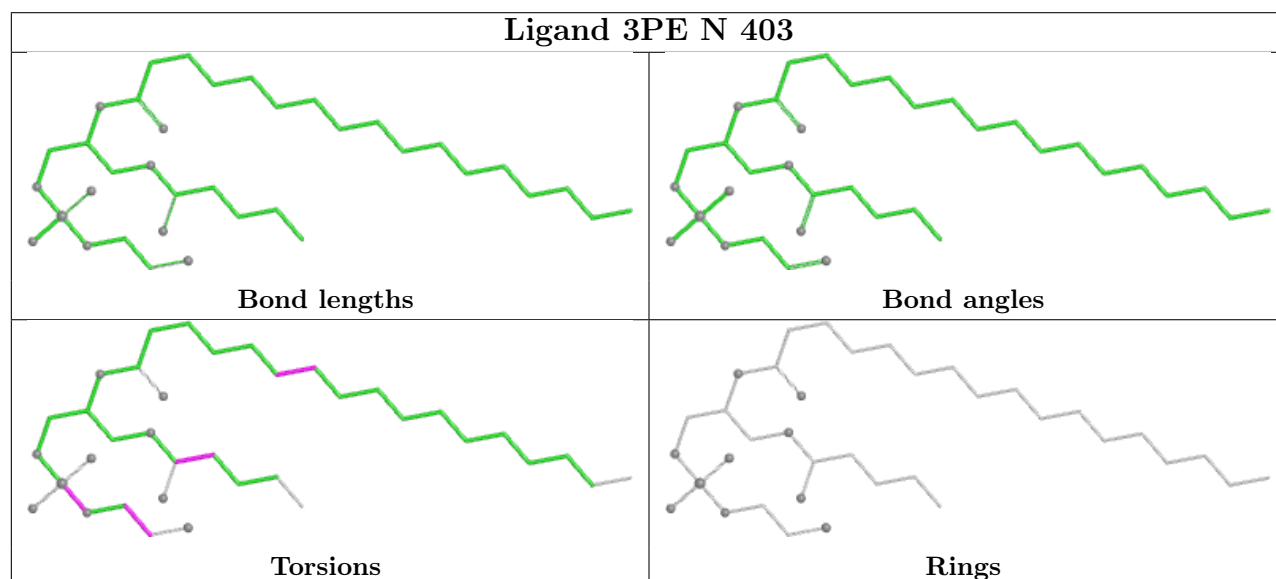
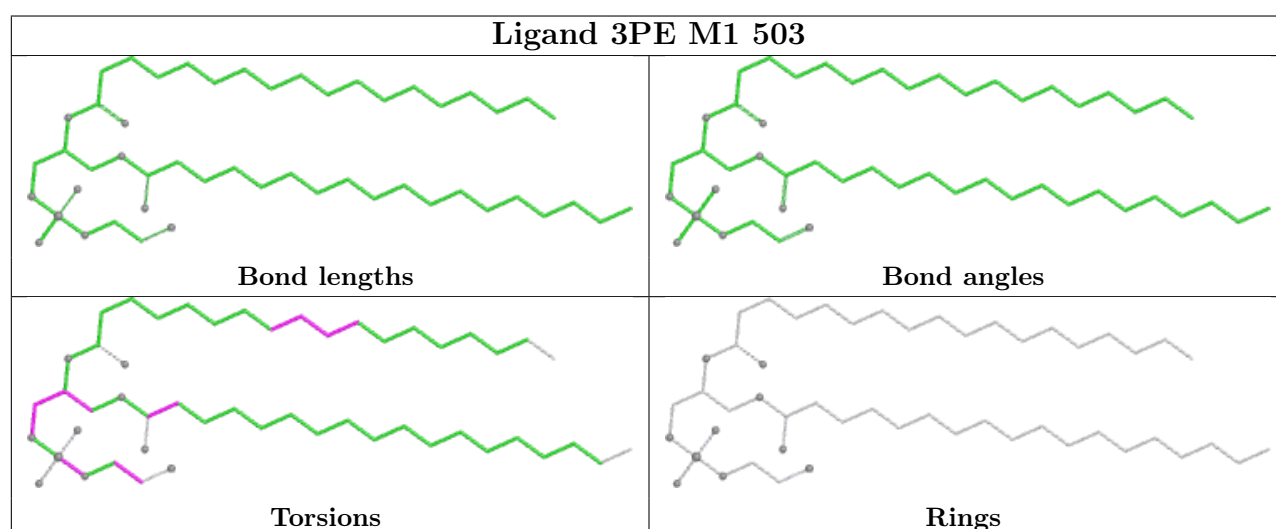
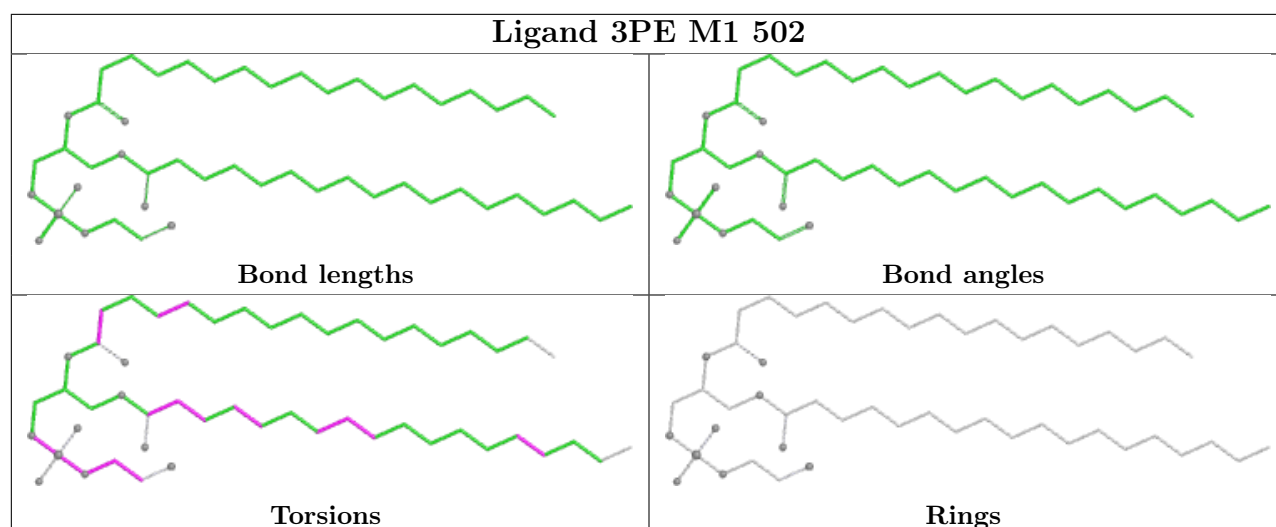


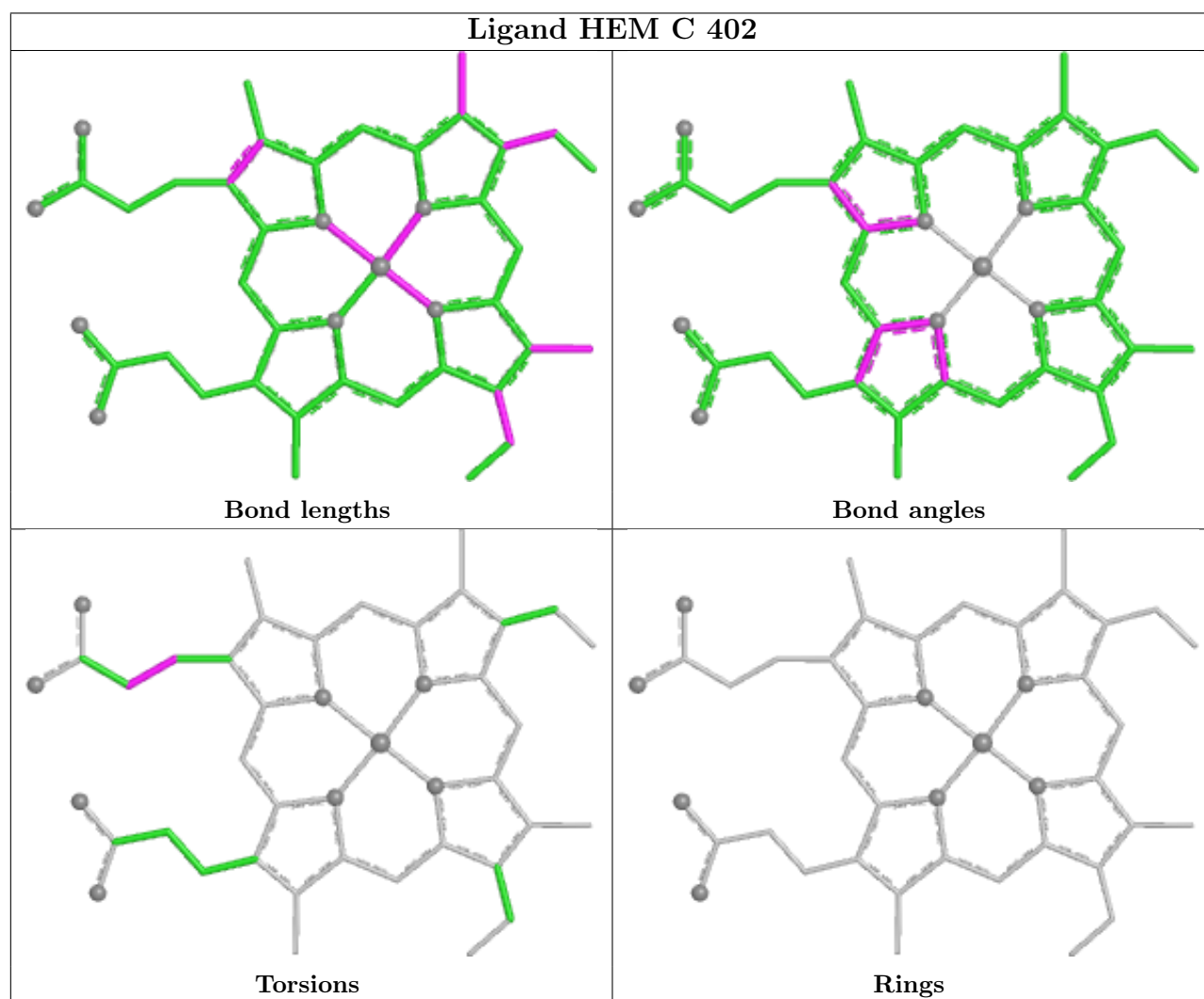
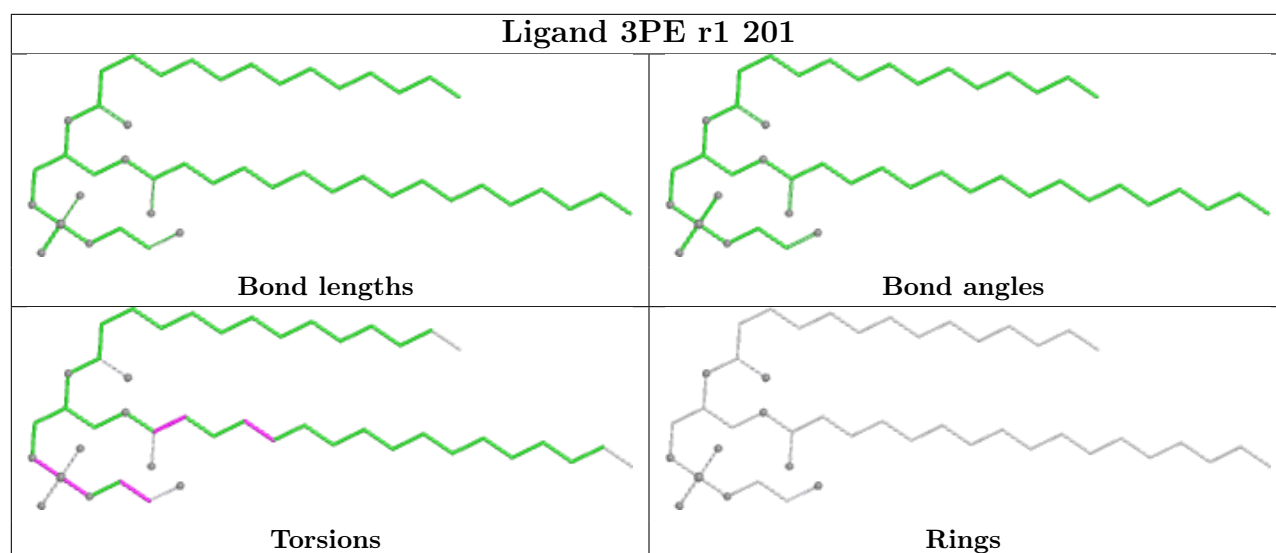


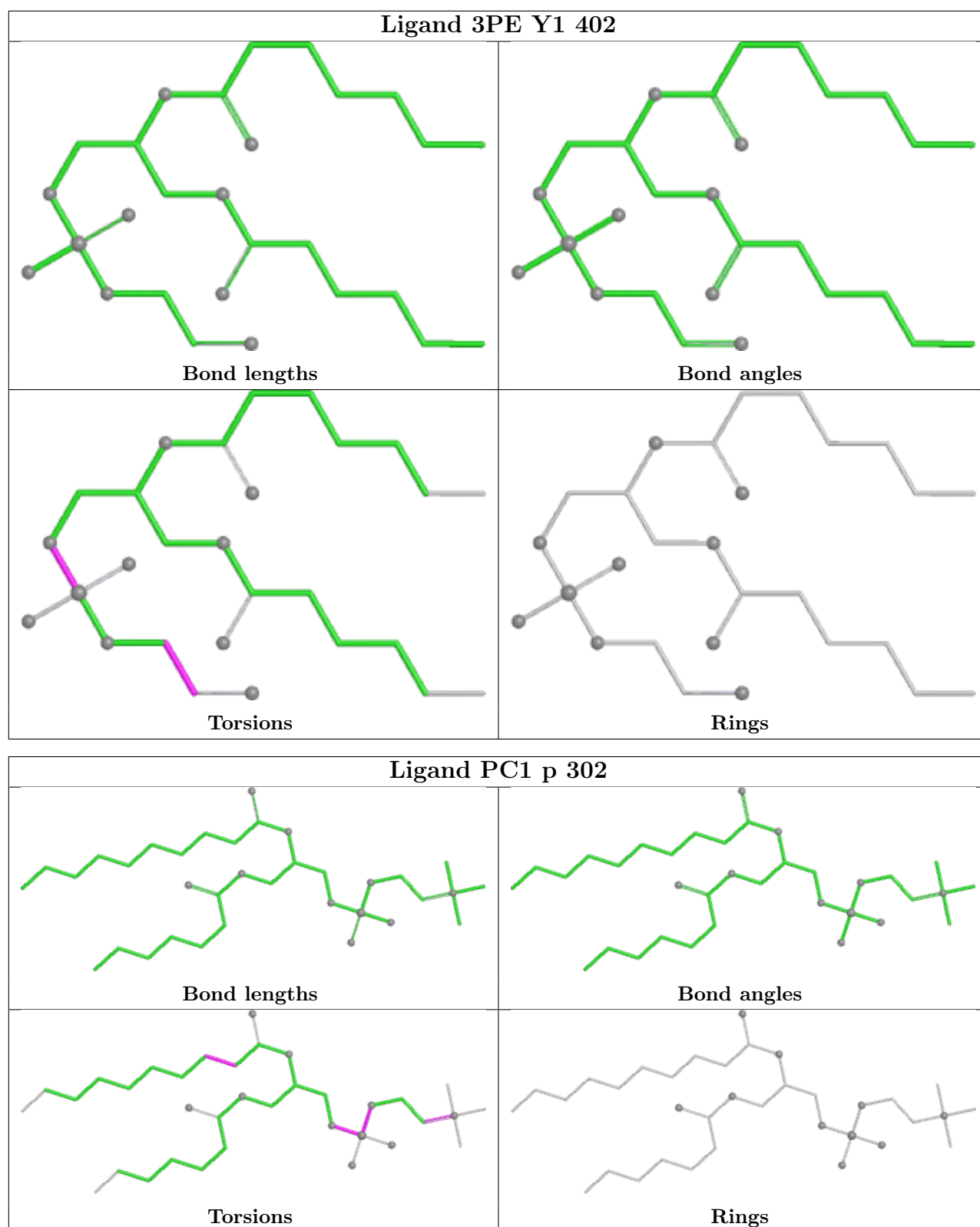


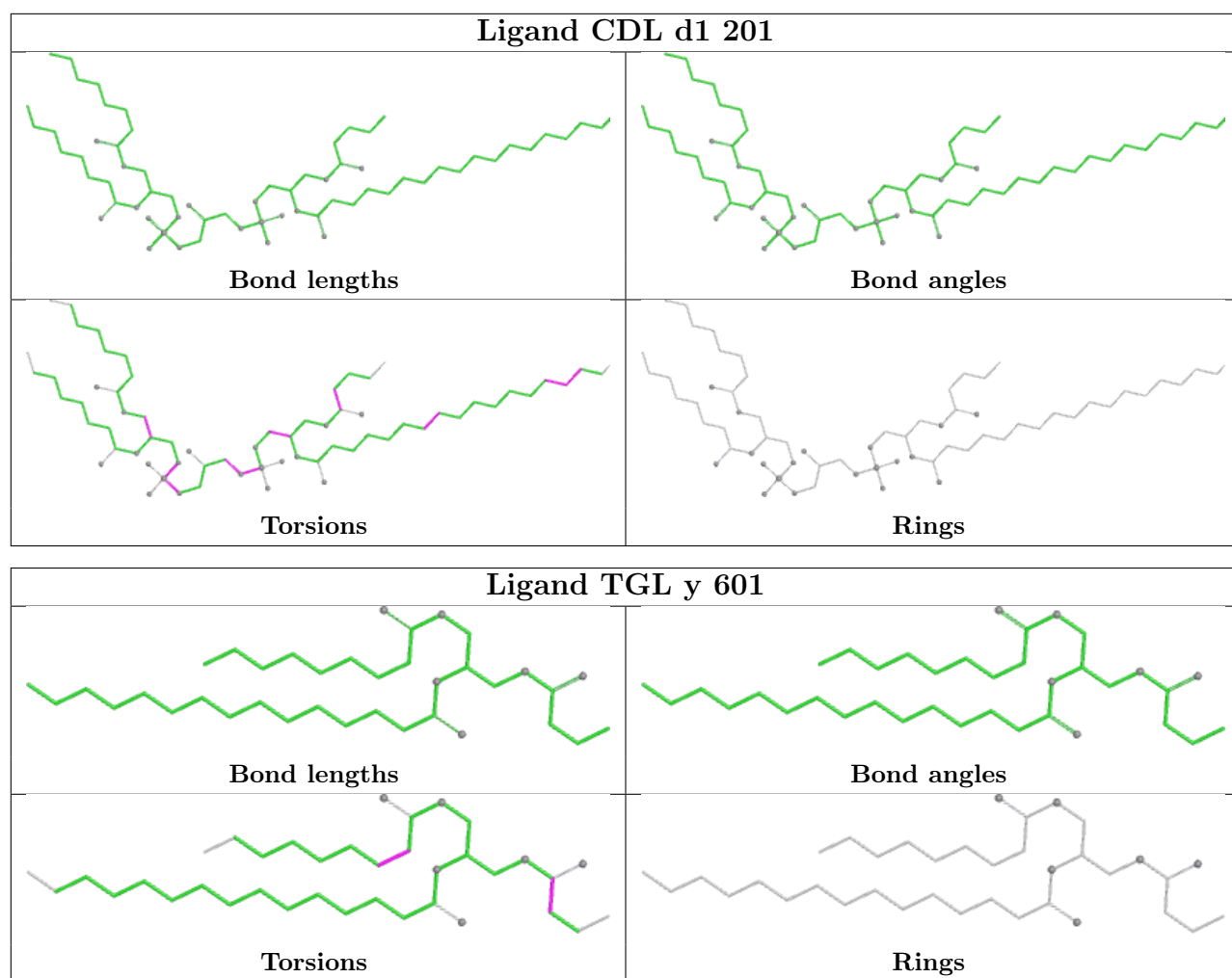


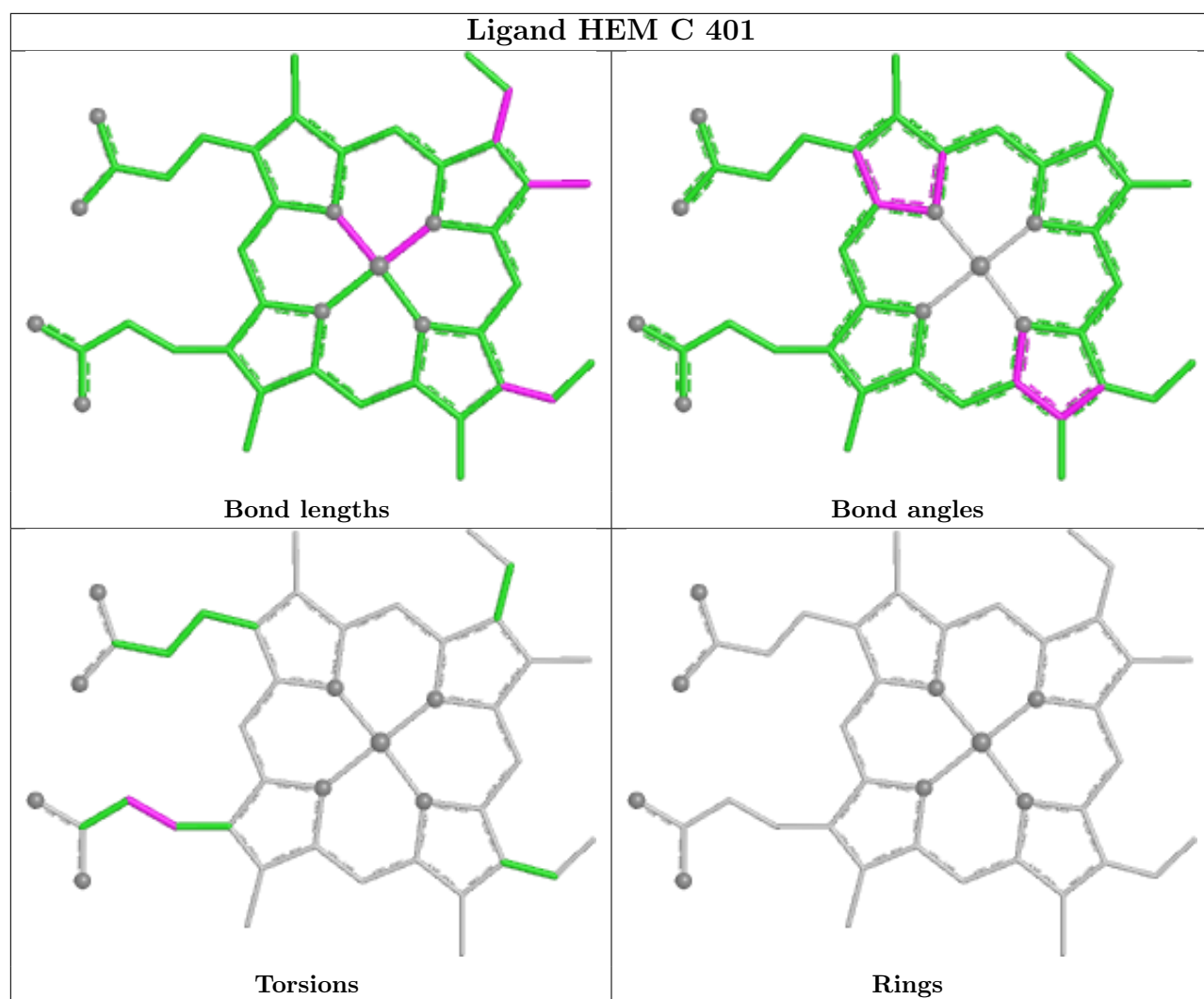


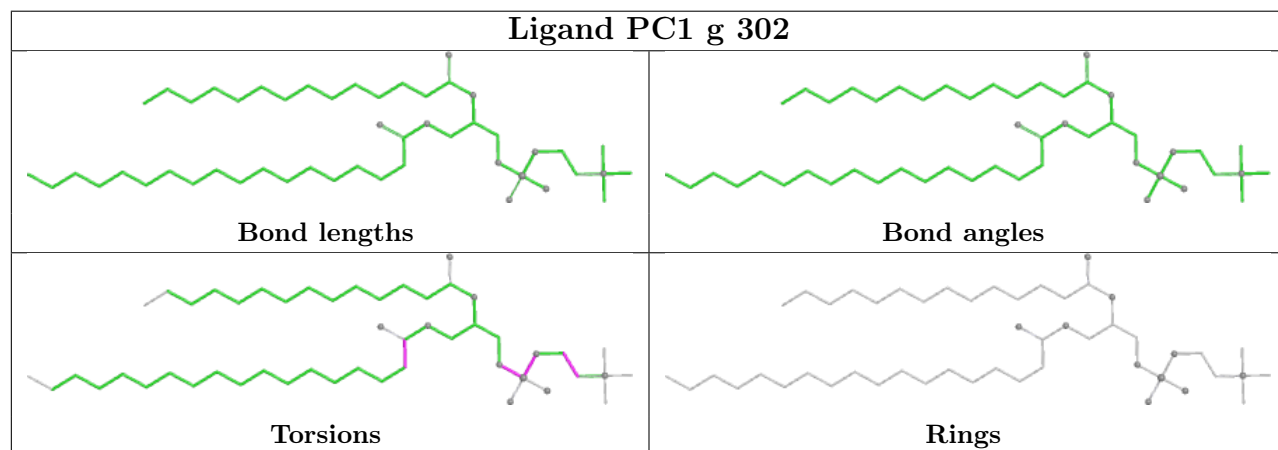
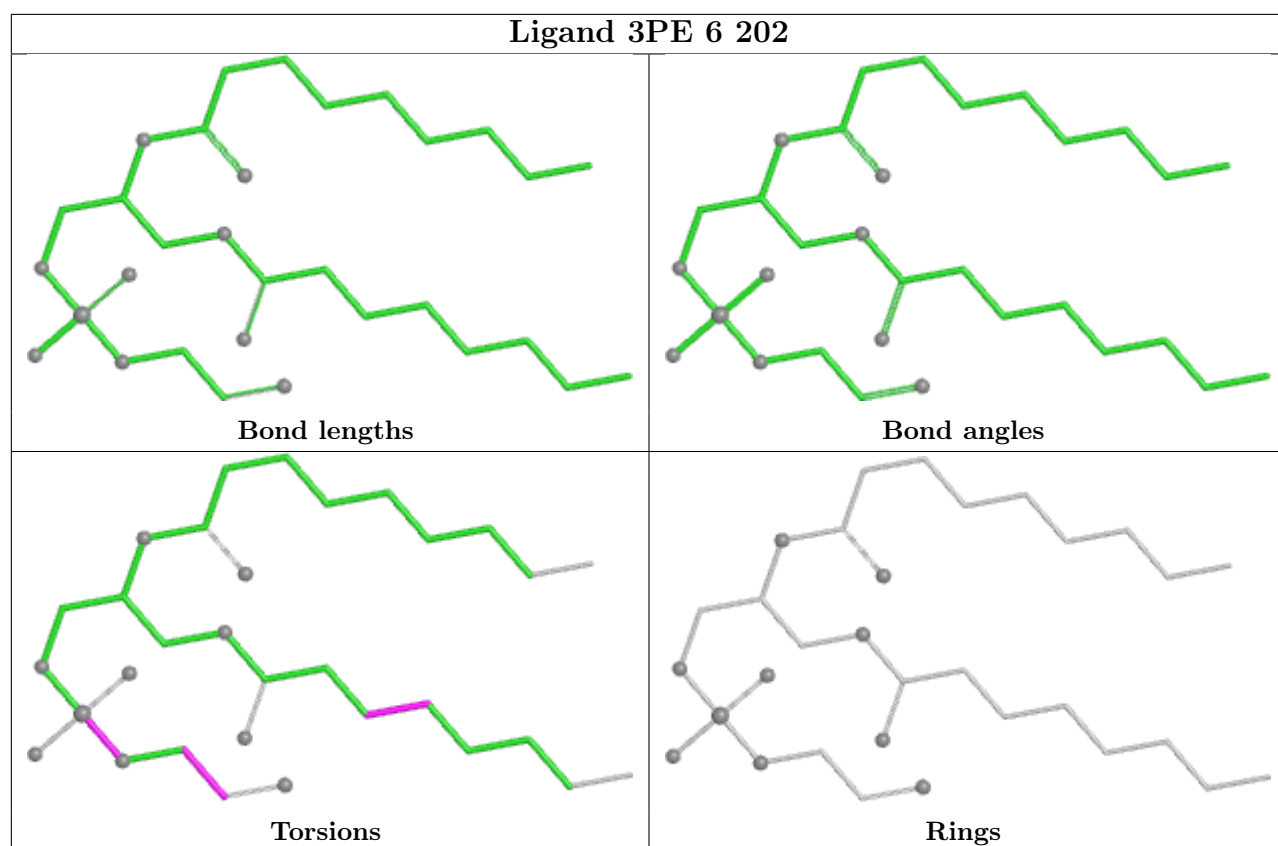


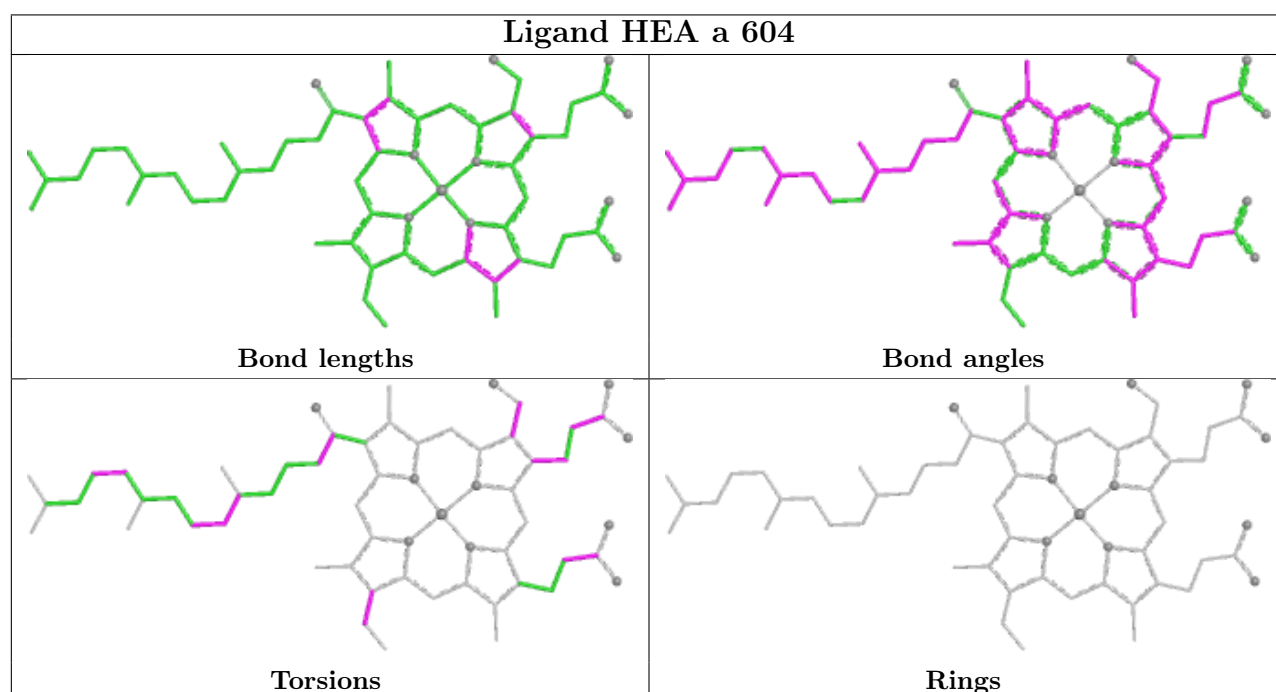
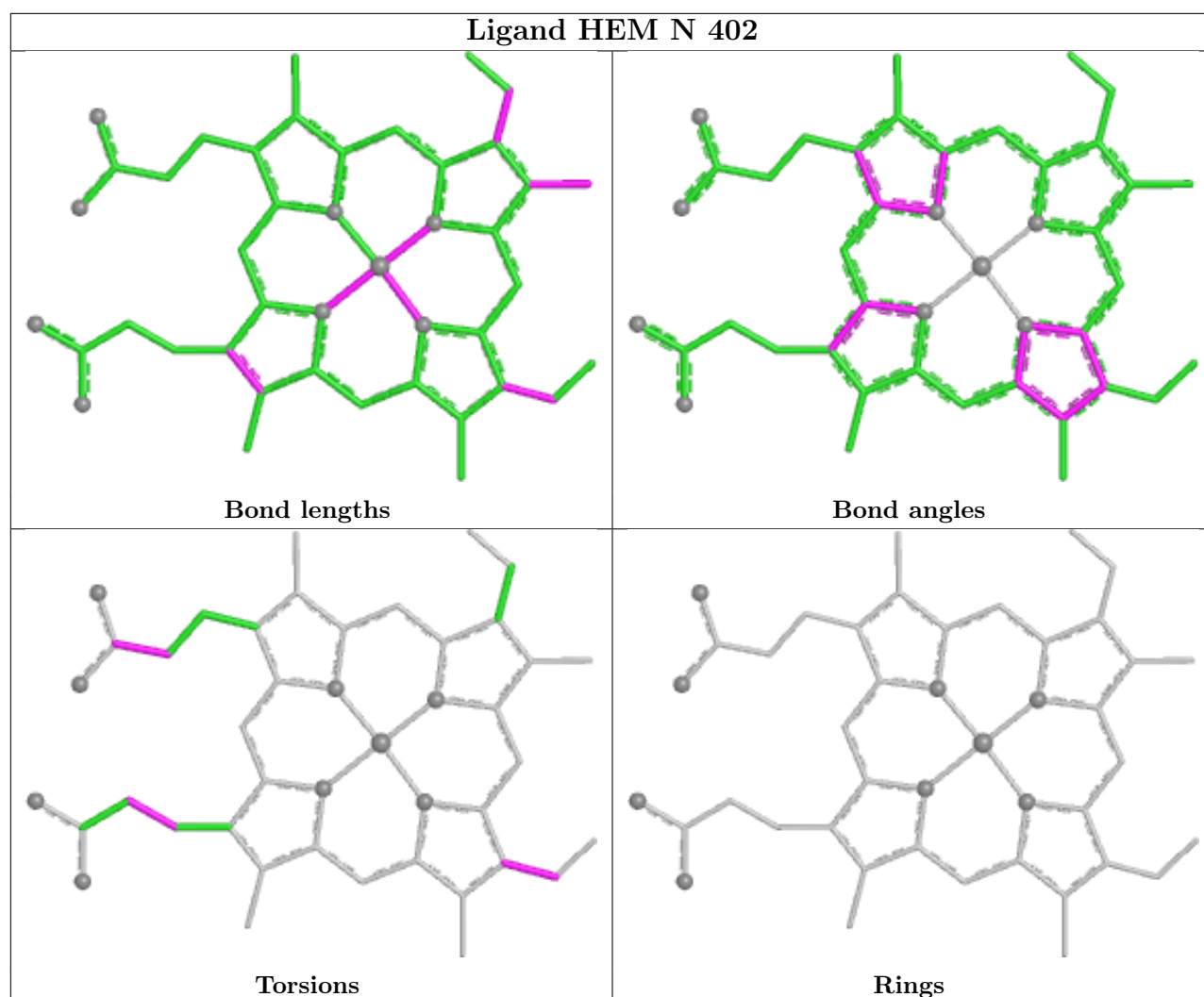




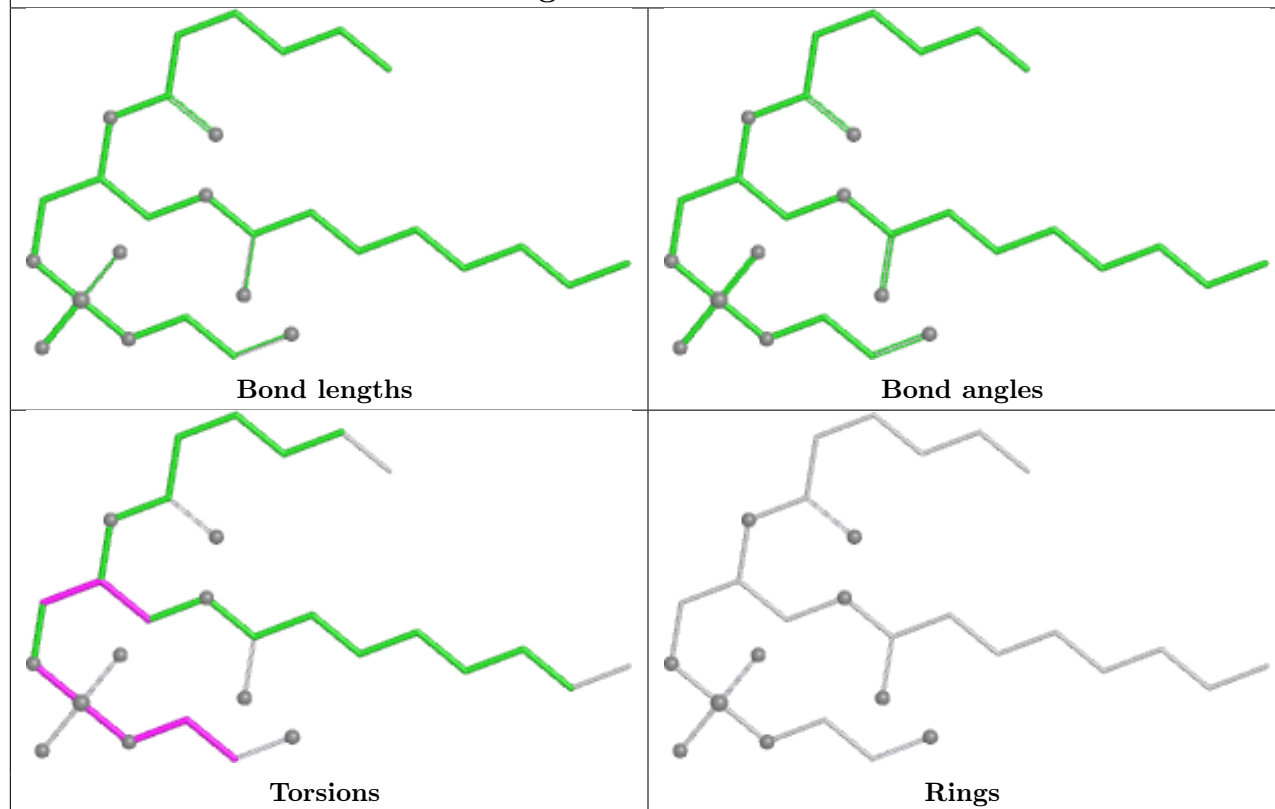




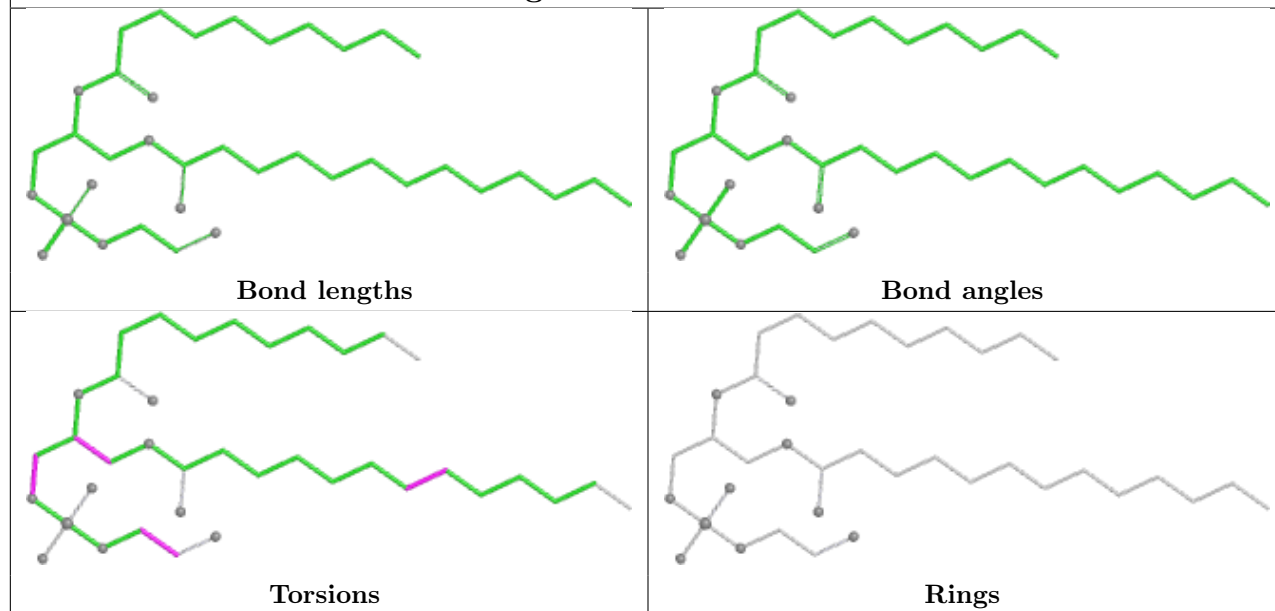


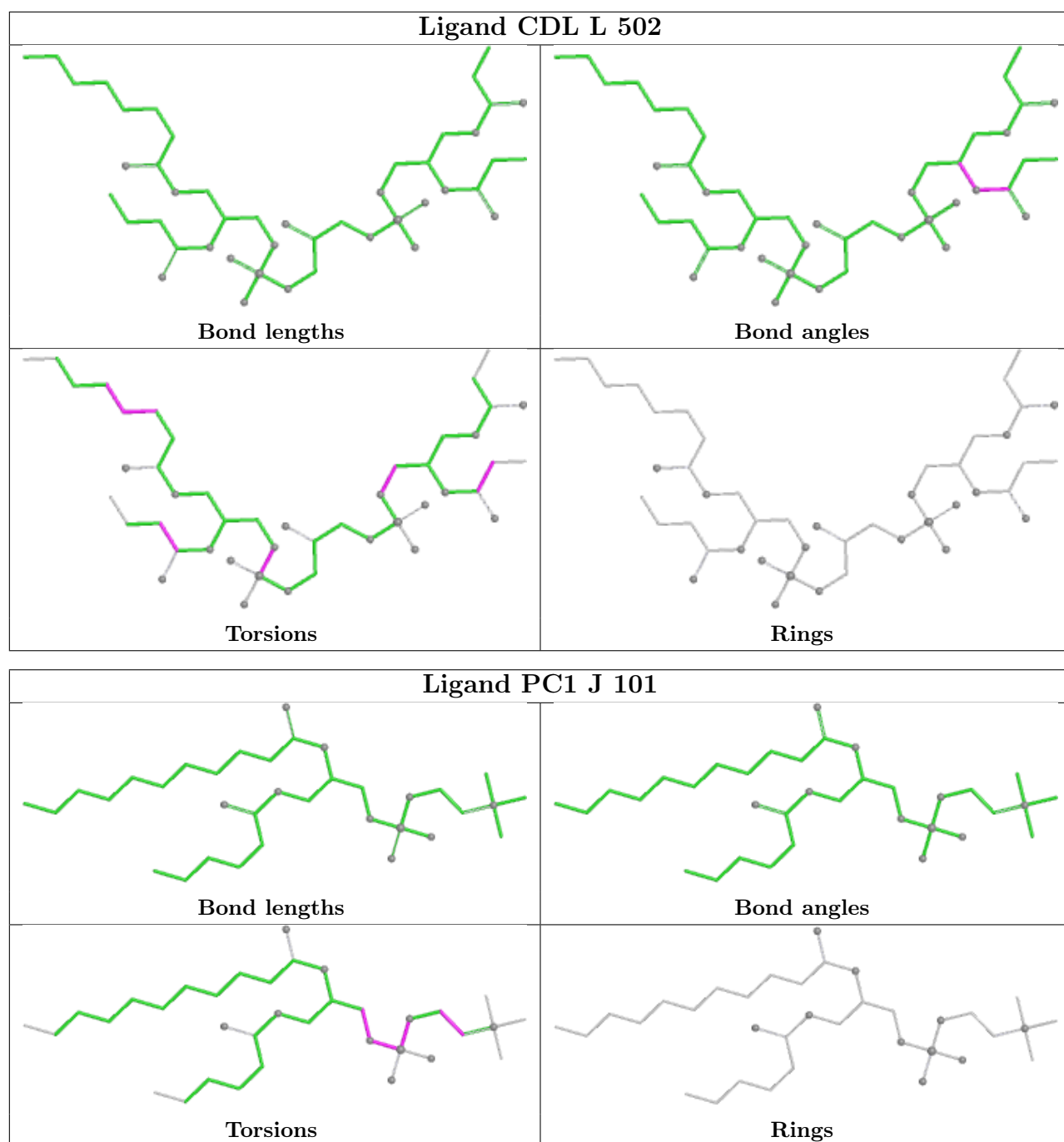


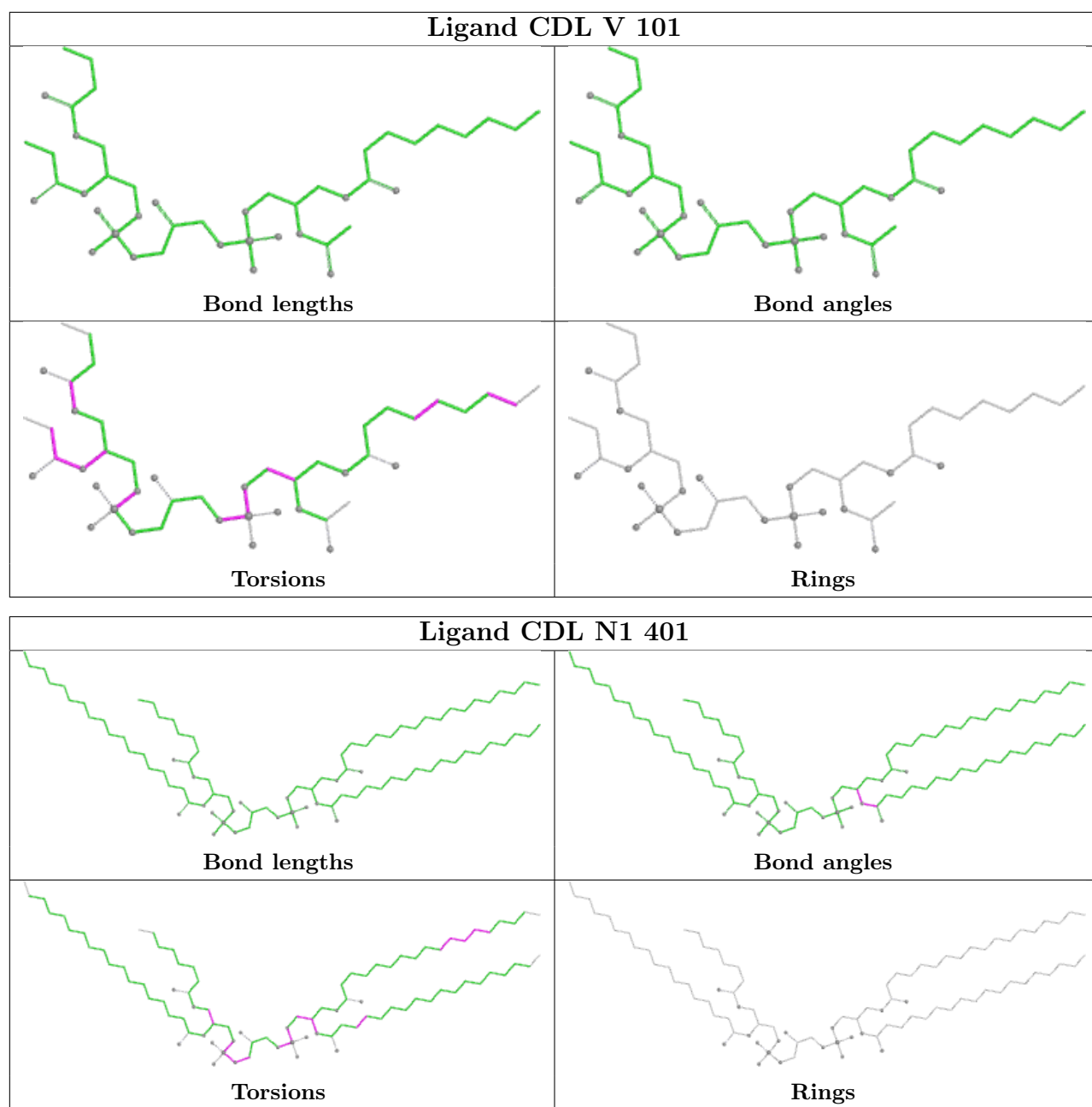
Ligand 3PE b 301

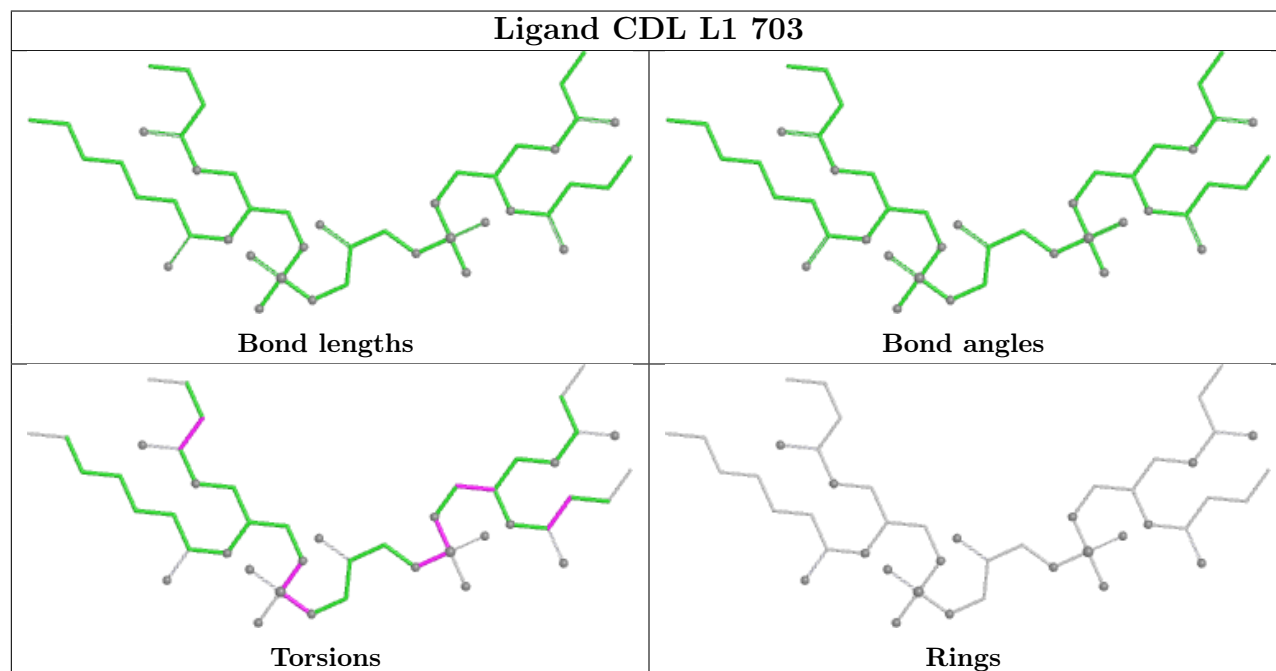
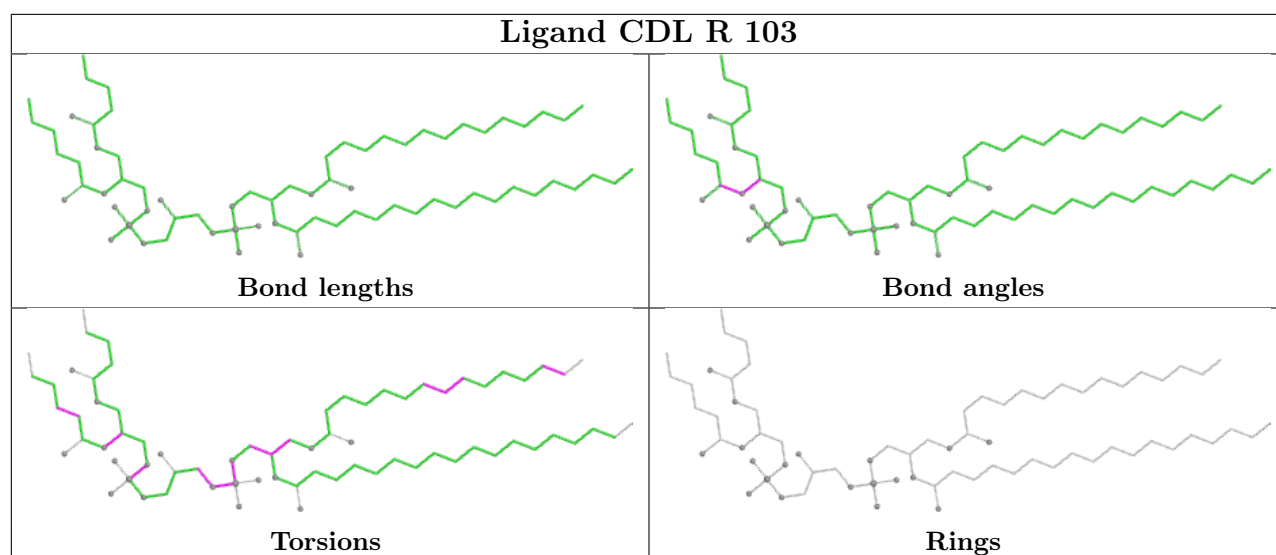


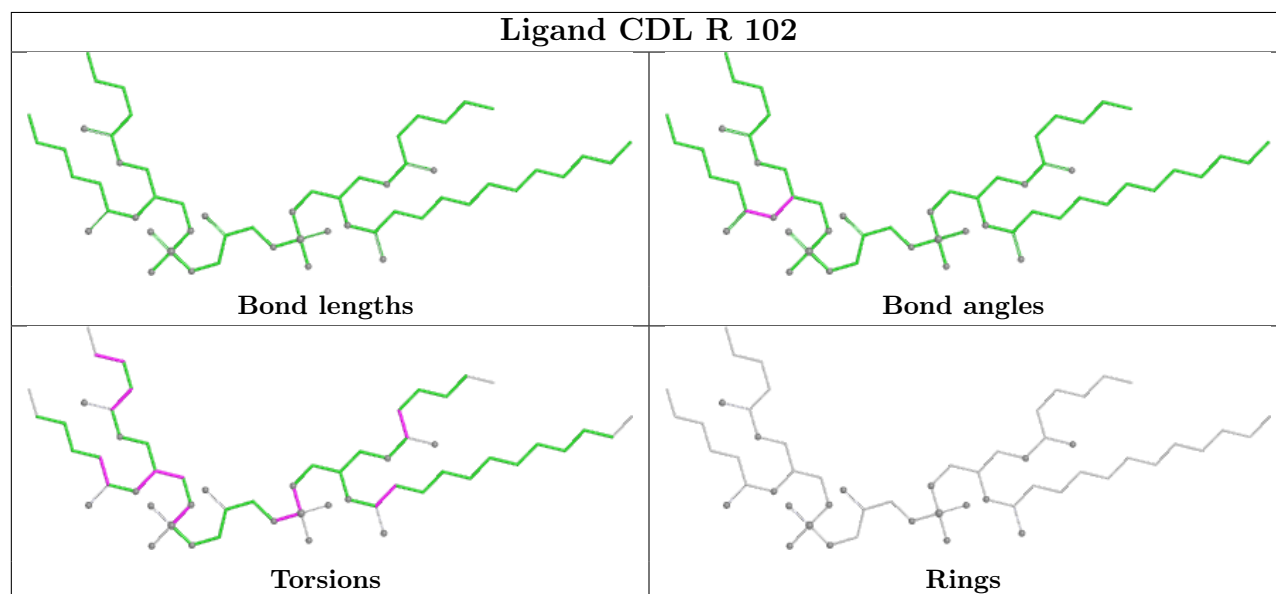
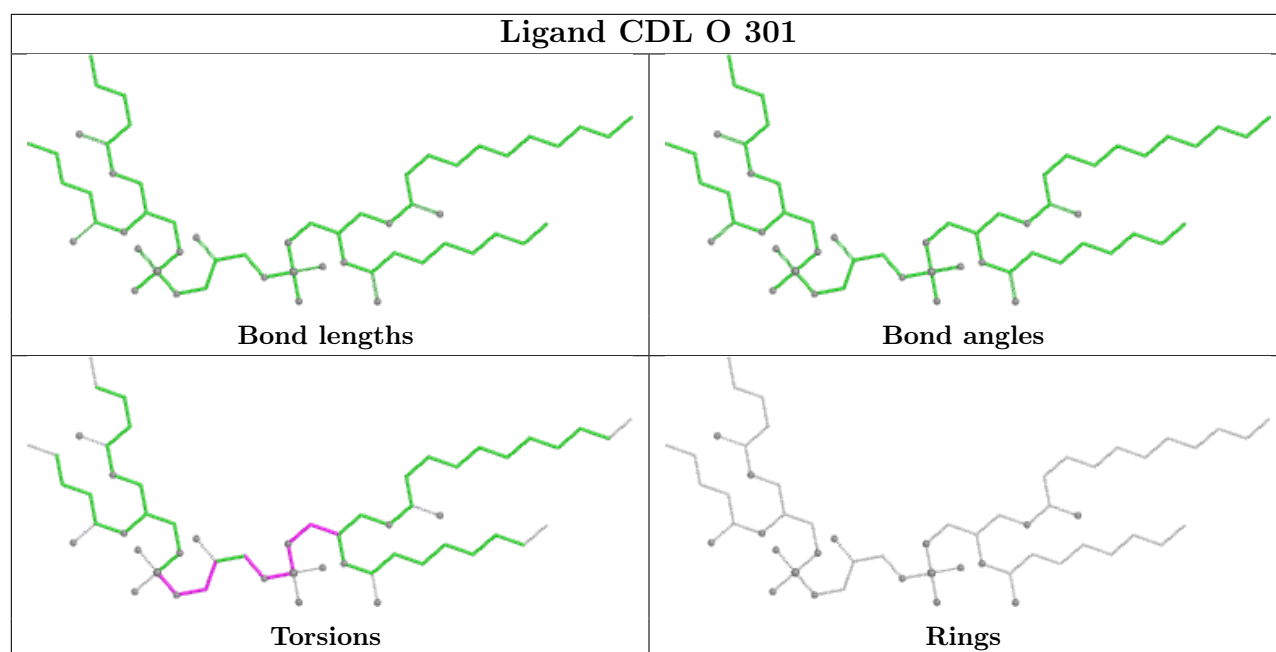
Ligand 3PE N1 402

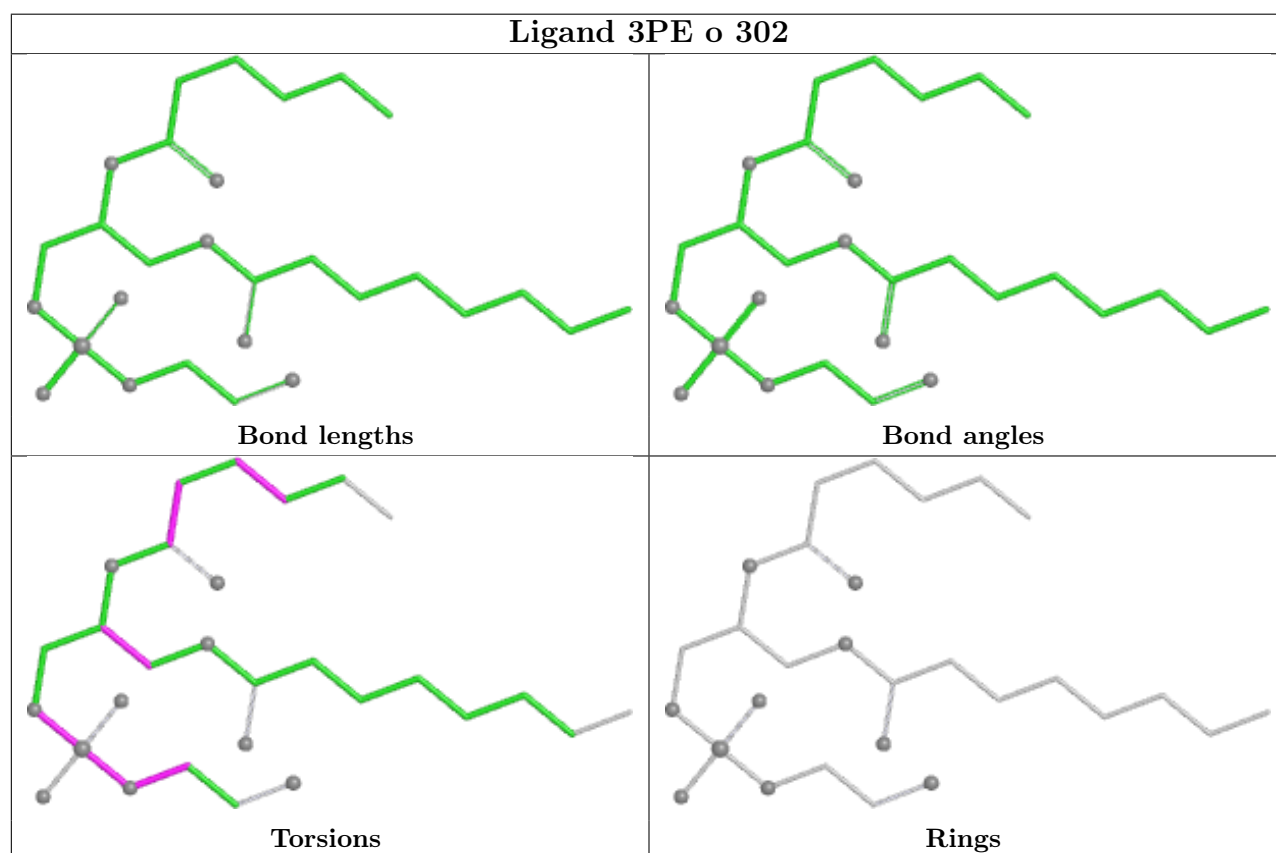
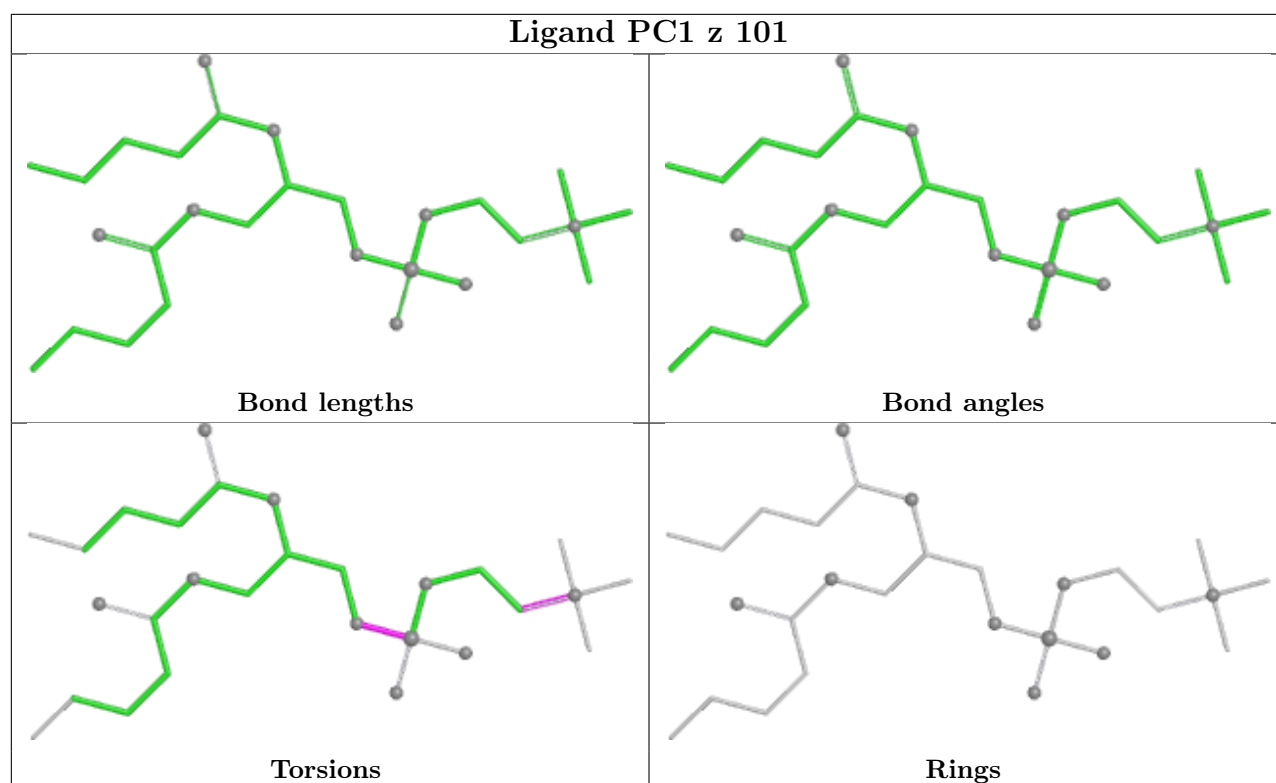


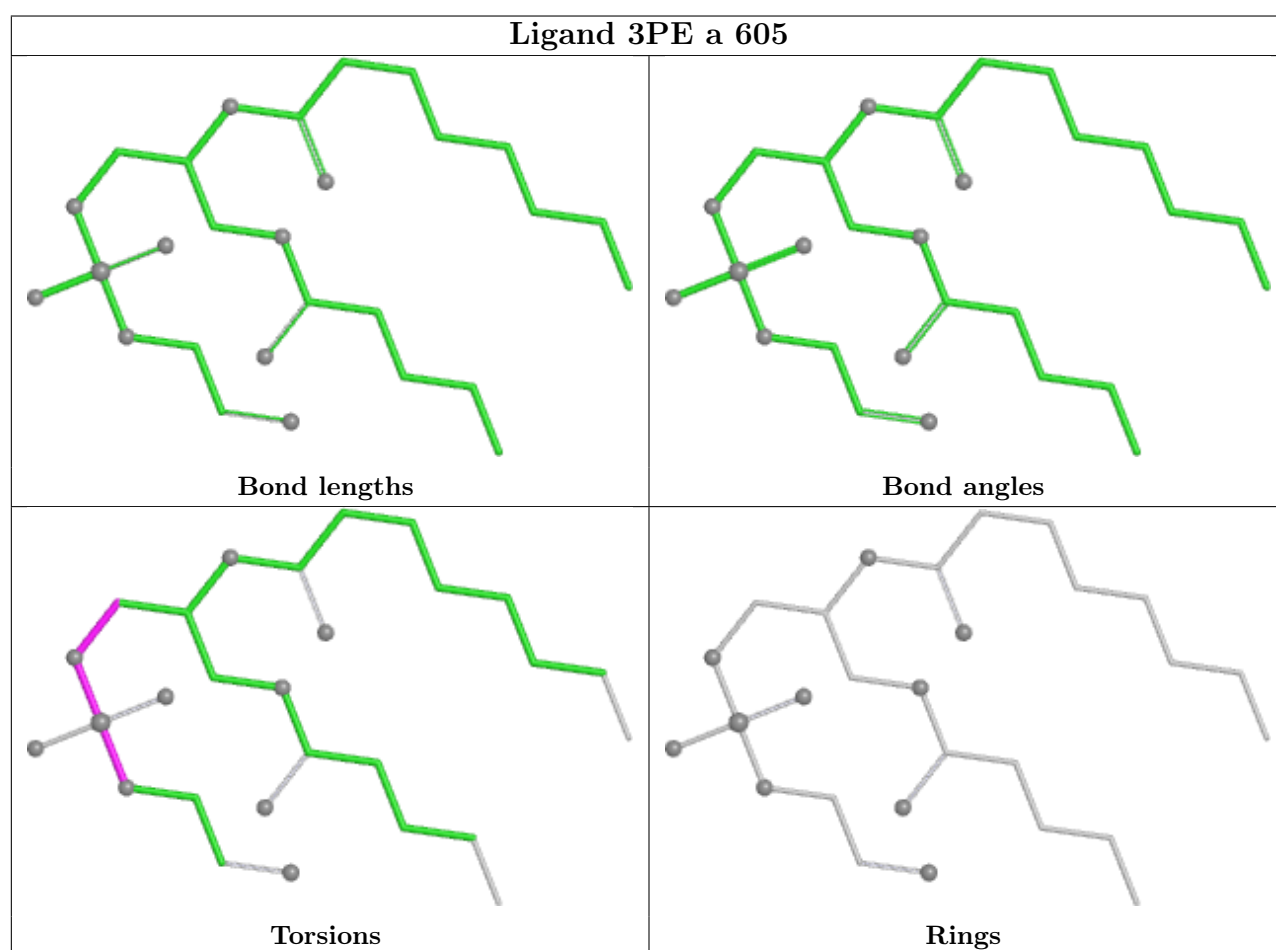
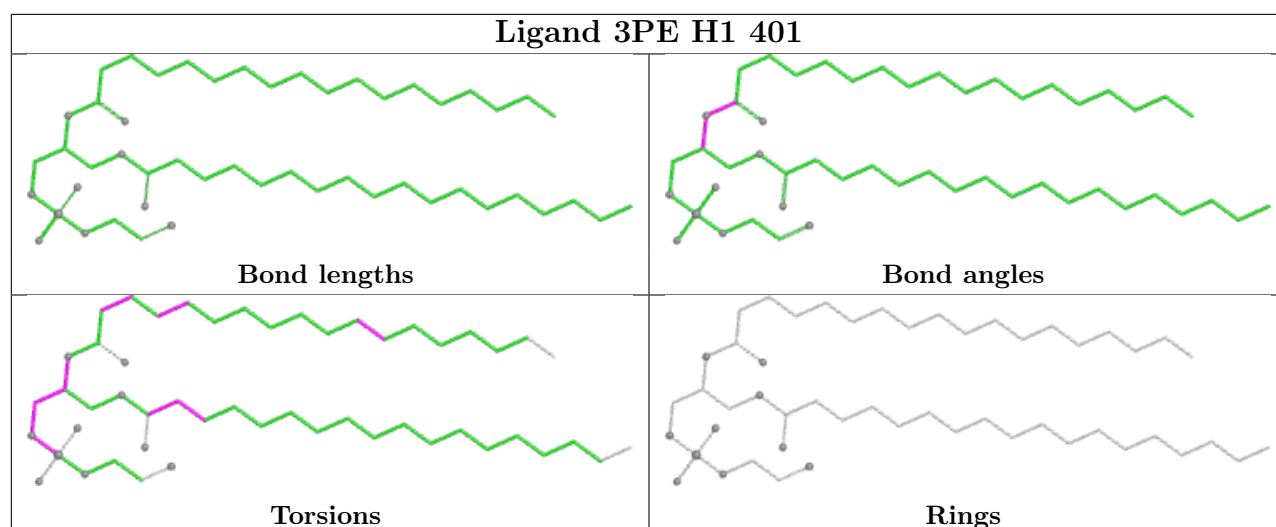


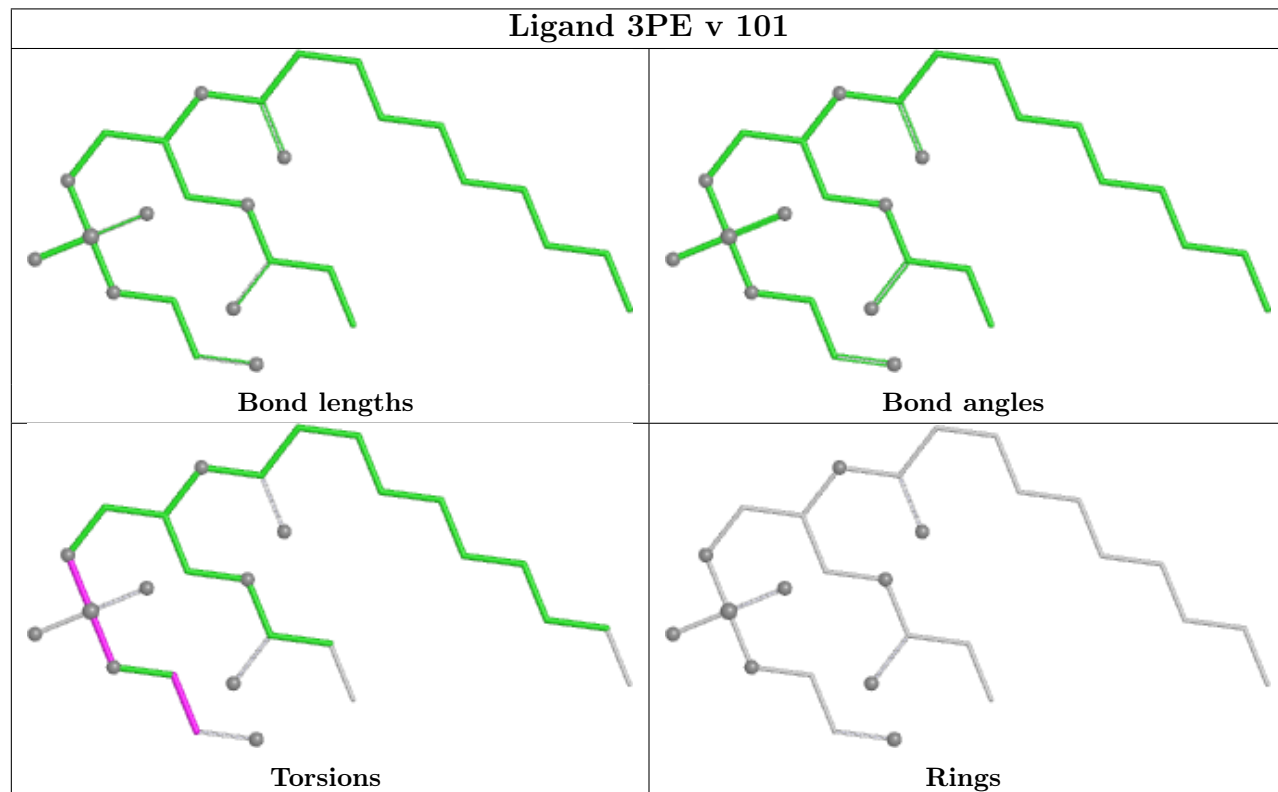
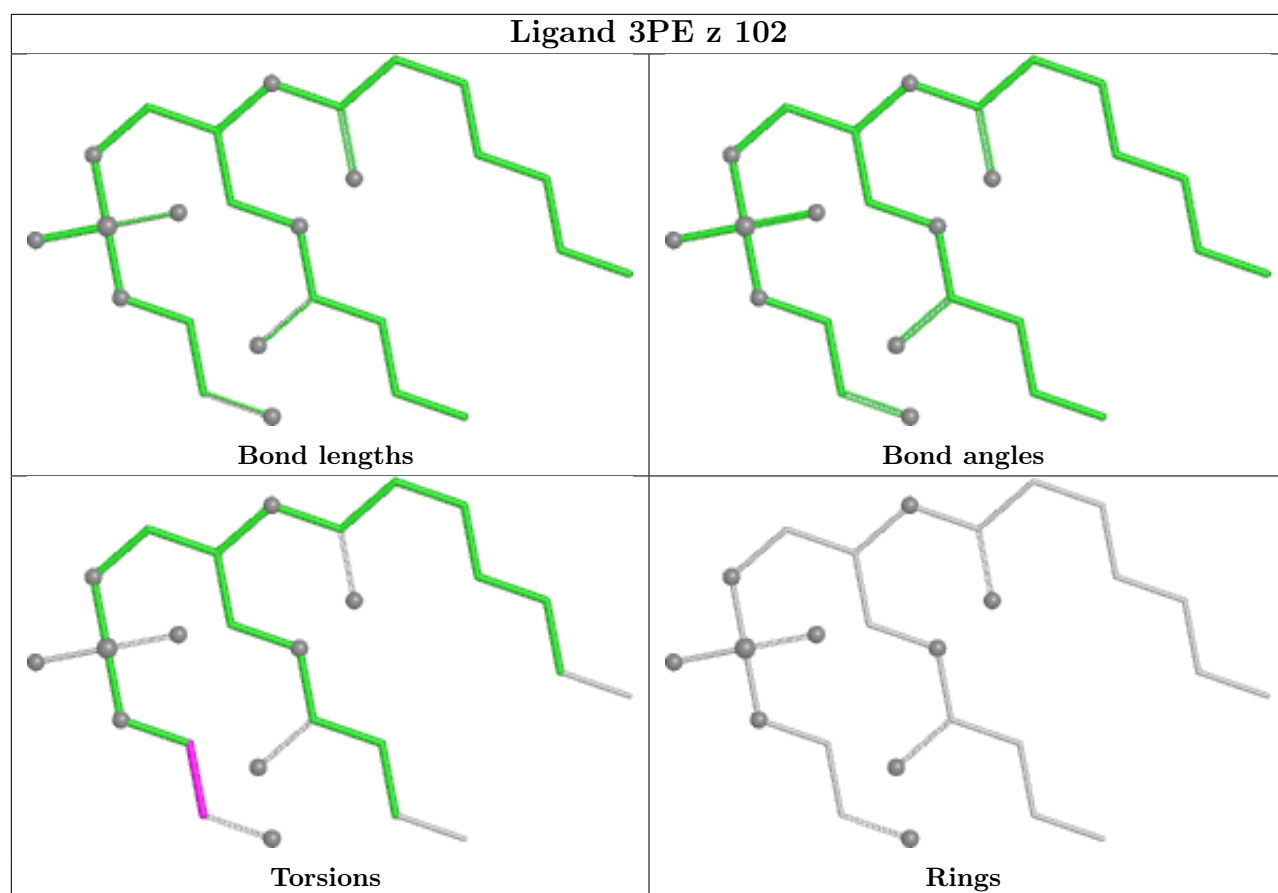


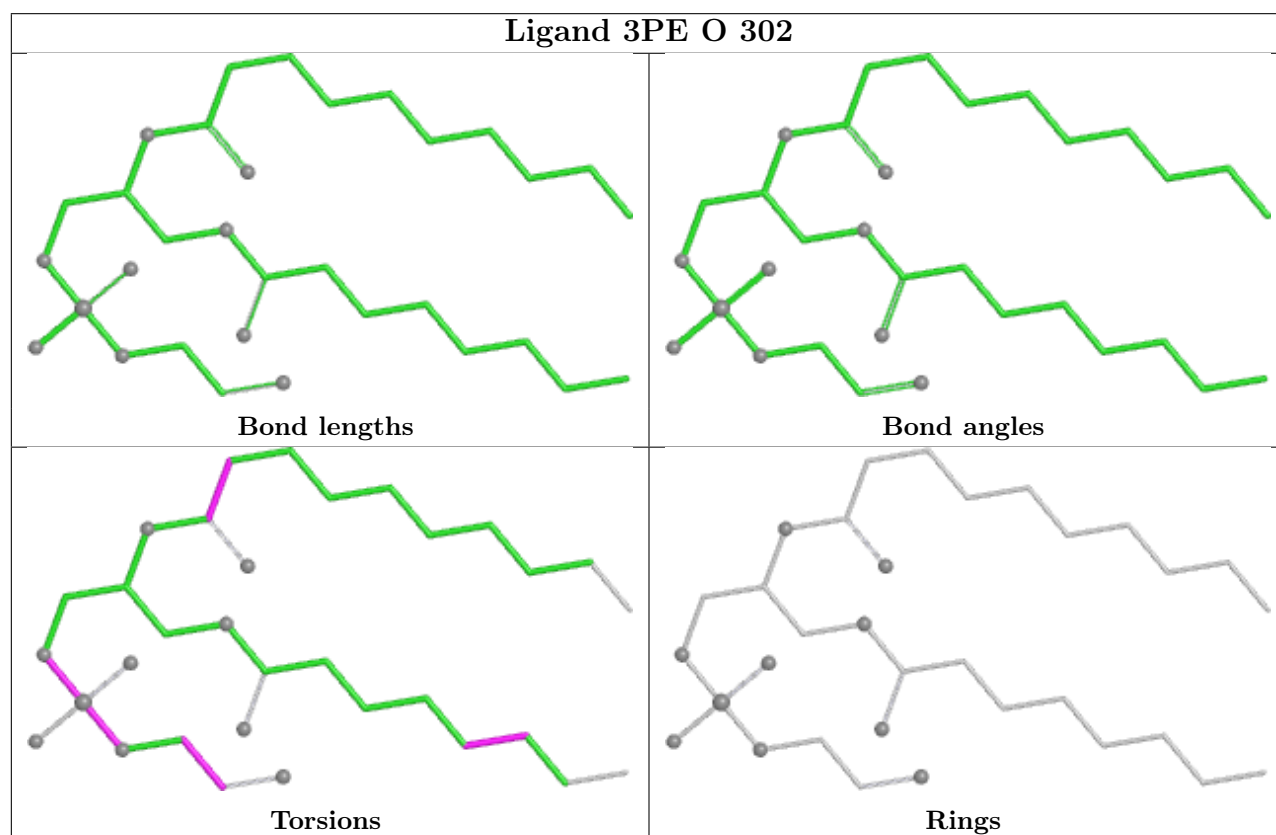
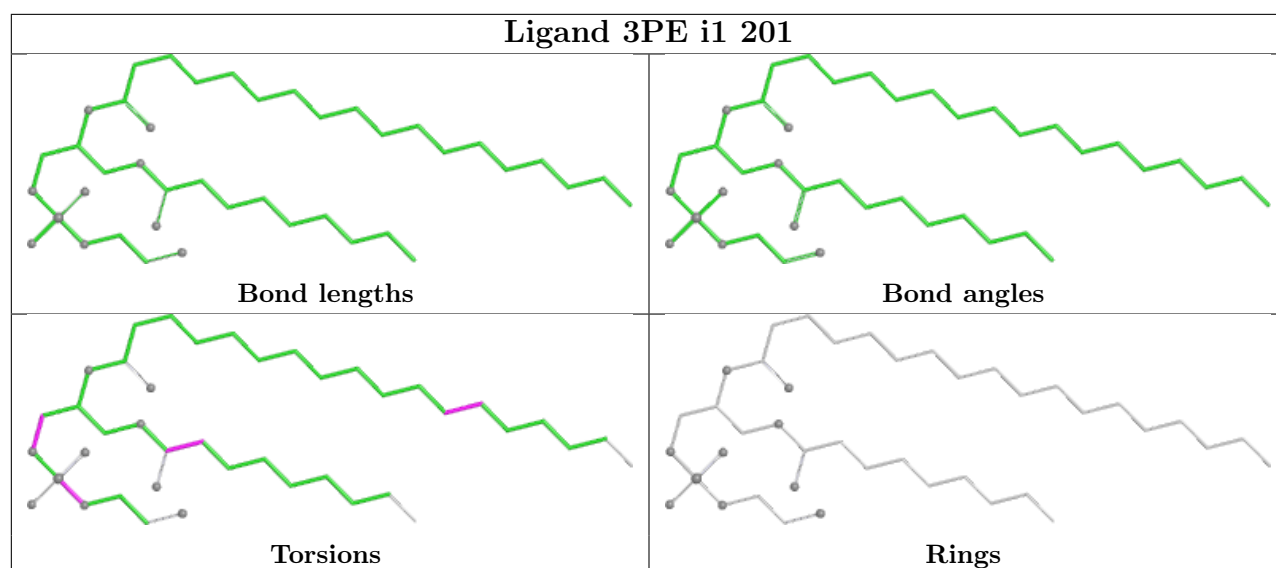


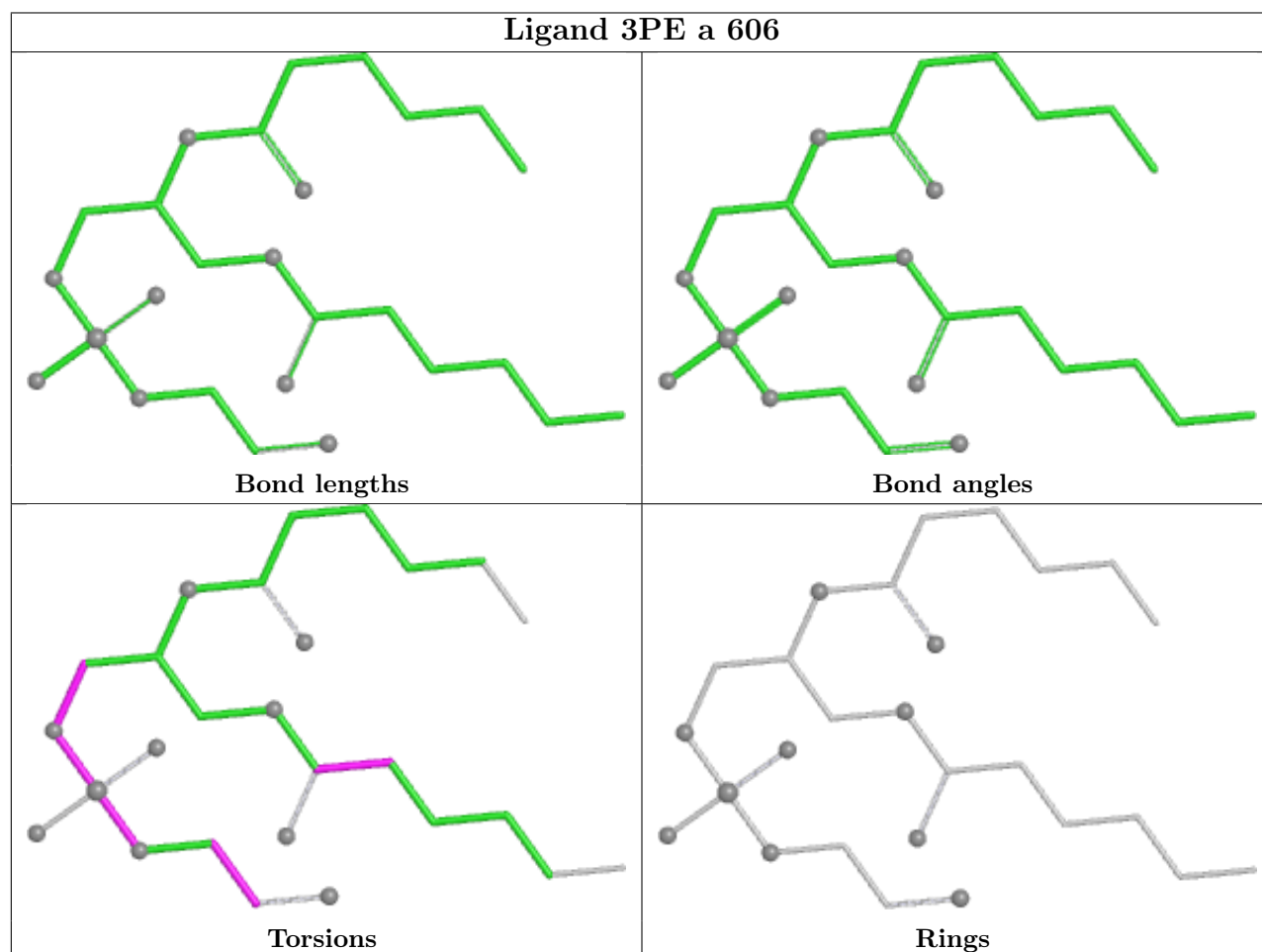
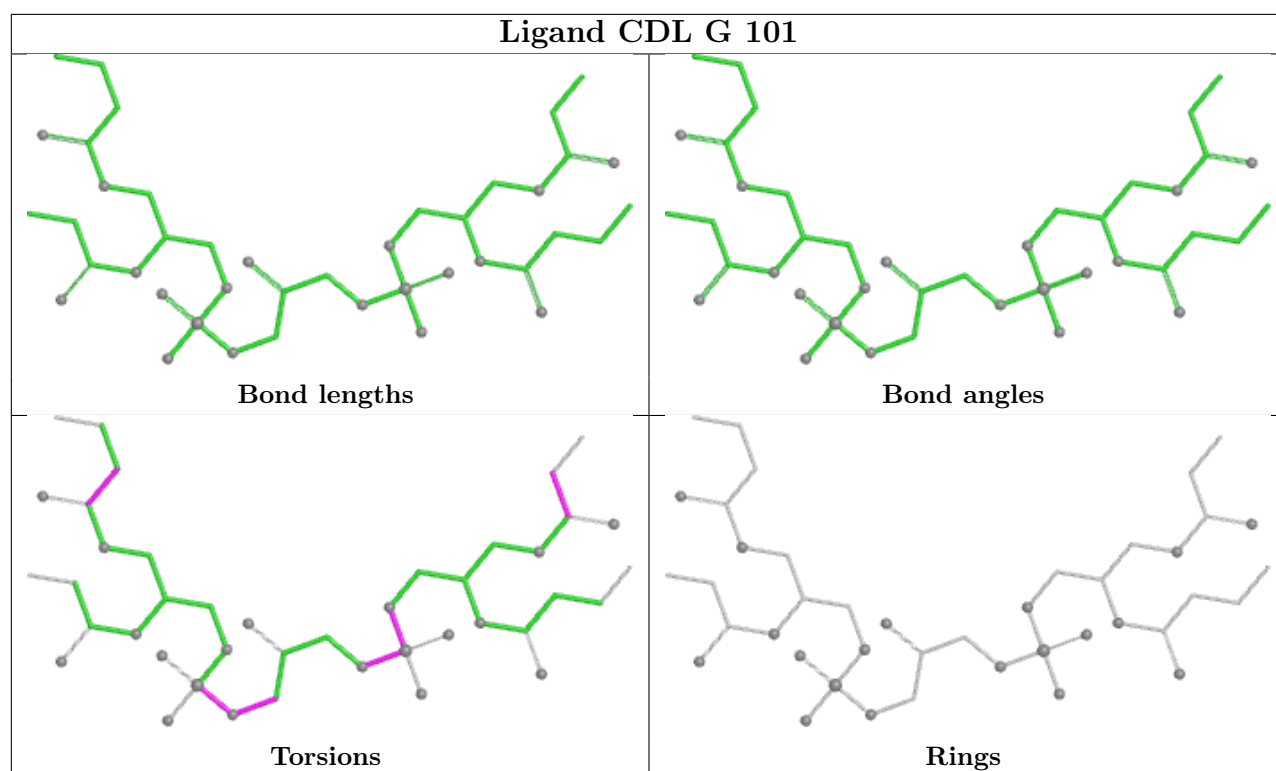


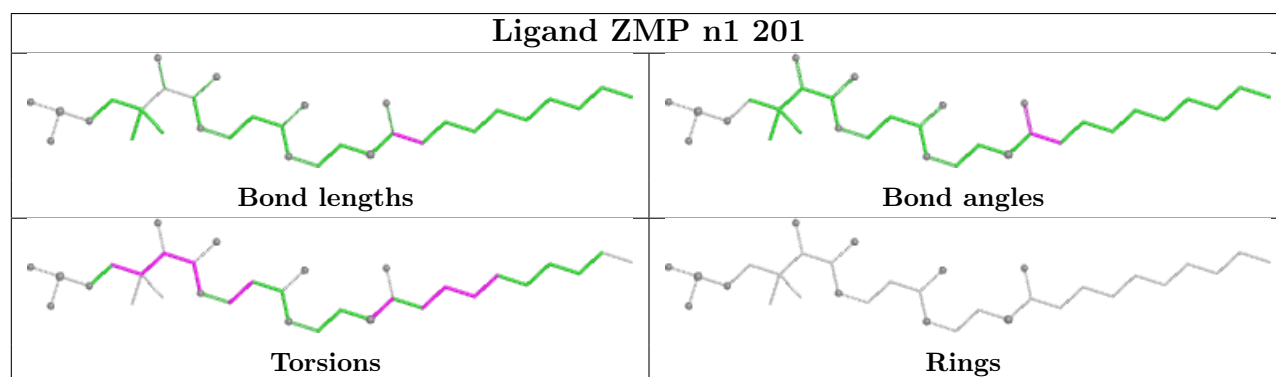
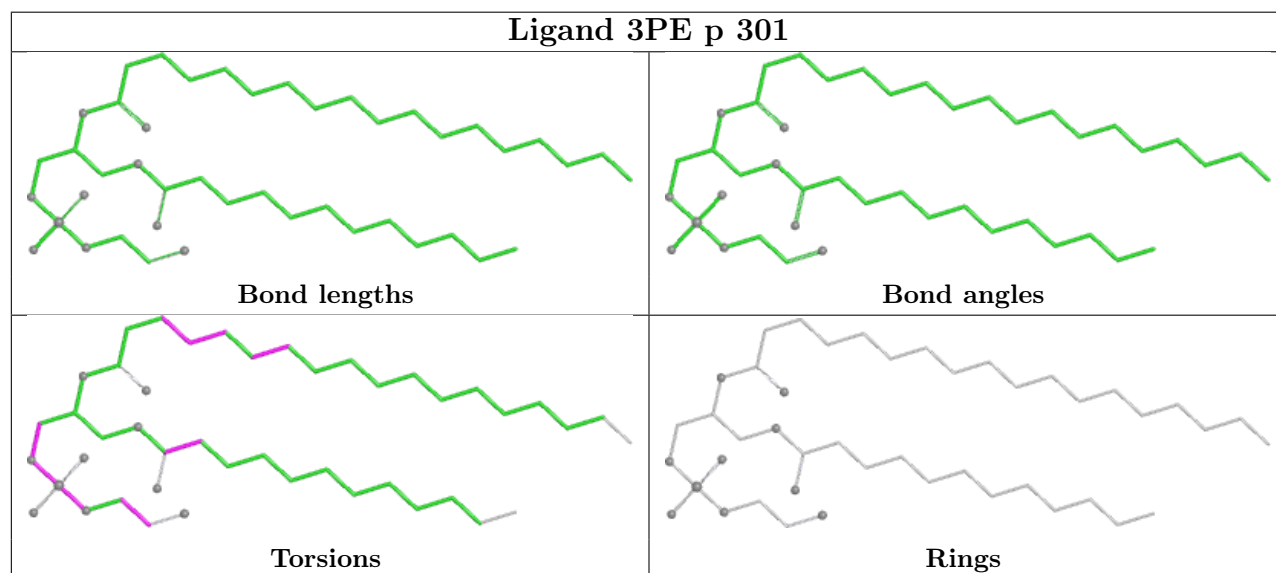
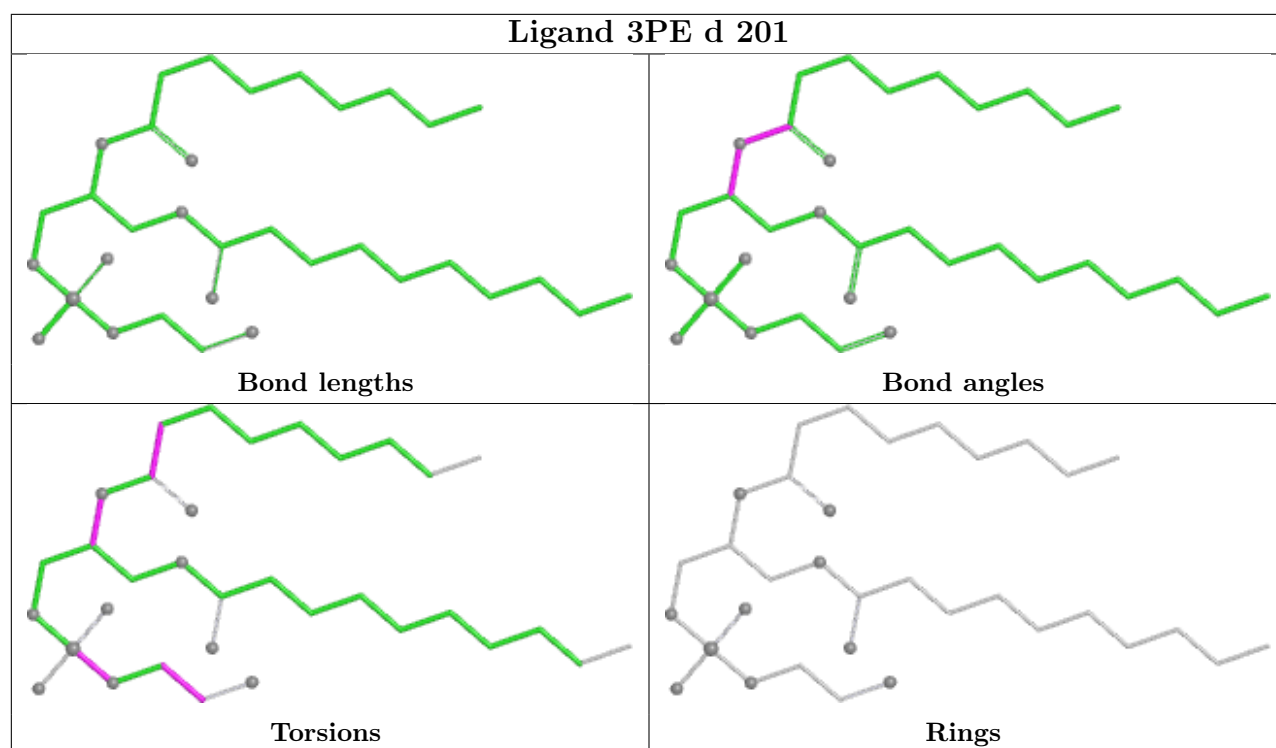


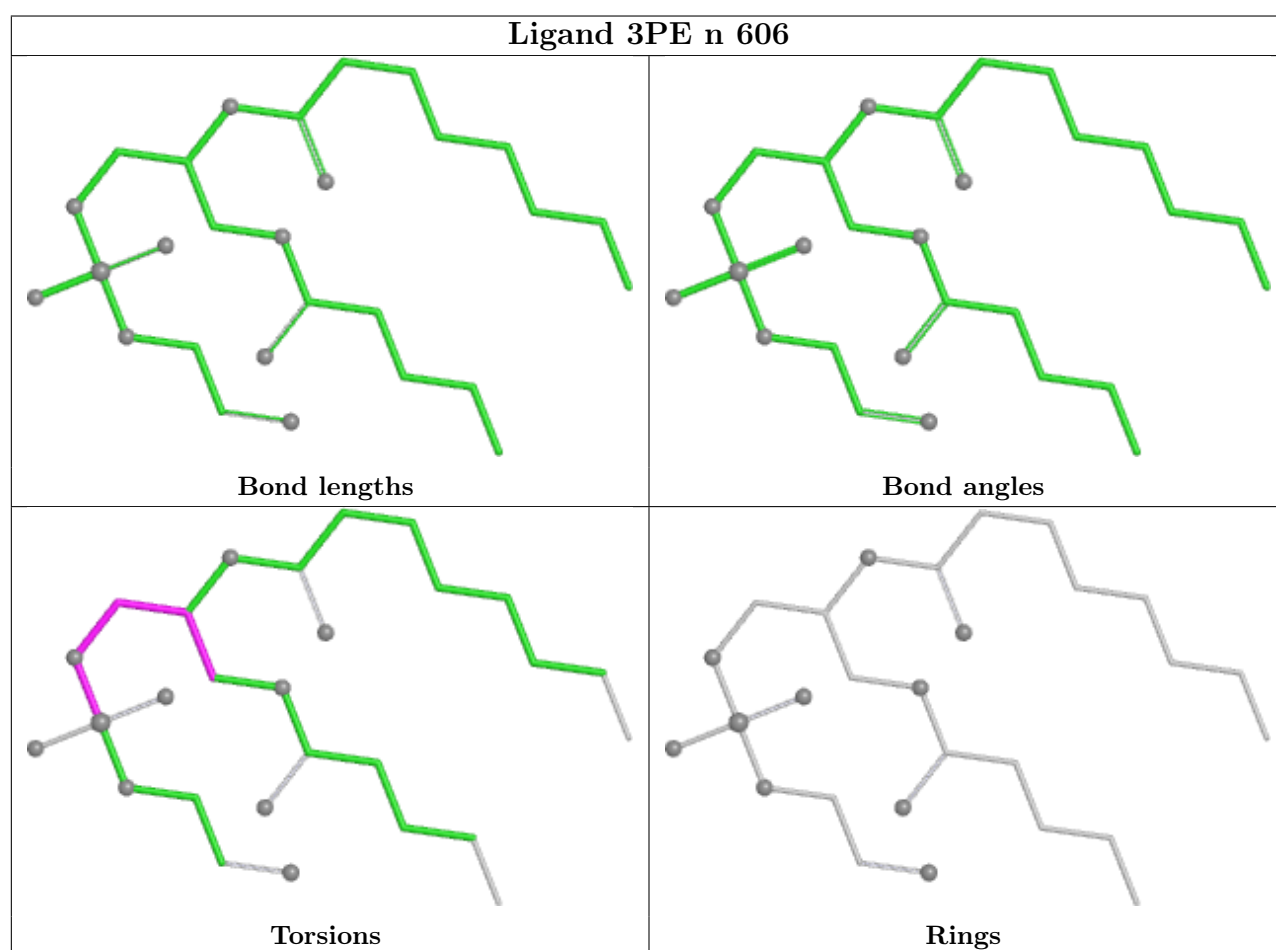
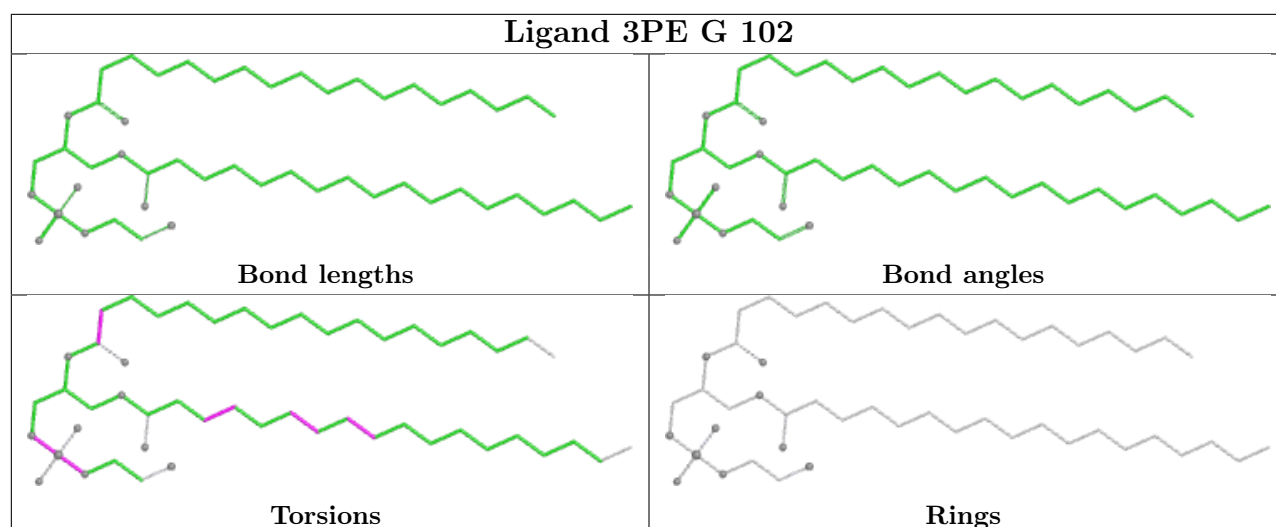


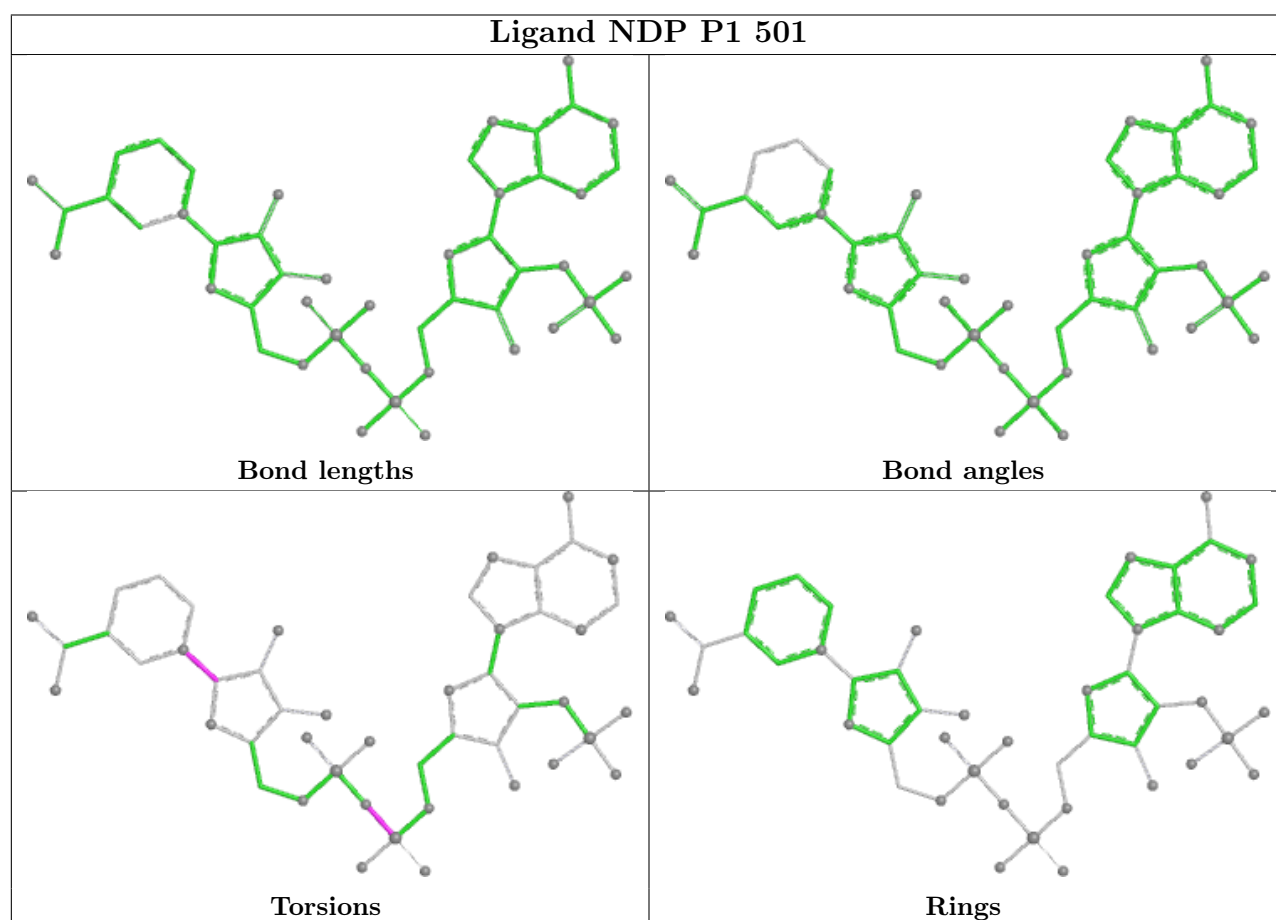
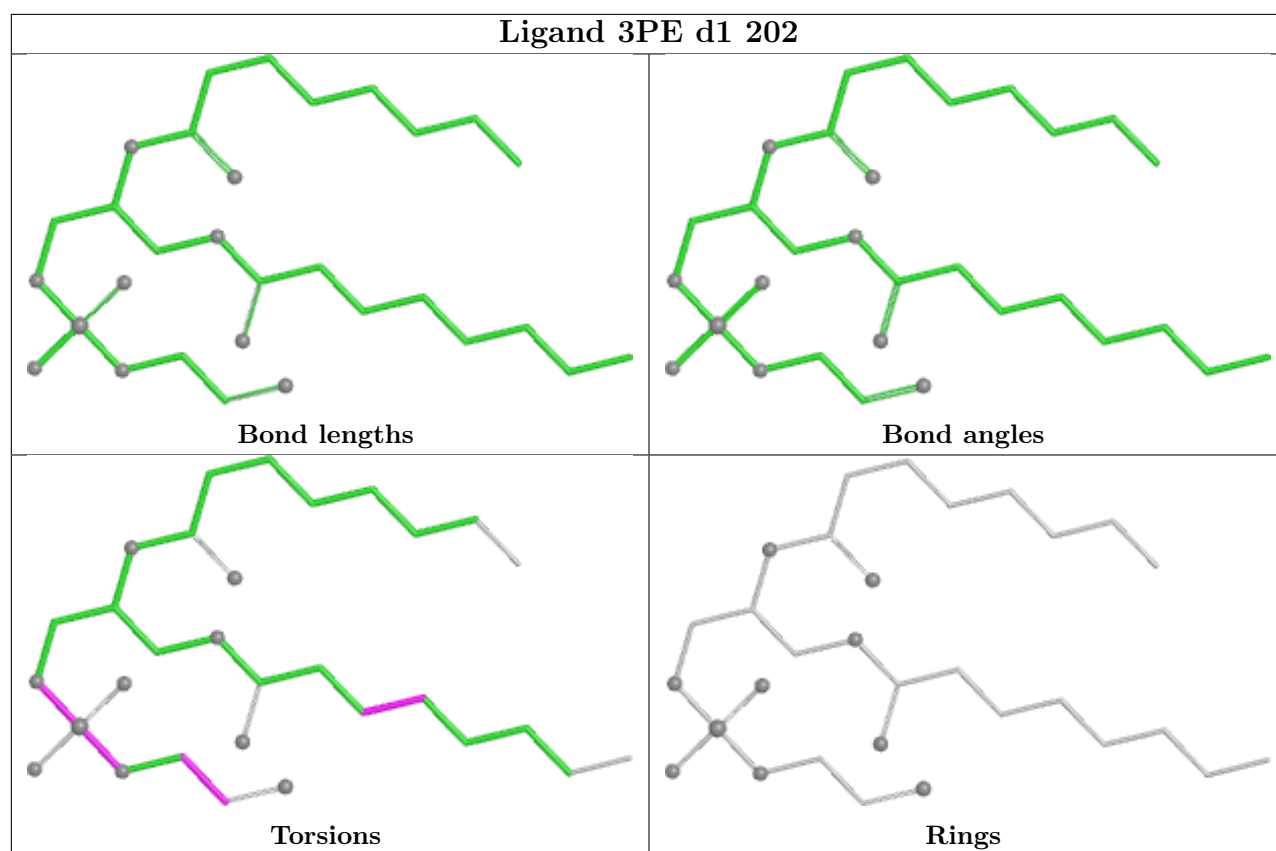


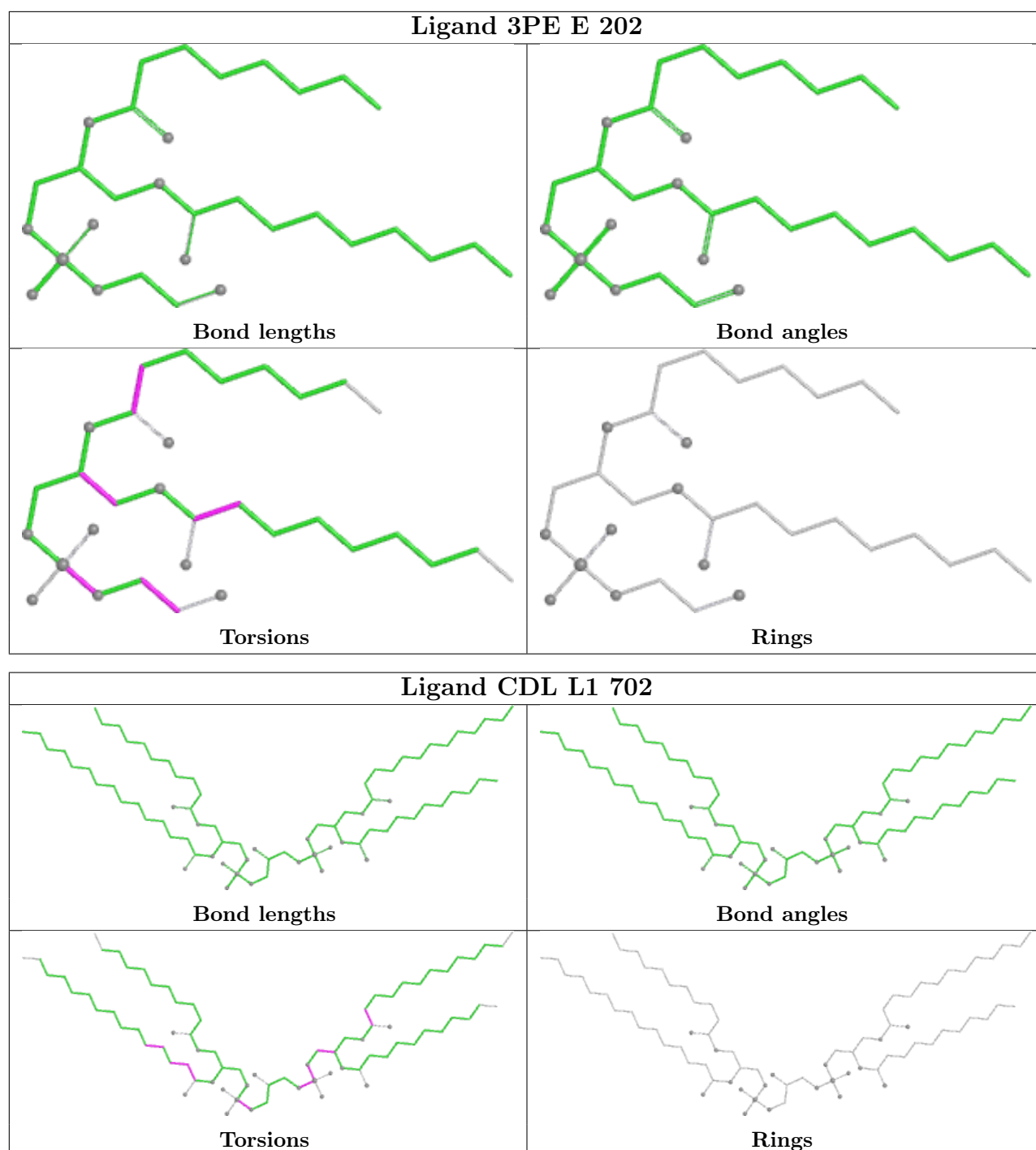


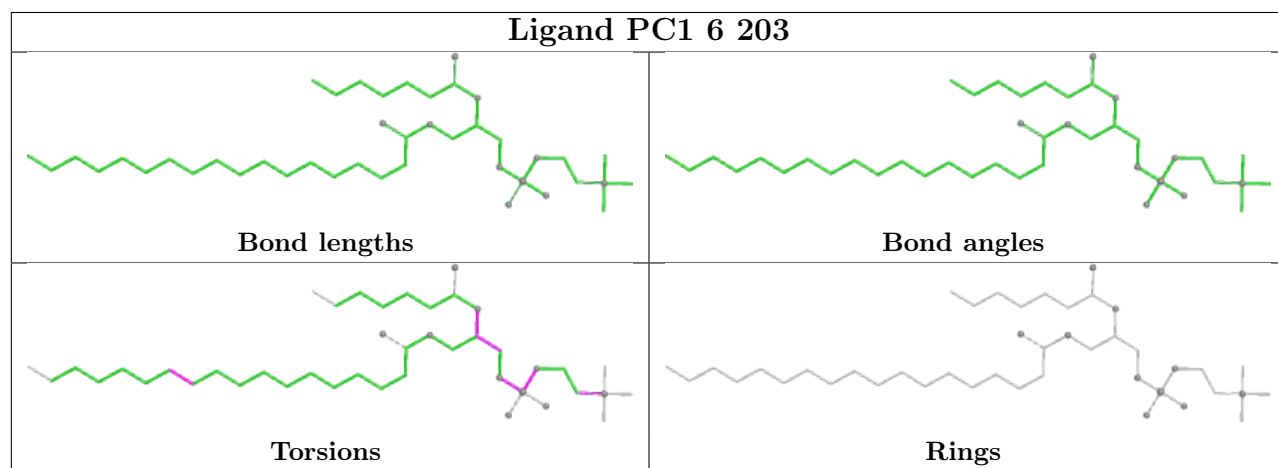
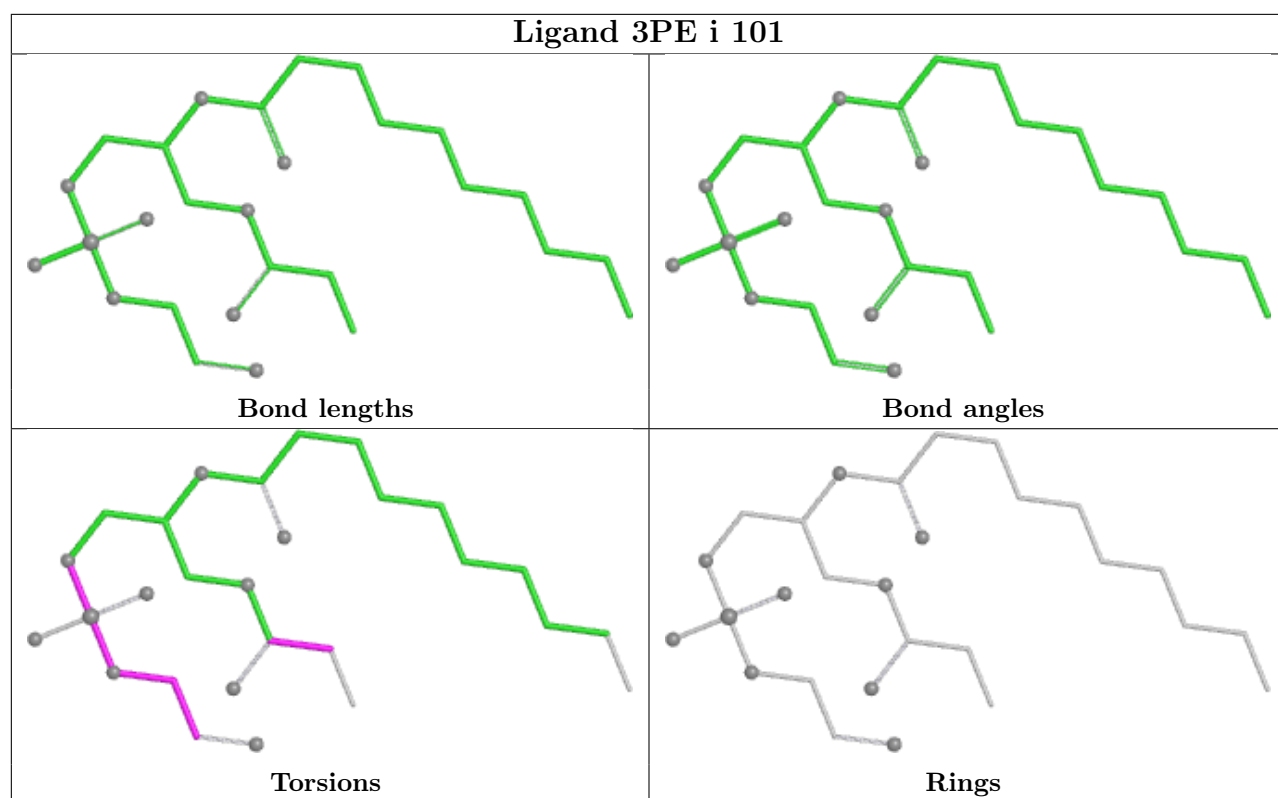


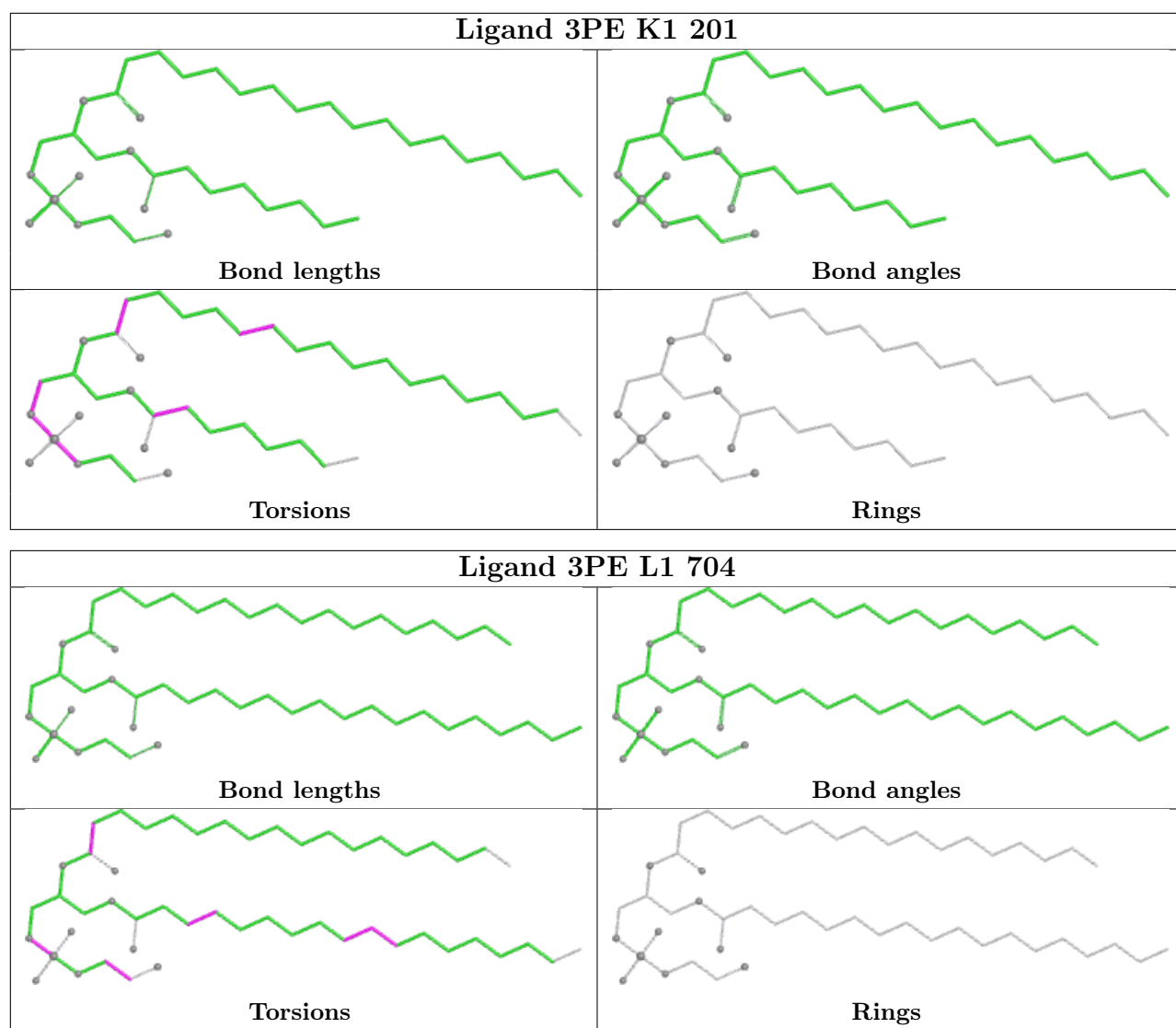




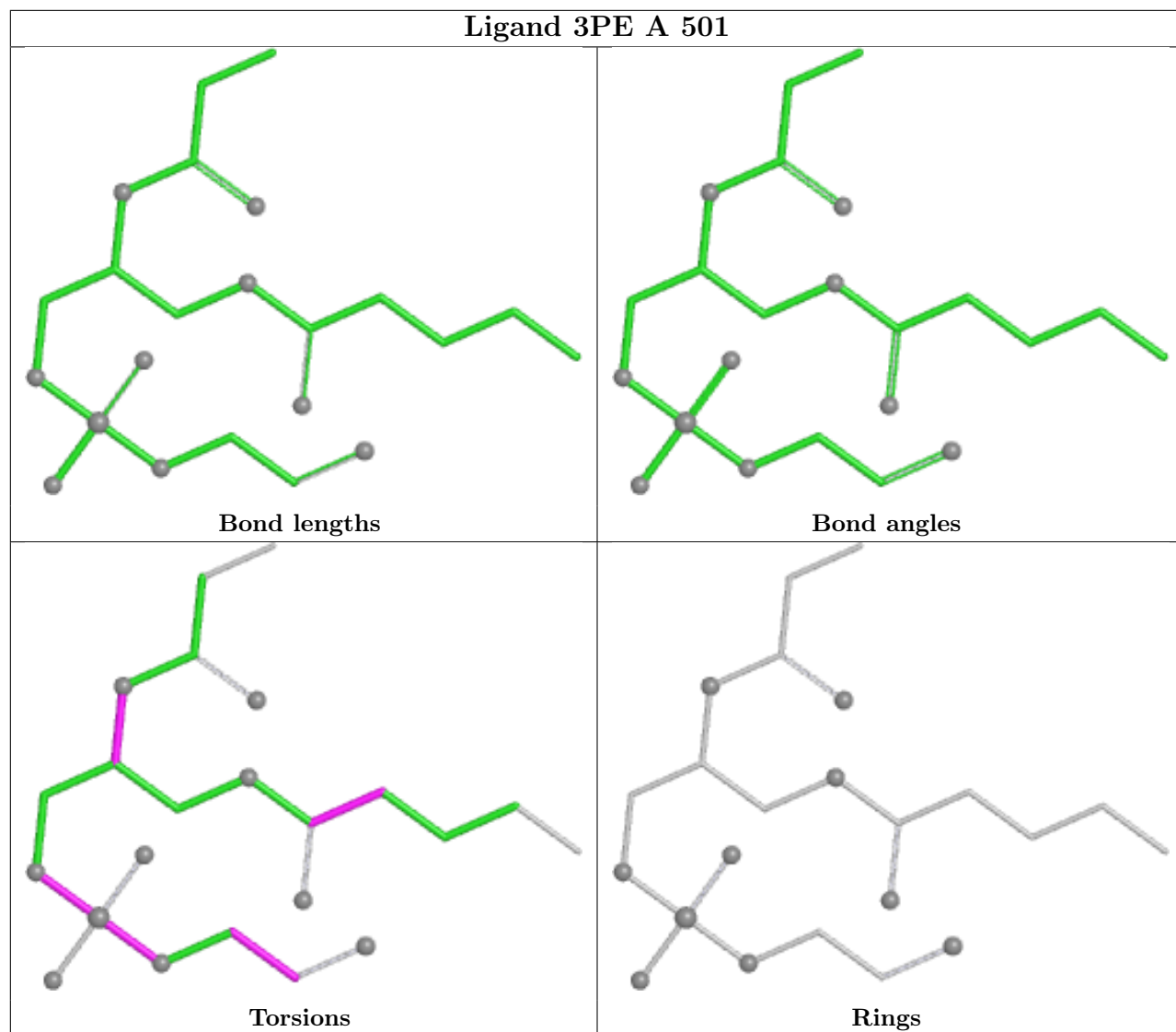




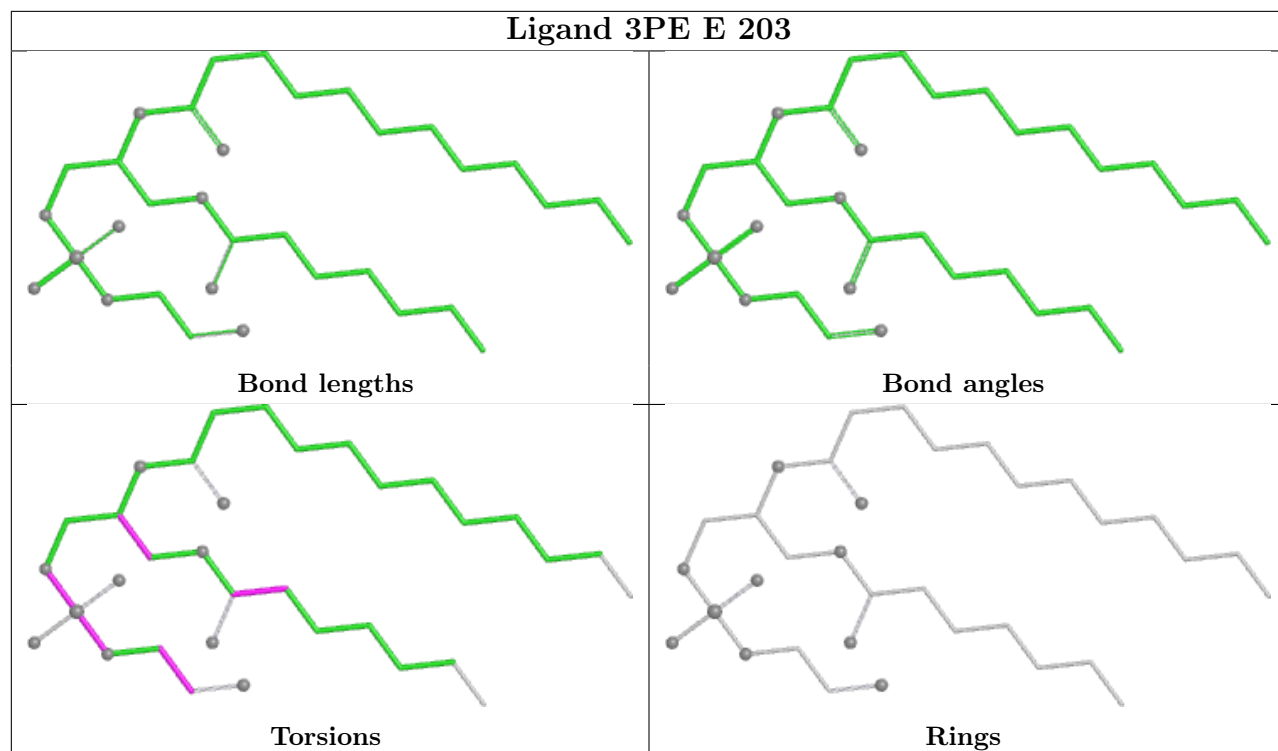




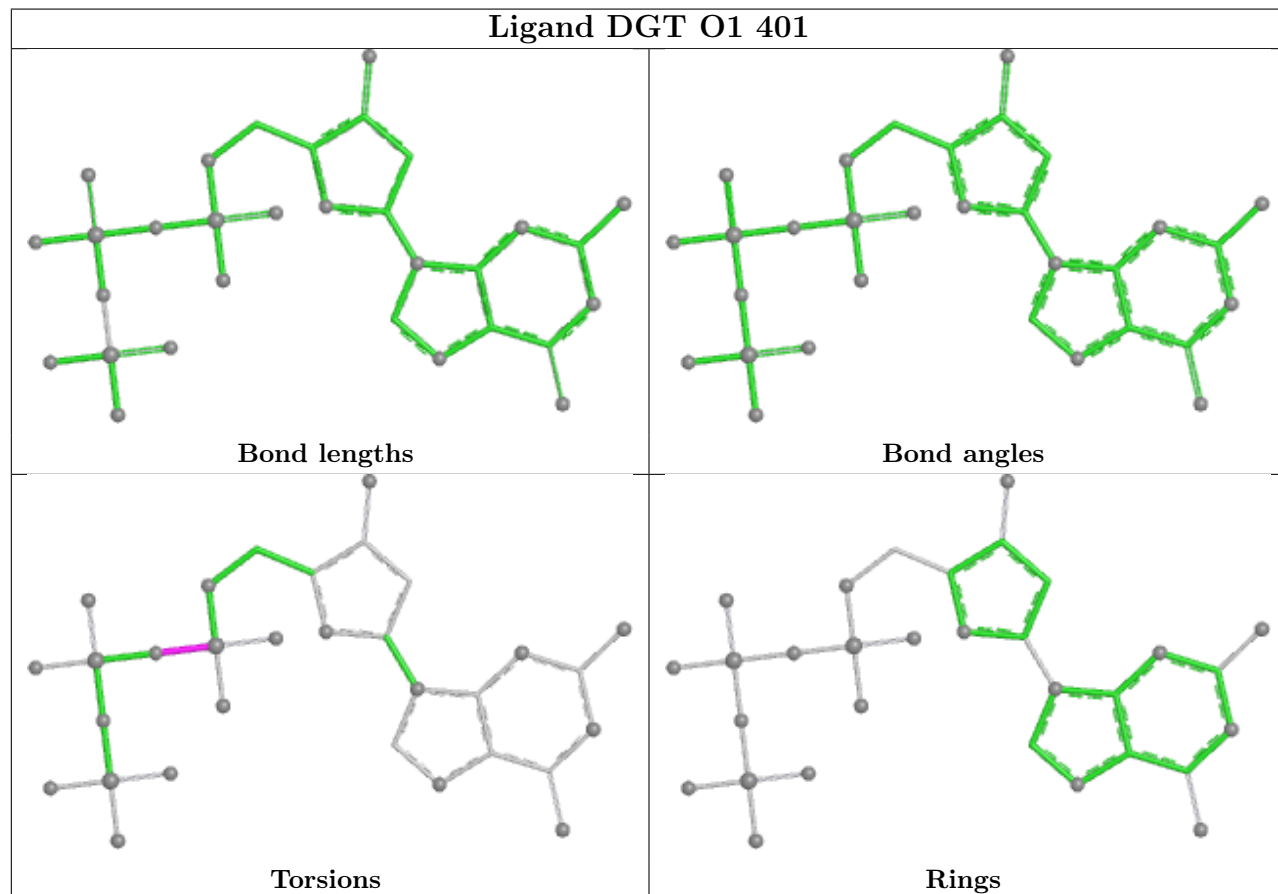
Ligand 3PE A 501

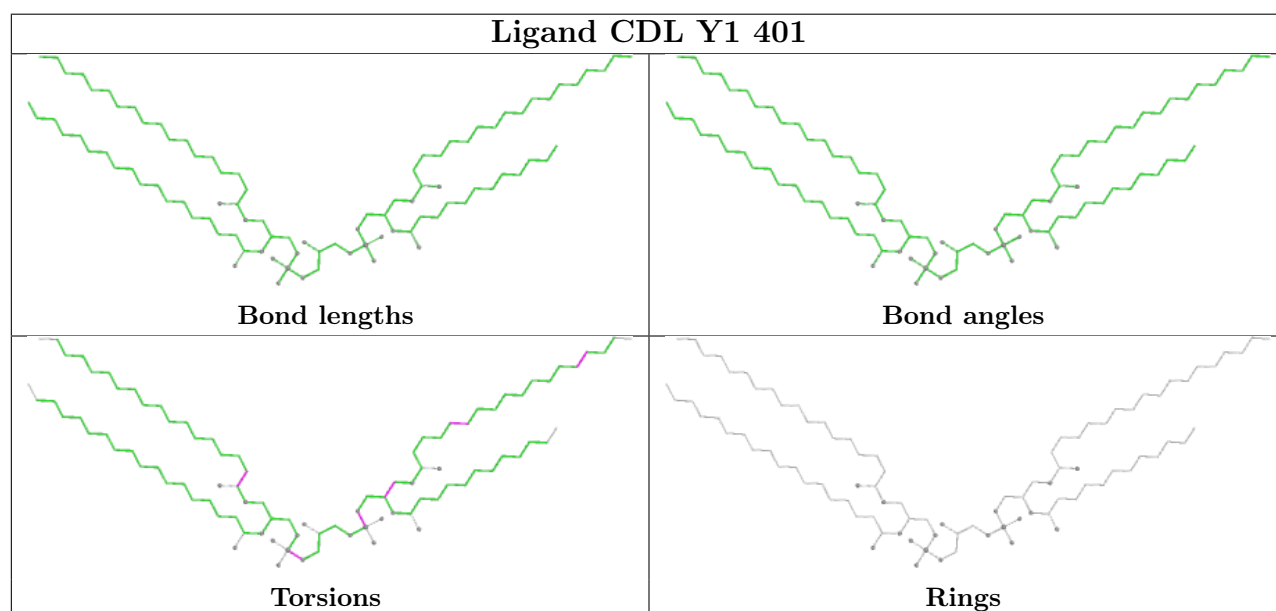
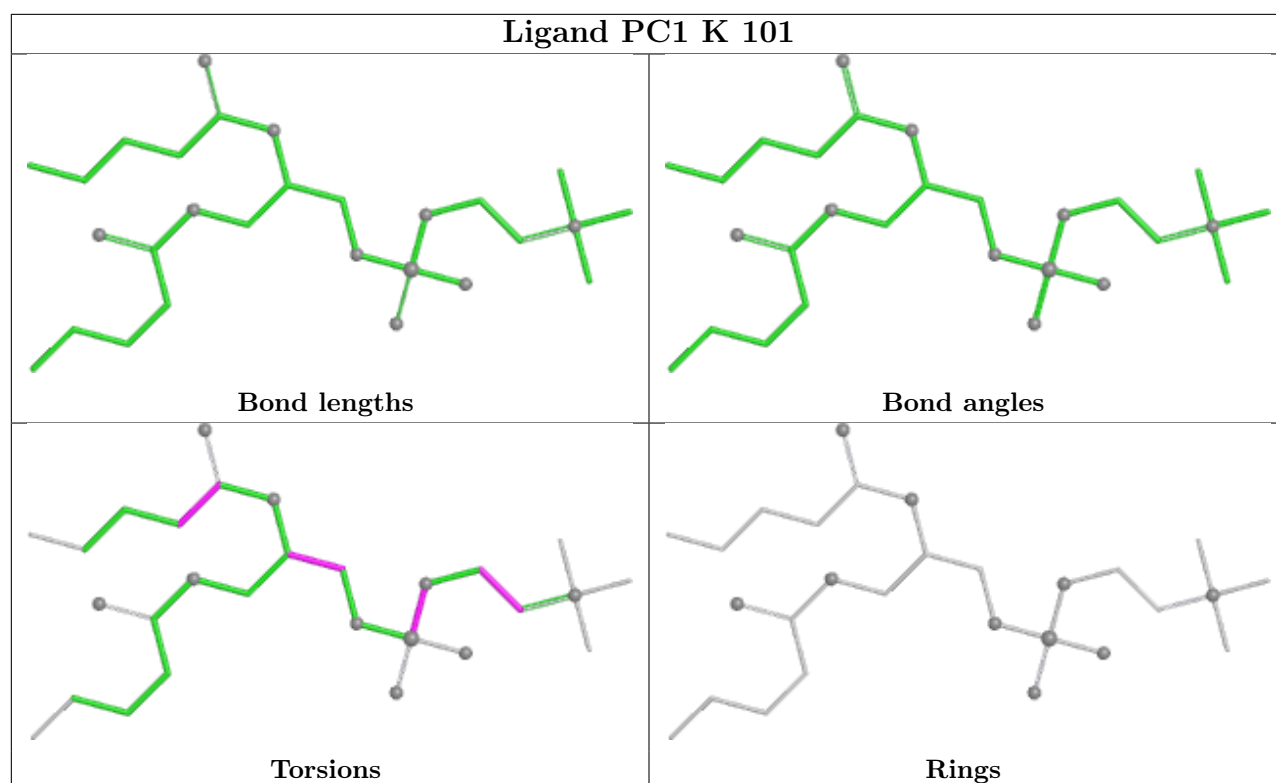


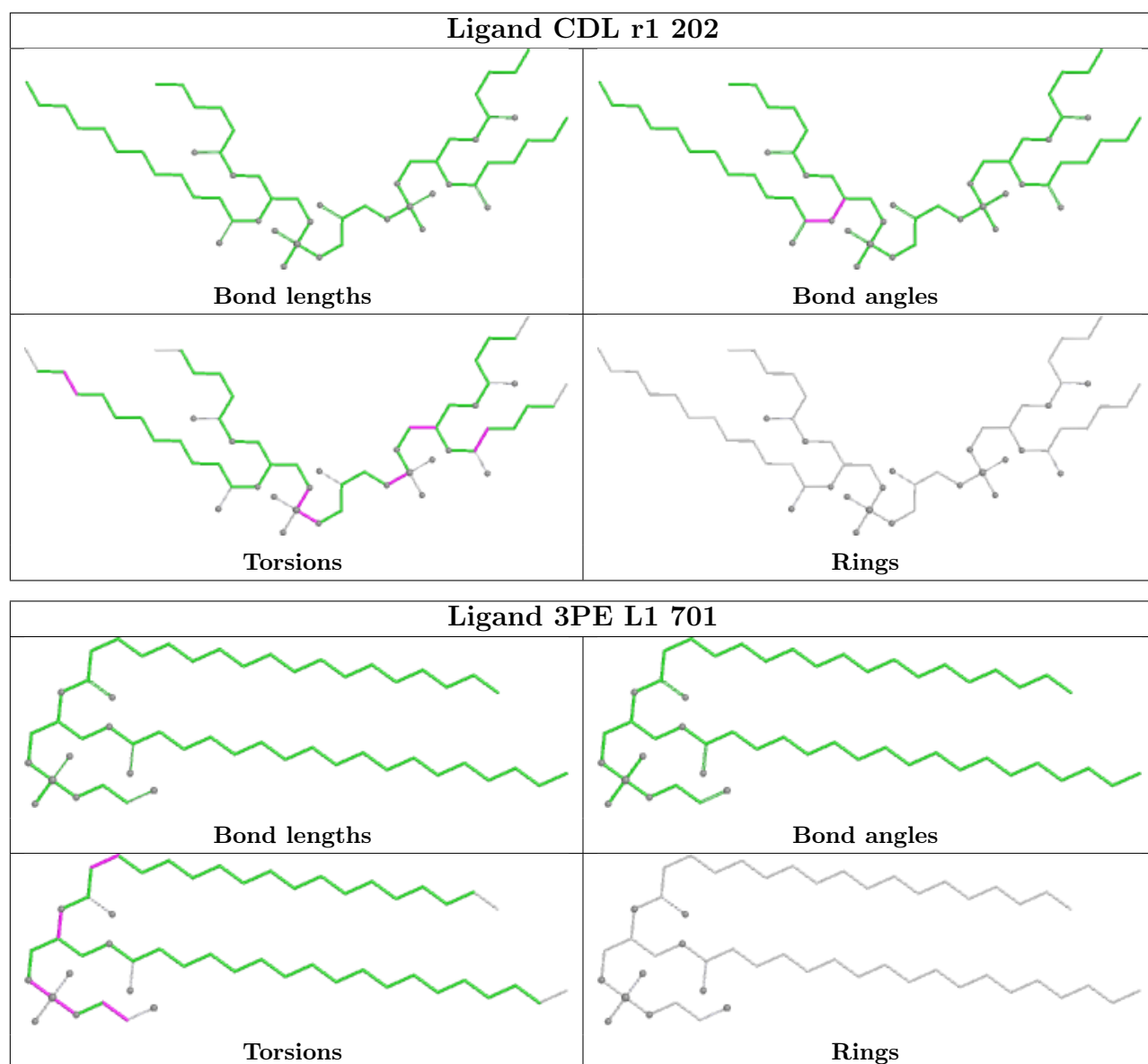
Ligand 3PE E 203

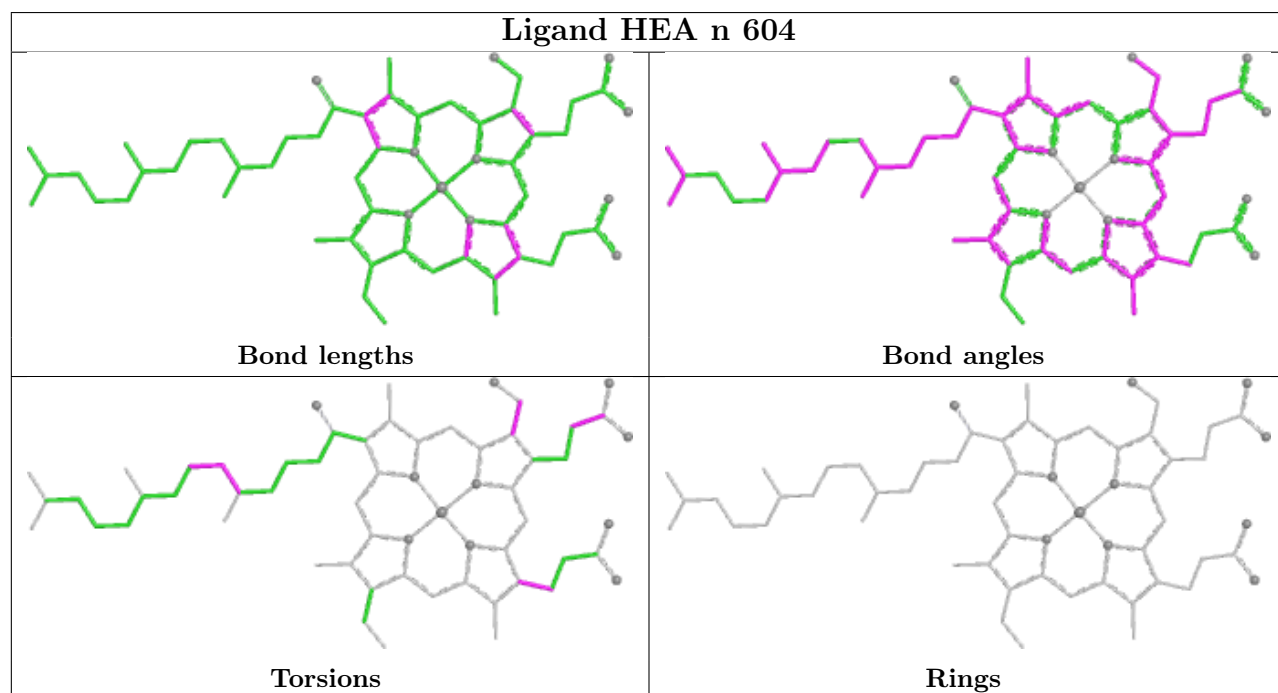
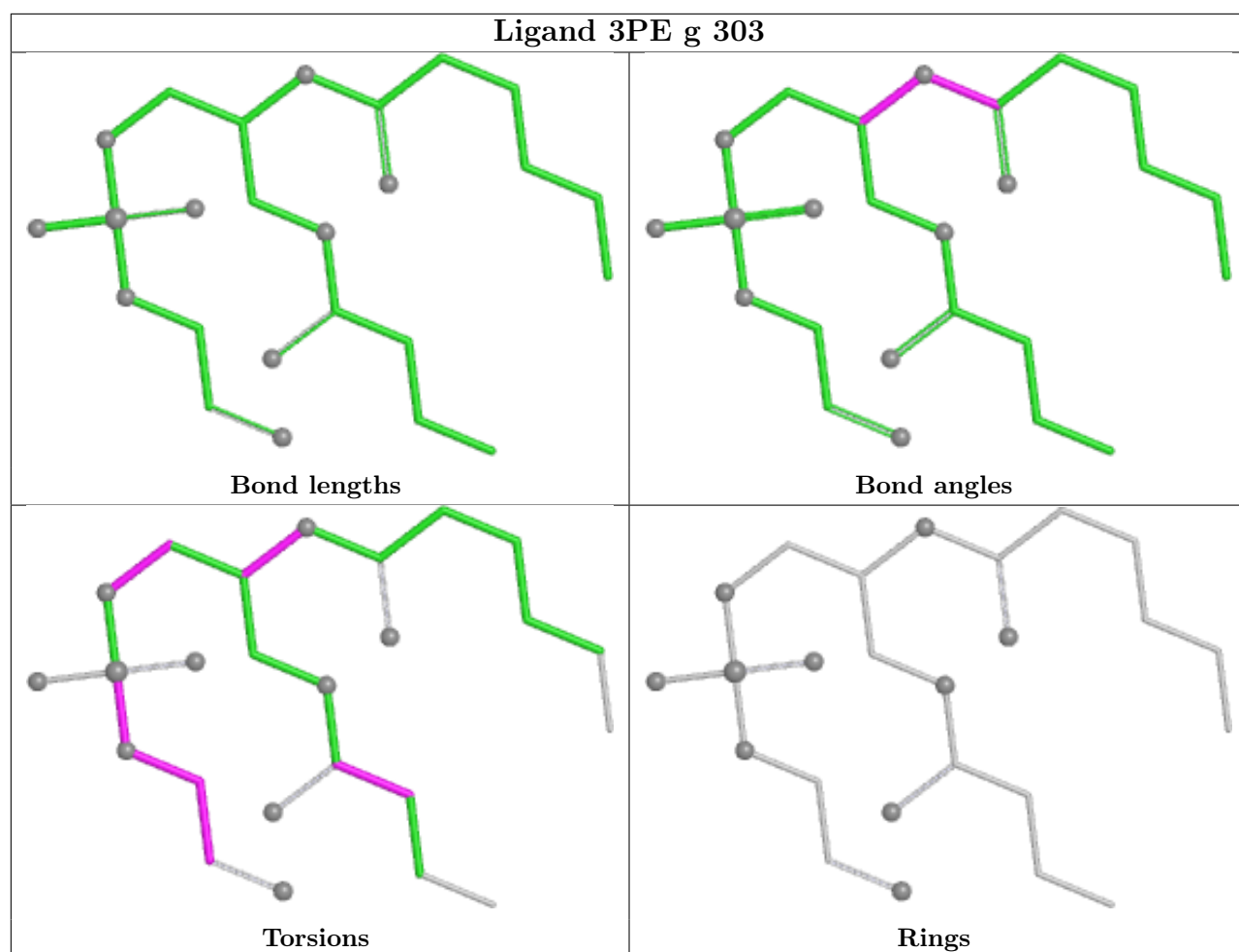


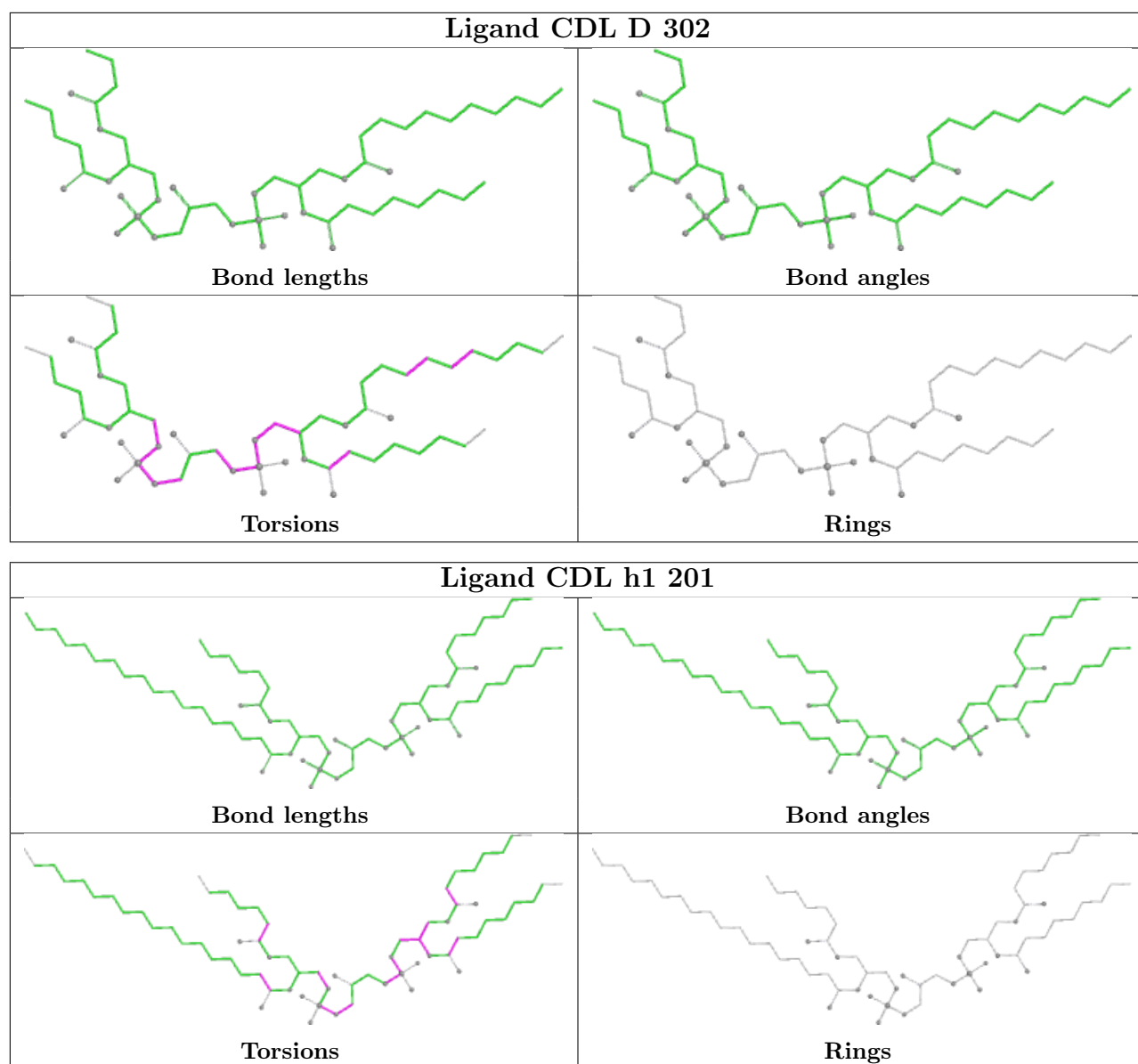
Ligand DGT O1 401

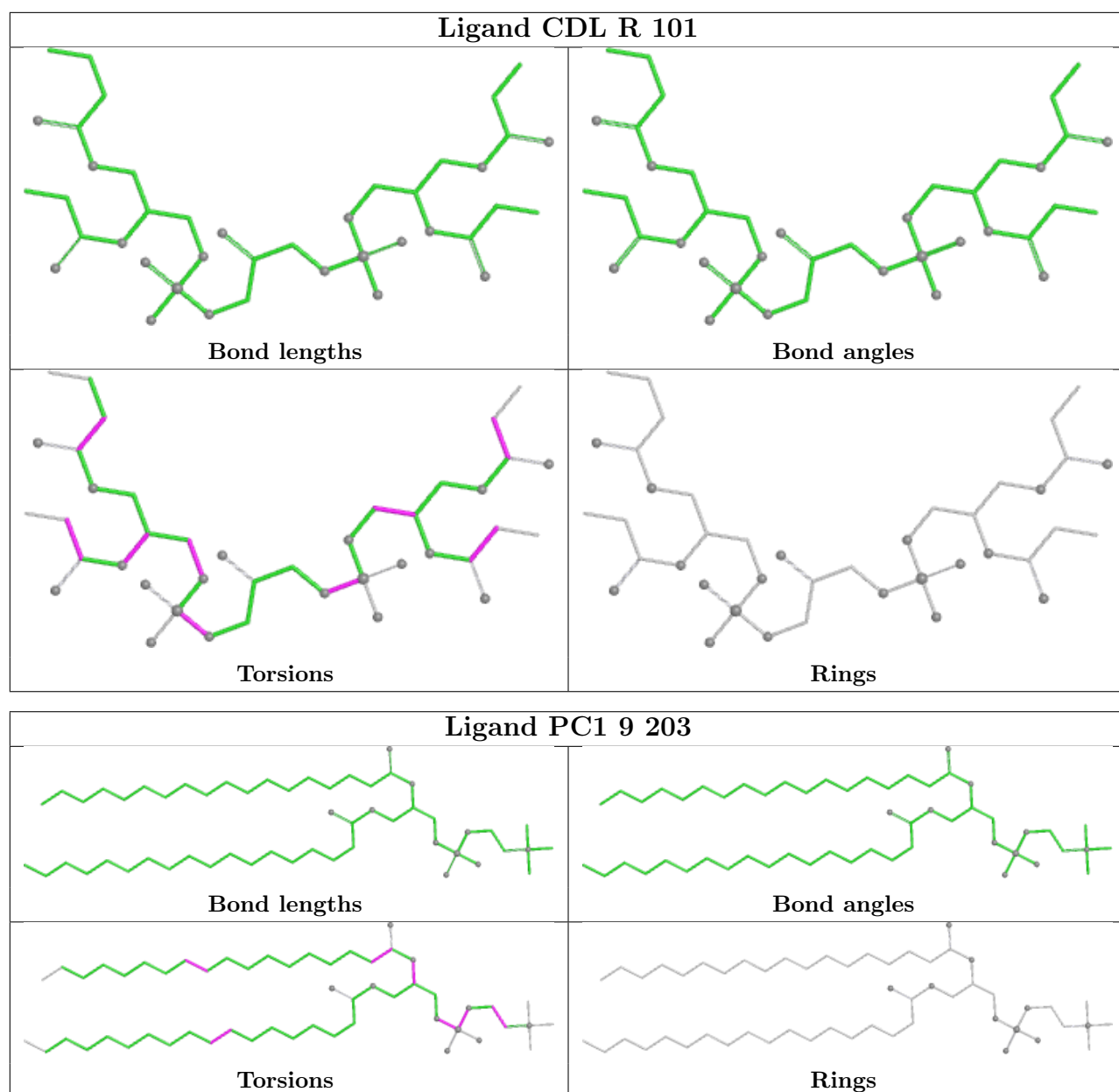


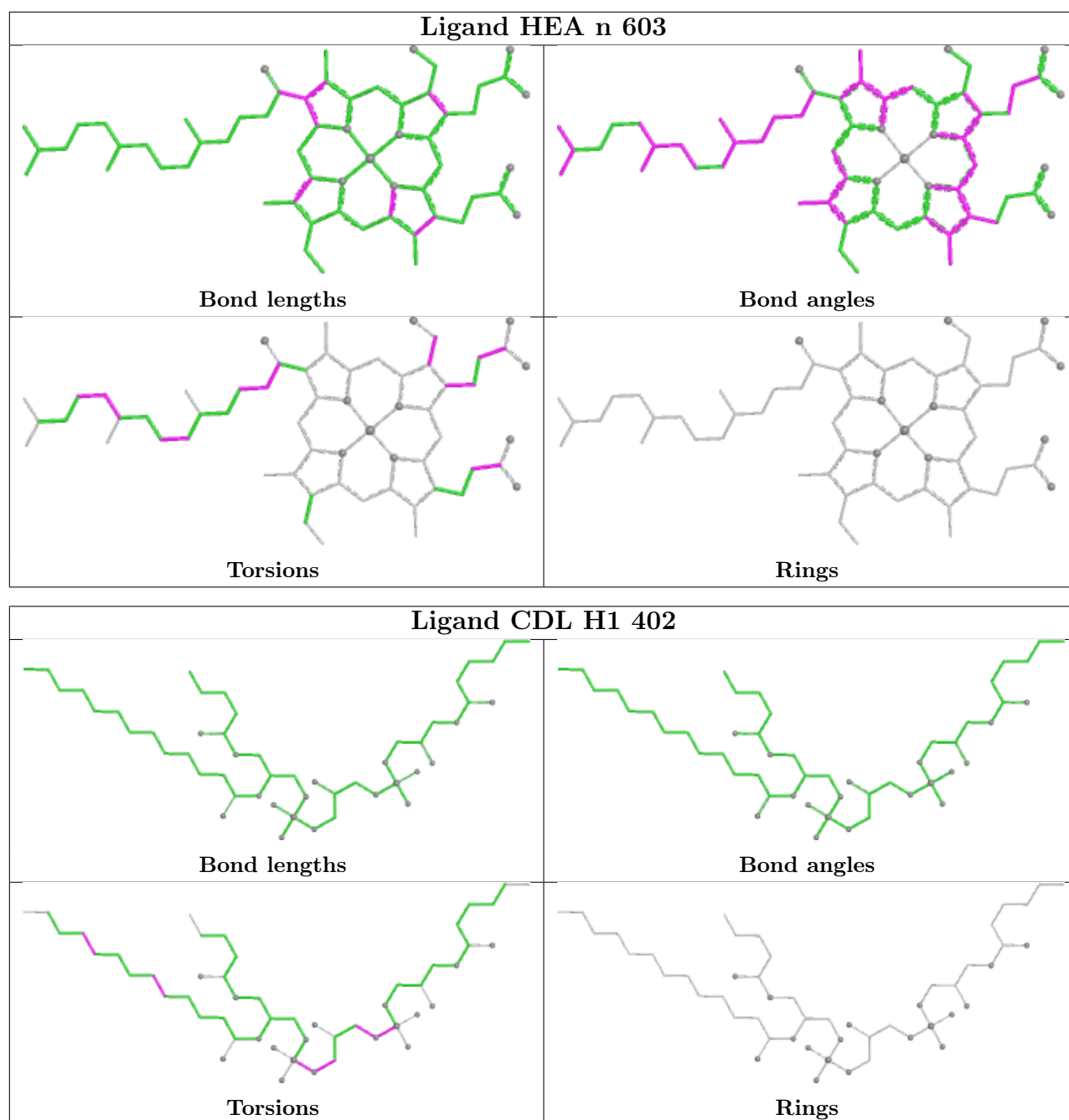


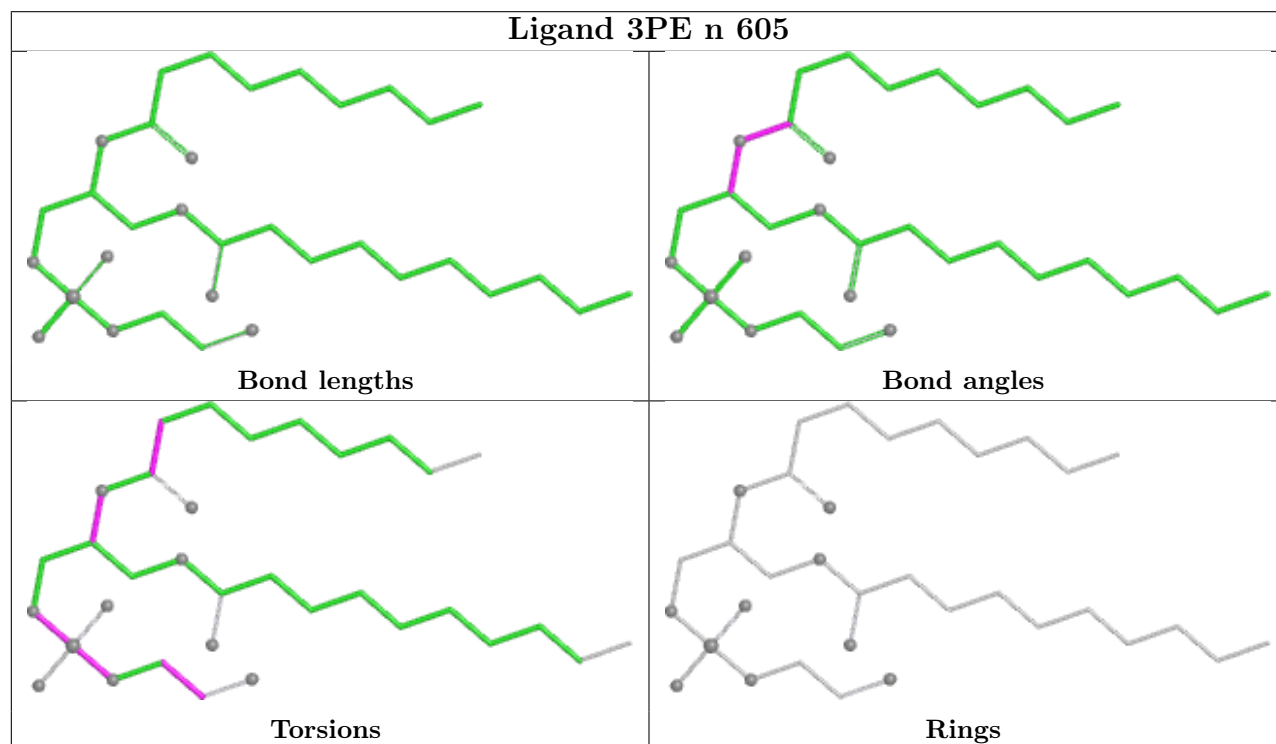
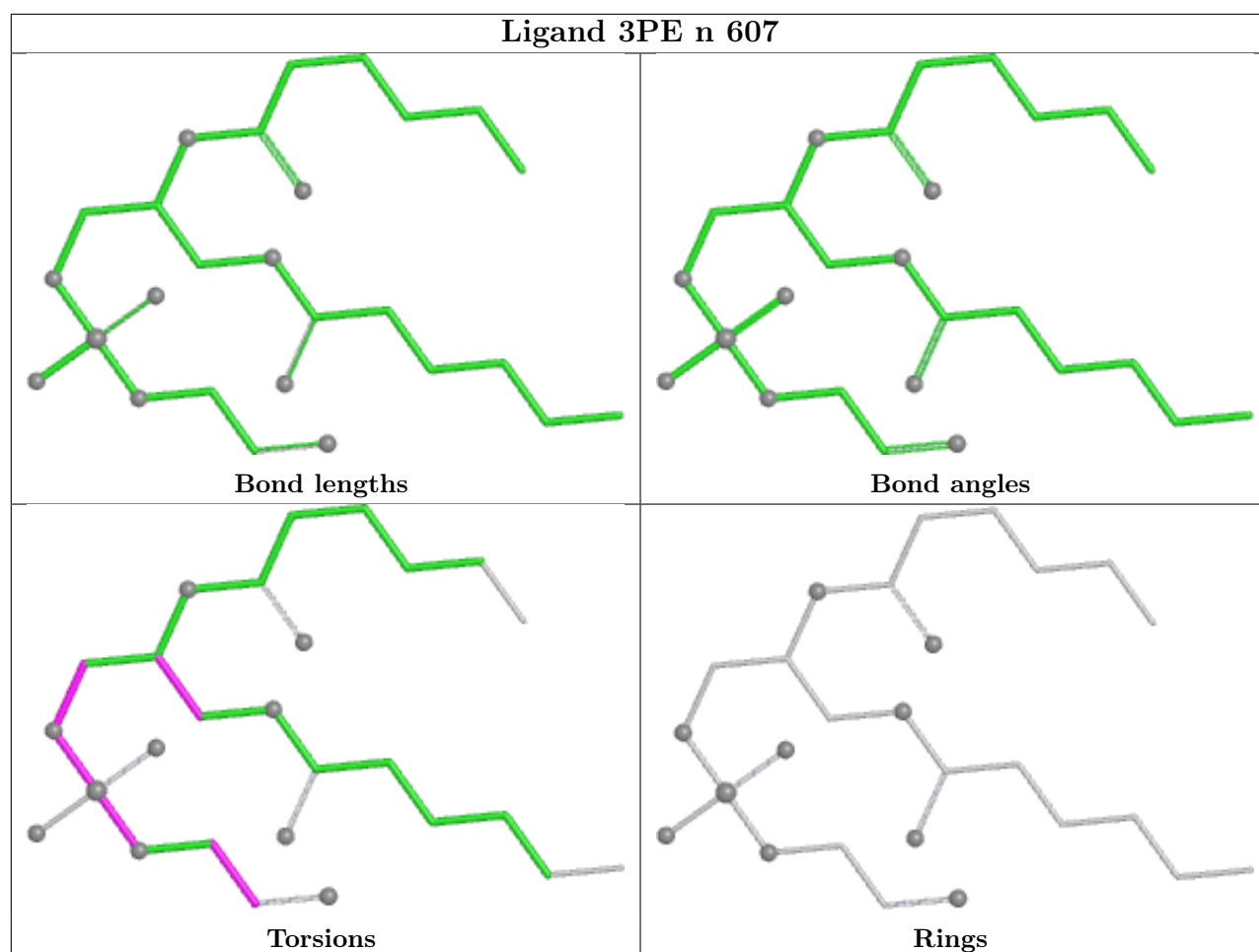


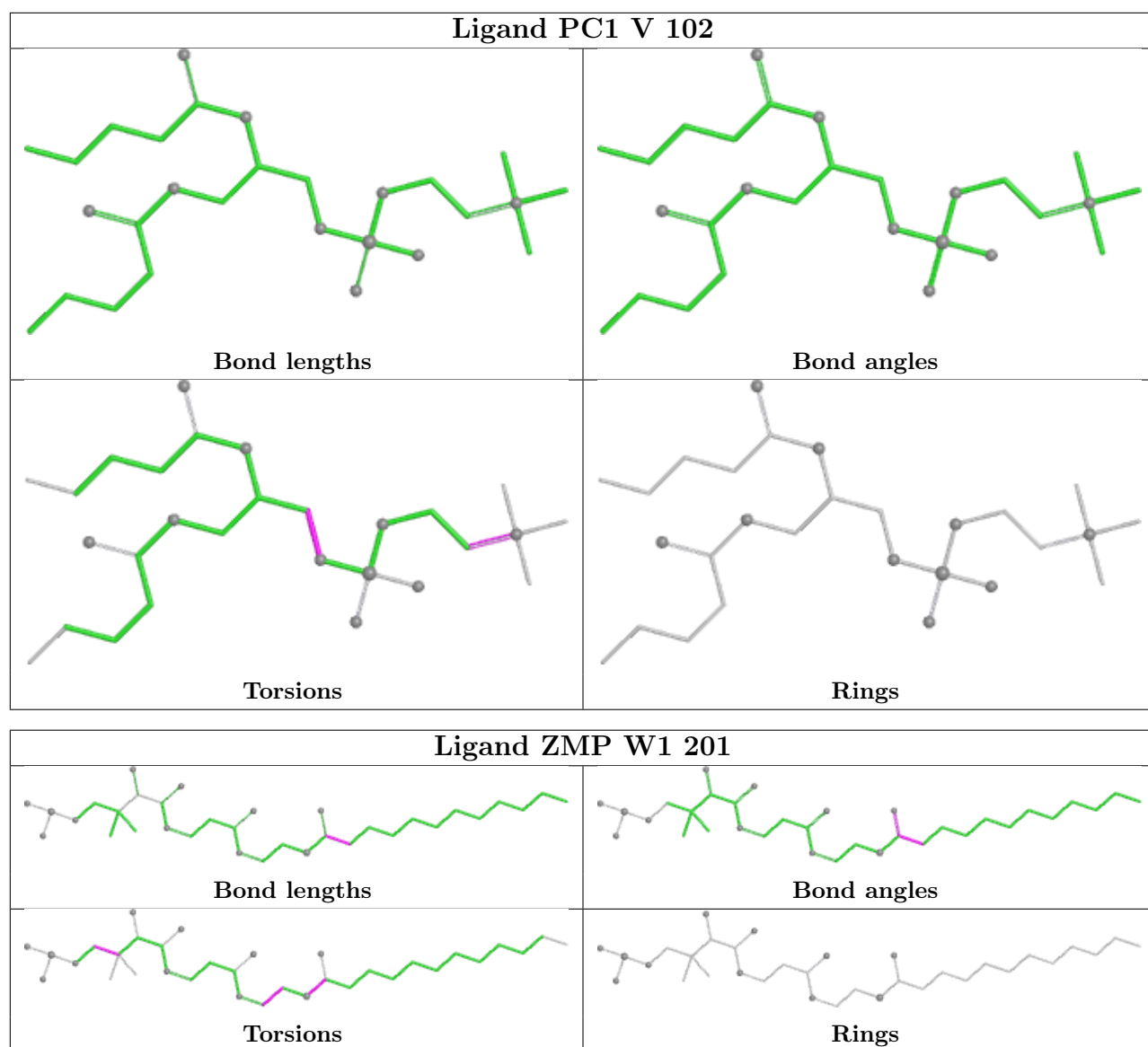


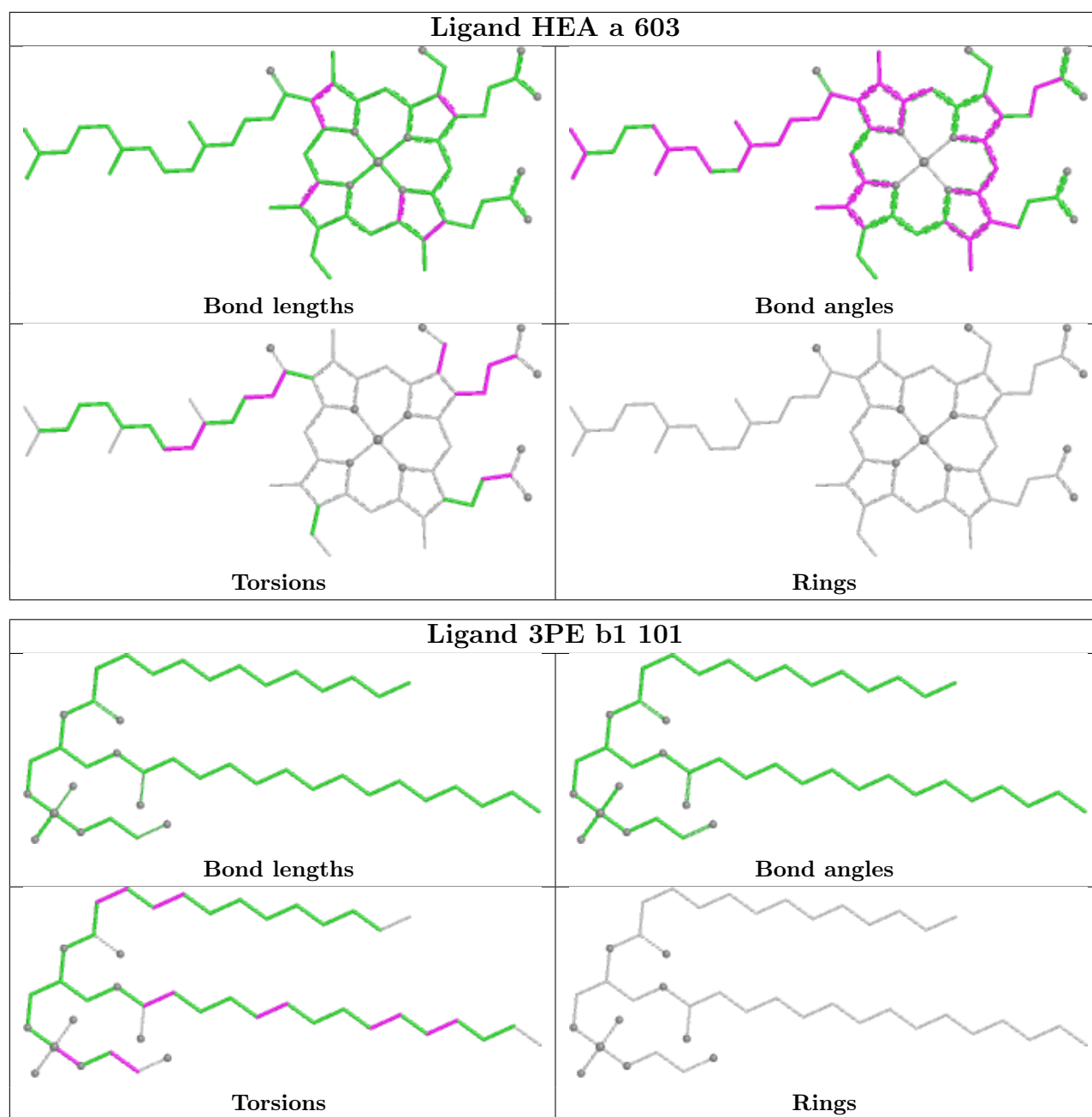


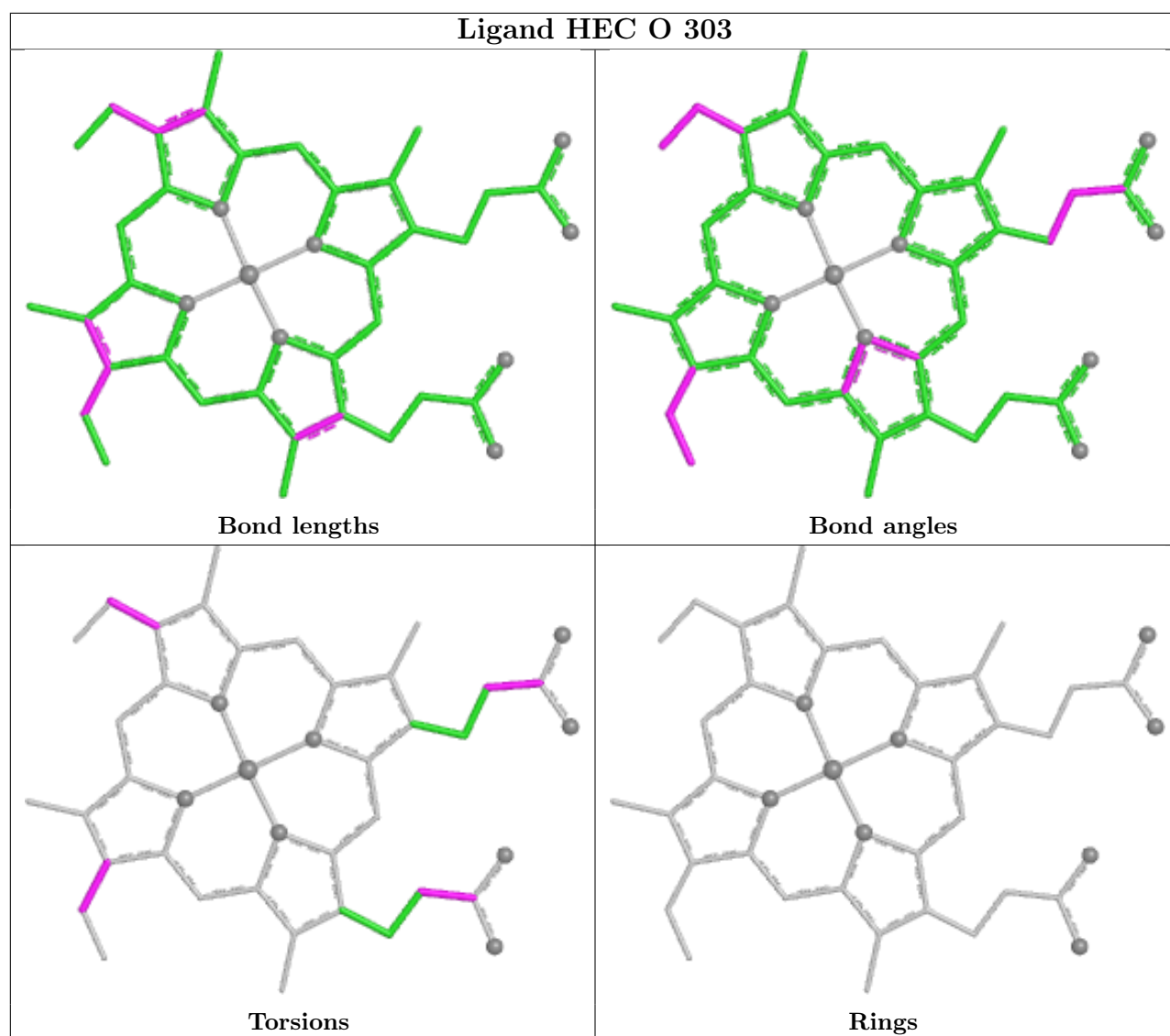


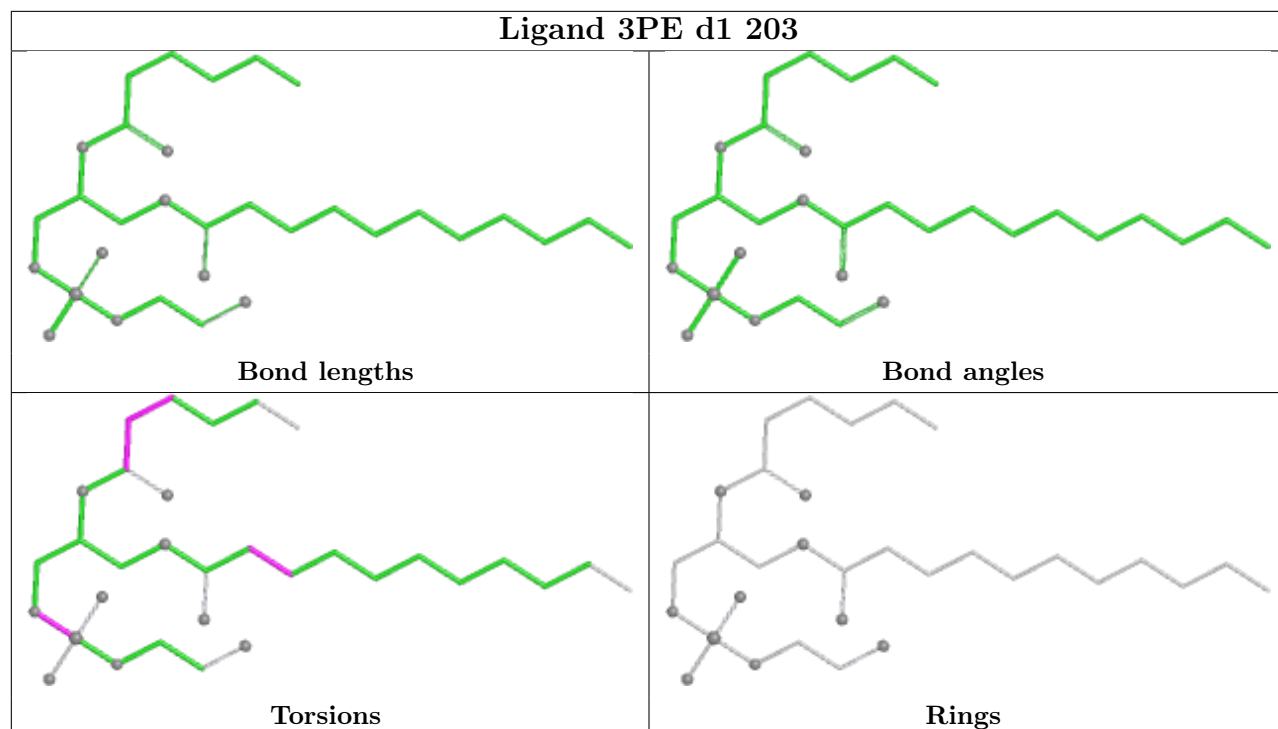


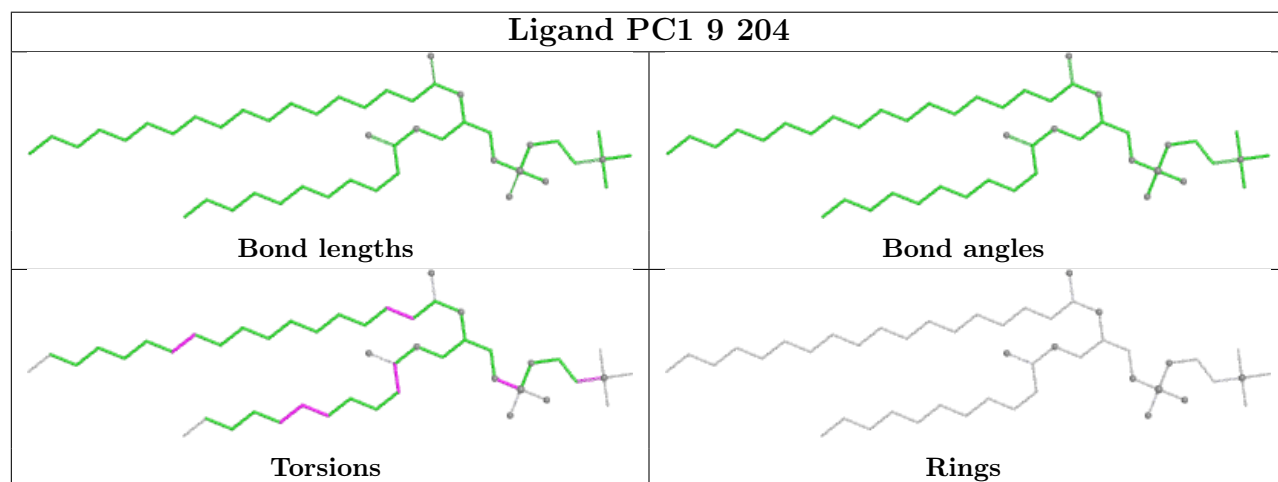
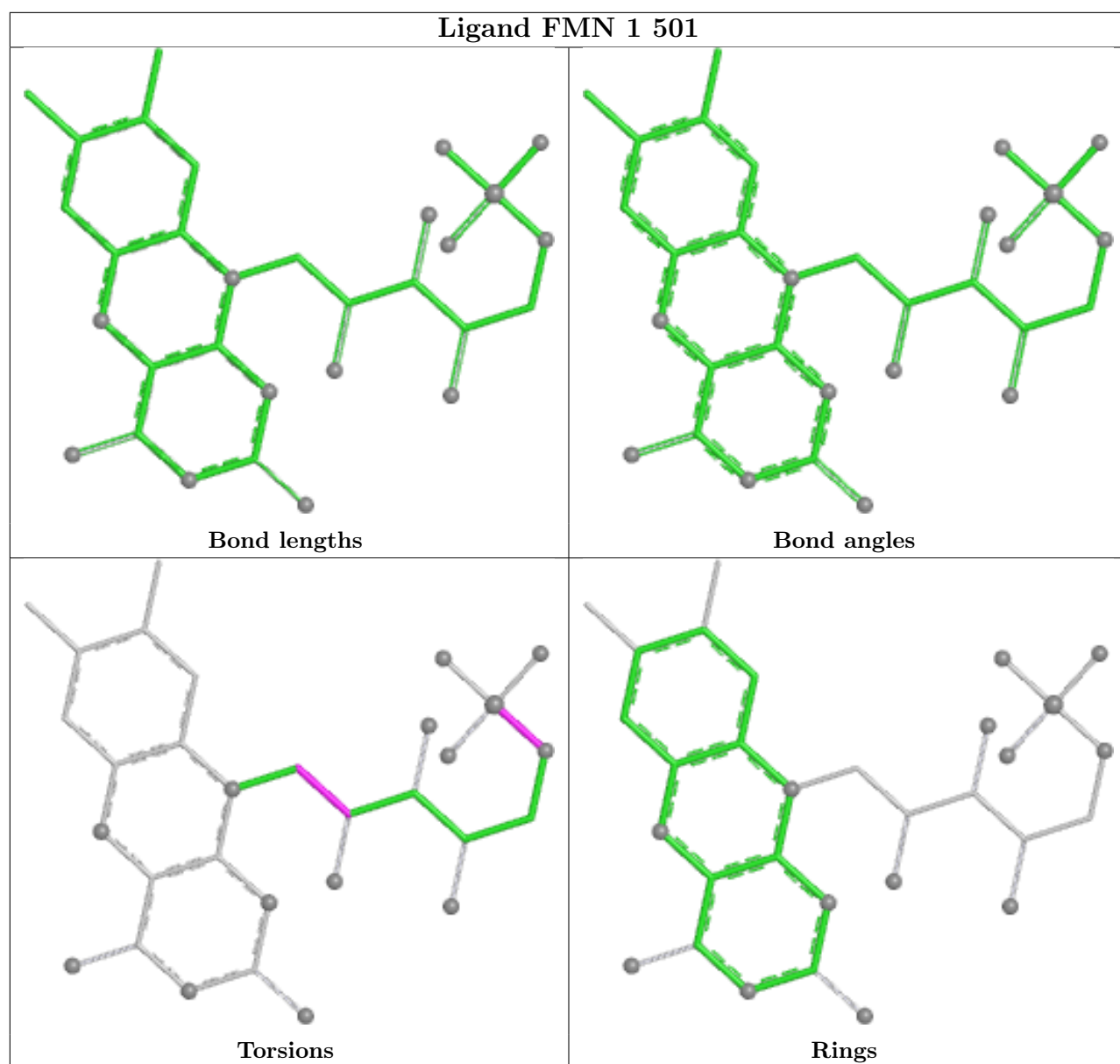












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

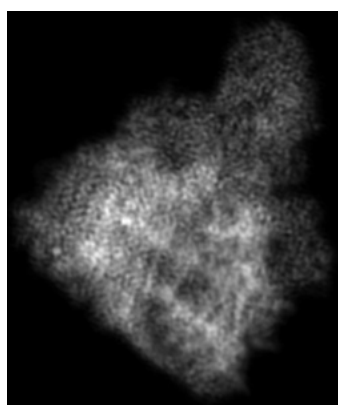
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-17989. These allow visual inspection of the internal detail of the map and identification of artifacts.

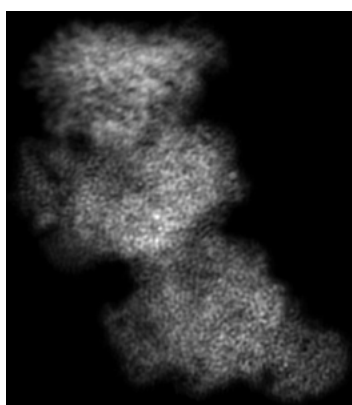
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

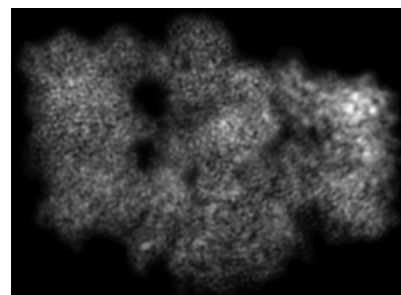
6.1.1 Primary map



X



Y



Z

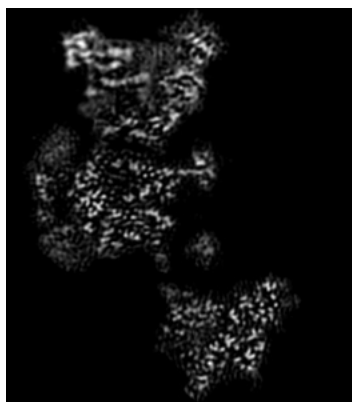
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

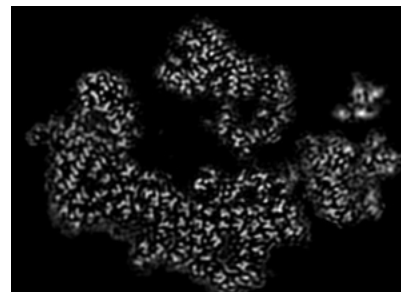
6.2.1 Primary map



X Index: 141



Y Index: 103

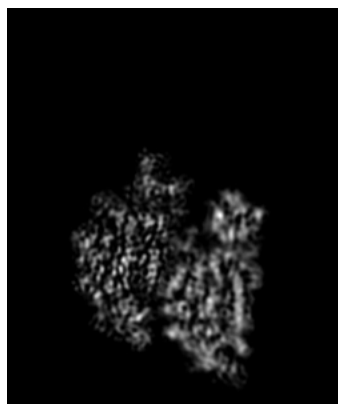


Z Index: 124

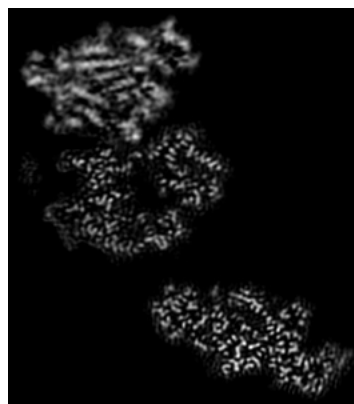
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

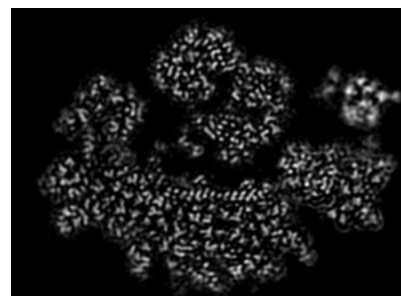
6.3.1 Primary map



X Index: 243



Y Index: 143

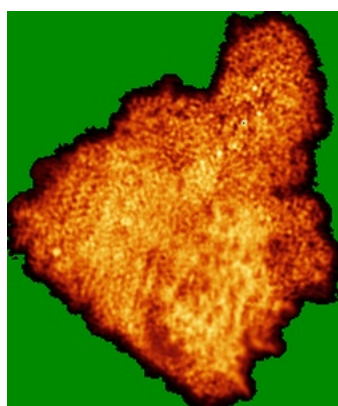


Z Index: 115

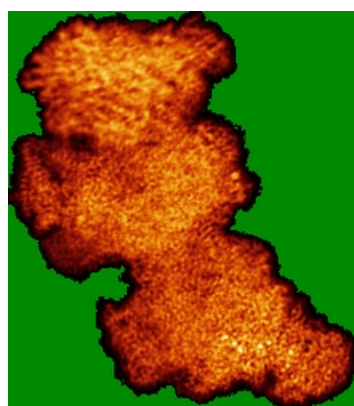
The images above show the largest variance slices of the map in three orthogonal directions.

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

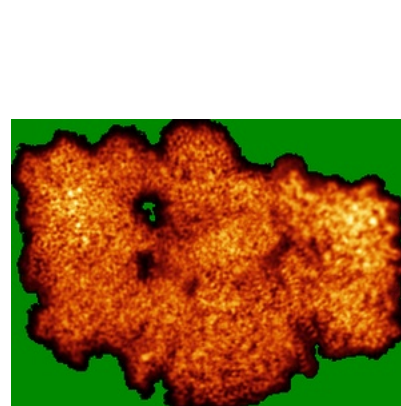
6.4.1 Primary map



X



Y

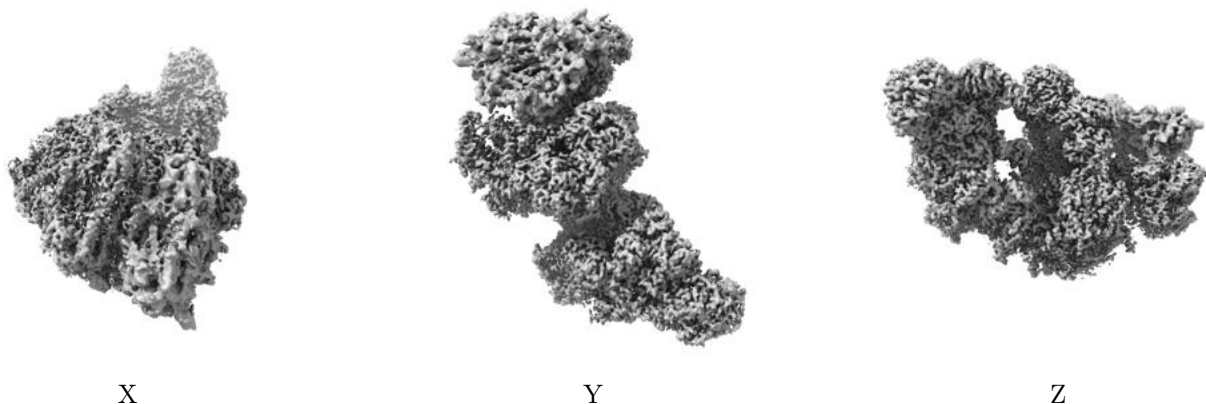


Z

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 0.015. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

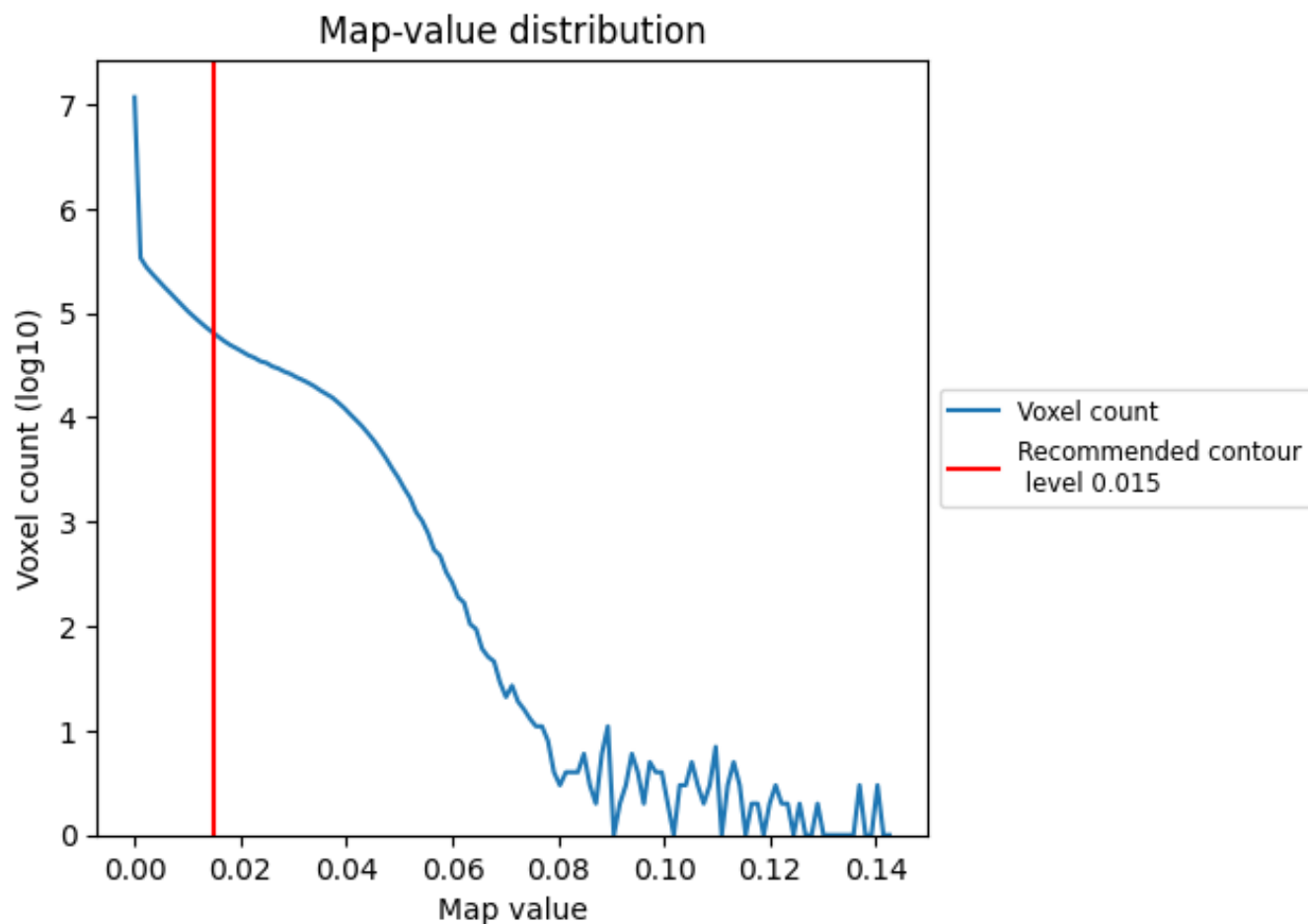
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

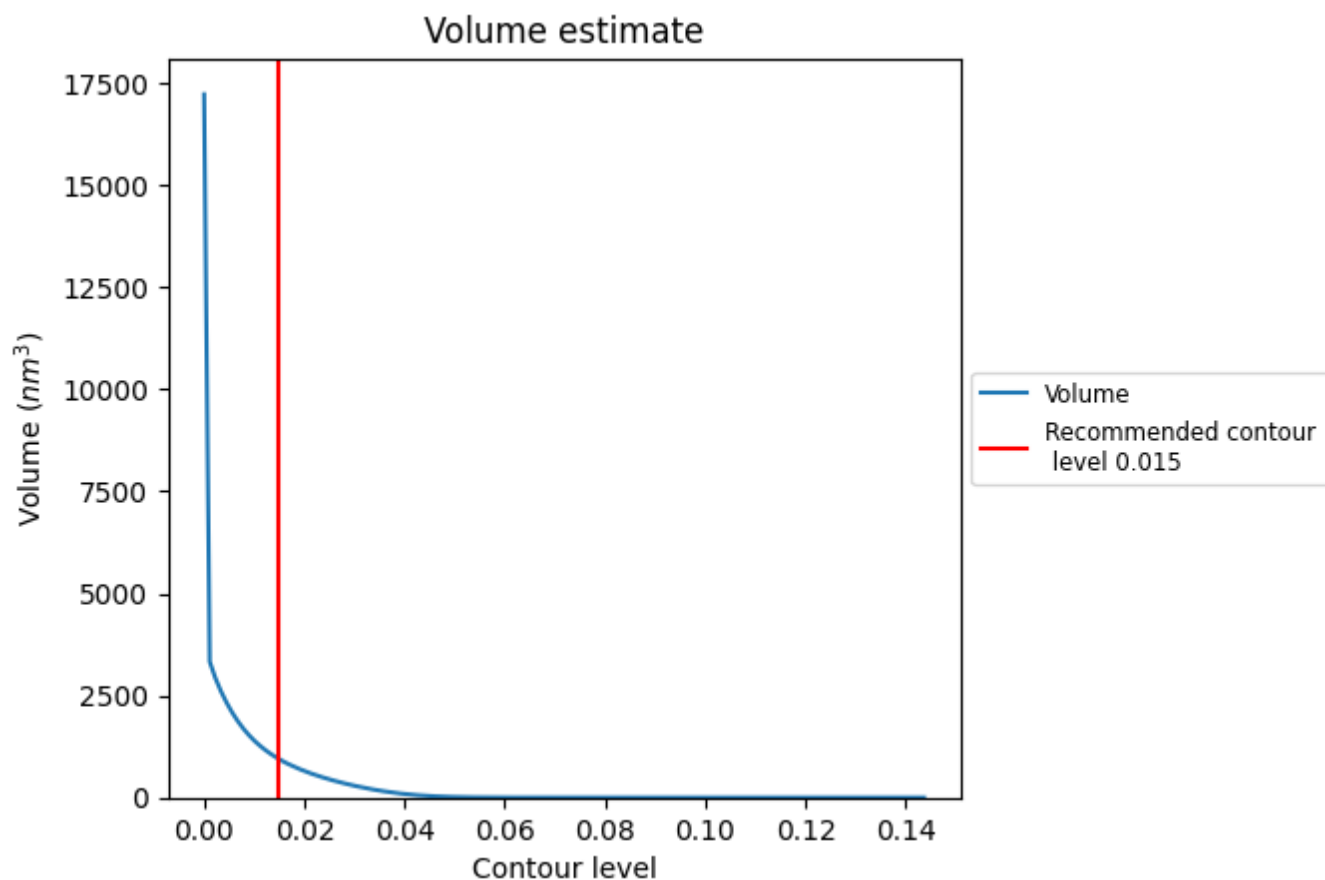
This section contains the results of statistical analysis of the map.

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 940 nm³; this corresponds to an approximate mass of 849 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.

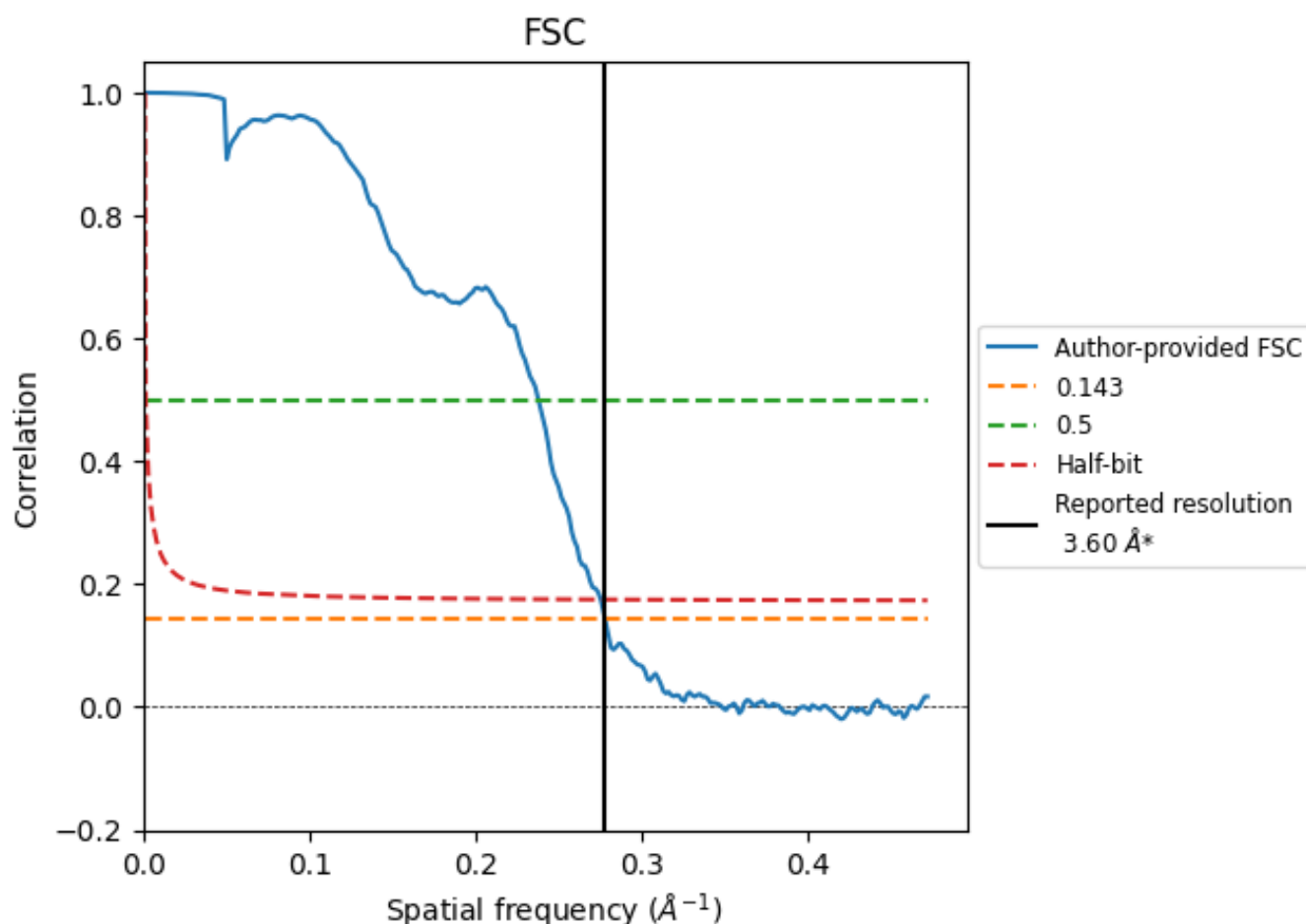
7.3 Rotationally averaged power spectrum [i](#)

This section was not generated. The rotationally averaged power spectrum is only generated for cubic maps.

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 0.278 $\text{\AA}^{-1}$

8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.60	-	-
Author-provided FSC curve	3.60	4.21	3.63
Unmasked-calculated*	-	-	-

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

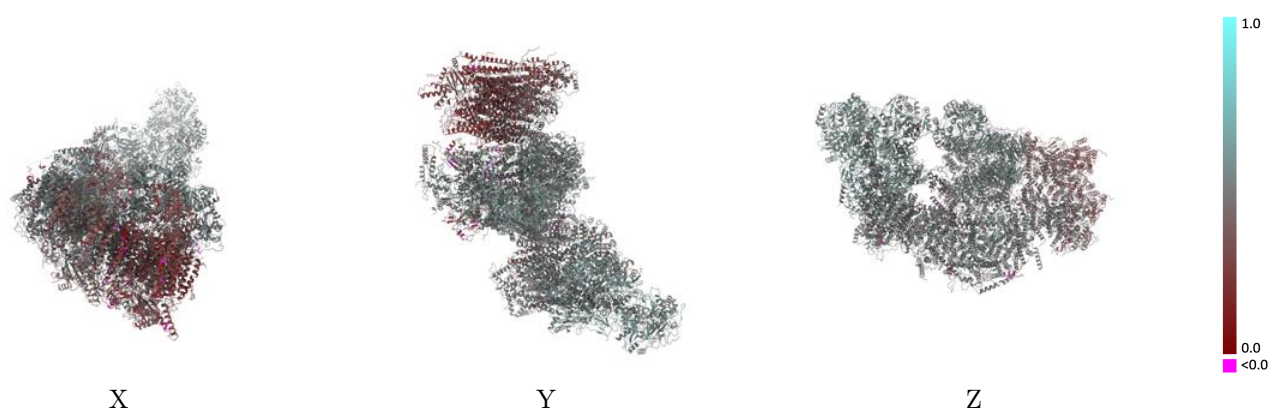
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-17989 and PDB model 8PW5. Per-residue inclusion information can be found in section 3 on page 32.

9.1 Map-model overlay [i](#)

This section was not generated.

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

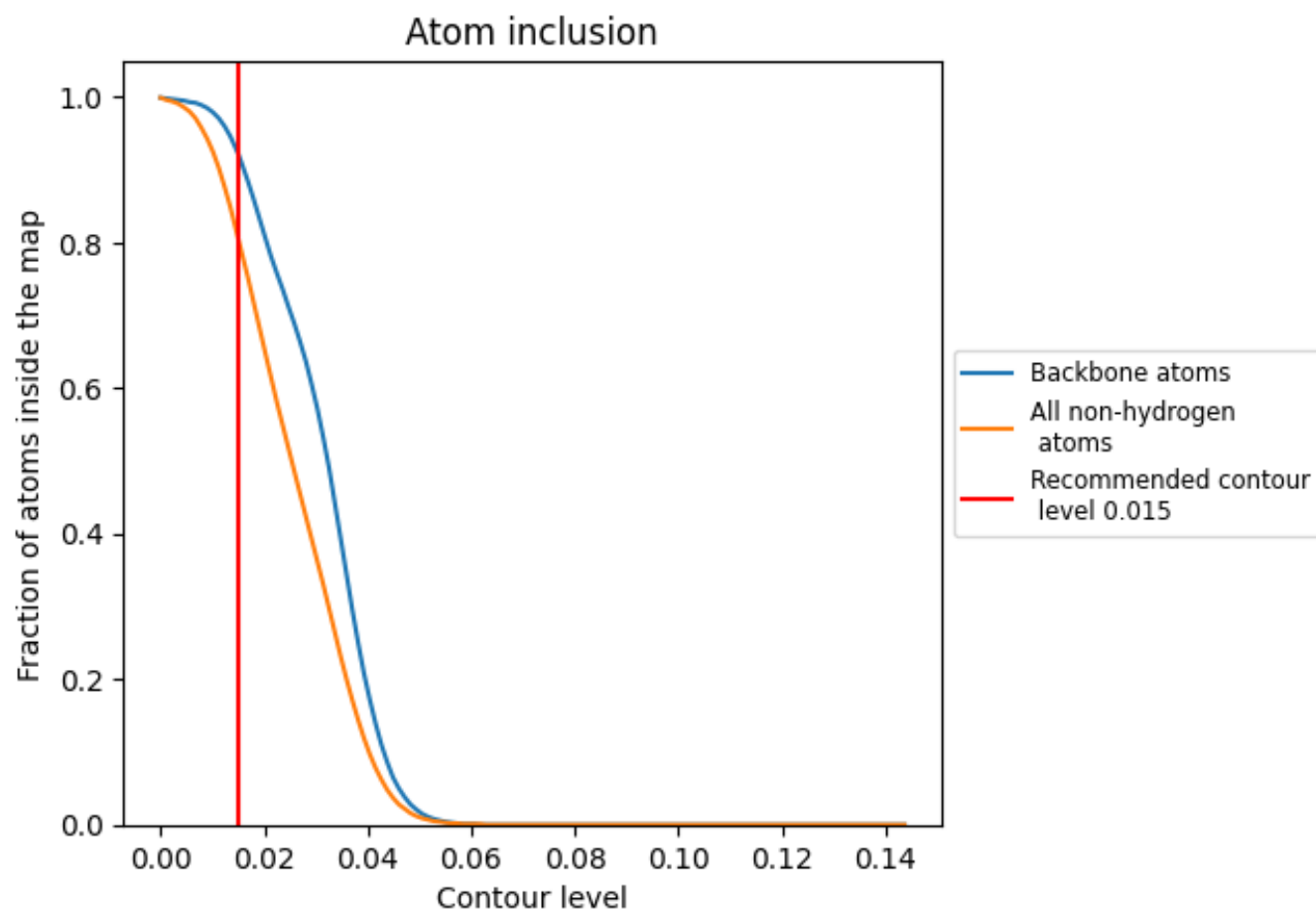


The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

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

This section was not generated.

9.4 Atom inclusion [i](#)



At the recommended contour level, 92% of all backbone atoms, 81% 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 (0.015) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8060	 0.4640
1	 0.8980	 0.5360
2	 0.8890	 0.5310
3	 0.8580	 0.5280
6	 0.8540	 0.5200
7	 0.8730	 0.5440
9	 0.8630	 0.5330
A	 0.8270	 0.5110
A1	 0.7140	 0.4720
B	 0.8420	 0.5200
C	 0.7850	 0.4980
C1	 0.8800	 0.5470
D	 0.8520	 0.5090
D1	 0.8130	 0.5020
E	 0.5370	 0.3560
F	 0.8000	 0.5020
G	 0.7650	 0.4990
H	 0.7730	 0.4440
H1	 0.7390	 0.4660
I	 0.6610	 0.3060
J	 0.7720	 0.5000
J1	 0.6380	 0.4250
K	 0.6100	 0.4630
K1	 0.7170	 0.4750
L	 0.8180	 0.5060
L1	 0.7810	 0.4900
M	 0.8460	 0.5150
M1	 0.7950	 0.5010
N	 0.8000	 0.5010
N1	 0.7660	 0.4930
O	 0.8200	 0.5070
O1	 0.8260	 0.4900
P	 0.4970	 0.3440
P1	 0.7980	 0.5010
Q	 0.7900	 0.5140



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Chain	Atom inclusion	Q-score
Q1	 0.8470	 0.5420
R	 0.6750	 0.4690
S	 0.7460	 0.4470
S1	 0.8470	 0.4820
T	 0.7060	 0.4930
T1	 0.7500	 0.4280
U	 0.7500	 0.5020
U1	 0.8090	 0.4890
V	 0.6460	 0.4590
V1	 0.8620	 0.5210
W1	 0.8470	 0.5290
X1	 0.8360	 0.4840
Y1	 0.6780	 0.4530
Z1	 0.8260	 0.4950
a	 0.8350	 0.3120
a1	 0.8170	 0.4920
b	 0.9150	 0.3000
b1	 0.7670	 0.4650
c	 0.8060	 0.2880
c1	 0.7670	 0.4680
d	 0.9240	 0.3070
d1	 0.7590	 0.4940
e	 0.9290	 0.3000
e1	 0.7840	 0.4850
f	 0.8860	 0.3030
f1	 0.7310	 0.4540
g	 0.7920	 0.2650
g1	 0.7600	 0.4690
h	 0.9070	 0.2810
h1	 0.8220	 0.4900
i	 0.8940	 0.2620
i1	 0.7470	 0.4570
j1	 0.7900	 0.4620
k	 0.9290	 0.2960
k1	 0.7960	 0.4800
l	 0.7370	 0.2750
l1	 0.8240	 0.5090
m	 0.7180	 0.2200
m1	 0.7540	 0.4750
n	 0.8060	 0.4290
n1	 0.8350	 0.5020
o	 0.8340	 0.4160

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Chain	Atom inclusion	Q-score
o1	 0.7940	 0.4630
p	 0.7830	 0.4190
p1	 0.8270	 0.4910
q	 0.8680	 0.4120
q1	 0.8950	 0.5450
r	 0.8580	 0.3740
r1	 0.8280	 0.5340
s	 0.8090	 0.4010
s1	 0.8040	 0.4860
t	 0.6790	 0.3260
u	 0.8840	 0.3990
v	 0.7940	 0.3500
w	 0.7670	 0.4310
x	 0.8420	 0.3890
y	 0.8030	 0.4430
z	 0.6440	 0.2910