



# wwPDB EM Validation Summary Report ⓘ

Jan 25, 2026 – 01:32 AM JST

PDB ID : 8ZSN / pdb\_00008zsn  
EMDB ID : EMD-60421  
Title : Respirasome closed state 1 in the absence of biguanide (SC-ApoC)  
Authors : Teng, F.; He, Z.X.; Hu, Y.Q.; Xu, C.Y.; Guo, R.Y.; Zhou, L.  
Deposited on : 2024-06-05  
Resolution : 2.88 Å (reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

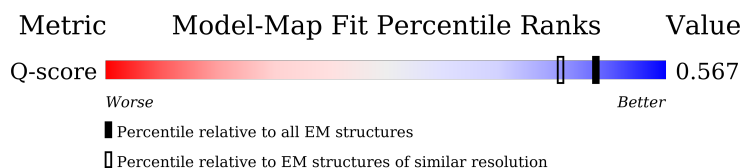
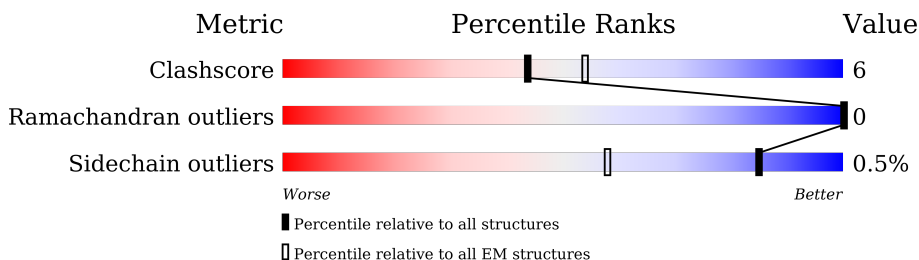
EMDB validation analysis : 0.0.1.dev129  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4-5-2 with Phenix2.0  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
EM percentile statistics : 202505.v01 (Using data in the 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) : 2.47

# 1 Overall quality at a glance

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

The reported resolution of this entry is 2.88 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.





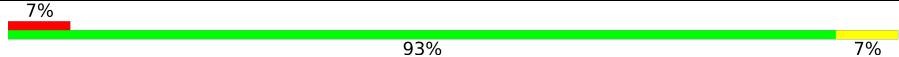
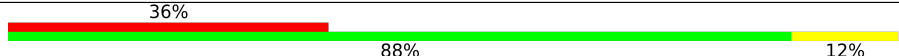
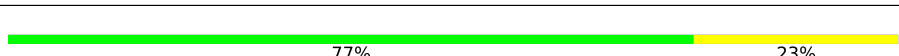
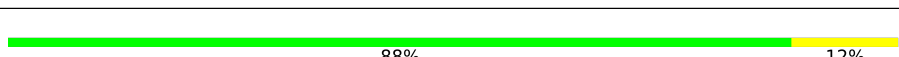
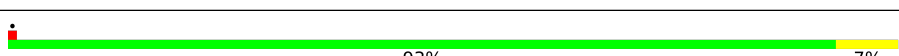
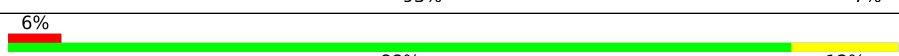
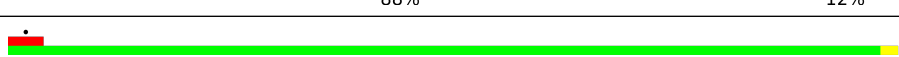
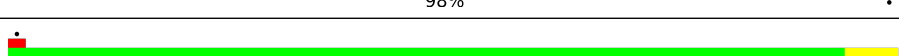
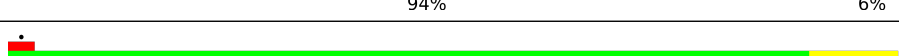
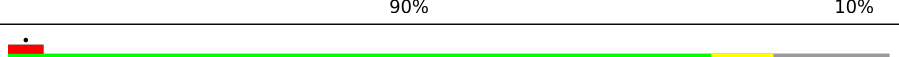

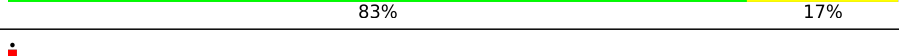
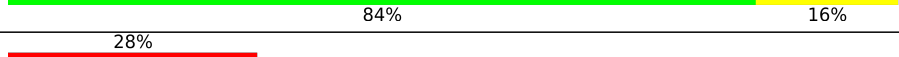



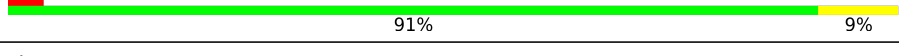
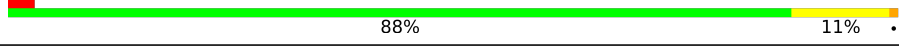

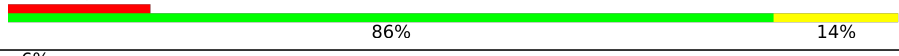
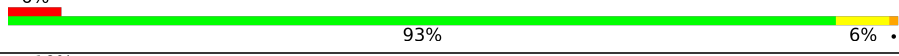

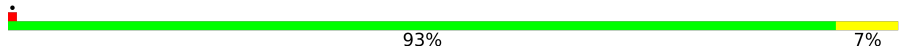
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	210492	15764	-
Ramachandran outliers	207382	16835	-
Sidechain outliers	206894	16415	-
Q-score	-	25397	12111 ( 2.38 - 3.38 )

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

Mol	Chain	Length	Quality of chain
1	4L	98	
2	5A	102	
3	5B	95	
4	6A	75	

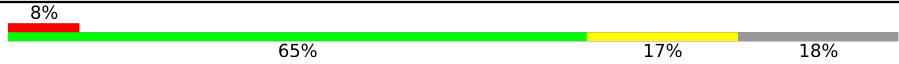
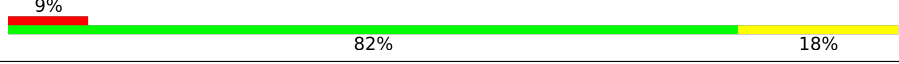
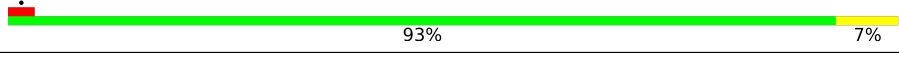


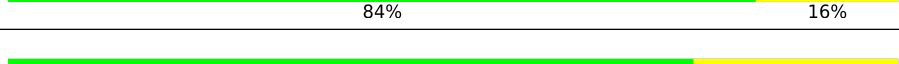
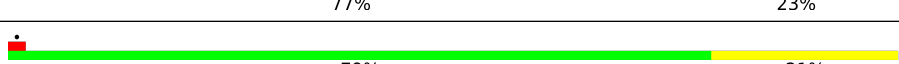
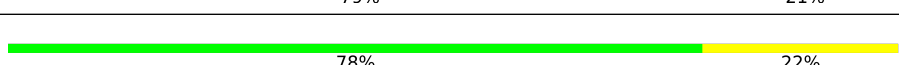
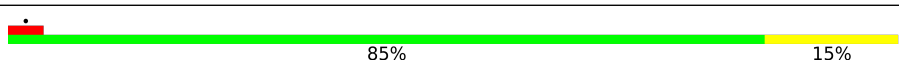


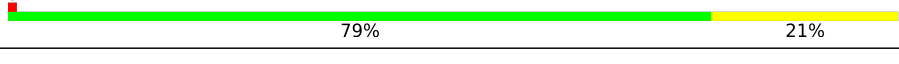
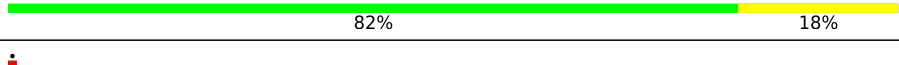

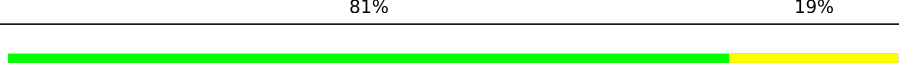






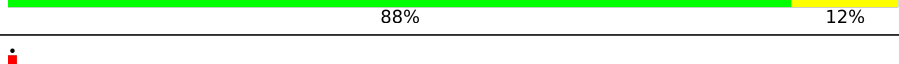



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Mol	Chain	Length	Quality of chain
5	6B	82	 79% 21%
6	6C	70	 7% 90% 10%
7	7A	57	 7% 93% 7%
8	7B	50	 36% 88% 12%
9	7C	47	 77% 23%
10	8B	43	 88% 12%
11	A1	70	 93% 7%
12	A2	85	 6% 88% 12%
13	A3	83	 98%
14	A5	112	 94% 6%
15	A6	114	 90% 10%
16	A7	112	 79% 7% 13%
17	A8	171	 83% 17%
18	A9	341	 84% 16%
19	AB	87	 28% 77% 11% 11%
19	AC	87	 80% 18%
20	AK	321	 87% 13%
21	AL	140	 91% 9%
22	AM	144	 88% 11%
23	AN	142	 84% 15%
24	B1	56	 16% 86% 14%
25	B2	67	 6% 93% 6%
26	B3	80	 10% 81% 19%
27	B4	128	 93% 7%
28	B5	138	 91% 9%







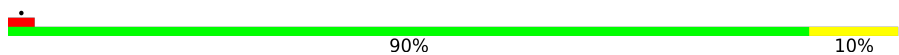





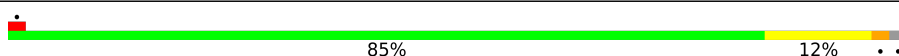
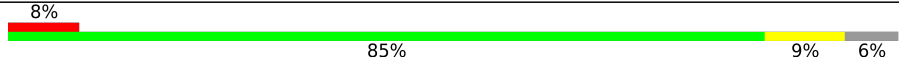
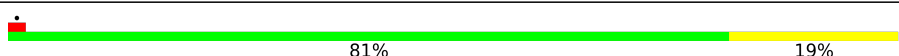

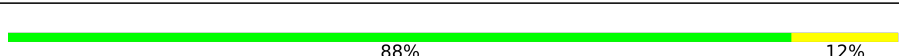
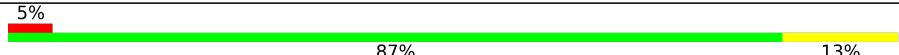
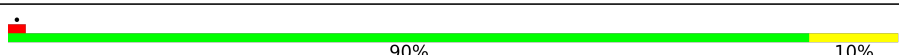
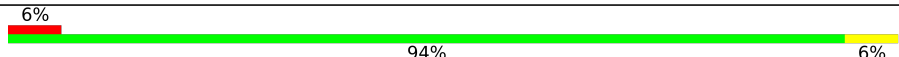
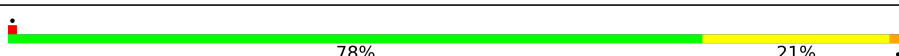



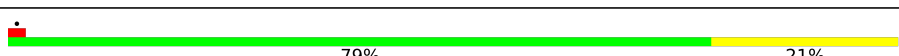
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Mol	Chain	Length	Quality of chain
29	B6	126	 8% 65% 17% 18%
30	B7	125	 9% 82% 18%
31	B8	156	 0% 93% 7%
32	B9	178	 0% 86% 14%
33	BK	174	 0% 87% 13%
34	BL	99	 0% 84% 16%
35	C1	514	 0% 77% 23%
36	C2	228	 0% 79% 21%
37	C3	260	 0% 78% 22%
38	C4	138	 0% 85% 15%
39	CA	49	 0% 86% 14%
40	CB	121	 0% 81% 19%
41	N1	318	 0% 79% 21%
42	N2	347	 0% 82% 18%
43	N3	115	 0% 84% 16%
44	N4	459	 0% 81% 19%
45	N5	603	 0% 81% 19%
46	N6	174	 0% 83% 17%
47	QA	419	 0% 87% 13%
47	Qa	419	 0% 86% 14%
48	QB	446	 0% 83% 17%
48	Qb	446	 0% 83% 14% 1%
49	QC	379	 0% 86% 14%
49	Qc	379	 0% 88% 12%
50	QD	241	 0% 86% 14%

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Mol	Chain	Length	Quality of chain
50	Qd	241	 85% 14%
51	QE	196	 24% 83% 16%
51	Qe	196	 24% 81% 18%
52	QF	67	 85% 15%
52	Qf	67	 81% 15%
53	QG	101	 89% 11%
53	Qg	101	 90% 10%
54	QH	79	 84% 15%
54	Qh	79	 84% 16%
55	QI	62	 6% 90% 10%
55	Qi	62	 85% 11%
56	QJ	52	 6% 87% 8% 6%
56	Qj	52	 85% 12%
57	QK	78	 8% 85% 9% 6%
58	S1	689	 81% 19%
59	S2	430	 81% 19%
60	S3	208	 88% 12%
61	S4	124	 5% 87% 13%
62	S5	105	 90% 10%
63	S6	96	 6% 94% 6%
64	S7	156	 78% 21%
65	S8	176	 86% 14%
66	V1	431	 78% 21%
67	V2	217	 88% 11%
68	V3	42	 79% 21%

## 2 Entry composition [i](#)

There are 85 unique types of molecules in this entry. The entry contains 117287 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 NADH-ubiquinone oxidoreductase chain 4L.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	4L	98	748	493	113	128	14	0	0

- Molecule 2 is a protein called Cytochrome c oxidase subunit 5A, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	5A	102	825	528	139	156	2	0	0

- Molecule 3 is a protein called Cytochrome c oxidase subunit 5B, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	5B	95	724	449	128	141	6	0	0

- Molecule 4 is a protein called Cytochrome c oxidase subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	6A	75	620	401	118	100	1	0	0

- Molecule 5 is a protein called Cytochrome c oxidase subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	6B	82	684	431	125	123	5	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	6C	70	574	375	101	95	3	0	0

- Molecule 7 is a protein called Cytochrome c oxidase subunit 7A1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	7A	57	447	287	76	81	3	0	0

- Molecule 8 is a protein called Cytochrome c oxidase subunit 7B, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	7B	50	392	254	66	71	1	0	0

- Molecule 9 is a protein called Cytochrome c oxidase subunit 7C, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	7C	47	387	257	65	63	2	0	0

- Molecule 10 is a protein called Cytochrome c oxidase subunit 8.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
10	8B	43	338	222	57	59	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	A1	70	562	361	101	94	6	0	0

- Molecule 12 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	A2	85	686	431	128	125	2	0	0

- Molecule 13 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	A3	83	643	417	110	115	1	0	0

- Molecule 14 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	A5	112	910	588	154	165	3	0	0

- Molecule 15 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	A6	114	967	617	178	167	5	0	0

- Molecule 16 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	A7	97	780	491	147	139	3	0	0

- Molecule 17 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	A8	171	1398	887	250	251	10	0	0

- Molecule 18 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 9, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	A9	341	2743	1777	480	477	9	0	0

- Molecule 19 is a protein called Acyl carrier protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	AB	77	624	402	93	124	5	0	0
19	AC	87	702	452	103	142	5	0	0

- Molecule 20 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 10, mitochondrial.



Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	AK	321	2601	1655	444	492	10	0	0

- Molecule 21 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	AL	140	1021	651	174	190	6	0	0

- Molecule 22 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	AM	144	1204	770	218	212	4	0	0

- Molecule 23 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	AN	142	1173	755	203	206	9	0	0

- Molecule 24 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	B1	56	479	311	88	79	1	0	0

- Molecule 25 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
25	B2	67	584	385	95	103	1	0	0

- Molecule 26 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
26	B3	80	641	418	108	114	1	0	0

- Molecule 27 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
27	B4	128	1062	691	182	189		0	0

- Molecule 28 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 5, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
28	B5	138	1151	754	195	199	3	0	0

- Molecule 29 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	B6	103	882	577	156	148	1	0	0

- Molecule 30 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
30	B7	125	1068	663	204	190	11	0	0

- Molecule 31 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 8, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	B8	156	1315	853	213	241	8	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	B9	178	1534	982	279	265	8	0	0

- Molecule 33 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	BK	174	1456	913	264	271	8	0	0

- Molecule 34 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 11, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	BL	99	828	531	137	156	4	0	0

- Molecule 35 is a protein called Cytochrome c oxidase subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	C1	514	4024	2692	625	675	32	0	0

- Molecule 36 is a protein called Cytochrome c oxidase subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	C2	228	1833	1193	282	340	18	0	0

- Molecule 37 is a protein called Cytochrome c oxidase subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
37	C3	260	2103	1403	337	353	10	0	0

- Molecule 38 is a protein called Cytochrome c oxidase subunit 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
38	C4	138	1153	751	188	210	4	0	0

- Molecule 39 is a protein called NADH dehydrogenase [ubiquinone] 1 subunit C1, mitochondrial.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
39	CA	49	417	276	71	70	0	0

- Molecule 40 is a protein called NADH dehydrogenase [ubiquinone] 1 subunit C2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
40	CB	121	1000	650	173	171	6	0	0

- Molecule 41 is a protein called NADH-ubiquinone oxidoreductase chain 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
41	N1	318	2508	1678	385	424	21	0	0

- Molecule 42 is a protein called NADH-ubiquinone oxidoreductase chain 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
42	N2	347	2710	1782	420	462	46	0	0

- Molecule 43 is a protein called NADH-ubiquinone oxidoreductase chain 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
43	N3	115	914	615	134	158	7	0	0

- Molecule 44 is a protein called NADH-ubiquinone oxidoreductase chain 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
44	N4	459	3631	2412	572	609	38	0	0

- Molecule 45 is a protein called NADH-ubiquinone oxidoreductase chain 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
45	N5	603	4785	3173	741	820	51	0	0

- Molecule 46 is a protein called NADH-ubiquinone oxidoreductase chain 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
46	N6	174	1329	892	189	236	12	0	0

- Molecule 47 is a protein called Cytochrome b-c1 complex subunit 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
47	QA	419	3147	1971	557	611	8	0	0
47	Qa	419	3147	1971	557	611	8	0	0

- Molecule 48 is a protein called Cytochrome b-c1 complex subunit 1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
48	QB	446	3459	2161	605	674	19	0	0
48	Qb	433	3367	2103	592	653	19	0	0

- Molecule 49 is a protein called Cytochrome b.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
49	QC	379	3025	2031	471	502	21	0	0
49	Qc	379	3025	2031	471	502	21	0	0

- Molecule 50 is a protein called Cytochrome c1, heme protein, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
50	QD	241	1921	1225	330	350	16	0	0
50	Qd	239	1904	1215	327	346	16	0	0

- Molecule 51 is a protein called Cytochrome b-c1 complex subunit Rieske, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
51	QE	196	1517	955	265	290	7	0	0
51	Qe	196	1517	955	265	290	7	0	0

- Molecule 52 is a protein called Cytochrome b-c1 complex subunit 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	QF	67	Total	C	N	O	S	0	0
			552	336	100	111	5		
52	Qf	64	Total	C	N	O	S	0	0
			528	320	97	106	5		

- Molecule 53 is a protein called Cytochrome b-c1 complex subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	QG	101	Total	C	N	O	S	0	0
			893	572	157	162	2		
53	Qg	101	Total	C	N	O	S	0	0
			893	572	157	162	2		

- Molecule 54 is a protein called Cytochrome b-c1 complex subunit 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	QH	78	Total	C	N	O	S	0	0
			662	432	121	107	2		
54	Qh	79	Total	C	N	O	S	0	0
			666	434	122	108	2		

- Molecule 55 is a protein called Complex III subunit 9.

Mol	Chain	Residues	Atoms				AltConf	Trace
55	QI	62	Total	C	N	O	0	0
			507	331	90	86		
55	Qi	60	Total	C	N	O	0	0
			493	322	87	84		

- Molecule 56 is a protein called Cytochrome b-c1 complex subunit 10.

Mol	Chain	Residues	Atoms					AltConf	Trace
56	QJ	49	Total	C	N	O	S	0	0
			405	269	71	63	2		
56	Qj	51	Total	C	N	O	S	0	0
			421	281	74	65	1		

- Molecule 57 is a protein called Cytochrome b-c1 complex subunit Rieske, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
57	QK	73	Total	C	N	O	S	0	0
			520	328	98	92	2		

- Molecule 58 is a protein called NADH-ubiquinone oxidoreductase 75 kDa subunit, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
58	S1	689	Total	C	N	O	S	0	0
			5290	3317	922	1012	39		

- Molecule 59 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
59	S2	430	Total	C	N	O	S	0	0
			3459	2212	594	629	24		

- Molecule 60 is a protein called Complex I-30kD.

Mol	Chain	Residues	Atoms					AltConf	Trace
60	S3	208	Total	C	N	O	S	0	0
			1738	1124	298	314	2		

- Molecule 61 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 4, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
61	S4	124	Total	C	N	O	S	0	0
			1007	637	179	188	3		

- Molecule 62 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
62	S5	105	Total	C	N	O	S	0	0
			867	550	161	150	6		

- Molecule 63 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 6, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
63	S6	96	Total	C	N	O	S	0	0
			741	452	140	146	3		

- Molecule 64 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 7, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
64	S7	156	1248	794	227	213	14	0	0

- Molecule 65 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 8, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
65	S8	176	1412	887	243	269	13	0	0

- Molecule 66 is a protein called NADH dehydrogenase [ubiquinone] flavoprotein 1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
66	V1	431	3316	2092	592	612	20	0	0

- Molecule 67 is a protein called NADH dehydrogenase [ubiquinone] flavoprotein 2, mitochondrial.

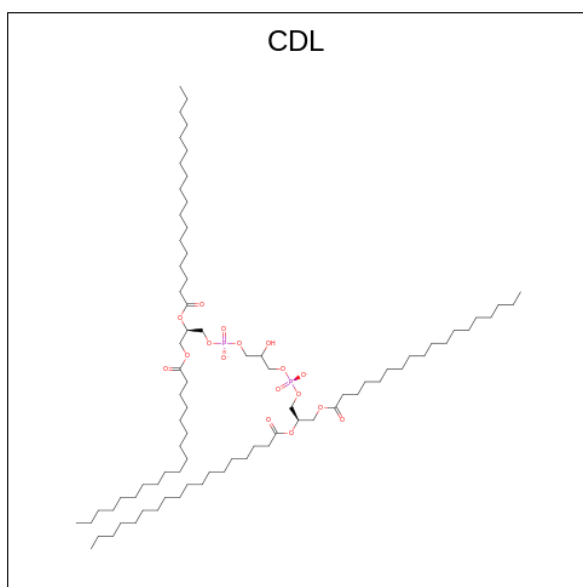
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
67	V2	217	1671	1065	281	315	10	0	0

- Molecule 68 is a protein called NADH:ubiquinone oxidoreductase subunit V3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
68	V3	42	355	219	67	68	1	0	0

- Molecule 69 is CARDIOLIPIN (CCD ID: CDL) (formula: C<sub>81</sub>H<sub>156</sub>O<sub>17</sub>P<sub>2</sub>).





Mol	Chain	Residues	Atoms				AltConf
			Total	C	O	P	
69	4L	1	92	73	17	2	0
69	6A	1	83	64	17	2	0
69	A7	1	51	32	17	2	0
69	AK	1	68	49	17	2	0
69	AL	1	94	75	17	2	0
69	AL	1	80	61	17	2	0
69	B5	1	100	81	17	2	0
69	CB	1	83	64	17	2	0
69	N1	1	78	59	17	2	0
69	N4	1	100	81	17	2	0
69	N4	1	62	43	17	2	0
69	N5	1	89	70	17	2	0
69	N5	1	100	81	17	2	0
69	QB	1	64	45	17	2	0

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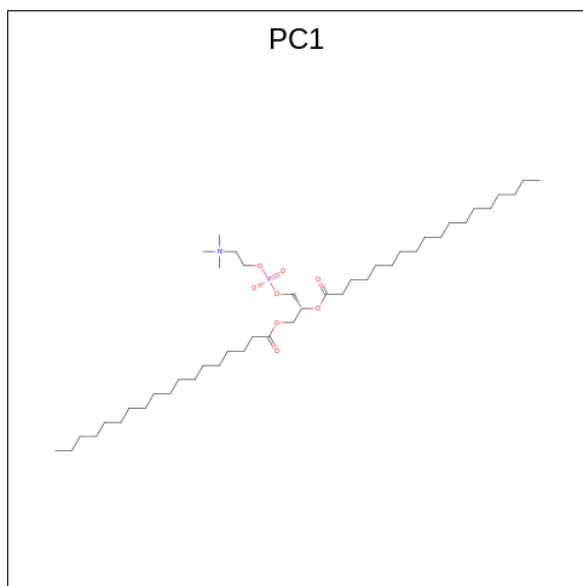
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Mol	Chain	Residues	Atoms				AltConf
			Total	C	O	P	
69	QD	1	58	39	17	2	0
69	QH	1	64	45	17	2	0
69	Qb	1	64	45	17	2	0
69	Qc	1	61	42	17	2	0
69	Qh	1	55	36	17	2	0

- Molecule 70 is ZINC ION (CCD ID: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
			Total	Zn	
70	5B	1	1	1	0
70	S6	1	1	1	0

- Molecule 71 is 1,2-DIACYL-SN-GLYCERO-3-PHOSPHOCHOLINE (CCD ID: PC1) (formula: C<sub>44</sub>H<sub>88</sub>NO<sub>8</sub>P).



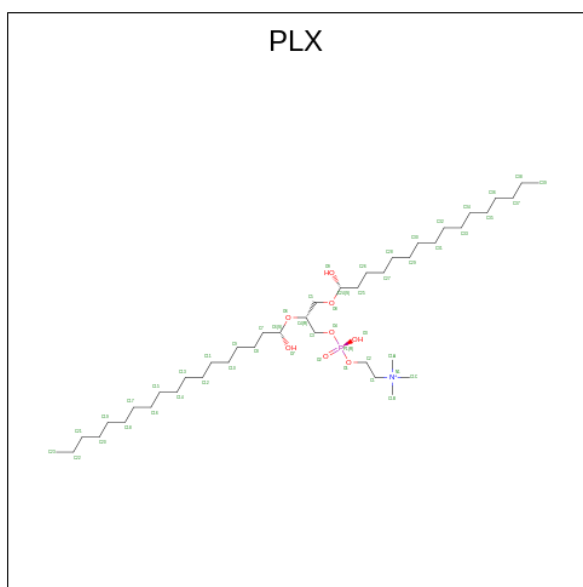
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
71	6A	1	45	35	1	8	1	0

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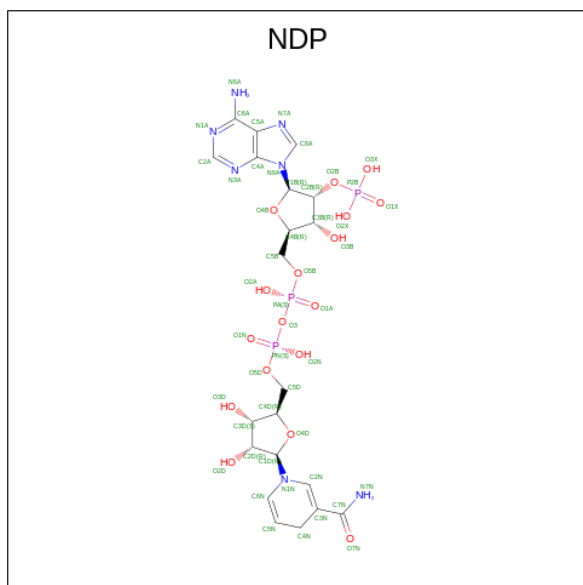
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
71	6A	1	Total 38	C 28	N 1	O 8	P 1	0
71	C1	1	Total 54	C 44	N 1	O 8	P 1	0
71	C1	1	Total 33	C 23	N 1	O 8	P 1	0
71	C1	1	Total 46	C 36	N 1	O 8	P 1	0
71	C3	1	Total 44	C 34	N 1	O 8	P 1	0
71	C3	1	Total 49	C 39	N 1	O 8	P 1	0
71	C3	1	Total 50	C 40	N 1	O 8	P 1	0
71	N1	1	Total 54	C 44	N 1	O 8	P 1	0
71	N1	1	Total 54	C 44	N 1	O 8	P 1	0
71	N3	1	Total 54	C 44	N 1	O 8	P 1	0
71	QB	1	Total 51	C 41	N 1	O 8	P 1	0
71	Qb	1	Total 48	C 38	N 1	O 8	P 1	0
71	Qc	1	Total 54	C 44	N 1	O 8	P 1	0
71	Qh	1	Total 54	C 44	N 1	O 8	P 1	0

- Molecule 72 is (9R,11S)-9-({(1S)-1-HYDROXYHEXADECYL}OXY)METHYL)-2,2-DIMETHYL-5,7,10-TRIOXA-2LAMBDA 5 -AZA-6LAMBDA 5 -PHOSPHAOCTACOSANE-6,6,11-TRIOL (CCD ID: PLX) (formula: C<sub>42</sub>H<sub>89</sub>NO<sub>8</sub>P).



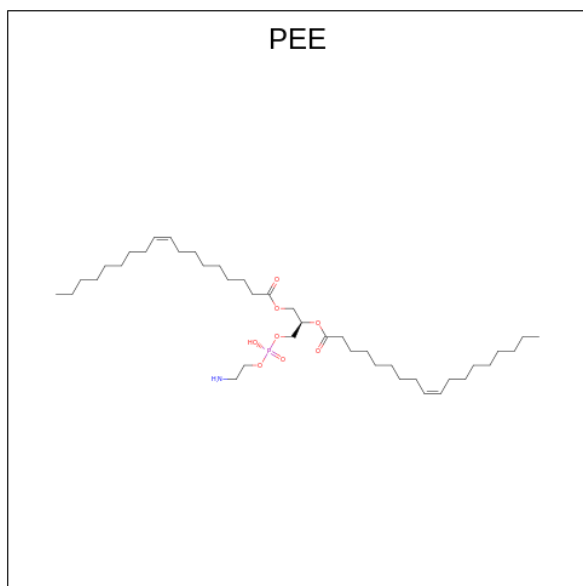
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
72	6C	1	43	33	1	8	1	0
72	AL	1	47	37	1	8	1	0
72	AM	1	52	42	1	8	1	0
72	B5	1	52	42	1	8	1	0
72	CB	1	52	42	1	8	1	0
72	N3	1	52	42	1	8	1	0
72	N4	1	52	42	1	8	1	0
72	QB	1	46	36	1	8	1	0
72	QI	1	52	42	1	8	1	0
72	S7	1	52	42	1	8	1	0

- Molecule 73 is NADPH DIHYDRO-NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (CCD ID: NDP) (formula:  $C_{21}H_{30}N_7O_{17}P_3$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
73	A9	1	48	21	7	17	3	0

- Molecule 74 is 1,2-dioleoyl-sn-glycero-3-phosphoethanolamine (CCD ID: PEE) (formula:  $C_{41}H_{78}NO_8P$ ).



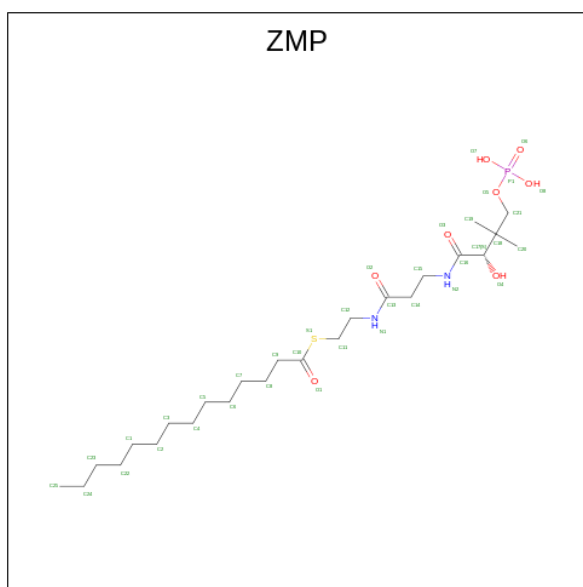
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
74	A9	1	39	29	1	8	1	0
74	AL	1	49	39	1	8	1	0

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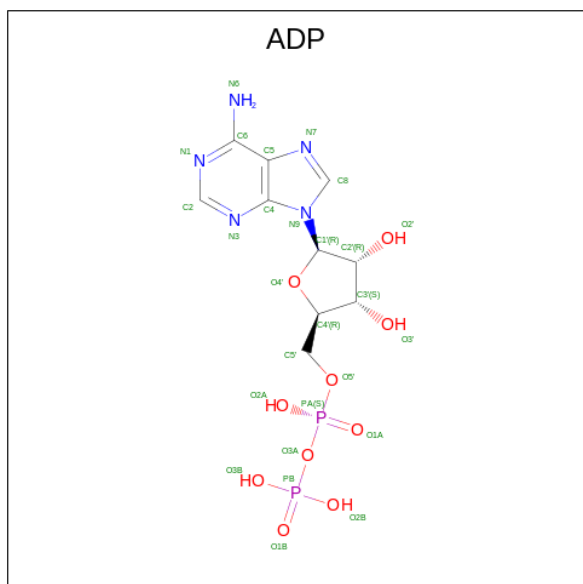
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
74	C3	1	Total 51	C 41	N 1	O 8	P 1	0
74	N1	1	Total 31	C 21	N 1	O 8	P 1	0
74	N3	1	Total 51	C 41	N 1	O 8	P 1	0
74	N5	1	Total 46	C 36	N 1	O 8	P 1	0
74	N5	1	Total 40	C 30	N 1	O 8	P 1	0
74	N5	1	Total 51	C 41	N 1	O 8	P 1	0
74	QB	1	Total 34	C 24	N 1	O 8	P 1	0
74	QC	1	Total 40	C 30	N 1	O 8	P 1	0
74	QE	1	Total 47	C 37	N 1	O 8	P 1	0
74	QJ	1	Total 51	C 41	N 1	O 8	P 1	0
74	Qc	1	Total 42	C 32	N 1	O 8	P 1	0
74	Qd	1	Total 24	C 14	N 1	O 8	P 1	0
74	S2	1	Total 45	C 35	N 1	O 8	P 1	0
74	S8	1	Total 51	C 41	N 1	O 8	P 1	0

- Molecule 75 is S-[2-({N-[(2S)-2-hydroxy-3,3-dimethyl-4-(phosphonoxy)butanoyl]-beta-alanyl}amino)ethyl] tetradecanethioate (CCD ID: ZMP) (formula: C<sub>25</sub>H<sub>49</sub>N<sub>2</sub>O<sub>8</sub>PS) (labeled as "Ligand of Interest" by depositor).



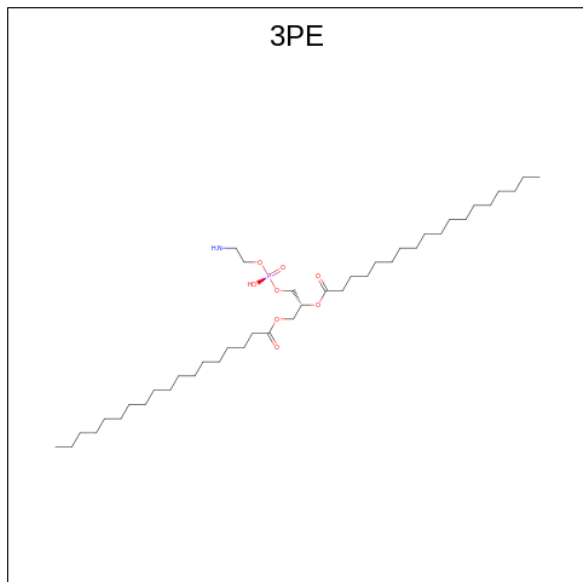
Mol	Chain	Residues	Atoms					AltConf		
			Total	C	N	O	P		S	
75	AB	1	Total	36	25	2	7	1	1	0
75	AC	1	Total	36	25	2	7	1	1	0

- Molecule 76 is ADENOSINE-5'-DIPHOSPHATE (CCD ID: ADP) (formula:  $C_{10}H_{15}N_5O_{10}P_2$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf	
			Total	C	N	O	P		
76	AK	1	Total	27	10	5	10	2	0

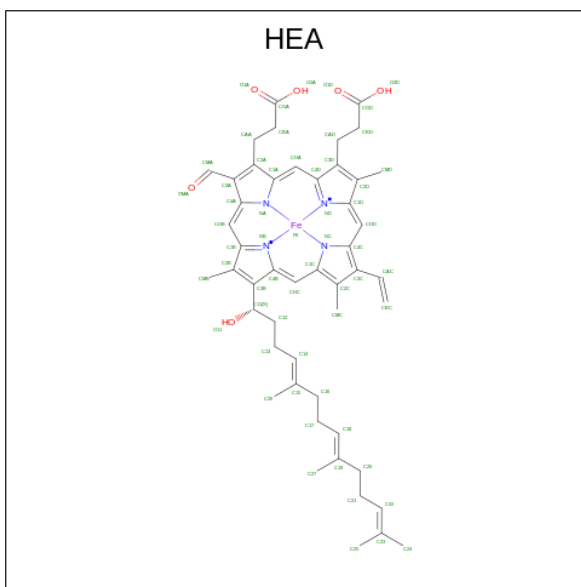
- Molecule 77 is 1,2-Distearoyl-sn-glycerophosphoethanolamine (CCD ID: 3PE) (formula:  $C_{41}H_{82}NO_8P$ ).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
77	B8	1	Total 32	C 22	N 1	O 8	P 1	0
77	C1	1	Total 45	C 35	N 1	O 8	P 1	0
77	C1	1	Total 46	C 36	N 1	O 8	P 1	0
77	CA	1	Total 46	C 36	N 1	O 8	P 1	0
77	CB	1	Total 48	C 38	N 1	O 8	P 1	0
77	N5	1	Total 38	C 28	N 1	O 8	P 1	0
77	QE	1	Total 44	C 34	N 1	O 8	P 1	0
77	QJ	1	Total 34	C 24	N 1	O 8	P 1	0
77	Qc	1	Total 48	C 38	N 1	O 8	P 1	0
77	Qj	1	Total 29	C 19	N 1	O 8	P 1	0
77	S7	1	Total 51	C 41	N 1	O 8	P 1	0

- Molecule 78 is HEME-A (CCD ID: HEA) (formula:  $C_{49}H_{56}FeN_4O_6$ ) (labeled as "Ligand of Interest" by depositor).





Mol	Chain	Residues	Atoms				AltConf	
78	C1	1	Total	C	Fe	N	O	0
			60	49	1	4	6	
78	C1	1	Total	C	Fe	N	O	0
			60	49	1	4	6	

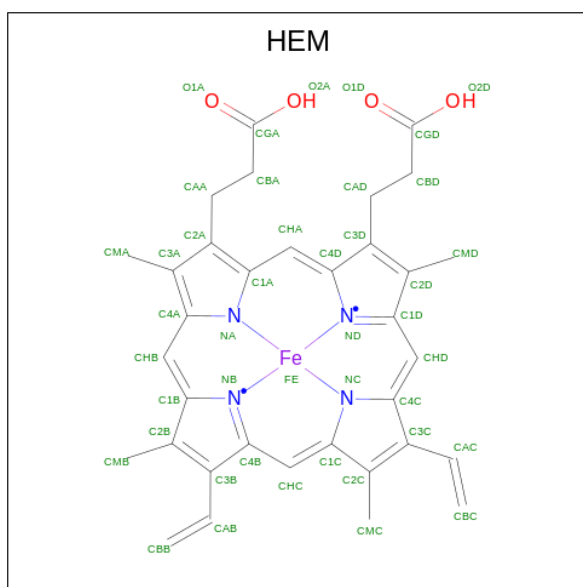
- Molecule 79 is COPPER (II) ION (CCD ID: CU) (formula: Cu) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
79	C1	1	Total	Cu	0
			1	1	
79	C2	2	Total	Cu	0
			2	2	

- Molecule 80 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

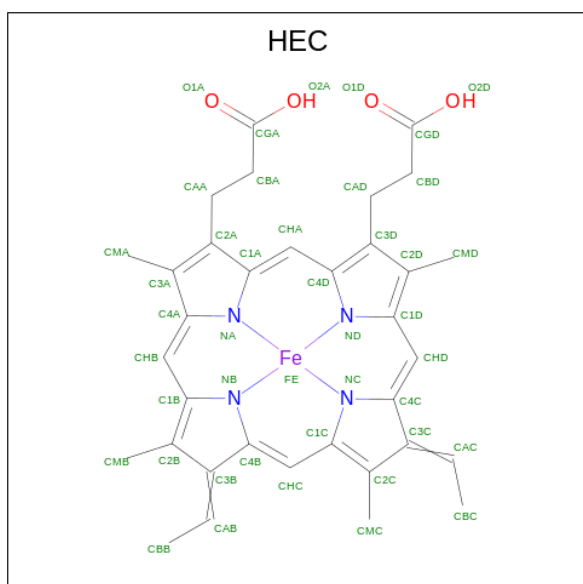
Mol	Chain	Residues	Atoms		AltConf
80	C1	1	Total	Mg	0
			1	1	
80	S1	1	Total	Mg	0
			1	1	

- Molecule 81 is PROTOPORPHYRIN IX CONTAINING FE (CCD ID: HEM) (formula: C<sub>34</sub>H<sub>32</sub>FeN<sub>4</sub>O<sub>4</sub>) (labeled as "Ligand of Interest" by depositor).



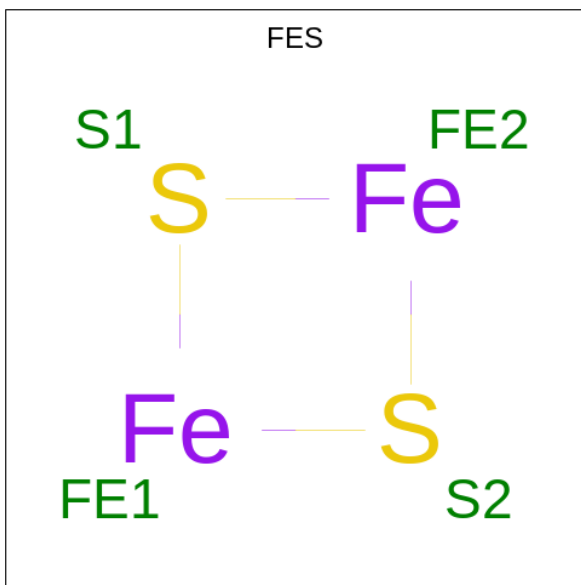
Mol	Chain	Residues	Atoms				AltConf	
			Total	C	Fe	N		O
81	QC	1	43	34	1	4	4	0
81	QC	1	43	34	1	4	4	0
81	Qc	1	43	34	1	4	4	0
81	Qc	1	43	34	1	4	4	0

- Molecule 82 is HEME C (CCD ID: HEC) (formula:  $C_{34}H_{34}FeN_4O_4$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf	
82	QD	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
82	Qd	1	Total	C	Fe	N	O	0
			43	34	1	4	4	

- Molecule 83 is FE2/S2 (INORGANIC) CLUSTER (CCD ID: FES) (formula: Fe<sub>2</sub>S<sub>2</sub>) (labeled as "Ligand of Interest" by depositor).



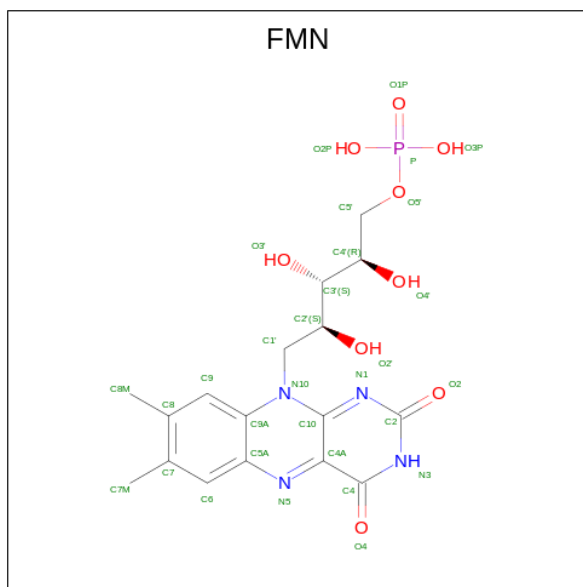
Mol	Chain	Residues	Atoms			AltConf
83	QE	1	Total	Fe	S	0
			4	2	2	
83	Qe	1	Total	Fe	S	0
			4	2	2	
83	S1	1	Total	Fe	S	0
			4	2	2	
83	V2	1	Total	Fe	S	0
			4	2	2	

- Molecule 84 is IRON/SULFUR CLUSTER (CCD ID: SF4) (formula: Fe<sub>4</sub>S<sub>4</sub>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			AltConf
84	S1	1	Total	Fe	S	0
			8	4	4	
84	S1	1	Total	Fe	S	0
			8	4	4	
84	S7	1	Total	Fe	S	0
			8	4	4	
84	S8	1	Total	Fe	S	0
			8	4	4	
84	S8	1	Total	Fe	S	0
			8	4	4	
84	V1	1	Total	Fe	S	0
			8	4	4	

- Molecule 85 is FLAVIN MONONUCLEOTIDE (CCD ID: FMN) (formula:  $C_{17}H_{21}N_4O_9P$ ) (labeled as "Ligand of Interest" by depositor).

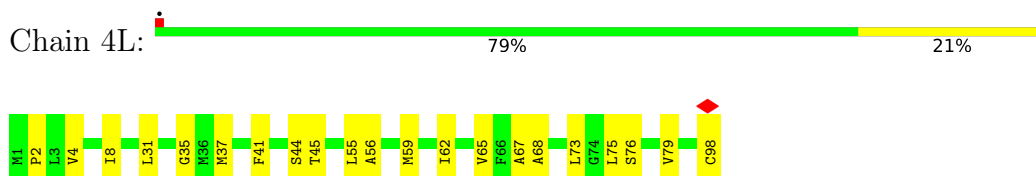


Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
85	V1	1	31	17	4	9	1	0

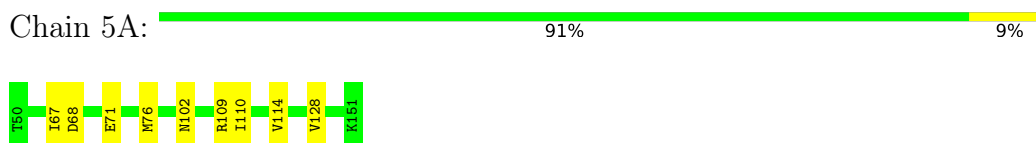
### 3 Residue-property plots [i](#)

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

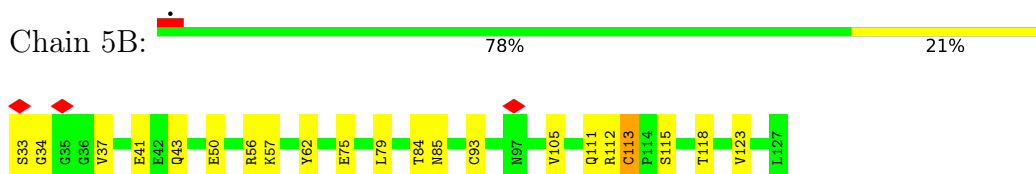
- Molecule 1: NADH-ubiquinone oxidoreductase chain 4L



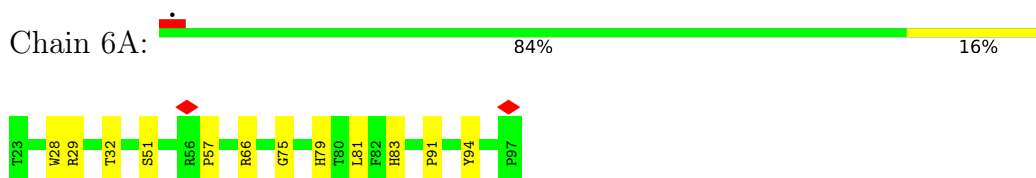
- Molecule 2: Cytochrome c oxidase subunit 5A, mitochondrial



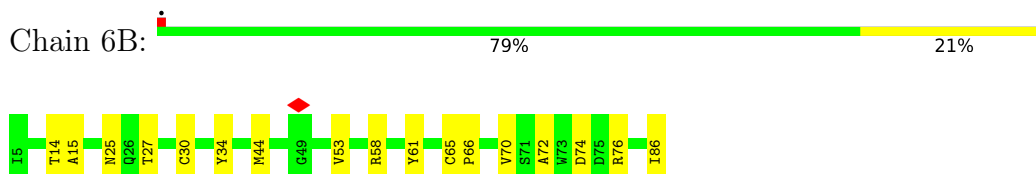
- Molecule 3: Cytochrome c oxidase subunit 5B, mitochondrial



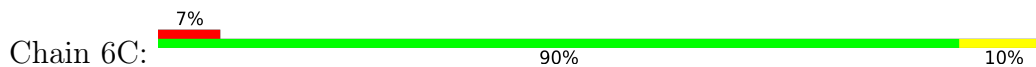
- Molecule 4: Cytochrome c oxidase subunit



- Molecule 5: Cytochrome c oxidase subunit



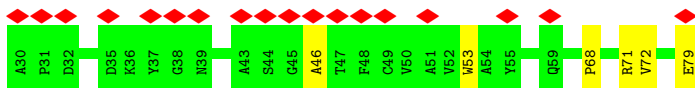
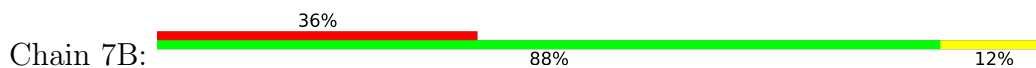
- Molecule 6: Cytochrome c oxidase subunit 6C



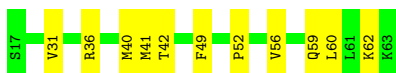
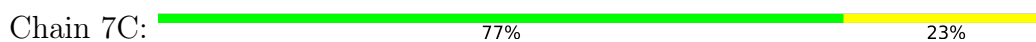
- Molecule 7: Cytochrome c oxidase subunit 7A1, mitochondrial



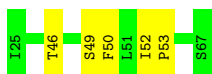
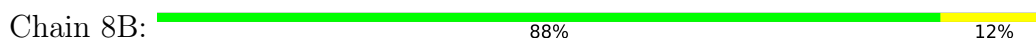
- Molecule 8: Cytochrome c oxidase subunit 7B, mitochondrial



- Molecule 9: Cytochrome c oxidase subunit 7C, mitochondrial



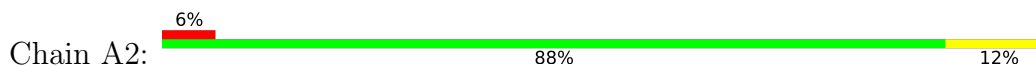
- Molecule 10: Cytochrome c oxidase subunit 8

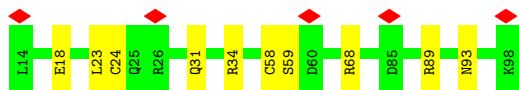


- Molecule 11: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 1



- Molecule 12: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 2





- Molecule 13: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 3



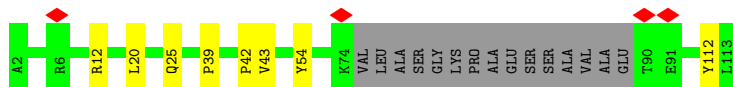
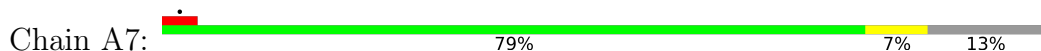
- Molecule 14: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 5



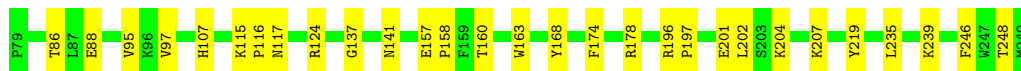
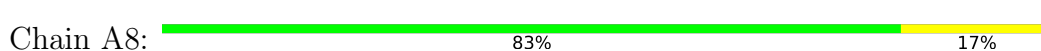
- Molecule 15: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 6



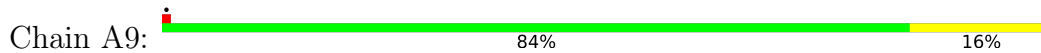
- Molecule 16: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 7



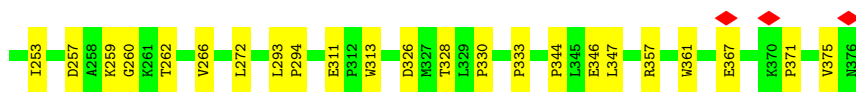
- Molecule 17: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 8



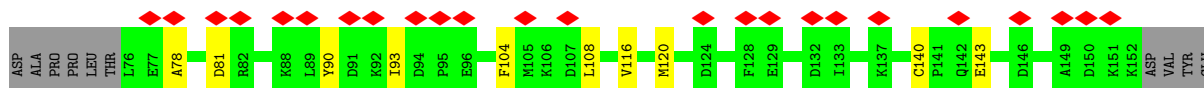
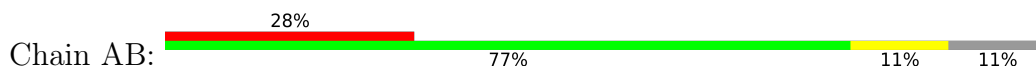
- Molecule 18: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 9, mitochondrial



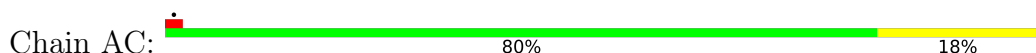




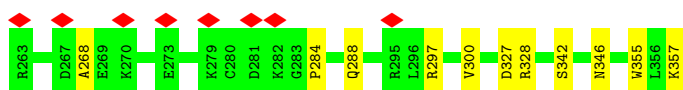
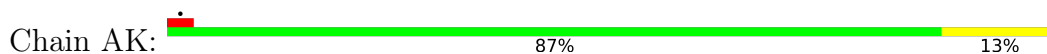
- Molecule 19: Acyl carrier protein



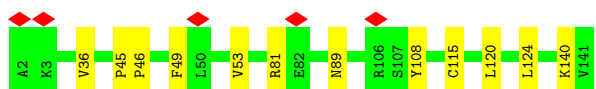
- Molecule 19: Acyl carrier protein



- Molecule 20: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 10, mitochondrial



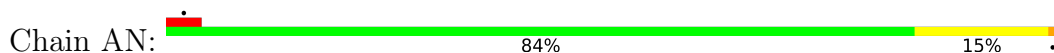
- Molecule 21: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 11

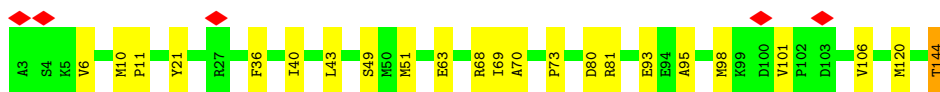


- Molecule 22: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 12

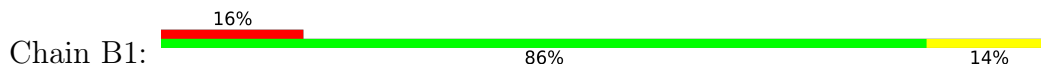


- Molecule 23: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 13

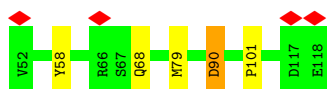




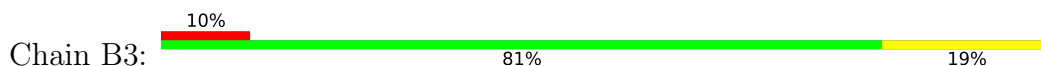
- Molecule 24: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 1



- Molecule 25: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 2, mitochondrial



- Molecule 26: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 3



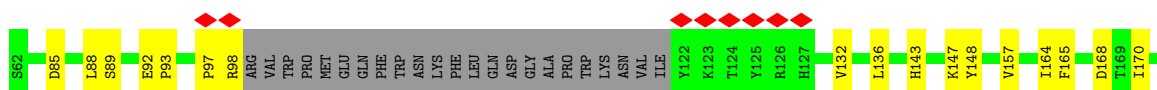
- Molecule 27: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 4

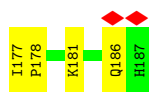


- Molecule 28: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 5, mitochondrial

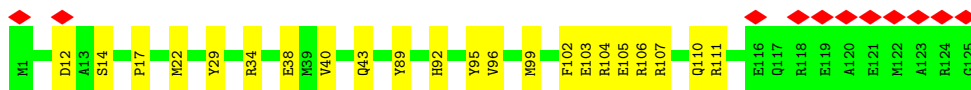
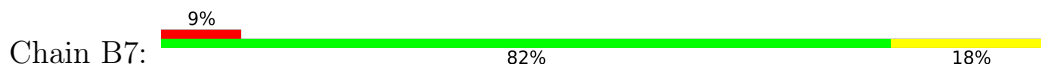


- Molecule 29: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 6

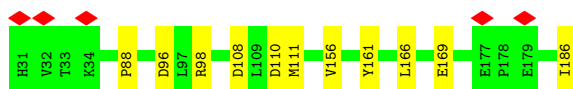




- Molecule 30: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 7



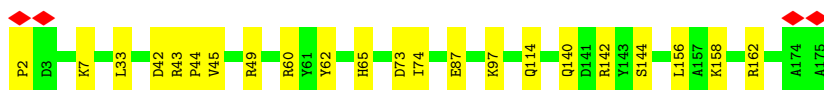
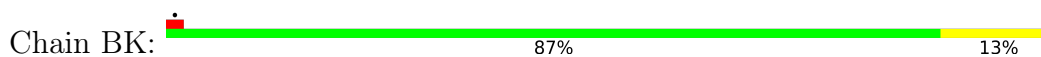
- Molecule 31: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 8, mitochondrial



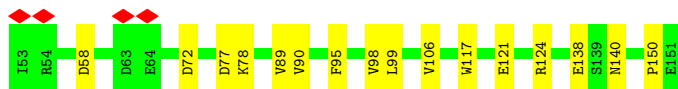
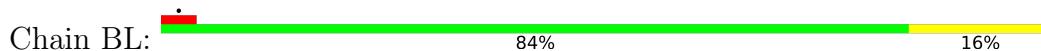
- Molecule 32: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 9



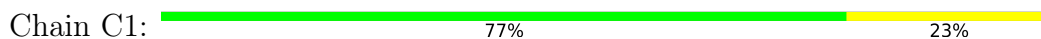
- Molecule 33: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 10



- Molecule 34: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 11, mitochondrial

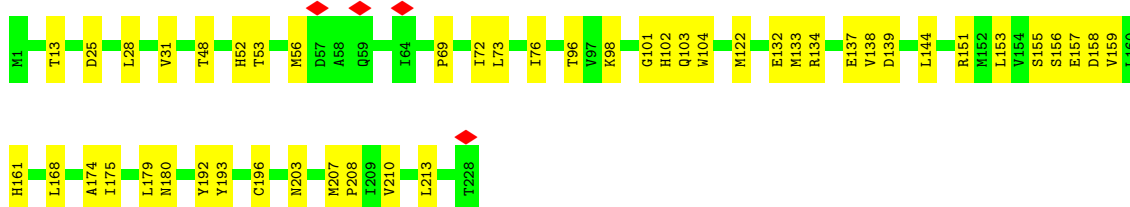
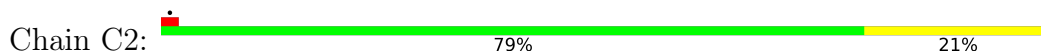


- Molecule 35: Cytochrome c oxidase subunit 1

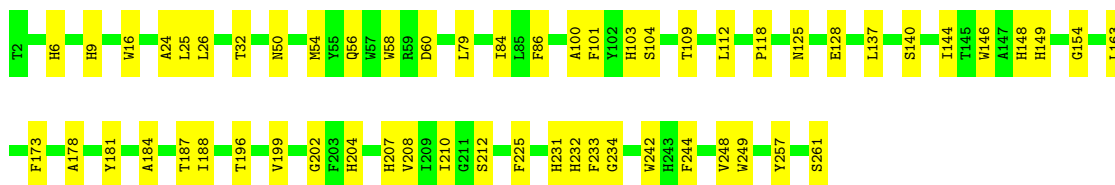
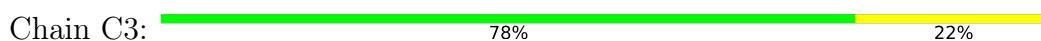




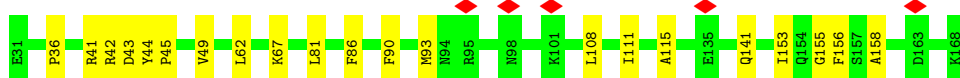
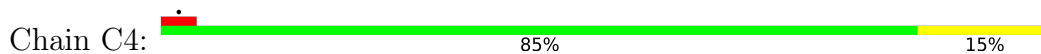
- Molecule 36: Cytochrome c oxidase subunit 2



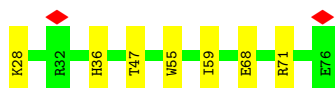
- Molecule 37: Cytochrome c oxidase subunit 3



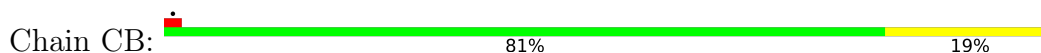
- Molecule 38: Cytochrome c oxidase subunit 4



- Molecule 39: NADH dehydrogenase [ubiquinone] 1 subunit C1, mitochondrial

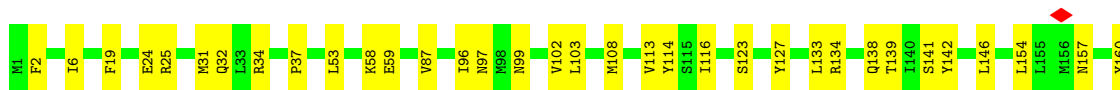
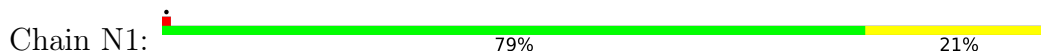


- Molecule 40: NADH dehydrogenase [ubiquinone] 1 subunit C2

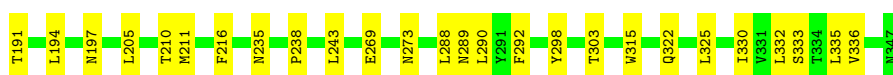
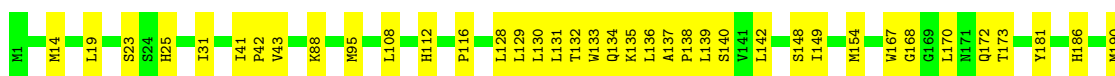
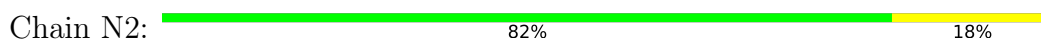




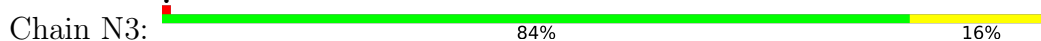
- Molecule 41: NADH-ubiquinone oxidoreductase chain 1



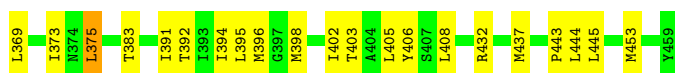
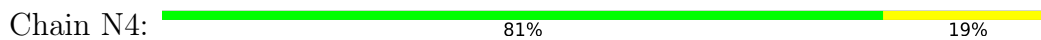
- Molecule 42: NADH-ubiquinone oxidoreductase chain 2



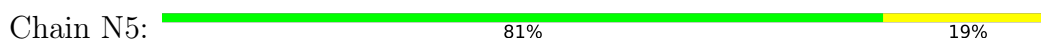
- Molecule 43: NADH-ubiquinone oxidoreductase chain 3

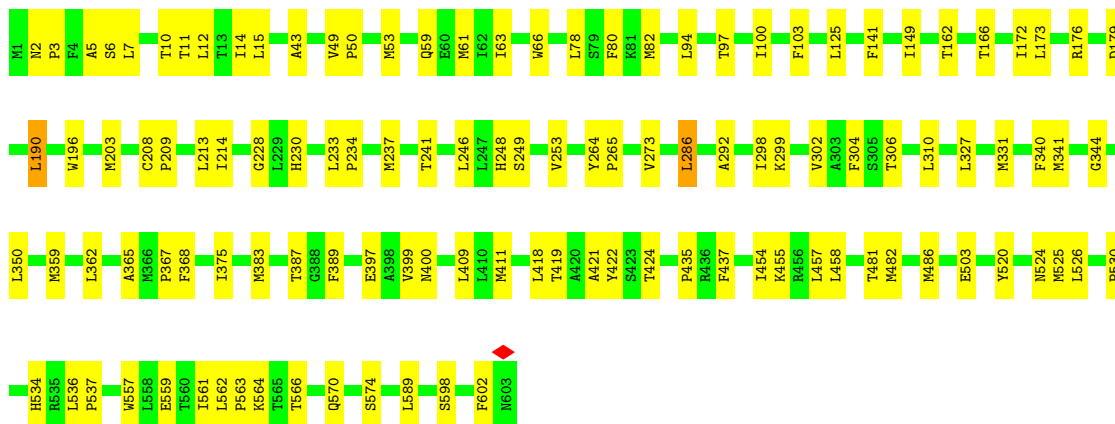


- Molecule 44: NADH-ubiquinone oxidoreductase chain 4

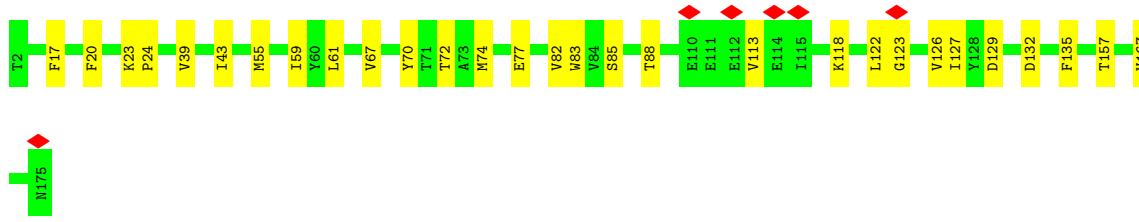
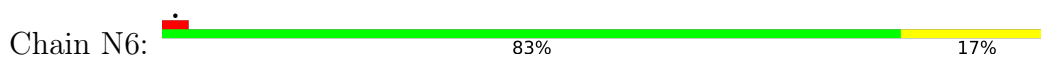


- Molecule 45: NADH-ubiquinone oxidoreductase chain 5

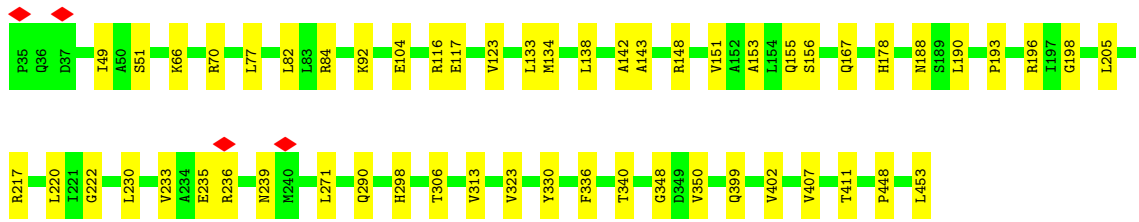
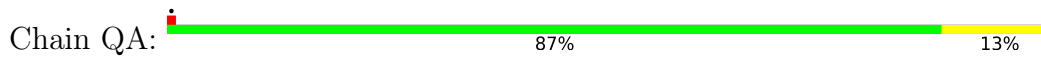




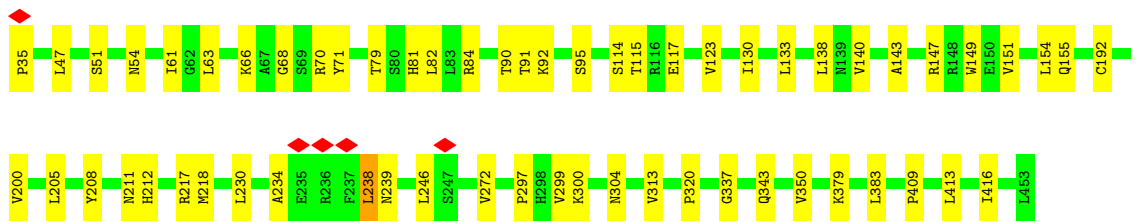
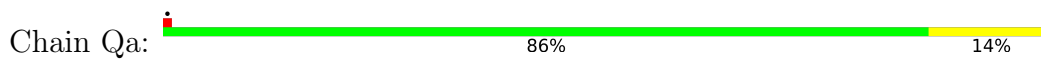
• Molecule 46: NADH-ubiquinone oxidoreductase chain 6



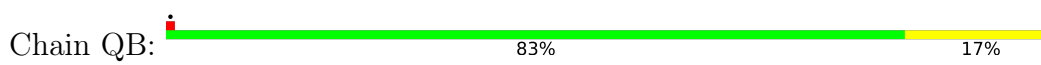
• Molecule 47: Cytochrome b-c1 complex subunit 2, mitochondrial

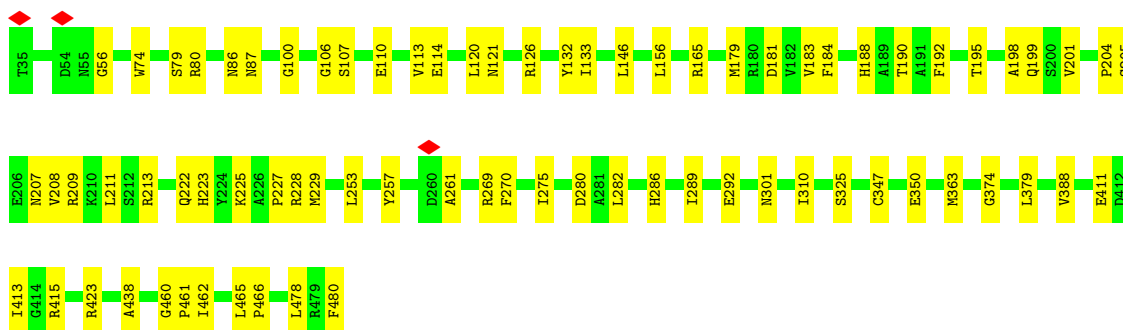


• Molecule 47: Cytochrome b-c1 complex subunit 2, mitochondrial

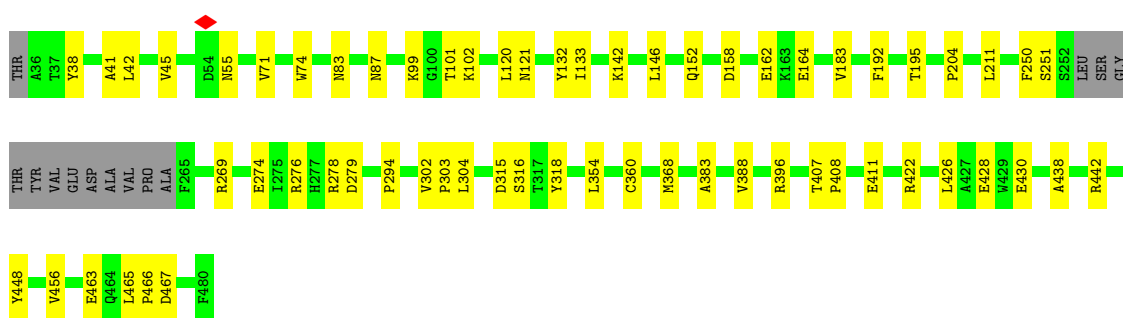
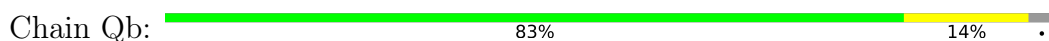


• Molecule 48: Cytochrome b-c1 complex subunit 1, mitochondrial

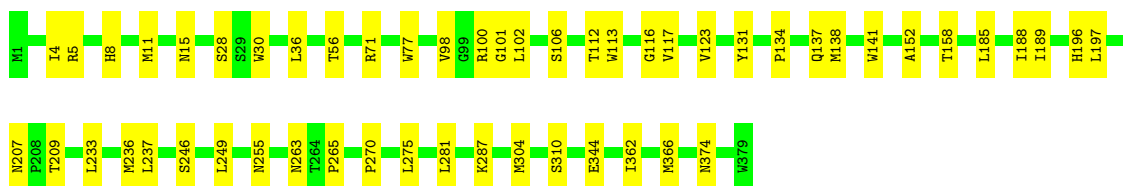
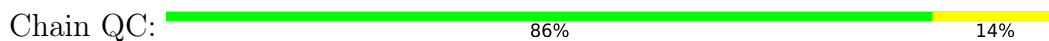




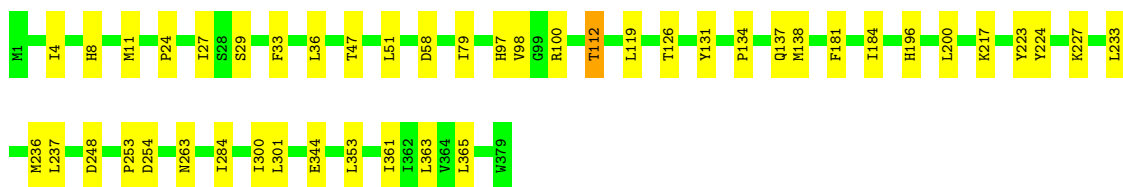
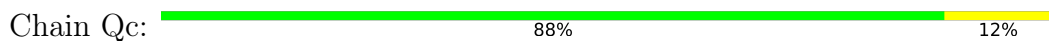
• Molecule 48: Cytochrome b-c1 complex subunit 1, mitochondrial



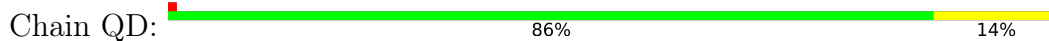
• Molecule 49: Cytochrome b

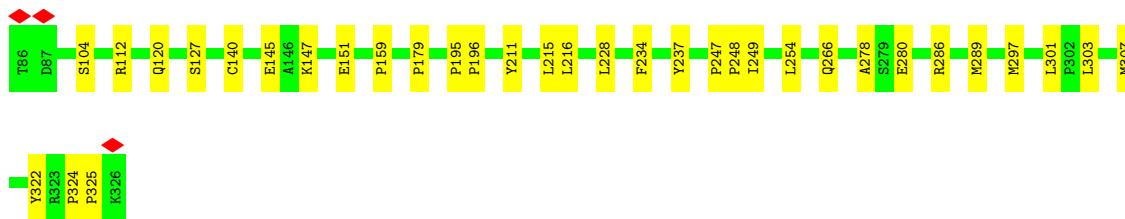


• Molecule 49: Cytochrome b

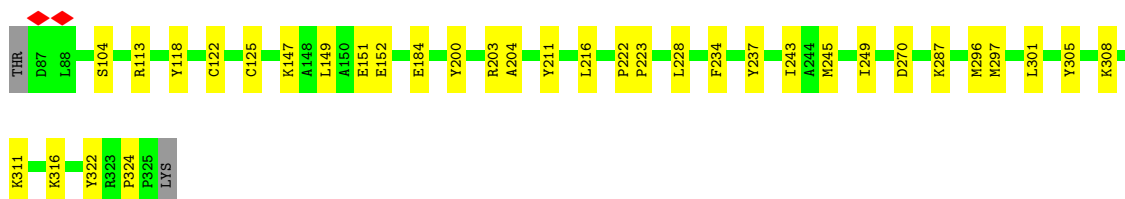
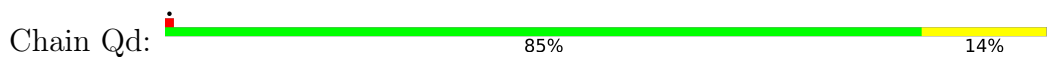


• Molecule 50: Cytochrome c1, heme protein, mitochondrial

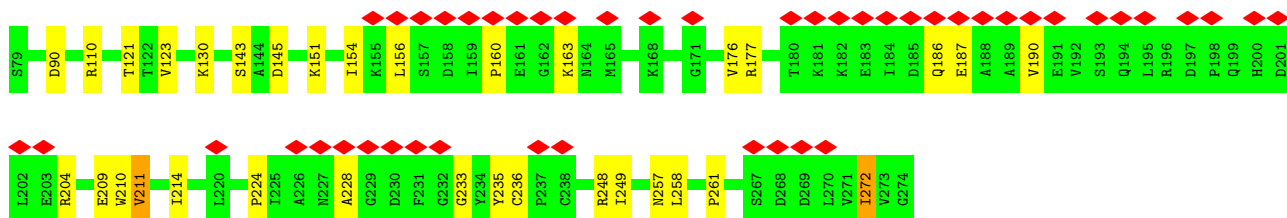
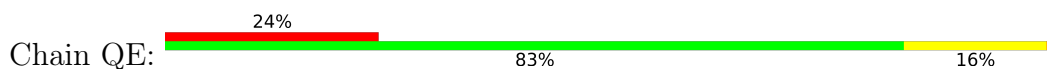




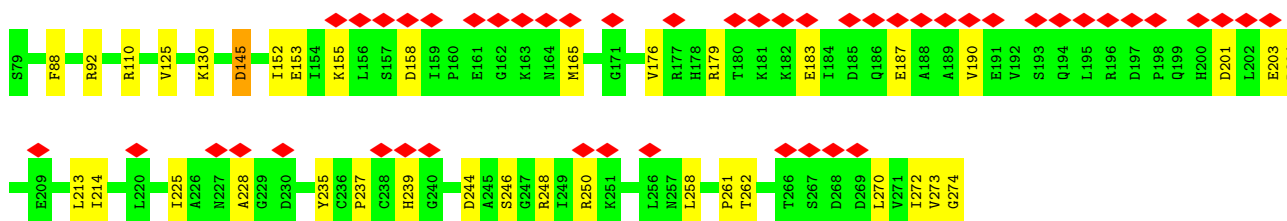
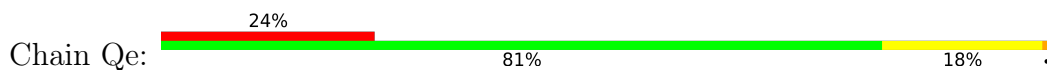
- Molecule 50: Cytochrome c1, heme protein, mitochondrial



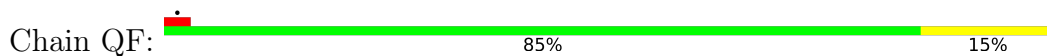
- Molecule 51: Cytochrome b-c1 complex subunit Rieske, mitochondrial



- Molecule 51: Cytochrome b-c1 complex subunit Rieske, mitochondrial

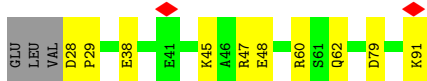
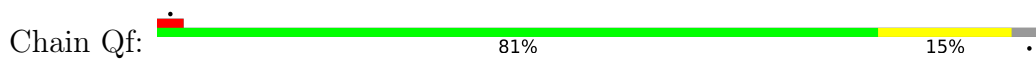


- Molecule 52: Cytochrome b-c1 complex subunit 6

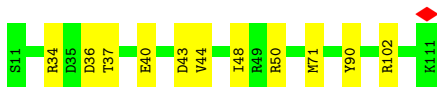


- Molecule 52: Cytochrome b-c1 complex subunit 6

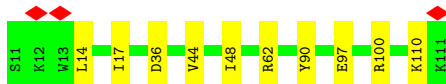
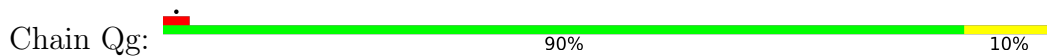




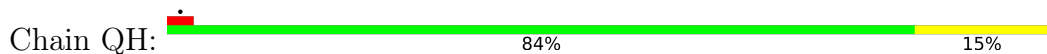
- Molecule 53: Cytochrome b-c1 complex subunit 7



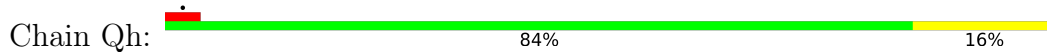
- Molecule 53: Cytochrome b-c1 complex subunit 7



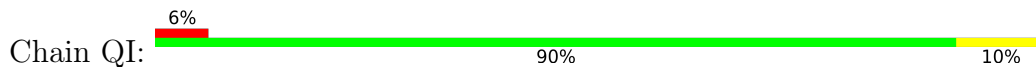
- Molecule 54: Cytochrome b-c1 complex subunit 8



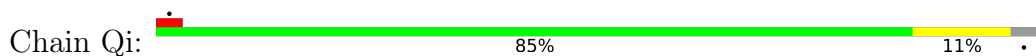
- Molecule 54: Cytochrome b-c1 complex subunit 8



- Molecule 55: Complex III subunit 9

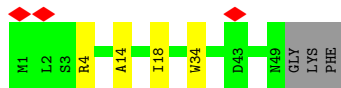
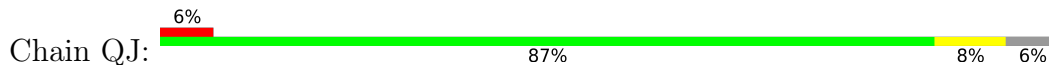


- Molecule 55: Complex III subunit 9

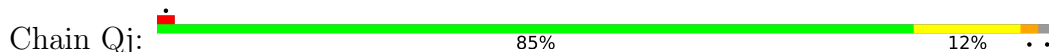




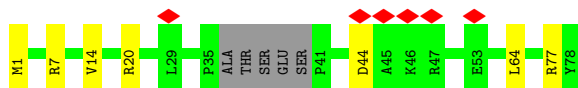
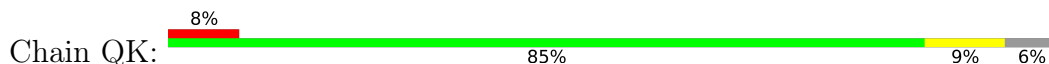
• Molecule 56: Cytochrome b-c1 complex subunit 10



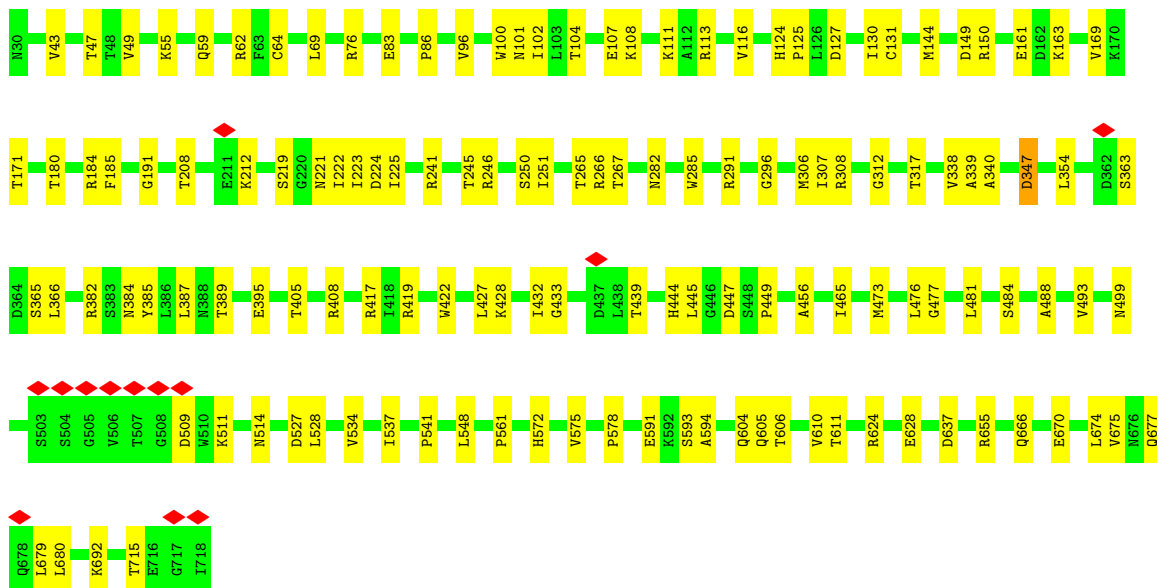
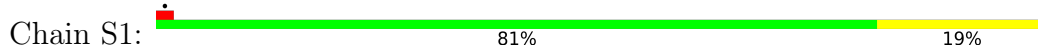
• Molecule 56: Cytochrome b-c1 complex subunit 10



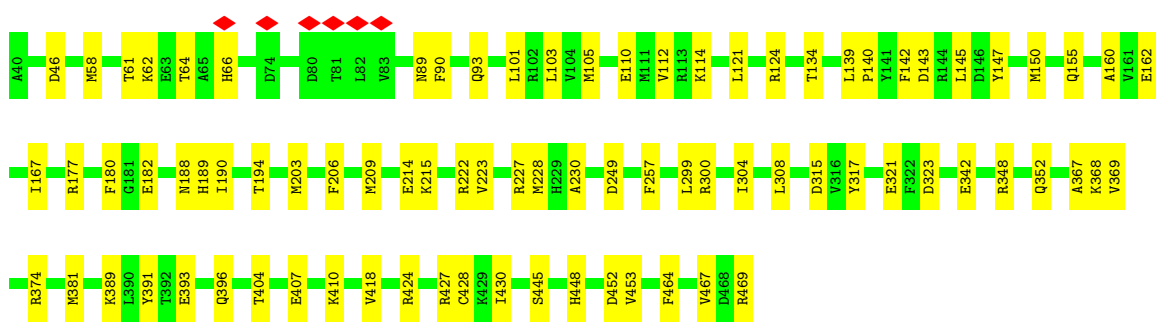
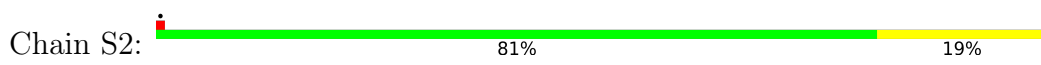
• Molecule 57: Cytochrome b-c1 complex subunit Rieske, mitochondrial



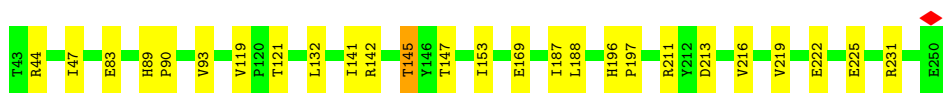
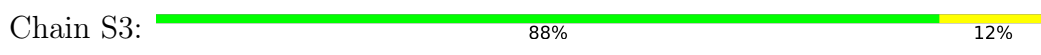
• Molecule 58: NADH-ubiquinone oxidoreductase 75 kDa subunit, mitochondrial



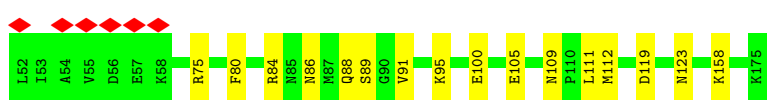
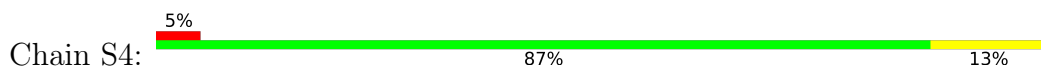
• Molecule 59: NADH dehydrogenase [ubiquinone] iron-sulfur protein 2, mitochondrial



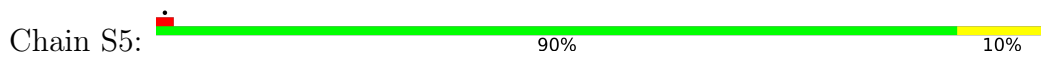
• Molecule 60: Complex I-30kD



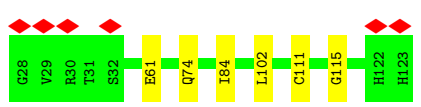
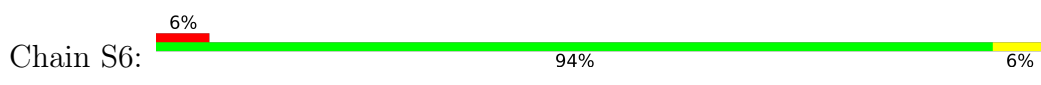
• Molecule 61: NADH dehydrogenase [ubiquinone] iron-sulfur protein 4, mitochondrial



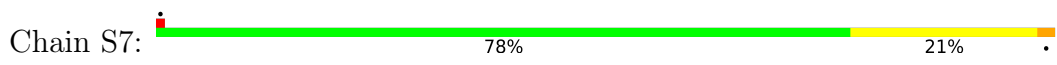
• Molecule 62: NADH dehydrogenase [ubiquinone] iron-sulfur protein 5



• Molecule 63: NADH dehydrogenase [ubiquinone] iron-sulfur protein 6, mitochondrial

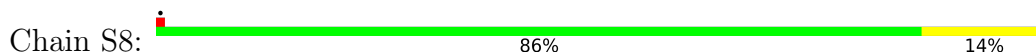


• Molecule 64: NADH dehydrogenase [ubiquinone] iron-sulfur protein 7, mitochondrial

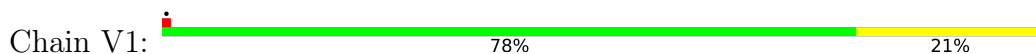




- Molecule 65: NADH dehydrogenase [ubiquinone] iron-sulfur protein 8, mitochondrial



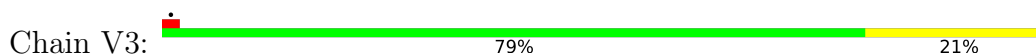
- Molecule 66: NADH dehydrogenase [ubiquinone] flavoprotein 1, mitochondrial



- Molecule 67: NADH dehydrogenase [ubiquinone] flavoprotein 2, mitochondrial



- Molecule 68: NADH:ubiquinone oxidoreductase subunit V3



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	168528	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	51.9	Depositor
Minimum defocus (nm)	600	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	105000	Depositor
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	63.880	Depositor
Minimum map value	-46.757	Depositor
Average map value	0.003	Depositor
Map value standard deviation	1.241	Depositor
Recommended contour level	5	Depositor
Map size (Å)	576.0, 576.0, 576.0	wwPDB
Map dimensions	480, 480, 480	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.2, 1.2, 1.2	Depositor

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: FES, SF4, CDL, HEM, 2MR, HEC, PC1, ZN, ZMP, FMN, 3PE, CU, PLX, ADP, HEA, PEE, MG, NDP

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	4L	0.14	0/759	0.30	0/1029
2	5A	0.11	0/843	0.23	0/1145
3	5B	0.17	0/739	0.33	0/1002
4	6A	0.12	0/648	0.27	0/888
5	6B	0.13	0/704	0.23	0/951
6	6C	0.11	0/587	0.23	0/781
7	7A	0.11	0/457	0.27	0/620
8	7B	0.11	0/405	0.26	0/555
9	7C	0.16	0/400	0.24	0/536
10	8B	0.12	0/349	0.27	0/477
11	A1	0.13	0/577	0.33	0/777
12	A2	0.10	0/697	0.26	0/938
13	A3	0.10	0/664	0.23	0/912
14	A5	0.11	0/929	0.22	0/1258
15	A6	0.13	0/991	0.27	0/1335
16	A7	0.11	0/798	0.26	0/1079
17	A8	0.11	0/1436	0.24	0/1938
18	A9	0.13	0/2820	0.27	0/3823
19	AB	0.08	0/633	0.21	0/851
19	AC	0.12	0/714	0.23	0/965
20	AK	0.11	0/2661	0.26	0/3602
21	AL	0.11	0/1042	0.21	0/1411
22	AM	0.12	0/1245	0.25	0/1694
23	AN	0.13	0/1204	0.26	0/1624
24	B1	0.11	0/491	0.24	0/663
25	B2	0.12	0/610	0.27	0/836
26	B3	0.11	0/660	0.26	0/892
27	B4	0.13	0/1092	0.25	0/1481
28	B5	0.14	0/1184	0.25	0/1603
29	B6	0.15	0/910	0.31	0/1237
30	B7	0.12	0/1092	0.24	0/1459

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
31	B8	0.12	0/1371	0.24	0/1875
32	B9	0.13	0/1590	0.28	0/2155
33	BK	0.14	0/1489	0.25	0/2008
34	BL	0.14	0/851	0.27	0/1155
35	C1	0.18	0/4164	0.32	0/5689
36	C2	0.17	0/1880	0.29	0/2564
37	C3	0.16	0/2186	0.29	0/2991
38	C4	0.13	0/1187	0.25	0/1606
39	CA	0.11	0/430	0.20	0/581
40	CB	0.14	0/1031	0.25	0/1394
41	N1	0.17	0/2581	0.34	0/3529
42	N2	0.18	0/2773	0.33	0/3768
43	N3	0.15	0/938	0.28	0/1281
44	N4	0.17	0/3723	0.32	0/5078
45	N5	0.16	0/4914	0.34	0/6683
46	N6	0.14	0/1364	0.30	0/1850
47	QA	0.14	0/3200	0.28	0/4333
47	Qa	0.14	0/3200	0.28	0/4333
48	QB	0.14	0/3531	0.30	0/4793
48	Qb	0.14	0/3436	0.29	0/4659
49	QC	0.16	0/3123	0.31	0/4269
49	Qc	0.18	0/3123	0.32	0/4269
50	QD	0.13	0/1979	0.25	0/2684
50	Qd	0.14	0/1962	0.27	0/2663
51	QE	0.11	0/1550	0.26	0/2098
51	Qe	0.12	0/1550	0.27	0/2098
52	QF	0.11	0/558	0.22	0/747
52	Qf	0.11	0/534	0.22	0/714
53	QG	0.14	0/913	0.25	0/1223
53	Qg	0.12	0/913	0.25	0/1223
54	QH	0.15	0/684	0.31	0/926
54	Qh	0.14	0/688	0.29	0/931
55	QI	0.10	0/520	0.20	0/701
55	Qi	0.14	0/506	0.25	0/683
56	QJ	0.10	0/420	0.24	0/576
56	Qj	0.13	0/437	0.32	0/598
57	QK	0.11	0/528	0.26	0/716
58	S1	0.14	0/5378	0.30	0/7287
59	S2	0.16	0/3538	0.29	0/4796
60	S3	0.14	0/1789	0.27	0/2436
61	S4	0.13	0/1030	0.26	0/1391
62	S5	0.11	0/889	0.23	0/1190
63	S6	0.12	0/755	0.27	0/1018

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
64	S7	0.16	0/1279	0.31	0/1730
65	S8	0.16	0/1443	0.28	0/1952
66	V1	0.14	0/3391	0.29	0/4583
67	V2	0.13	0/1711	0.29	0/2328
68	V3	0.10	0/365	0.26	0/493
All	All	0.14	0/115736	0.28	0/157010

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	4L	748	0	799	21	0
2	5A	825	0	823	6	0
3	5B	724	0	705	14	0
4	6A	620	0	589	9	0
5	6B	684	0	649	10	0
6	6C	574	0	590	7	0
7	7A	447	0	443	4	0
8	7B	392	0	372	7	0
9	7C	387	0	385	12	0
10	8B	338	0	342	4	0
11	A1	562	0	557	4	0
12	A2	686	0	699	6	0
13	A3	643	0	642	2	0
14	A5	910	0	950	4	0
15	A6	967	0	972	10	0
16	A7	780	0	808	6	0
17	A8	1398	0	1372	24	0
18	A9	2743	0	2762	32	0
19	AB	624	0	625	6	0
19	AC	702	0	694	13	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
20	AK	2601	0	2566	24	0
21	AL	1021	0	1025	11	0
22	AM	1204	0	1162	12	0
23	AN	1173	0	1166	21	0
24	B1	479	0	486	6	0
25	B2	584	0	529	6	0
26	B3	641	0	620	11	0
27	B4	1062	0	1072	6	0
28	B5	1151	0	1164	11	0
29	B6	882	0	899	20	0
30	B7	1068	0	1043	18	0
31	B8	1315	0	1208	9	0
32	B9	1534	0	1470	19	0
33	BK	1456	0	1426	19	0
34	BL	828	0	788	13	0
35	C1	4024	0	4005	81	0
36	C2	1833	0	1843	40	0
37	C3	2103	0	2034	53	0
38	C4	1153	0	1130	18	0
39	CA	417	0	422	4	0
40	CB	1000	0	994	19	0
41	N1	2508	0	2607	53	0
42	N2	2710	0	2874	48	0
43	N3	914	0	951	16	0
44	N4	3631	0	3839	60	0
45	N5	4785	0	4933	87	0
46	N6	1329	0	1326	28	0
47	QA	3147	0	3129	35	0
47	Qa	3147	0	3129	37	0
48	QB	3459	0	3350	48	0
48	Qb	3367	0	3262	36	0
49	QC	3025	0	3090	35	0
49	Qc	3025	0	3090	40	0
50	QD	1921	0	1867	25	0
50	Qd	1904	0	1849	29	0
51	QE	1517	0	1500	21	0
51	Qe	1517	0	1500	27	0
52	QF	552	0	536	7	0
52	Qf	528	0	510	7	0
53	QG	893	0	888	7	0
53	Qg	893	0	888	6	0
54	QH	662	0	660	13	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
54	Qh	666	0	663	11	0
55	QI	507	0	509	5	0
55	Qi	493	0	491	6	0
56	QJ	405	0	405	5	0
56	Qj	421	0	418	6	0
57	QK	520	0	554	5	0
58	S1	5290	0	5321	86	0
59	S2	3459	0	3396	68	0
60	S3	1738	0	1693	15	0
61	S4	1007	0	1008	10	0
62	S5	867	0	871	11	0
63	S6	741	0	701	4	0
64	S7	1248	0	1254	26	0
65	S8	1412	0	1363	21	0
66	V1	3316	0	3272	61	0
67	V2	1671	0	1673	15	0
68	V3	355	0	329	8	0
69	4L	92	0	137	7	0
69	6A	83	0	116	5	0
69	A7	51	0	46	1	0
69	AK	68	0	80	4	0
69	AL	174	0	245	10	0
69	B5	100	0	156	3	0
69	CB	83	0	113	4	0
69	N1	78	0	103	6	0
69	N4	162	0	224	10	0
69	N5	189	0	284	9	0
69	QB	64	0	72	2	0
69	QD	58	0	60	1	0
69	QH	64	0	72	4	0
69	Qb	64	0	72	3	0
69	Qc	61	0	66	1	0
69	Qh	55	0	54	3	0
70	5B	1	0	0	0	0
70	S6	1	0	0	0	0
71	6A	83	0	114	8	0
71	C1	133	0	197	1	0
71	C3	143	0	217	22	0
71	N1	108	0	176	9	0
71	N3	54	0	88	1	0
71	QB	51	0	79	4	0
71	Qb	48	0	73	5	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
71	Qc	54	0	88	1	0
71	Qh	54	0	88	3	0
72	6C	43	0	67	1	0
72	AL	47	0	75	1	0
72	AM	52	0	88	5	0
72	B5	52	0	88	1	0
72	CB	52	0	88	7	0
72	N3	52	0	88	3	0
72	N4	52	0	88	3	0
72	QB	46	0	73	3	0
72	QI	52	0	88	5	0
72	S7	52	0	88	4	0
73	A9	48	0	26	0	0
74	A9	39	0	52	1	0
74	AL	49	0	75	4	0
74	C3	51	0	82	6	0
74	N1	31	0	36	1	0
74	N3	51	0	82	2	0
74	N5	137	0	205	5	0
74	QB	34	0	42	3	0
74	QC	40	0	54	0	0
74	QE	47	0	71	1	0
74	QJ	51	0	82	3	0
74	Qc	42	0	61	1	0
74	Qd	24	0	22	0	0
74	S2	45	0	67	1	0
74	S8	51	0	82	2	0
75	AB	36	0	47	0	0
75	AC	36	0	47	3	0
76	AK	27	0	12	2	0
77	B8	32	0	38	0	0
77	C1	91	0	136	4	0
77	CA	46	0	69	0	0
77	CB	48	0	73	5	0
77	N5	38	0	50	1	0
77	QE	44	0	65	0	0
77	QJ	34	0	42	1	0
77	Qc	48	0	73	3	0
77	Qj	29	0	32	1	0
77	S7	51	0	82	4	0
78	C1	120	0	108	13	0
79	C1	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
79	C2	2	0	0	0	0
80	C1	1	0	0	0	0
80	S1	1	0	0	0	0
81	QC	86	0	60	6	0
81	Qc	86	0	60	10	0
82	QD	43	0	30	2	0
82	Qd	43	0	32	3	0
83	QE	4	0	0	0	0
83	Qe	4	0	0	1	0
83	S1	4	0	0	1	0
83	V2	4	0	0	0	0
84	S1	16	0	0	1	0
84	S7	8	0	0	0	0
84	S8	16	0	0	0	0
84	V1	8	0	0	1	0
85	V1	31	0	19	0	0
All	All	117287	0	118494	1475	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 6.

The worst 5 of 1475 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)
33:BK:140:GLN:O	33:BK:144:SER:HB2	1.71	0.89
30:B7:92:HIS:HD1	45:N5:481:THR:HG1	1.24	0.85
77:CB:202:3PE:H381	42:N2:325:LEU:H	1.42	0.84
21:AL:108:TYR:HB2	69:AL:202:CDL:HB32	1.62	0.80
1:4L:37:MET:HG2	1:4L:67:ALA:HB2	1.63	0.79

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	4L	96/98 (98%)	94 (98%)	2 (2%)	0	100	100
2	5A	100/102 (98%)	99 (99%)	1 (1%)	0	100	100
3	5B	93/95 (98%)	88 (95%)	5 (5%)	0	100	100
4	6A	73/75 (97%)	72 (99%)	1 (1%)	0	100	100
5	6B	80/82 (98%)	77 (96%)	3 (4%)	0	100	100
6	6C	68/70 (97%)	66 (97%)	2 (3%)	0	100	100
7	7A	55/57 (96%)	55 (100%)	0	0	100	100
8	7B	48/50 (96%)	47 (98%)	1 (2%)	0	100	100
9	7C	45/47 (96%)	43 (96%)	2 (4%)	0	100	100
10	8B	41/43 (95%)	41 (100%)	0	0	100	100
11	A1	68/70 (97%)	68 (100%)	0	0	100	100
12	A2	83/85 (98%)	80 (96%)	3 (4%)	0	100	100
13	A3	81/83 (98%)	78 (96%)	3 (4%)	0	100	100
14	A5	110/112 (98%)	109 (99%)	1 (1%)	0	100	100
15	A6	112/114 (98%)	107 (96%)	5 (4%)	0	100	100
16	A7	93/112 (83%)	91 (98%)	2 (2%)	0	100	100
17	A8	169/171 (99%)	165 (98%)	4 (2%)	0	100	100
18	A9	339/341 (99%)	327 (96%)	12 (4%)	0	100	100
19	AB	75/87 (86%)	74 (99%)	1 (1%)	0	100	100
19	AC	85/87 (98%)	85 (100%)	0	0	100	100
20	AK	319/321 (99%)	309 (97%)	10 (3%)	0	100	100
21	AL	138/140 (99%)	138 (100%)	0	0	100	100
22	AM	142/144 (99%)	140 (99%)	2 (1%)	0	100	100
23	AN	140/142 (99%)	129 (92%)	11 (8%)	0	100	100
24	B1	54/56 (96%)	54 (100%)	0	0	100	100
25	B2	65/67 (97%)	64 (98%)	1 (2%)	0	100	100
26	B3	78/80 (98%)	77 (99%)	1 (1%)	0	100	100
27	B4	126/128 (98%)	123 (98%)	3 (2%)	0	100	100
28	B5	136/138 (99%)	133 (98%)	3 (2%)	0	100	100
29	B6	99/126 (79%)	94 (95%)	5 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
30	B7	123/125 (98%)	118 (96%)	5 (4%)	0	100	100
31	B8	154/156 (99%)	151 (98%)	3 (2%)	0	100	100
32	B9	176/178 (99%)	175 (99%)	1 (1%)	0	100	100
33	BK	172/174 (99%)	171 (99%)	1 (1%)	0	100	100
34	BL	97/99 (98%)	88 (91%)	9 (9%)	0	100	100
35	C1	512/514 (100%)	493 (96%)	19 (4%)	0	100	100
36	C2	226/228 (99%)	221 (98%)	5 (2%)	0	100	100
37	C3	258/260 (99%)	248 (96%)	10 (4%)	0	100	100
38	C4	136/138 (99%)	128 (94%)	8 (6%)	0	100	100
39	CA	47/49 (96%)	47 (100%)	0	0	100	100
40	CB	119/121 (98%)	117 (98%)	2 (2%)	0	100	100
41	N1	316/318 (99%)	305 (96%)	11 (4%)	0	100	100
42	N2	345/347 (99%)	335 (97%)	10 (3%)	0	100	100
43	N3	113/115 (98%)	111 (98%)	2 (2%)	0	100	100
44	N4	457/459 (100%)	453 (99%)	4 (1%)	0	100	100
45	N5	601/603 (100%)	576 (96%)	25 (4%)	0	100	100
46	N6	172/174 (99%)	161 (94%)	11 (6%)	0	100	100
47	QA	417/419 (100%)	410 (98%)	7 (2%)	0	100	100
47	Qa	417/419 (100%)	411 (99%)	6 (1%)	0	100	100
48	QB	444/446 (100%)	432 (97%)	12 (3%)	0	100	100
48	Qb	429/446 (96%)	423 (99%)	6 (1%)	0	100	100
49	QC	377/379 (100%)	371 (98%)	6 (2%)	0	100	100
49	Qc	377/379 (100%)	372 (99%)	5 (1%)	0	100	100
50	QD	239/241 (99%)	230 (96%)	9 (4%)	0	100	100
50	Qd	237/241 (98%)	232 (98%)	5 (2%)	0	100	100
51	QE	194/196 (99%)	189 (97%)	5 (3%)	0	100	100
51	Qe	194/196 (99%)	188 (97%)	6 (3%)	0	100	100
52	QF	65/67 (97%)	65 (100%)	0	0	100	100
52	Qf	62/67 (92%)	61 (98%)	1 (2%)	0	100	100
53	QG	99/101 (98%)	97 (98%)	2 (2%)	0	100	100
53	Qg	99/101 (98%)	97 (98%)	2 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
54	QH	76/79 (96%)	74 (97%)	2 (3%)	0	100	100
54	Qh	77/79 (98%)	76 (99%)	1 (1%)	0	100	100
55	QI	60/62 (97%)	59 (98%)	1 (2%)	0	100	100
55	Qi	58/62 (94%)	58 (100%)	0	0	100	100
56	QJ	47/52 (90%)	46 (98%)	1 (2%)	0	100	100
56	Qj	49/52 (94%)	48 (98%)	1 (2%)	0	100	100
57	QK	69/78 (88%)	69 (100%)	0	0	100	100
58	S1	687/689 (100%)	662 (96%)	25 (4%)	0	100	100
59	S2	427/430 (99%)	413 (97%)	14 (3%)	0	100	100
60	S3	206/208 (99%)	198 (96%)	8 (4%)	0	100	100
61	S4	122/124 (98%)	121 (99%)	1 (1%)	0	100	100
62	S5	103/105 (98%)	101 (98%)	2 (2%)	0	100	100
63	S6	94/96 (98%)	92 (98%)	2 (2%)	0	100	100
64	S7	154/156 (99%)	149 (97%)	5 (3%)	0	100	100
65	S8	174/176 (99%)	172 (99%)	2 (1%)	0	100	100
66	V1	429/431 (100%)	412 (96%)	17 (4%)	0	100	100
67	V2	215/217 (99%)	208 (97%)	7 (3%)	0	100	100
68	V3	40/42 (95%)	37 (92%)	3 (8%)	0	100	100
All	All	13972/14217 (98%)	13598 (97%)	374 (3%)	0	100	100

There are no Ramachandran outliers to report.

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

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	4L	85/85 (100%)	85 (100%)	0	100	100
2	5A	89/89 (100%)	89 (100%)	0	100	100
3	5B	80/80 (100%)	79 (99%)	1 (1%)	65	86

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
4	6A	66/66 (100%)	66 (100%)	0	100	100
5	6B	73/73 (100%)	71 (97%)	2 (3%)	40	71
6	6C	57/57 (100%)	57 (100%)	0	100	100
7	7A	48/48 (100%)	48 (100%)	0	100	100
8	7B	39/39 (100%)	39 (100%)	0	100	100
9	7C	40/40 (100%)	40 (100%)	0	100	100
10	8B	37/37 (100%)	37 (100%)	0	100	100
11	A1	58/58 (100%)	58 (100%)	0	100	100
12	A2	76/76 (100%)	76 (100%)	0	100	100
13	A3	69/69 (100%)	69 (100%)	0	100	100
14	A5	99/99 (100%)	99 (100%)	0	100	100
15	A6	107/107 (100%)	107 (100%)	0	100	100
16	A7	87/97 (90%)	86 (99%)	1 (1%)	70	88
17	A8	153/153 (100%)	153 (100%)	0	100	100
18	A9	295/295 (100%)	294 (100%)	1 (0%)	91	97
19	AB	71/80 (89%)	71 (100%)	0	100	100
19	AC	80/80 (100%)	79 (99%)	1 (1%)	65	86
20	AK	284/284 (100%)	282 (99%)	2 (1%)	81	93
21	AL	101/101 (100%)	100 (99%)	1 (1%)	73	90
22	AM	130/130 (100%)	128 (98%)	2 (2%)	60	84
23	AN	123/123 (100%)	122 (99%)	1 (1%)	79	92
24	B1	53/53 (100%)	53 (100%)	0	100	100
25	B2	62/62 (100%)	61 (98%)	1 (2%)	58	82
26	B3	62/62 (100%)	61 (98%)	1 (2%)	58	82
27	B4	113/113 (100%)	113 (100%)	0	100	100
28	B5	121/121 (100%)	121 (100%)	0	100	100
29	B6	98/119 (82%)	98 (100%)	0	100	100
30	B7	112/112 (100%)	112 (100%)	0	100	100
31	B8	141/141 (100%)	141 (100%)	0	100	100
32	B9	159/159 (100%)	159 (100%)	0	100	100
33	BK	155/155 (100%)	155 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
34	BL	91/91 (100%)	91 (100%)	0	100	100
35	C1	425/425 (100%)	420 (99%)	5 (1%)	67	87
36	C2	212/212 (100%)	212 (100%)	0	100	100
37	C3	224/224 (100%)	223 (100%)	1 (0%)	89	96
38	C4	123/123 (100%)	123 (100%)	0	100	100
39	CA	45/45 (100%)	44 (98%)	1 (2%)	47	76
40	CB	108/108 (100%)	107 (99%)	1 (1%)	75	91
41	N1	275/275 (100%)	272 (99%)	3 (1%)	70	88
42	N2	311/311 (100%)	311 (100%)	0	100	100
43	N3	100/100 (100%)	100 (100%)	0	100	100
44	N4	410/410 (100%)	407 (99%)	3 (1%)	81	93
45	N5	537/537 (100%)	534 (99%)	3 (1%)	84	94
46	N6	140/140 (100%)	140 (100%)	0	100	100
47	QA	330/330 (100%)	330 (100%)	0	100	100
47	Qa	330/330 (100%)	328 (99%)	2 (1%)	84	94
48	QB	372/372 (100%)	371 (100%)	1 (0%)	91	97
48	Qb	362/372 (97%)	358 (99%)	4 (1%)	70	88
49	QC	332/332 (100%)	330 (99%)	2 (1%)	84	94
49	Qc	332/332 (100%)	331 (100%)	1 (0%)	91	97
50	QD	206/206 (100%)	205 (100%)	1 (0%)	86	95
50	Qd	204/206 (99%)	204 (100%)	0	100	100
51	QE	166/166 (100%)	164 (99%)	2 (1%)	67	87
51	Qe	166/166 (100%)	165 (99%)	1 (1%)	84	94
52	QF	64/64 (100%)	64 (100%)	0	100	100
52	Qf	61/64 (95%)	61 (100%)	0	100	100
53	QG	93/93 (100%)	93 (100%)	0	100	100
53	Qg	93/93 (100%)	93 (100%)	0	100	100
54	QH	70/70 (100%)	70 (100%)	0	100	100
54	Qh	70/70 (100%)	69 (99%)	1 (1%)	62	85
55	QI	50/50 (100%)	50 (100%)	0	100	100
55	Qi	49/50 (98%)	49 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
56	QJ	40/42 (95%)	40 (100%)	0	100	100
56	Qj	41/42 (98%)	40 (98%)	1 (2%)	44	74
57	QK	55/59 (93%)	54 (98%)	1 (2%)	54	80
58	S1	579/579 (100%)	577 (100%)	2 (0%)	91	97
59	S2	370/370 (100%)	370 (100%)	0	100	100
60	S3	190/190 (100%)	189 (100%)	1 (0%)	86	95
61	S4	112/112 (100%)	111 (99%)	1 (1%)	75	91
62	S5	93/93 (100%)	93 (100%)	0	100	100
63	S6	79/79 (100%)	78 (99%)	1 (1%)	65	86
64	S7	132/132 (100%)	127 (96%)	5 (4%)	28	60
65	S8	151/151 (100%)	151 (100%)	0	100	100
66	V1	344/344 (100%)	341 (99%)	3 (1%)	75	91
67	V2	183/183 (100%)	180 (98%)	3 (2%)	58	82
68	V3	41/41 (100%)	41 (100%)	0	100	100
All	All	12184/12247 (100%)	12120 (100%)	64 (0%)	85	95

5 of 64 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
64	S7	142	TYR
66	V1	235	VAL
41	N1	282	TYR
41	N1	251	THR
66	V1	347	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 251 such sidechains are listed below:

Mol	Chain	Res	Type
45	N5	296	ASN
58	S1	677	GLN
50	QD	206	HIS
58	S1	498	GLN
64	S7	144	HIS

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

1 non-standard protein/DNA/RNA residue is 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
59	2MR	S2	124	59	10,12,13	2.45	2 (20%)	5,13,15	1.07	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
59	2MR	S2	124	59	-	3/10/13/15	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
59	S2	124	2MR	CZ-NE	5.21	1.45	1.34
59	S2	124	2MR	CZ-NH2	5.08	1.44	1.33

There are no bond angle outliers.

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
59	S2	124	2MR	NE-CD-CG-CB
59	S2	124	2MR	CA-CB-CG-CD
59	S2	124	2MR	CG-CD-NE-CZ

There are no ring outliers.

No monomer is involved in short contacts.

## 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 101 ligands modelled in this entry, 7 are monoatomic - leaving 94 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
82	HEC	Qd	401	50	32,50,50	2.02	4 (12%)	24,82,82	2.30	13 (54%)
72	PLX	B5	201	-	51,51,51	1.10	3 (5%)	55,59,59	0.89	1 (1%)
73	NDP	A9	401	-	45,52,52	0.52	0	53,80,80	0.59	1 (1%)
77	3PE	QE	302	-	43,43,50	0.32	0	46,48,55	0.32	0
74	PEE	Qd	402	-	23,23,50	1.41	3 (13%)	26,28,55	1.38	3 (11%)
77	3PE	Qc	405	-	47,47,50	0.32	0	50,52,55	0.36	0
72	PLX	AL	204	-	46,46,51	1.16	5 (10%)	50,54,59	0.88	1 (2%)
71	PC1	N1	403	-	53,53,53	0.29	0	59,61,61	0.30	0
69	CDL	4L	201	-	91,91,99	0.32	0	97,103,111	0.35	0
84	SF4	V1	501	66	0,12,12	-	-	-	-	-
74	PEE	Qc	402	-	41,41,50	1.27	4 (9%)	44,46,55	1.17	4 (9%)
74	PEE	QJ	101	-	50,50,50	1.32	5 (10%)	53,55,55	1.21	4 (7%)
71	PC1	QB	503	-	50,50,53	0.31	0	56,58,61	0.34	0
71	PC1	Qb	502	-	47,47,53	0.32	0	53,55,61	0.36	0
69	CDL	CB	203	-	82,82,99	0.32	0	88,94,111	0.32	0
77	3PE	QJ	102	-	33,33,50	0.37	0	36,38,55	0.34	0
69	CDL	AL	202	-	79,79,99	0.33	0	85,91,111	0.33	0
74	PEE	C3	304	-	50,50,50	1.32	5 (10%)	53,55,55	1.22	4 (7%)
71	PC1	C1	606	-	32,32,53	0.36	0	38,40,61	0.35	0
81	HEM	QC	402	49	41,50,50	1.25	4 (9%)	45,82,82	1.69	9 (20%)
69	CDL	6A	102	-	82,82,99	0.33	0	88,94,111	0.32	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
82	HEC	QD	401	50	32,50,50	2.03	4 (12%)	24,82,82	2.30	15 (62%)
74	PEE	S8	303	-	50,50,50	1.32	5 (10%)	53,55,55	1.15	3 (5%)
71	PC1	C3	301	-	43,43,53	0.32	0	49,51,61	0.30	0
71	PC1	6A	101	-	44,44,53	0.33	0	50,52,61	0.32	0
74	PEE	N1	404	-	30,30,50	1.28	3 (10%)	33,35,55	1.20	2 (6%)
84	SF4	S8	302	65	0,12,12	-	-	-	-	-
71	PC1	N3	203	-	53,53,53	0.30	0	59,61,61	0.37	0
69	CDL	Qb	501	-	63,63,99	0.37	0	69,75,111	0.36	0
78	HEA	C1	602	35	57,67,67	2.00	16 (28%)	61,103,103	2.71	30 (49%)
69	CDL	N4	502	-	99,99,99	0.30	0	105,111,111	0.27	0
72	PLX	AM	201	-	51,51,51	1.10	4 (7%)	55,59,59	0.90	1 (1%)
69	CDL	AL	201	-	93,93,99	0.31	0	99,105,111	0.32	0
72	PLX	N4	501	-	51,51,51	1.11	3 (5%)	55,59,59	0.88	1 (1%)
77	3PE	C1	609	-	45,45,50	0.32	0	48,50,55	0.29	0
71	PC1	6A	103	-	37,37,53	0.34	0	43,45,61	0.30	0
75	ZMP	AB	201	19	29,35,36	0.70	1 (3%)	34,42,45	0.78	0
84	SF4	S8	301	65	0,12,12	-	-	-	-	-
72	PLX	CB	201	-	51,51,51	1.11	4 (7%)	55,59,59	0.88	1 (1%)
72	PLX	QB	504	-	45,45,51	1.17	4 (8%)	49,53,59	0.91	1 (2%)
69	CDL	N5	704	-	99,99,99	0.30	0	105,111,111	0.28	0
77	3PE	S7	303	-	50,50,50	0.32	0	53,55,55	0.34	0
69	CDL	QD	402	-	57,57,99	0.38	0	63,69,111	0.39	0
74	PEE	N5	702	-	39,39,50	1.49	5 (12%)	41,44,55	1.21	2 (4%)
74	PEE	QB	502	-	33,33,50	1.43	4 (12%)	36,38,55	1.20	2 (5%)
71	PC1	C3	303	-	49,49,53	0.30	0	55,57,61	0.31	0
84	SF4	S1	801	58	0,12,12	-	-	-	-	-
77	3PE	Qj	101	-	28,28,50	0.39	0	31,33,55	0.34	0
69	CDL	A7	201	-	50,50,99	0.41	0	56,62,111	0.34	0
72	PLX	S7	302	-	51,51,51	1.11	3 (5%)	55,59,59	0.91	2 (3%)
81	HEM	QC	401	49	41,50,50	1.23	4 (9%)	45,82,82	1.71	9 (20%)
71	PC1	C1	605	-	53,53,53	0.30	0	59,61,61	0.34	0
69	CDL	N1	401	-	77,77,99	0.34	0	83,89,111	0.32	0
74	PEE	N5	705	-	50,50,50	1.32	5 (10%)	53,55,55	1.18	5 (9%)
71	PC1	Qc	406	-	53,53,53	0.29	0	59,61,61	0.34	0
81	HEM	Qc	404	49	41,50,50	1.24	3 (7%)	45,82,82	1.72	10 (22%)
83	FES	V2	301	67	0,4,4	-	-	-	-	-
78	HEA	C1	601	35	57,67,67	2.04	17 (29%)	61,103,103	2.69	27 (44%)
74	PEE	N5	701	-	45,45,50	1.37	6 (13%)	48,50,55	1.23	3 (6%)
71	PC1	Qh	101	-	53,53,53	0.29	0	59,61,61	0.28	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
71	PC1	C3	302	-	48,48,53	0.31	0	54,56,61	0.36	0
81	HEM	Qc	403	49	41,50,50	1.22	3 (7%)	45,82,82	1.75	9 (20%)
77	3PE	CB	202	-	47,47,50	0.31	0	50,52,55	0.34	0
69	CDL	Qh	102	-	54,54,99	0.39	0	60,66,111	0.47	1 (1%)
74	PEE	QC	403	-	39,39,50	1.31	4 (10%)	42,44,55	1.18	3 (7%)
76	ADP	AK	401	-	24,29,29	0.95	1 (4%)	29,45,45	1.45	4 (13%)
69	CDL	QB	501	-	63,63,99	0.37	0	69,75,111	0.39	0
83	FES	QE	303	51	0,4,4	-	-	-	-	-
74	PEE	A9	402	-	38,38,50	1.49	6 (15%)	41,43,55	1.20	3 (7%)
72	PLX	QI	301	-	51,51,51	1.11	5 (9%)	55,59,59	0.88	1 (1%)
74	PEE	S2	501	-	44,44,50	1.40	5 (11%)	46,49,55	1.20	3 (6%)
69	CDL	N4	503	-	61,61,99	0.37	0	67,73,111	0.33	0
77	3PE	CA	101	-	45,45,50	0.32	0	48,50,55	0.31	0
77	3PE	C1	608	-	44,44,50	0.33	0	47,49,55	0.38	0
72	PLX	N3	202	-	51,51,51	1.10	4 (7%)	55,59,59	3.03	7 (12%)
71	PC1	C1	607	-	45,45,53	0.31	0	51,53,61	0.32	0
69	CDL	QH	401	-	63,63,99	0.38	0	69,75,111	0.36	0
69	CDL	AK	402	-	67,67,99	0.36	0	73,79,111	0.36	0
74	PEE	N3	201	-	50,50,50	1.32	5 (10%)	53,55,55	1.17	4 (7%)
83	FES	S1	803	58	0,4,4	-	-	-	-	-
74	PEE	QE	301	-	46,46,50	1.37	5 (10%)	49,51,55	1.18	4 (8%)
69	CDL	B5	202	-	99,99,99	0.30	0	105,111,111	0.29	0
84	SF4	S7	301	64	0,12,12	-	-	-	-	-
69	CDL	Qc	401	-	60,60,99	0.38	0	66,72,111	0.37	0
71	PC1	N1	402	-	53,53,53	0.30	0	59,61,61	0.31	0
85	FMN	V1	502	-	33,33,33	0.24	0	48,50,50	0.46	1 (2%)
72	PLX	6C	101	-	42,42,51	1.17	4 (9%)	46,50,59	0.90	2 (4%)
74	PEE	AL	203	-	48,48,50	1.34	5 (10%)	51,53,55	1.20	2 (3%)
69	CDL	N5	703	-	88,88,99	0.32	0	94,100,111	0.33	0
84	SF4	S1	802	58	0,12,12	-	-	-	-	-
77	3PE	B8	201	-	31,31,50	0.37	0	34,36,55	0.32	0
83	FES	Qe	301	51	0,4,4	-	-	-	-	-
75	ZMP	AC	201	19	29,35,36	0.65	1 (3%)	34,42,45	0.73	0
77	3PE	N5	706	-	37,37,50	0.35	0	40,42,55	0.30	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
82	HEC	Qd	401	50	-	3/10/54/54	-
72	PLX	B5	201	-	-	19/55/55/55	-
73	NDP	A9	401	-	-	5/30/77/77	0/5/5/5
77	3PE	QE	302	-	-	16/47/47/54	-
74	PEE	Qd	402	-	-	9/27/27/54	-
77	3PE	Qc	405	-	-	11/51/51/54	-
72	PLX	AL	204	-	-	18/50/50/55	-
71	PC1	N1	403	-	-	20/57/57/57	-
69	CDL	4L	201	-	-	19/102/102/110	-
84	SF4	V1	501	66	-	-	0/6/5/5
74	PEE	Qc	402	-	-	27/45/45/54	-
74	PEE	QJ	101	-	-	28/54/54/54	-
71	PC1	QB	503	-	-	18/54/54/57	-
71	PC1	Qb	502	-	-	15/51/51/57	-
69	CDL	CB	203	-	-	28/93/93/110	-
77	3PE	QJ	102	-	-	5/37/37/54	-
69	CDL	AL	202	-	-	25/90/90/110	-
74	PEE	C3	304	-	-	21/54/54/54	-
71	PC1	C1	606	-	-	9/36/36/57	-
81	HEM	QC	402	49	-	4/12/54/54	-
69	CDL	6A	102	-	-	21/93/93/110	-
82	HEC	QD	401	50	-	2/10/54/54	-
74	PEE	S8	303	-	-	22/54/54/54	-
71	PC1	C3	301	-	-	18/47/47/57	-
71	PC1	6A	101	-	-	14/48/48/57	-
74	PEE	N1	404	-	-	15/34/34/54	-
84	SF4	S8	302	65	-	-	0/6/5/5
71	PC1	N3	203	-	-	14/57/57/57	-
69	CDL	Qb	501	-	-	16/74/74/110	-
78	HEA	C1	602	35	-	11/32/76/76	-
69	CDL	N4	502	-	-	15/110/110/110	-
72	PLX	AM	201	-	-	19/55/55/55	-
69	CDL	AL	201	-	-	23/104/104/110	-
72	PLX	N4	501	-	-	25/55/55/55	-
77	3PE	C1	609	-	-	9/49/49/54	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
71	PC1	6A	103	-	-	9/41/41/57	-
75	ZMP	AB	201	19	-	12/40/42/43	-
84	SF4	S8	301	65	-	-	0/6/5/5
72	PLX	CB	201	-	-	25/55/55/55	-
72	PLX	QB	504	-	-	18/49/49/55	-
69	CDL	N5	704	-	-	18/110/110/110	-
77	3PE	S7	303	-	-	15/54/54/54	-
69	CDL	QD	402	-	-	20/68/68/110	-
74	PEE	N5	702	-	-	27/43/43/54	-
74	PEE	QB	502	-	-	24/37/37/54	-
71	PC1	C3	303	-	-	8/53/53/57	-
84	SF4	S1	801	58	-	-	0/6/5/5
77	3PE	Qj	101	-	-	5/32/32/54	-
69	CDL	A7	201	-	-	11/61/61/110	-
72	PLX	S7	302	-	-	24/55/55/55	-
81	HEM	QC	401	49	-	7/12/54/54	-
71	PC1	C1	605	-	-	17/57/57/57	-
69	CDL	N1	401	-	-	16/88/88/110	-
74	PEE	N5	705	-	-	29/54/54/54	-
71	PC1	Qc	406	-	-	11/57/57/57	-
81	HEM	Qc	404	49	-	9/12/54/54	-
83	FES	V2	301	67	-	-	0/1/1/1
78	HEA	C1	601	35	-	10/32/76/76	-
74	PEE	N5	701	-	-	26/49/49/54	-
71	PC1	Qh	101	-	-	18/57/57/57	-
71	PC1	C3	302	-	-	13/52/52/57	-
81	HEM	Qc	403	49	-	7/12/54/54	-
77	3PE	CB	202	-	-	11/51/51/54	-
69	CDL	Qh	102	-	-	12/65/65/110	-
74	PEE	QC	403	-	-	23/43/43/54	-
76	ADP	AK	401	-	-	1/12/32/32	0/3/3/3
69	CDL	QB	501	-	-	17/74/74/110	-
83	FES	QE	303	51	-	-	0/1/1/1
74	PEE	A9	402	-	-	17/42/42/54	-
72	PLX	QI	301	-	-	18/55/55/55	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
74	PEE	S2	501	-	-	20/48/48/54	-
69	CDL	N4	503	-	-	28/72/72/110	-
77	3PE	CA	101	-	-	6/49/49/54	-
77	3PE	C1	608	-	-	11/48/48/54	-
72	PLX	N3	202	-	-	32/55/55/55	-
71	PC1	C1	607	-	-	13/49/49/57	-
69	CDL	QH	401	-	-	17/74/74/110	-
69	CDL	AK	402	-	-	25/78/78/110	-
74	PEE	N3	201	-	-	29/54/54/54	-
83	FES	S1	803	58	-	-	0/1/1/1
74	PEE	QE	301	-	-	23/50/50/54	-
69	CDL	B5	202	-	-	23/110/110/110	-
84	SF4	S7	301	64	-	-	0/6/5/5
69	CDL	Qc	401	-	-	18/71/71/110	-
71	PC1	N1	402	-	-	16/57/57/57	-
85	FMN	V1	502	-	-	6/18/18/18	0/3/3/3
72	PLX	6C	101	-	-	20/46/46/55	-
74	PEE	AL	203	-	-	31/52/52/54	-
69	CDL	N5	703	-	-	22/99/99/110	-
84	SF4	S1	802	58	-	-	0/6/5/5
77	3PE	B8	201	-	-	10/35/35/54	-
83	FES	Qe	301	51	-	-	0/1/1/1
75	ZMP	AC	201	19	-	17/40/42/43	-
77	3PE	N5	706	-	-	7/41/41/54	-

The worst 5 of 172 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
82	Qd	401	HEC	C3C-C2C	-6.51	1.34	1.40
82	QD	401	HEC	C3C-C2C	-6.50	1.34	1.40
82	QD	401	HEC	C2B-C3B	-6.16	1.34	1.40
82	Qd	401	HEC	C2B-C3B	-6.11	1.34	1.40
78	C1	601	HEA	C3B-C2B	5.33	1.46	1.34

The worst 5 of 198 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
72	N3	202	PLX	C1A-N1-C1B	-11.48	79.45	108.97
72	N3	202	PLX	C1B-N1-C1C	-11.33	79.84	108.97
72	N3	202	PLX	C1A-N1-C1C	8.60	131.09	108.97
78	C1	601	HEA	CAD-CBD-CGD	-7.71	97.01	113.60
78	C1	602	HEA	CAD-CBD-CGD	-7.68	97.07	113.60

There are no chirality outliers.

5 of 1376 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
69	4L	201	CDL	CA2-OA2-PA1-OA3
69	4L	201	CDL	CB2-OB2-PB2-OB4
69	6A	102	CDL	CA3-OA5-PA1-OA2
69	6A	102	CDL	CA3-OA5-PA1-OA3
69	6A	102	CDL	CA3-OA5-PA1-OA4

There are no ring outliers.

78 monomers are involved in 239 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
82	Qd	401	HEC	3	0
72	B5	201	PLX	1	0
77	Qc	405	3PE	3	0
72	AL	204	PLX	1	0
71	N1	403	PC1	6	0
69	4L	201	CDL	7	0
84	V1	501	SF4	1	0
74	Qc	402	PEE	1	0
74	QJ	101	PEE	3	0
71	QB	503	PC1	4	0
71	Qb	502	PC1	5	0
69	CB	203	CDL	4	0
77	QJ	102	3PE	1	0
69	AL	202	CDL	5	0
74	C3	304	PEE	6	0
81	QC	402	HEM	5	0
69	6A	102	CDL	5	0
82	QD	401	HEC	2	0
74	S8	303	PEE	2	0
71	C3	301	PC1	2	0
71	6A	101	PC1	6	0
74	N1	404	PEE	1	0

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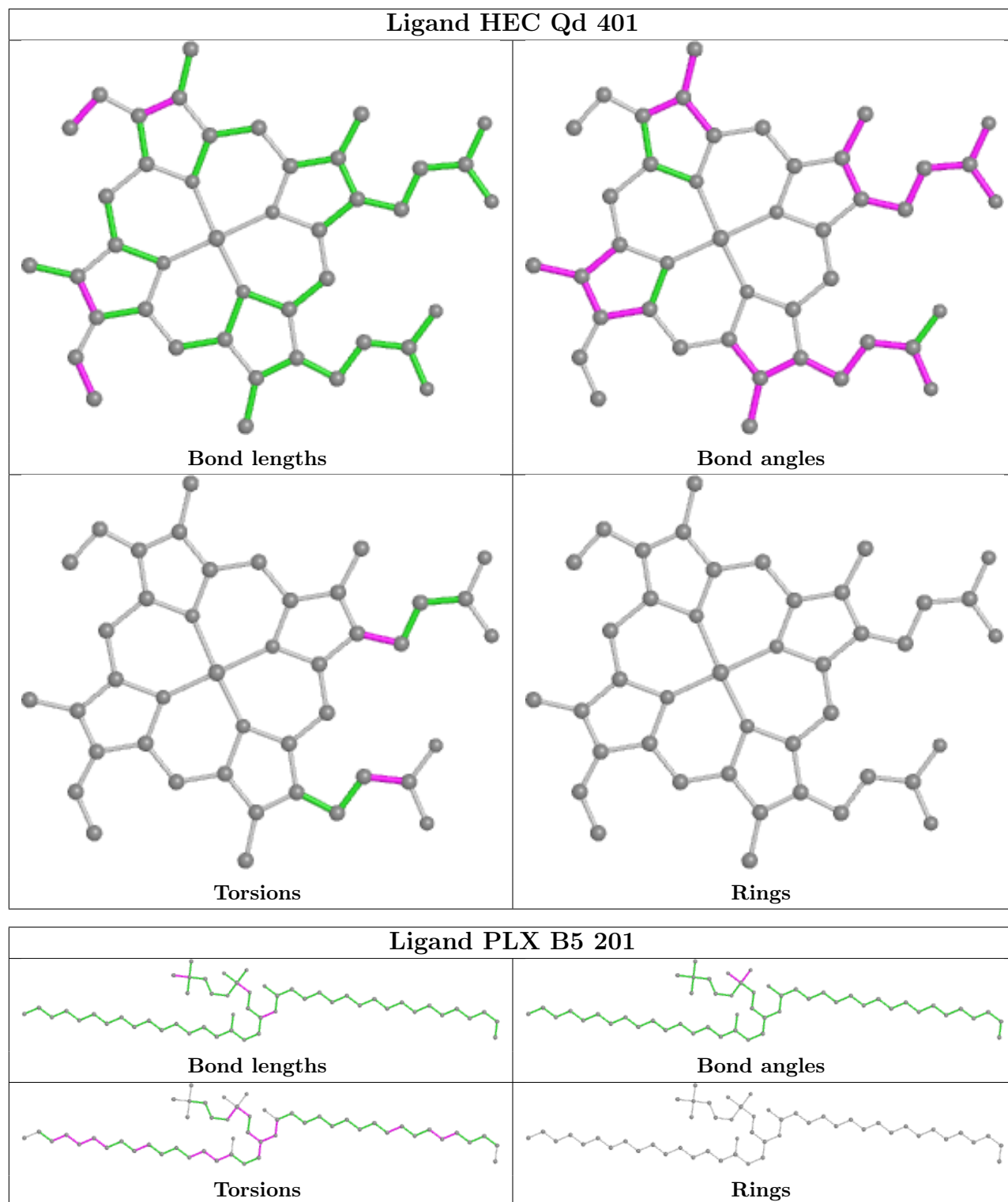
Mol	Chain	Res	Type	Clashes	Symm-Clashes
71	N3	203	PC1	1	0
69	Qb	501	CDL	3	0
78	C1	602	HEA	3	0
69	N4	502	CDL	6	0
72	AM	201	PLX	5	0
69	AL	201	CDL	5	0
72	N4	501	PLX	3	0
77	C1	609	3PE	1	0
71	6A	103	PC1	2	0
72	CB	201	PLX	7	0
72	QB	504	PLX	3	0
69	N5	704	CDL	3	0
77	S7	303	3PE	4	0
69	QD	402	CDL	1	0
74	N5	702	PEE	1	0
74	QB	502	PEE	3	0
71	C3	303	PC1	13	0
77	Qj	101	3PE	1	0
69	A7	201	CDL	1	0
72	S7	302	PLX	4	0
81	QC	401	HEM	1	0
69	N1	401	CDL	6	0
74	N5	705	PEE	2	0
71	Qc	406	PC1	1	0
81	Qc	404	HEM	7	0
78	C1	601	HEA	10	0
74	N5	701	PEE	2	0
71	Qh	101	PC1	3	0
71	C3	302	PC1	9	0
81	Qc	403	HEM	3	0
77	CB	202	3PE	5	0
69	Qh	102	CDL	3	0
76	AK	401	ADP	2	0
69	QB	501	CDL	2	0
74	A9	402	PEE	1	0
72	QI	301	PLX	5	0
74	S2	501	PEE	1	0
69	N4	503	CDL	4	0
77	C1	608	3PE	3	0
72	N3	202	PLX	3	0
71	C1	607	PC1	1	0
69	QH	401	CDL	4	0

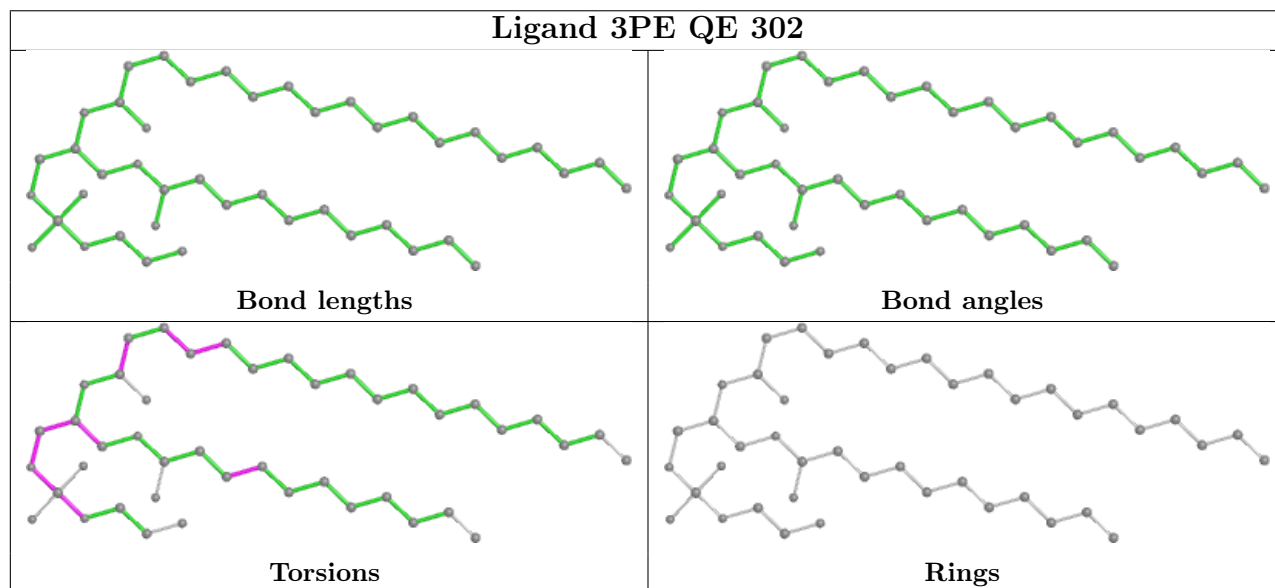
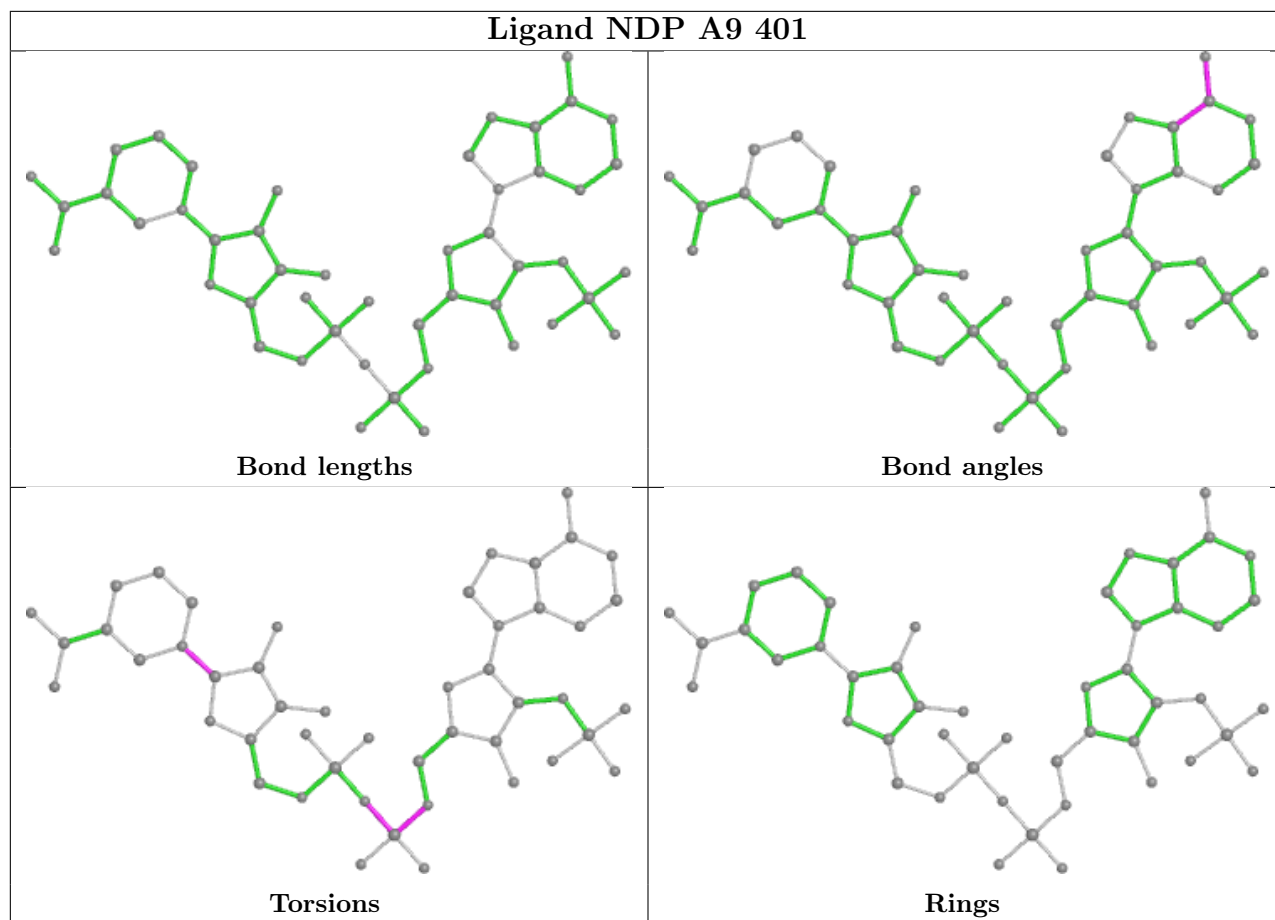
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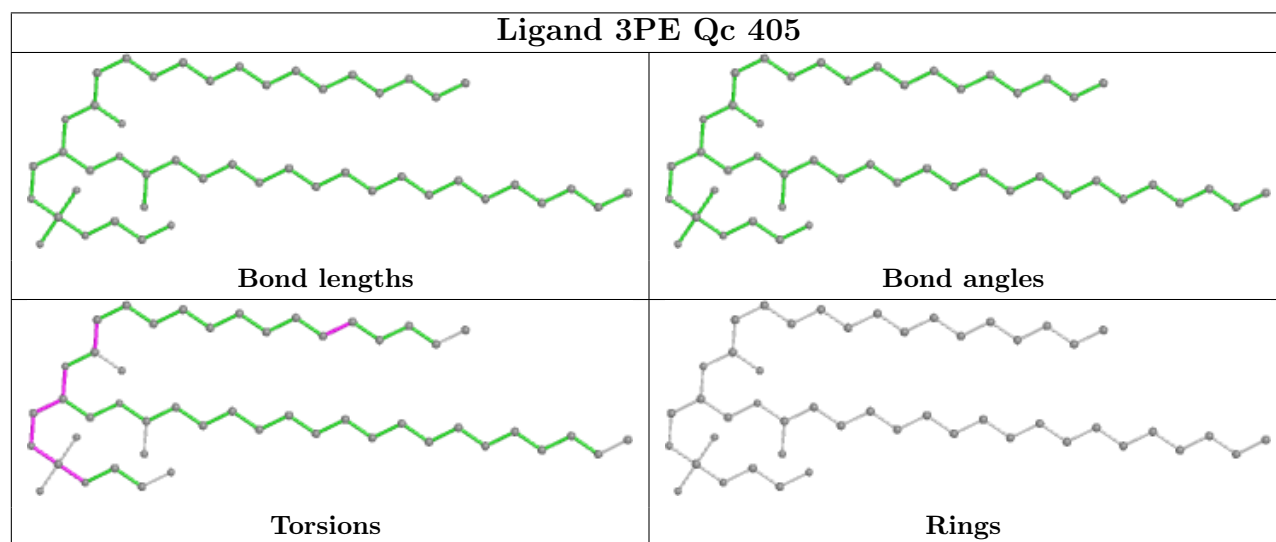
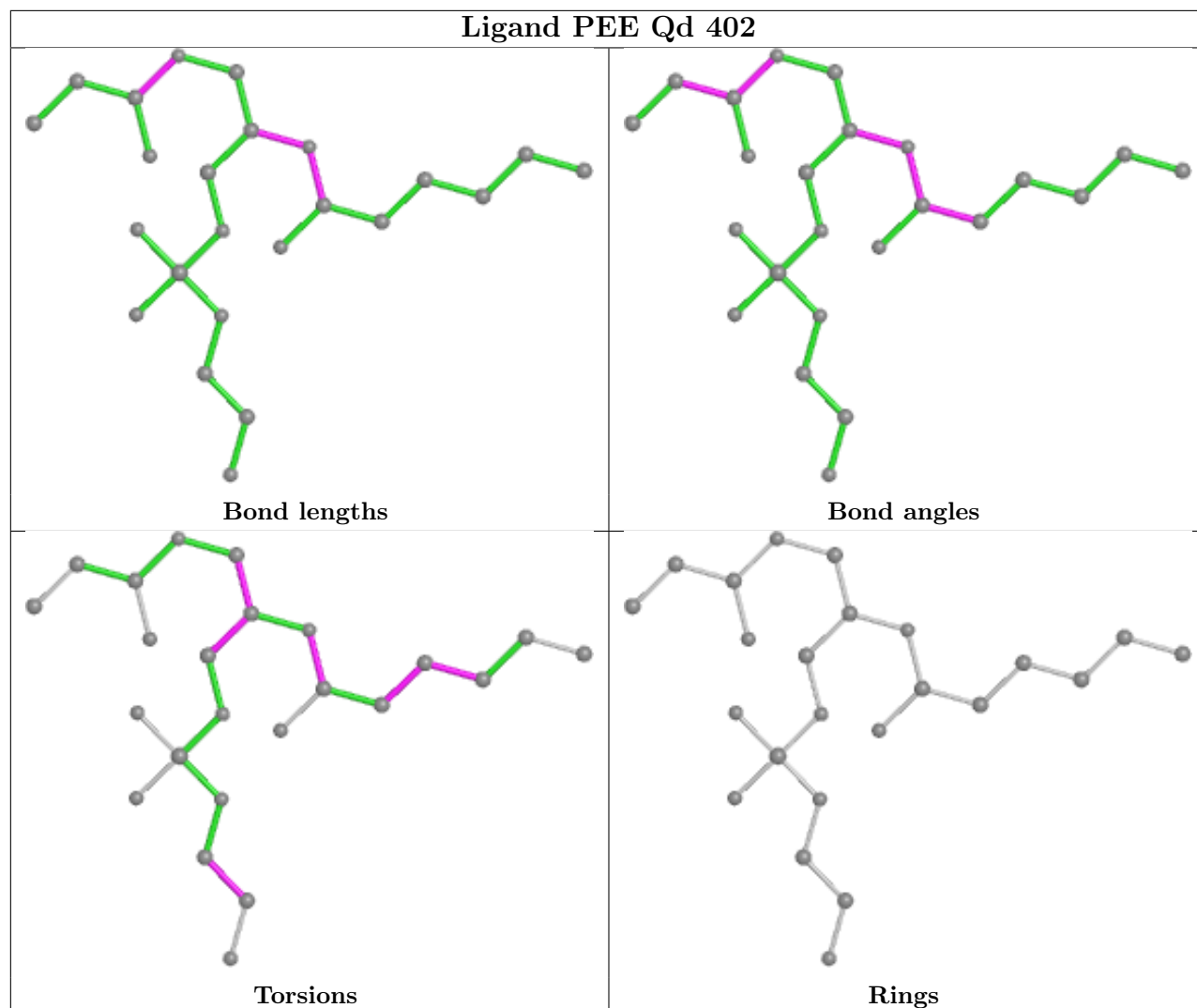
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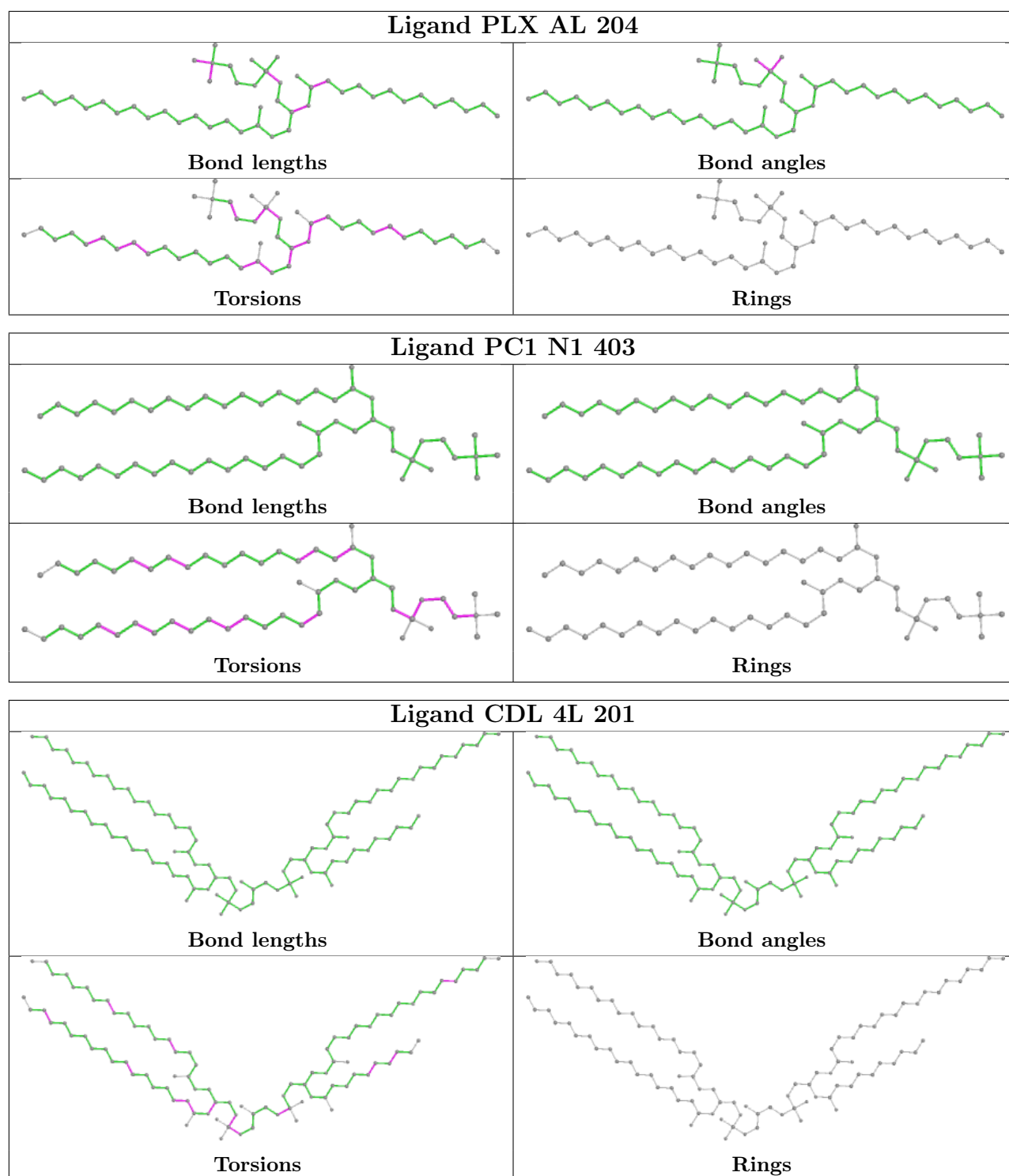
Mol	Chain	Res	Type	Clashes	Symm-Clashes
69	AK	402	CDL	4	0
74	N3	201	PEE	2	0
83	S1	803	FES	1	0
74	QE	301	PEE	1	0
69	B5	202	CDL	3	0
69	Qc	401	CDL	1	0
71	N1	402	PC1	3	0
72	6C	101	PLX	1	0
74	AL	203	PEE	4	0
69	N5	703	CDL	6	0
84	S1	802	SF4	1	0
83	Qe	301	FES	1	0
75	AC	201	ZMP	3	0
77	N5	706	3PE	1	0

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

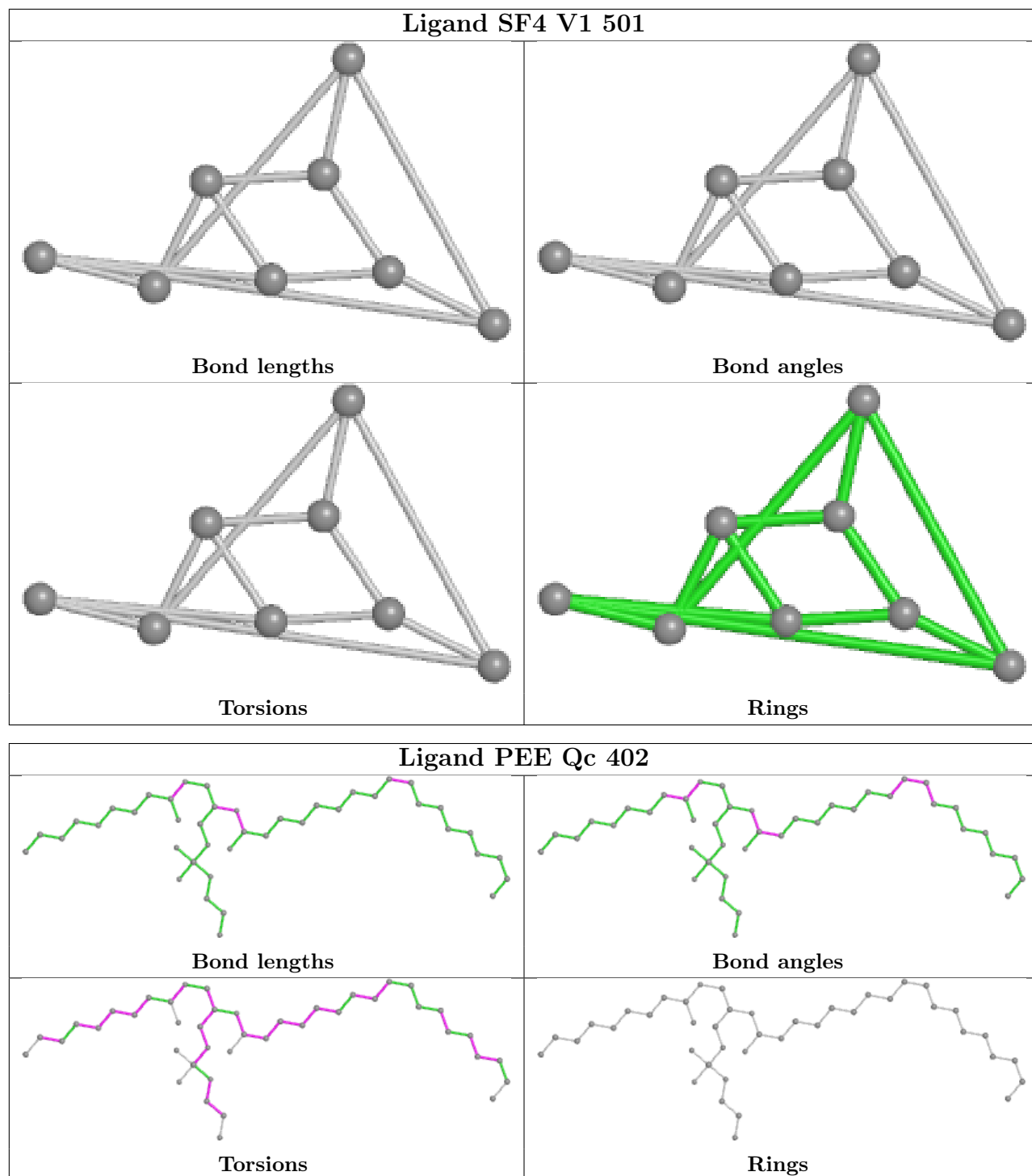


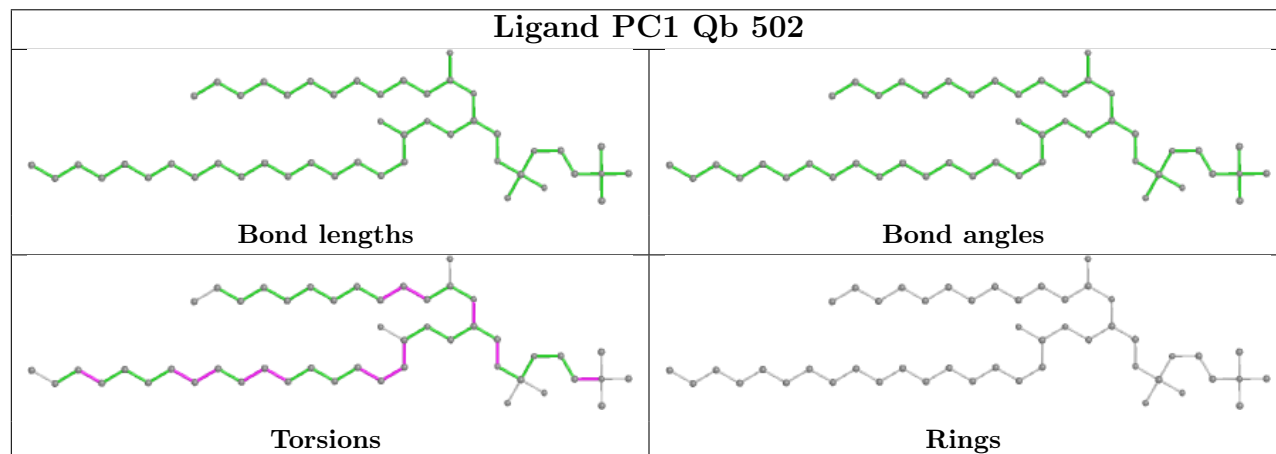
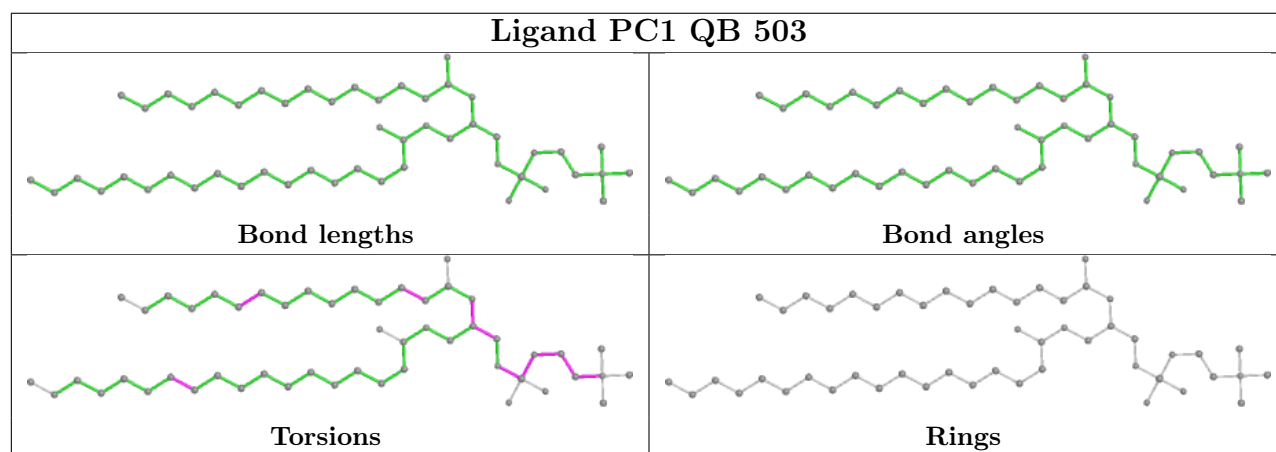
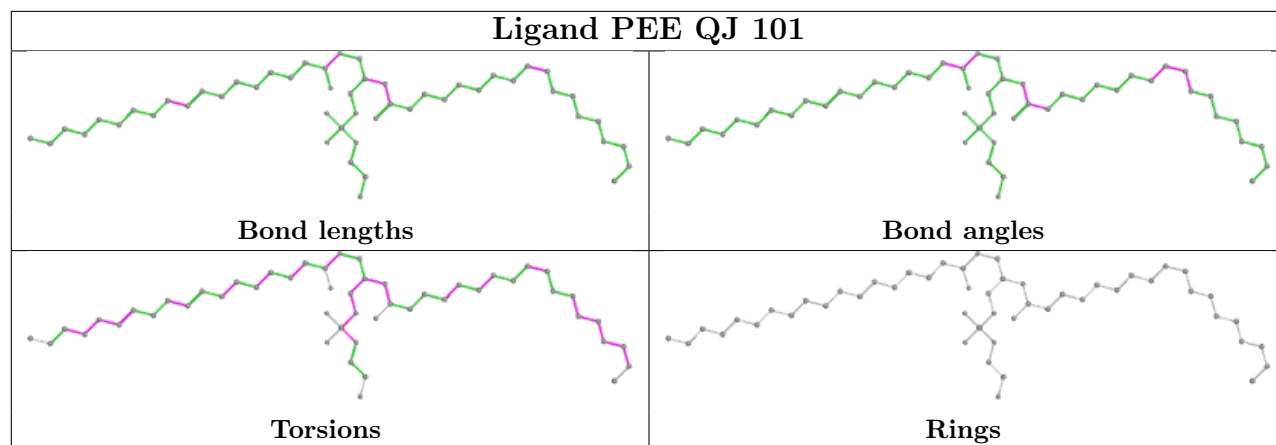


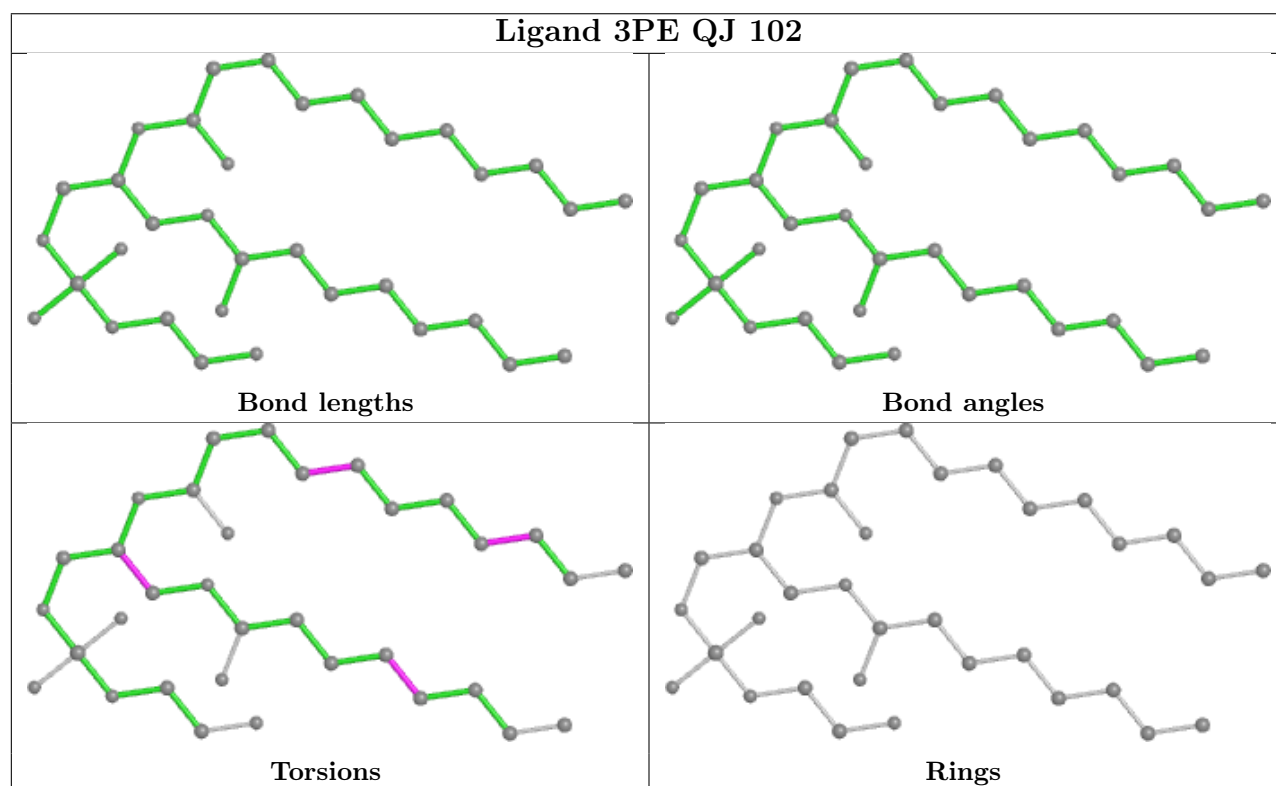
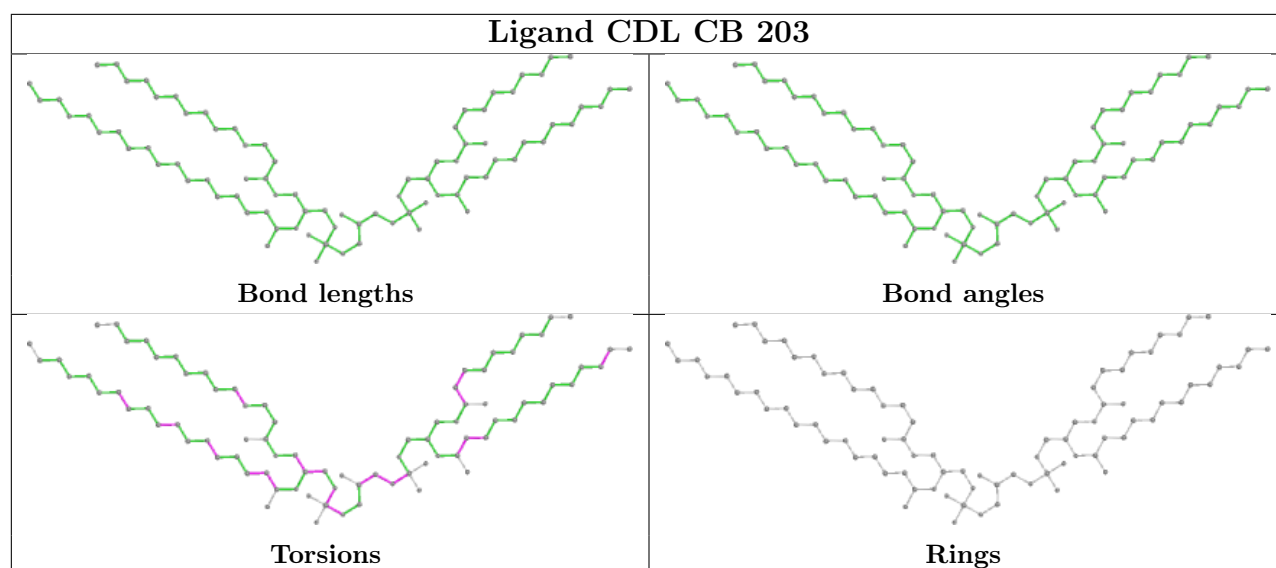


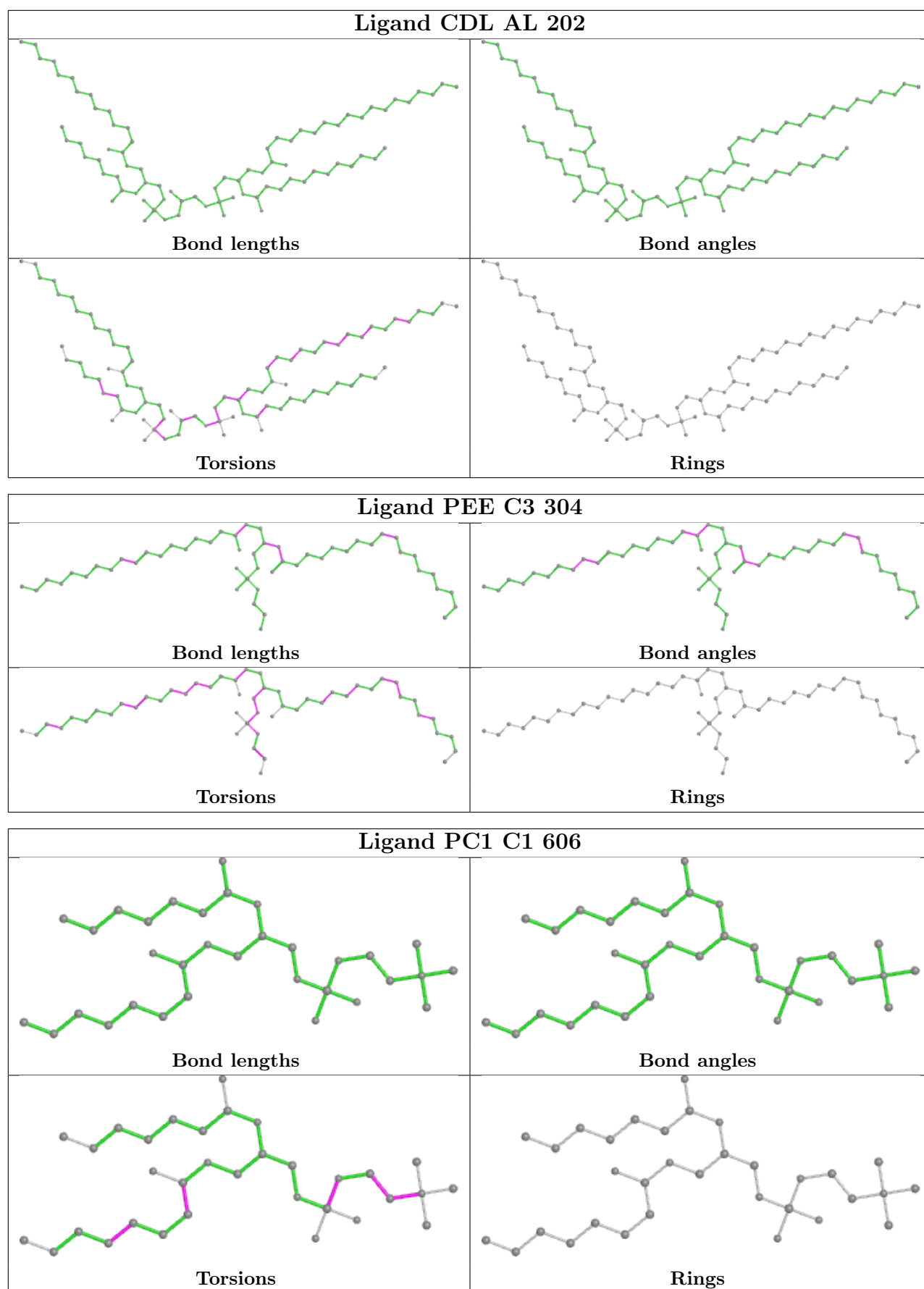


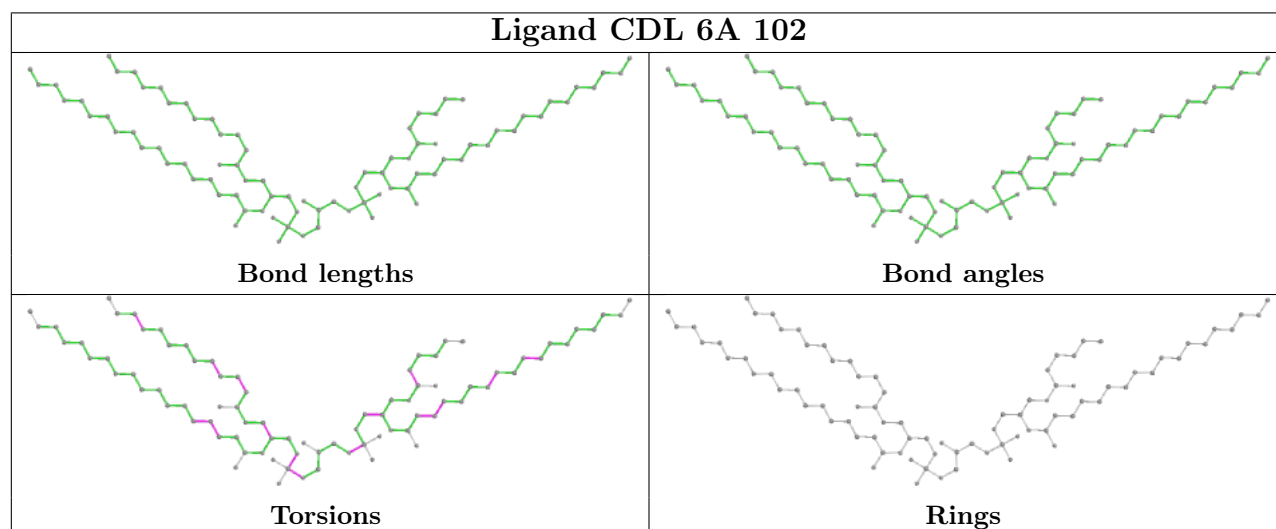
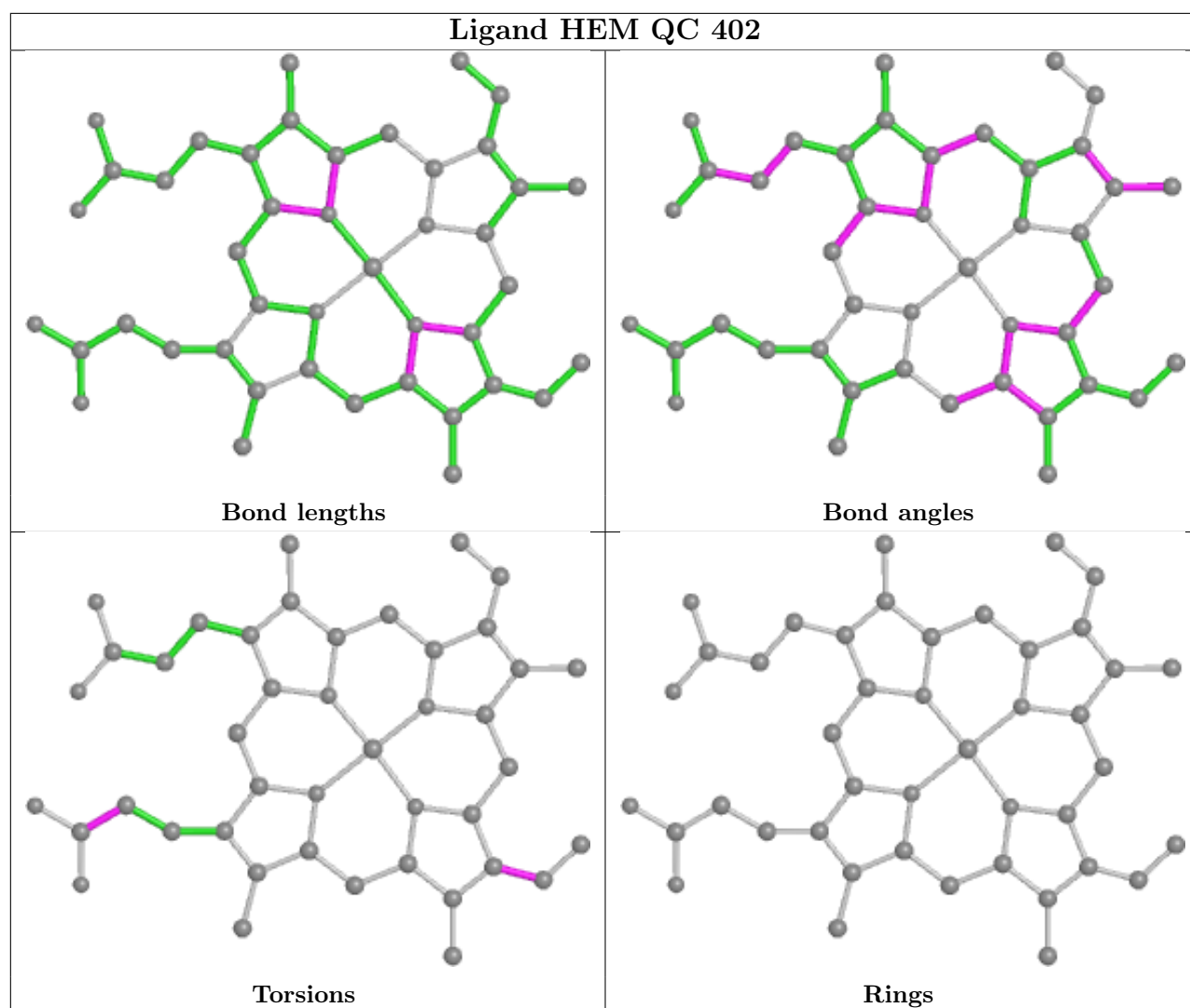


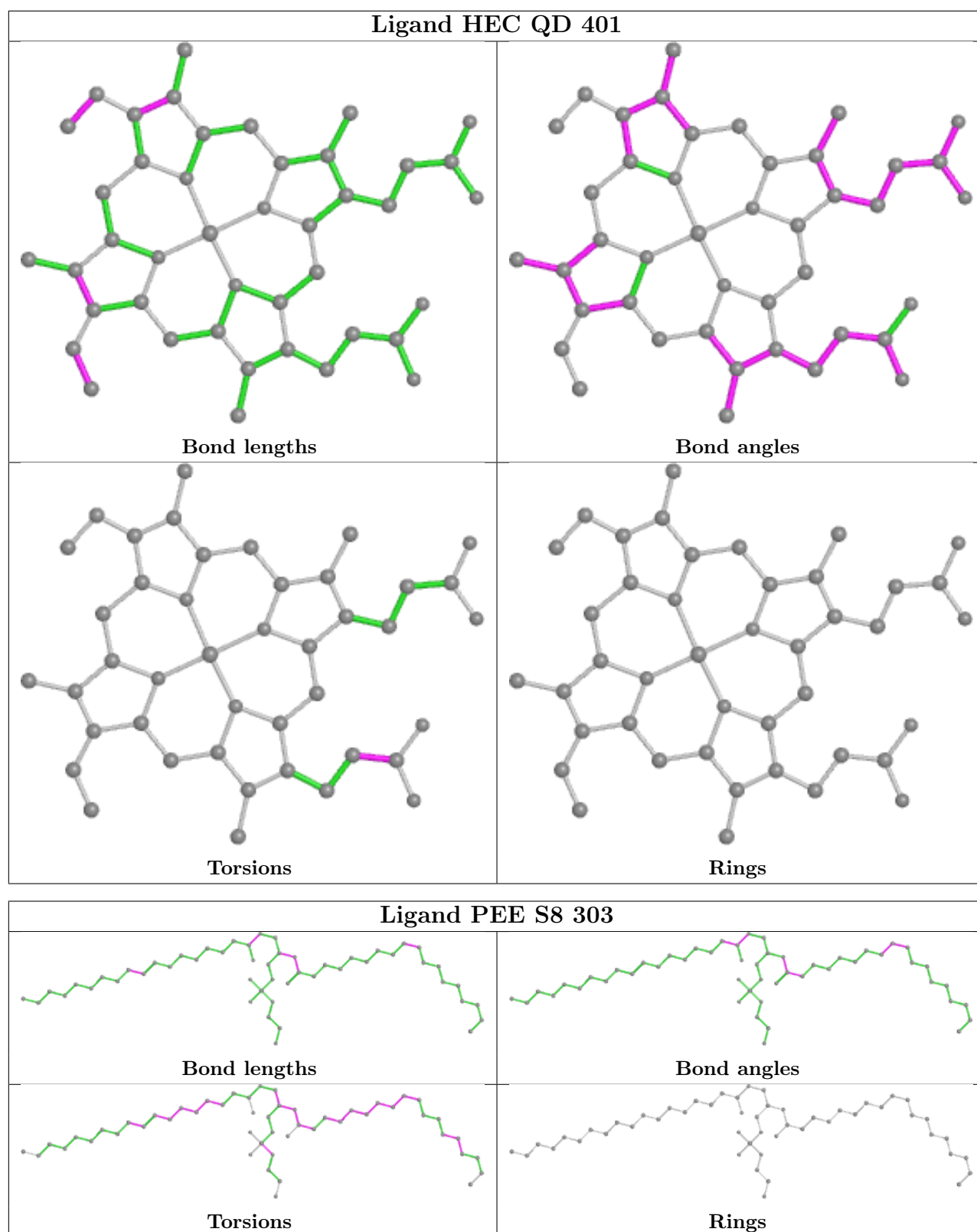


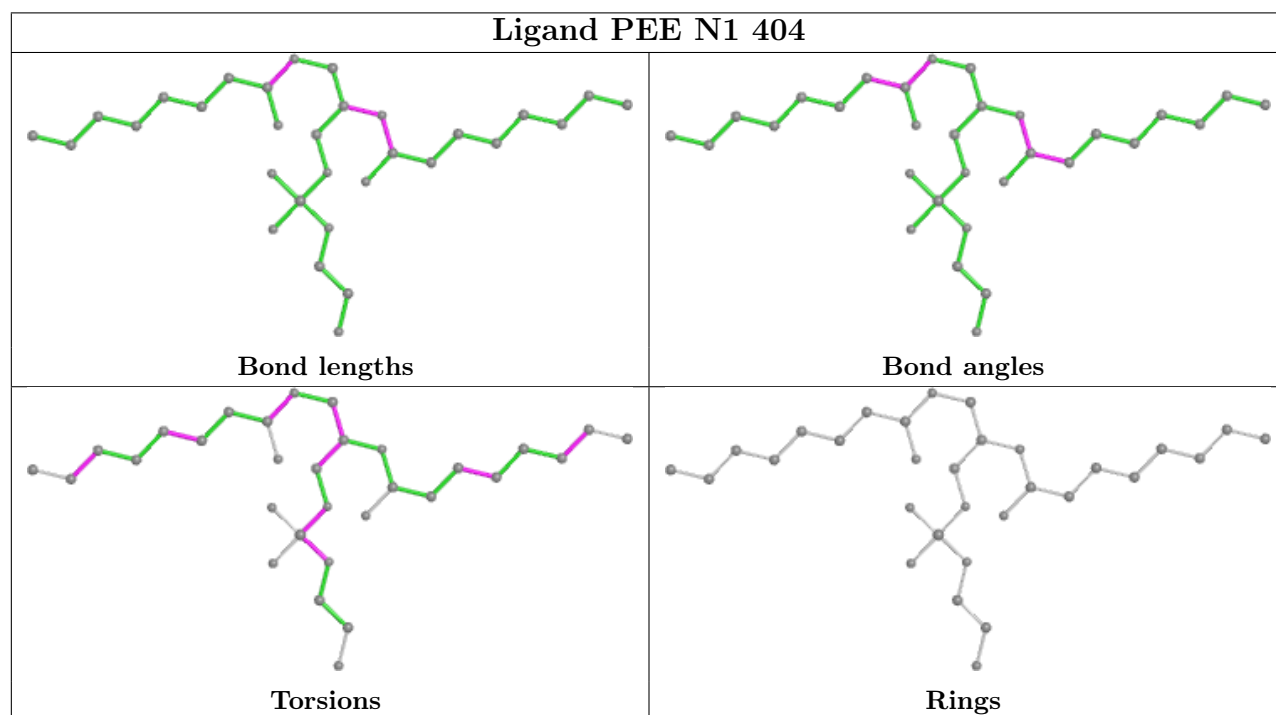
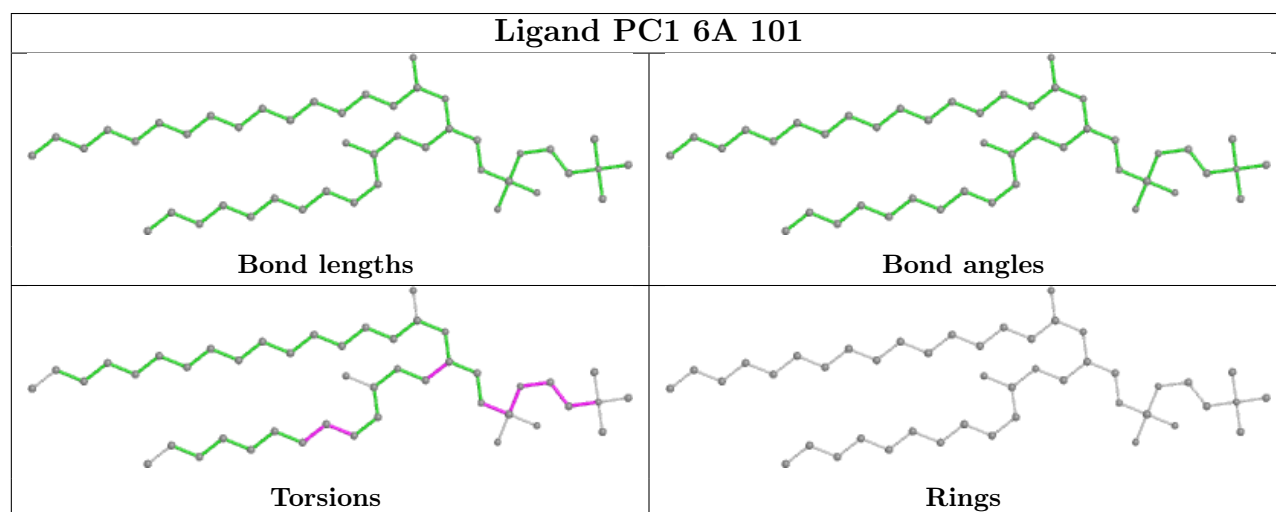
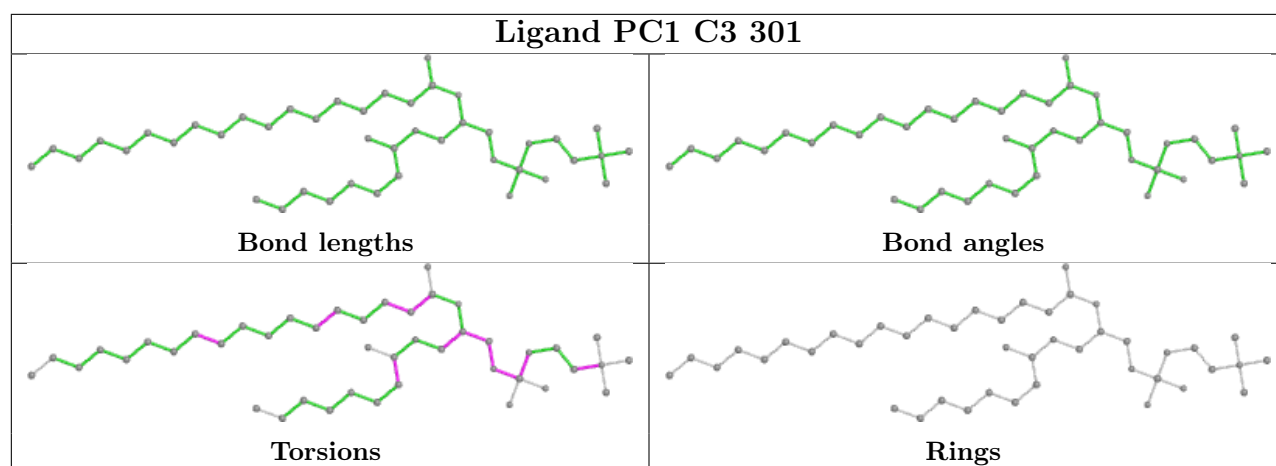


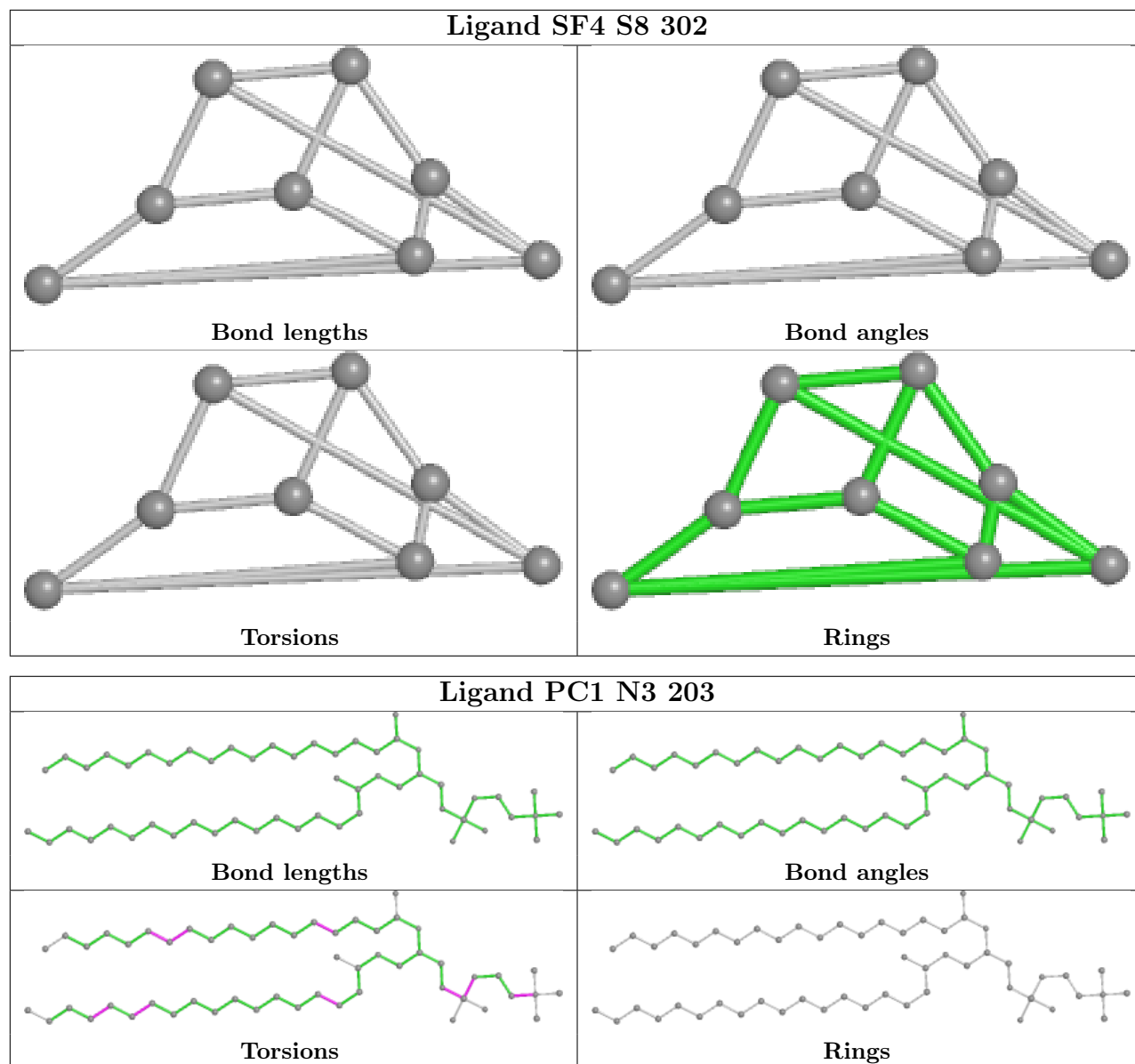




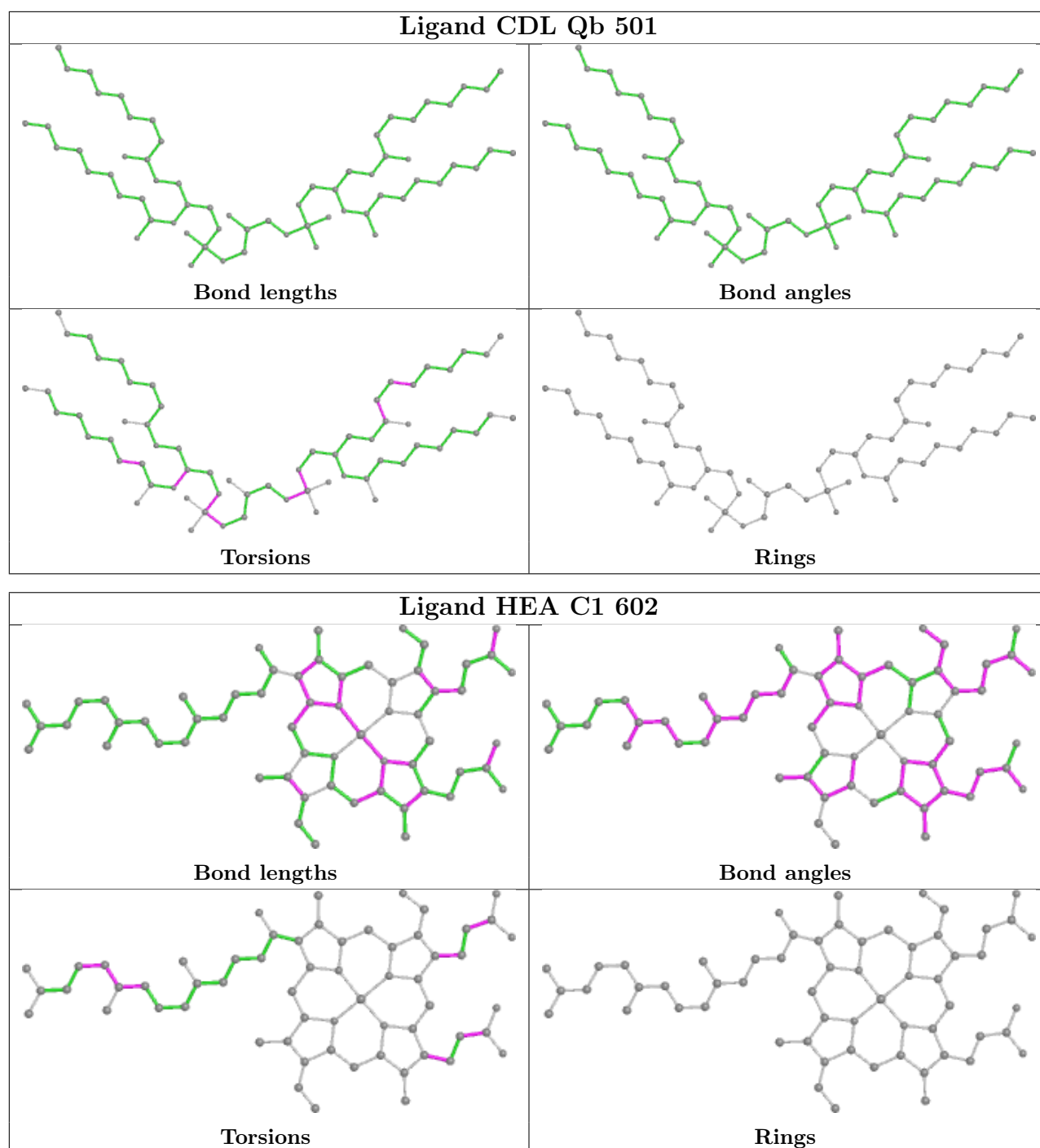


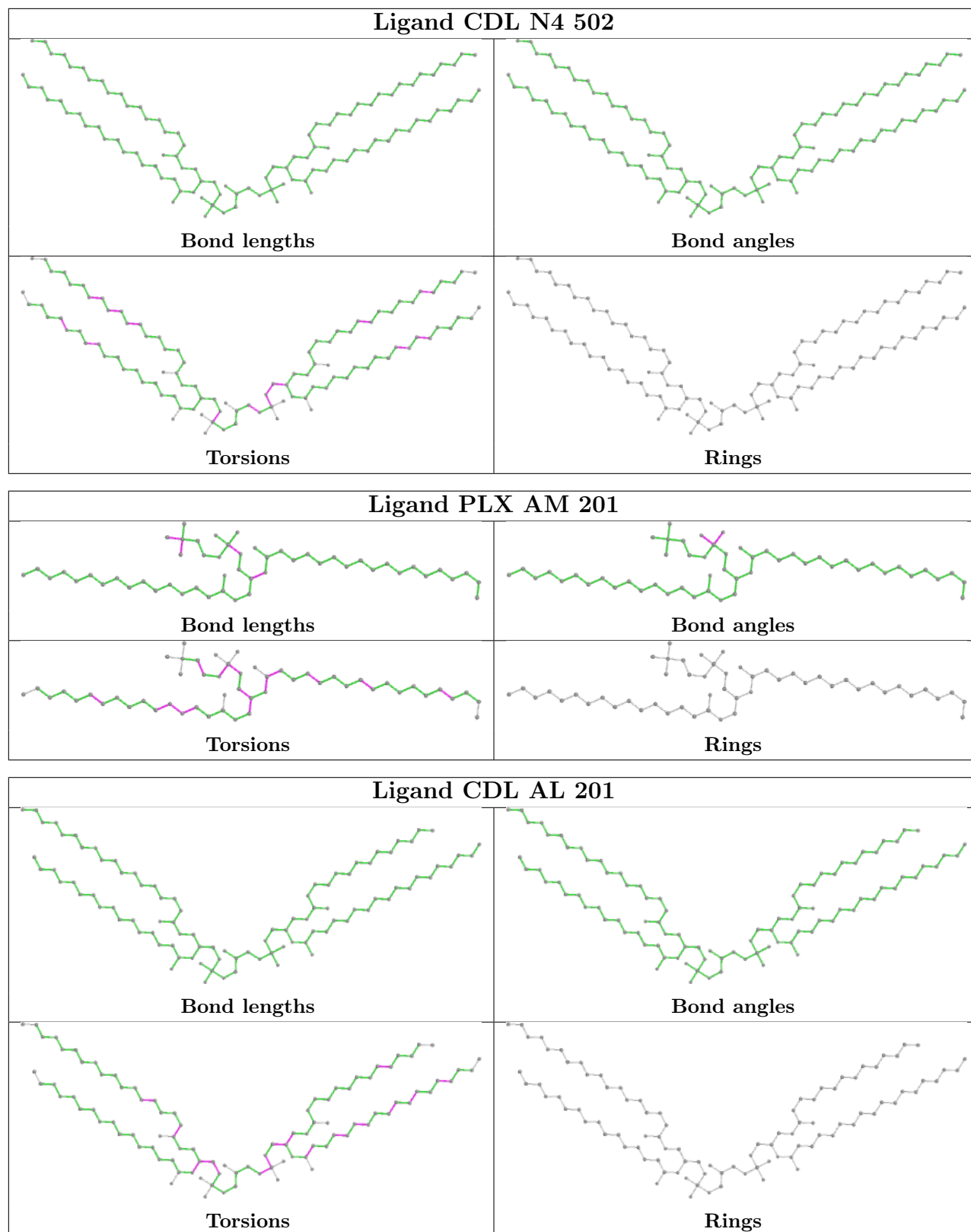


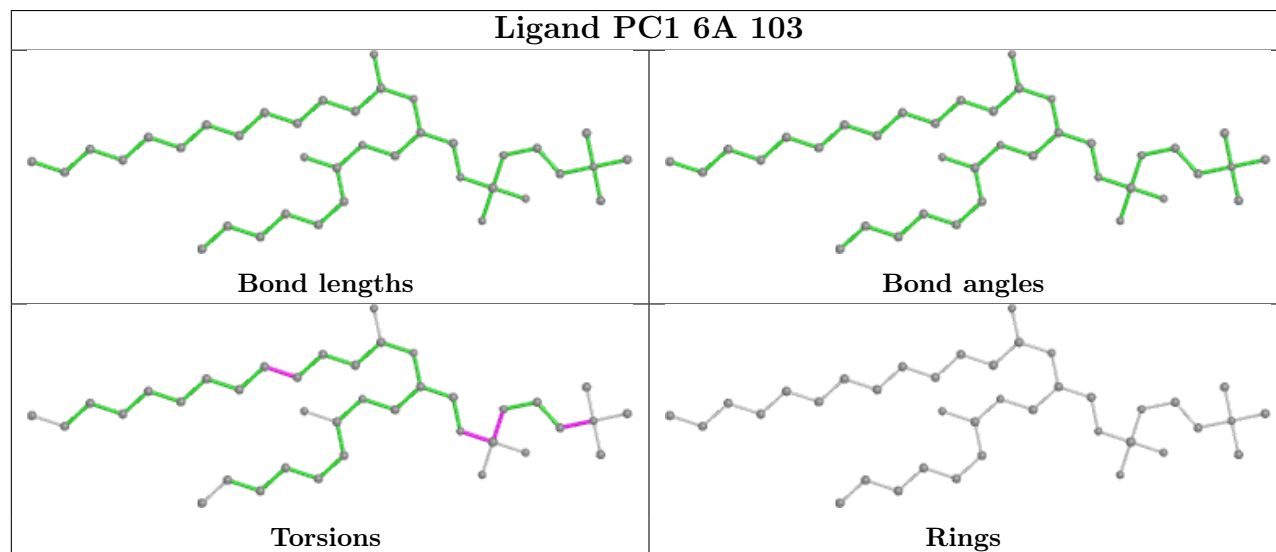
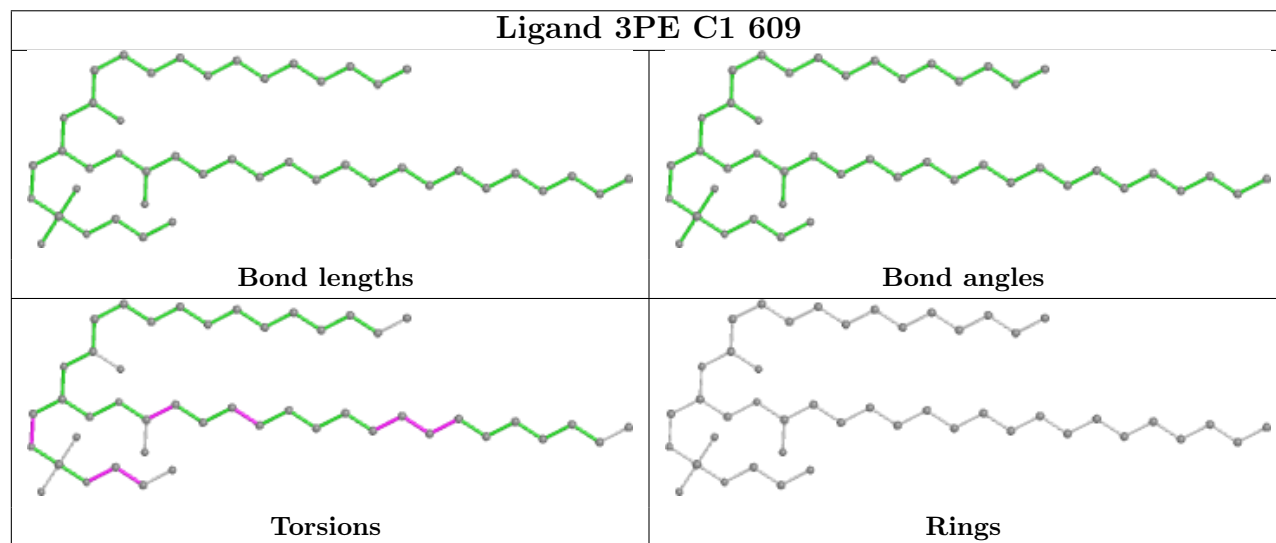
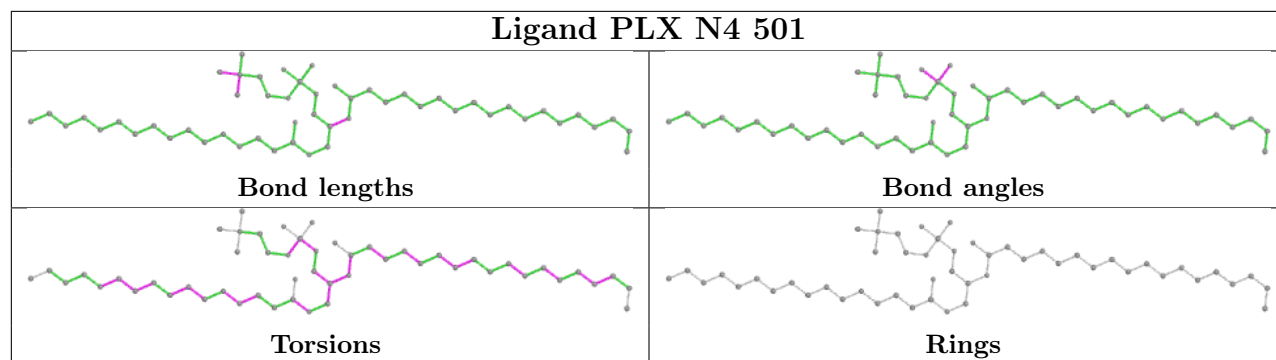


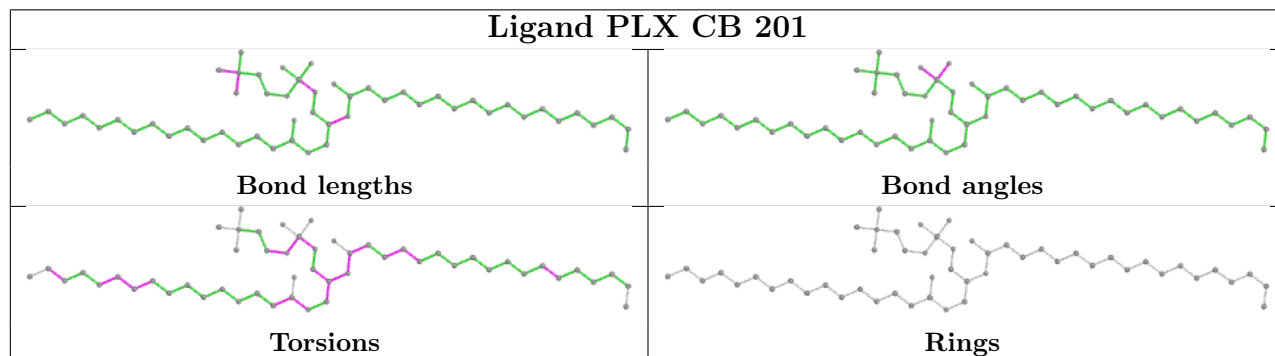
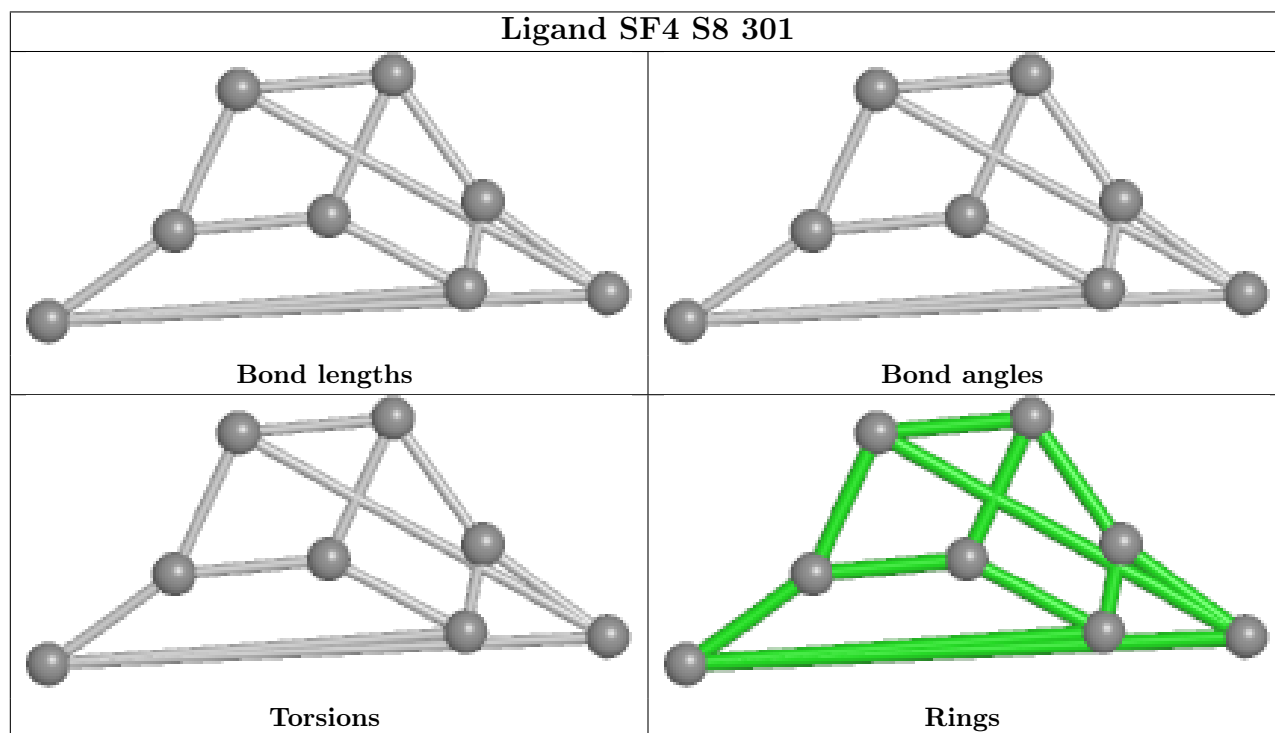
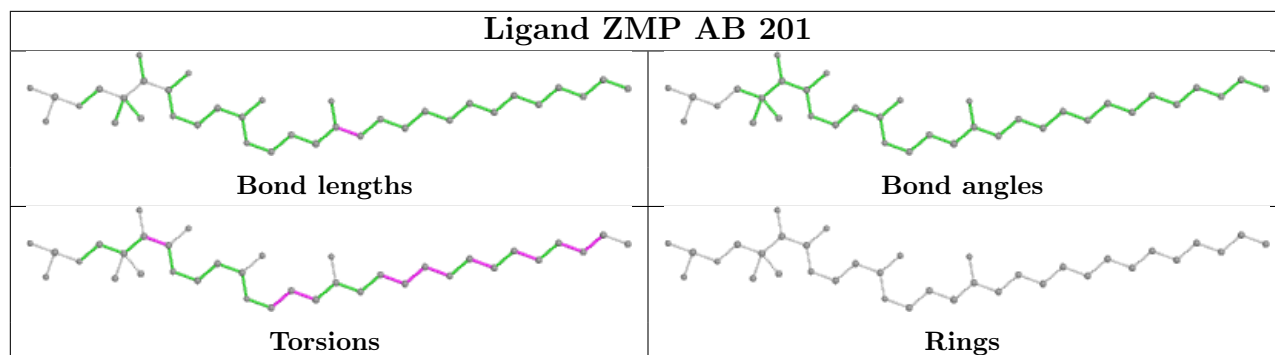


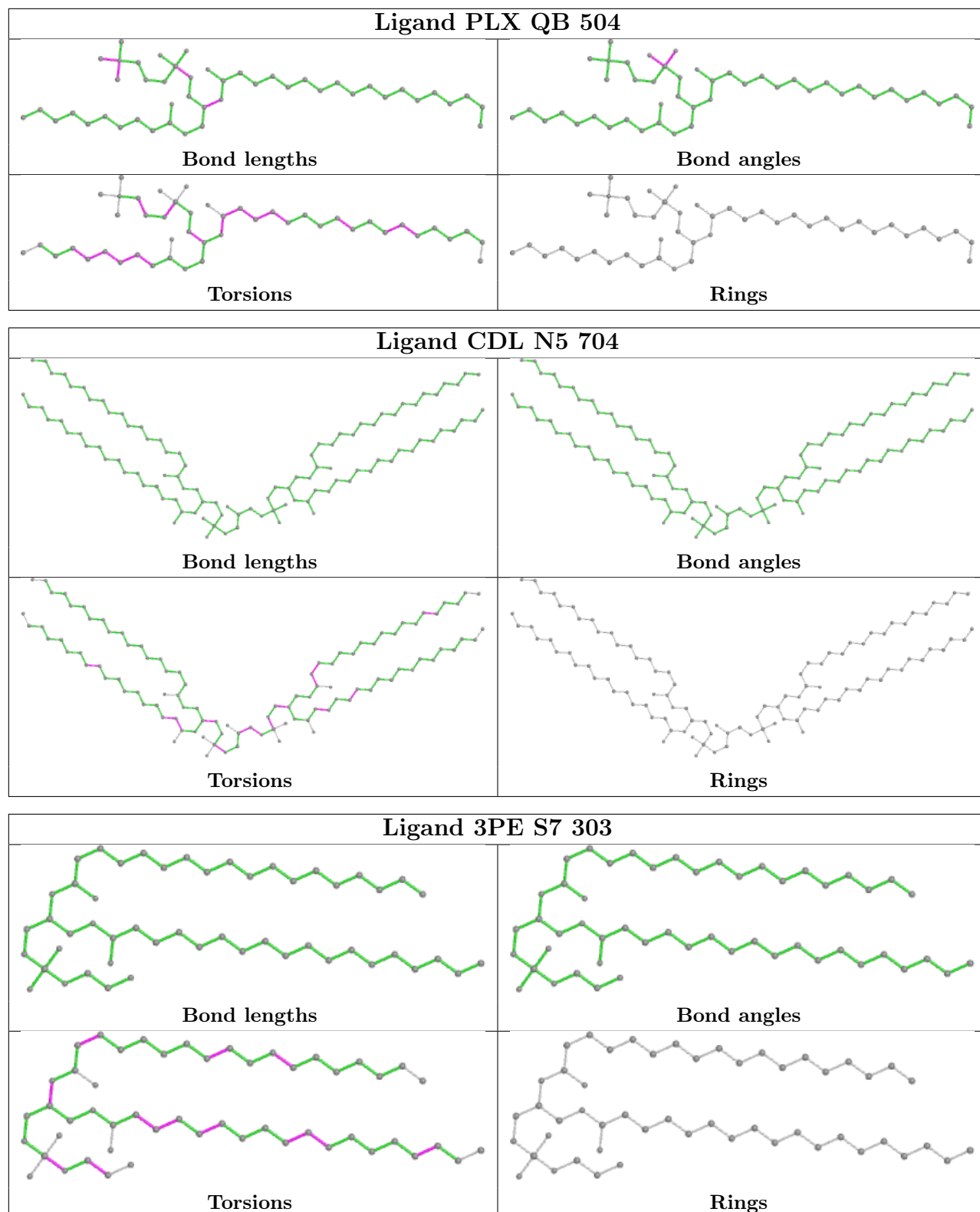


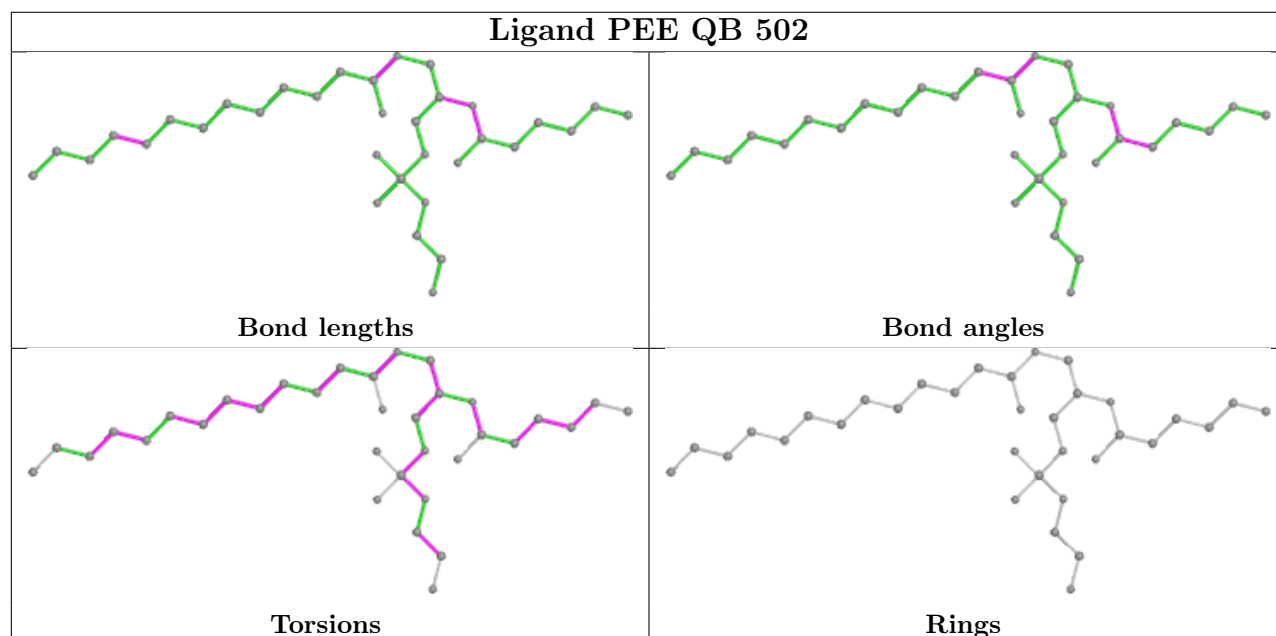
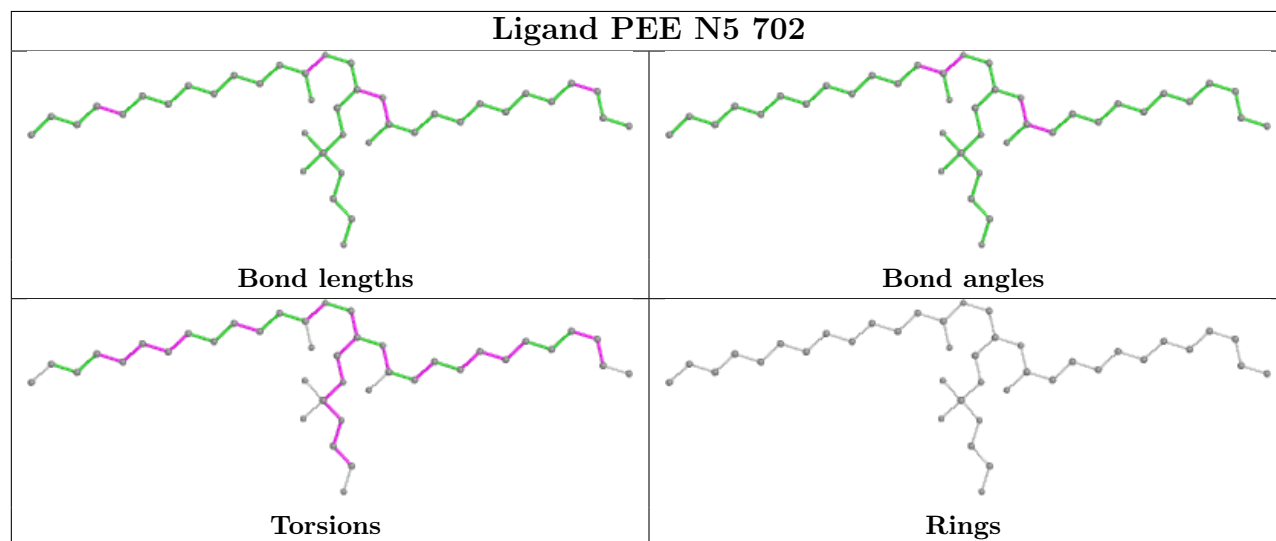
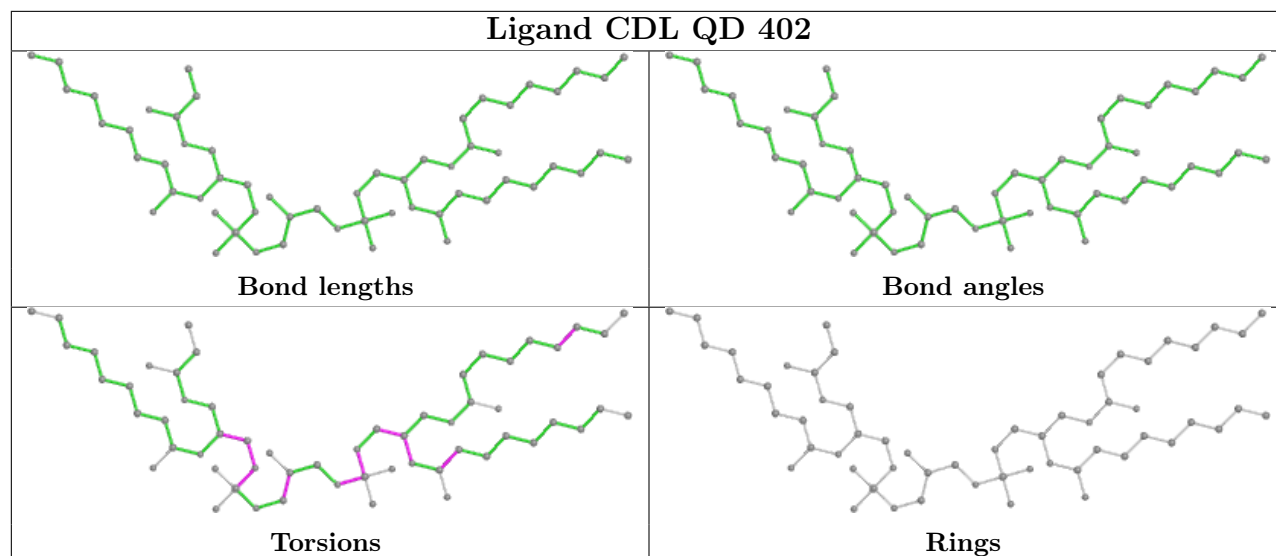


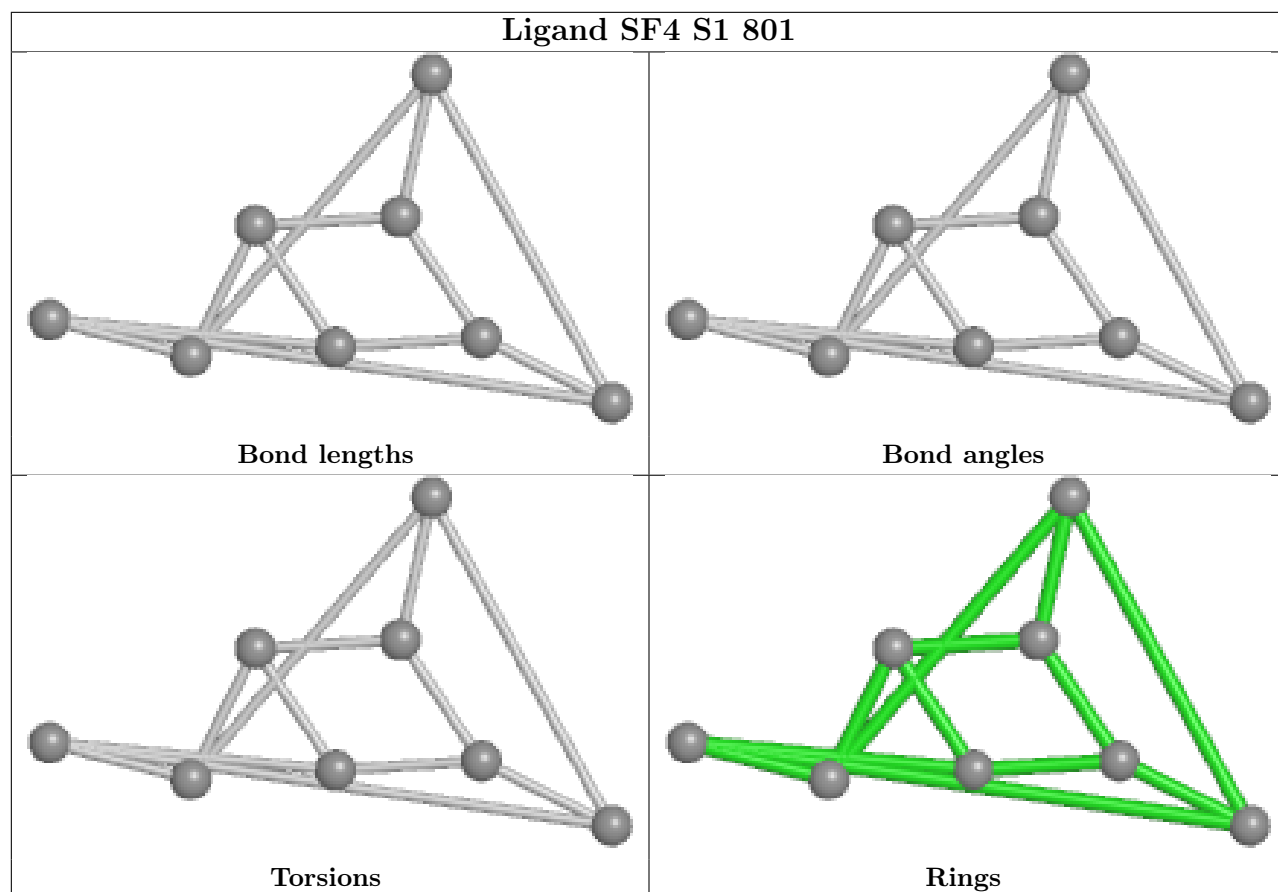
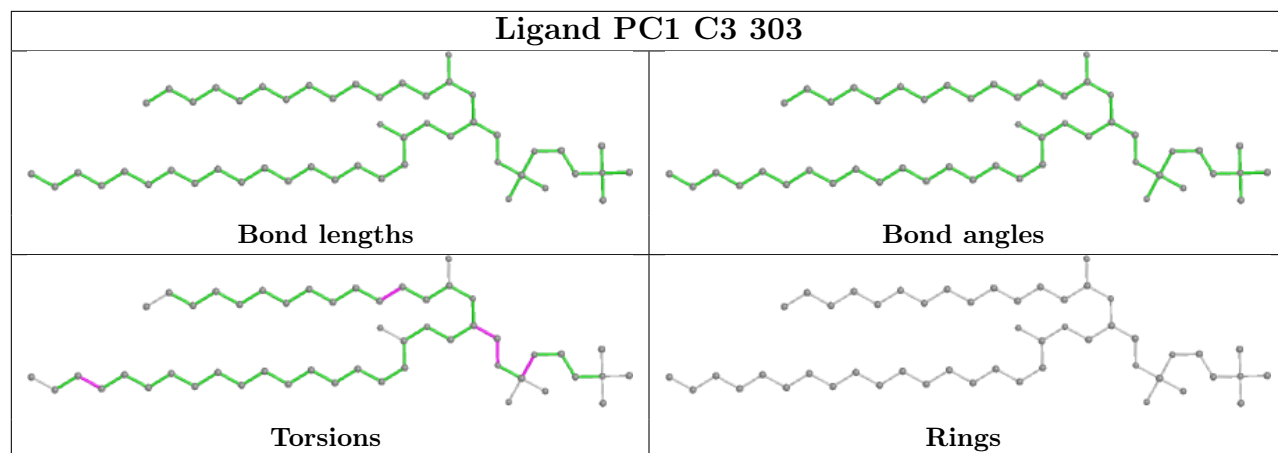


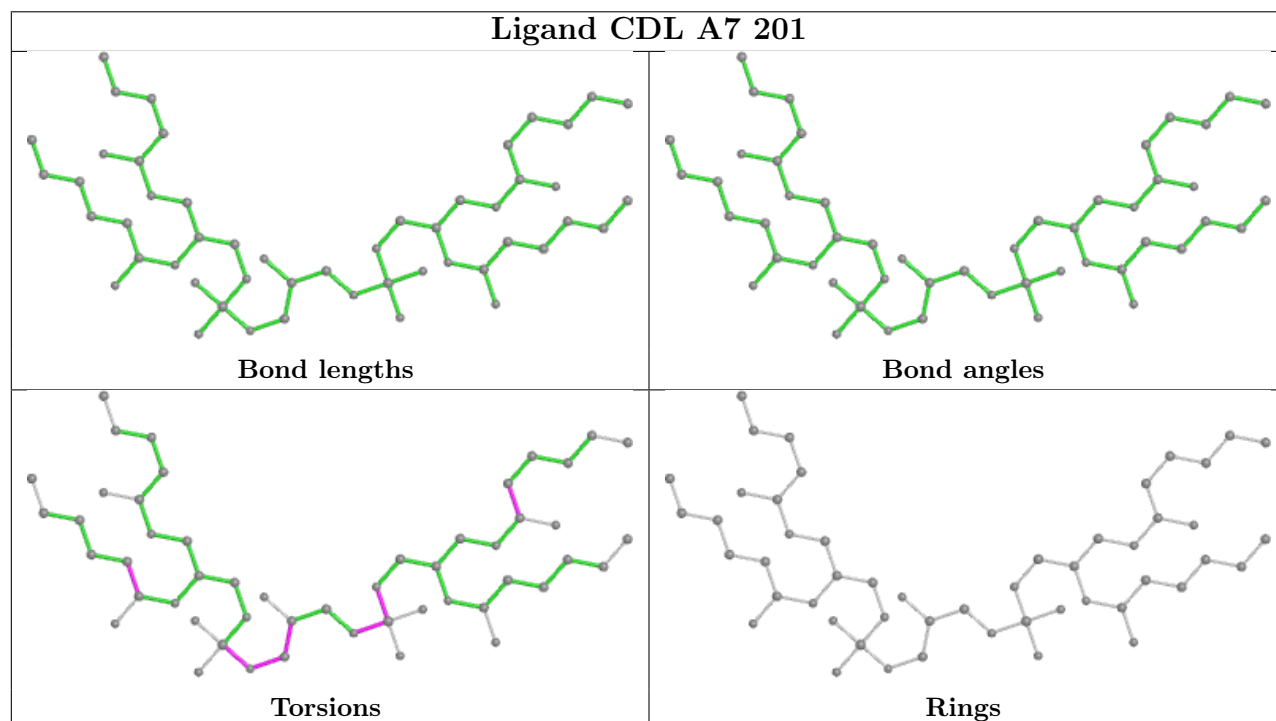
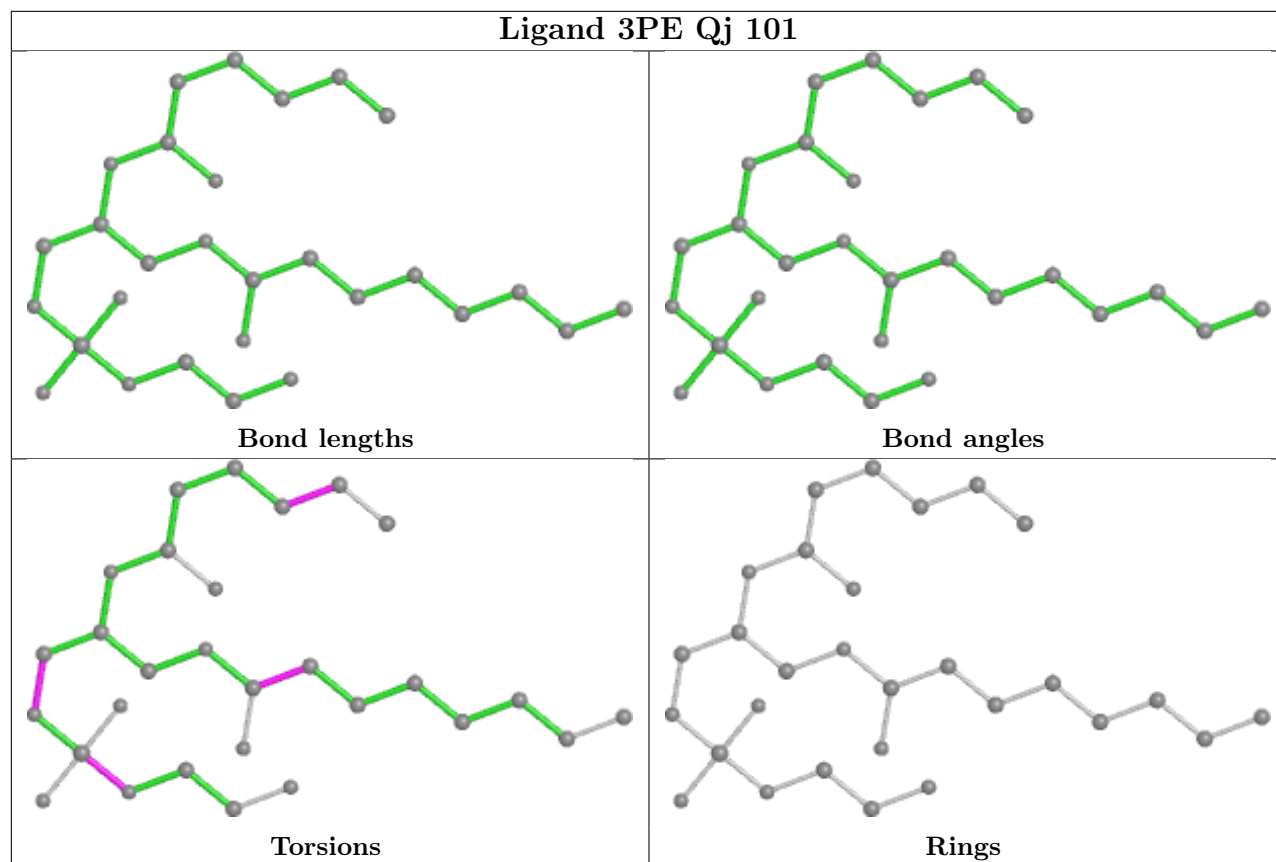




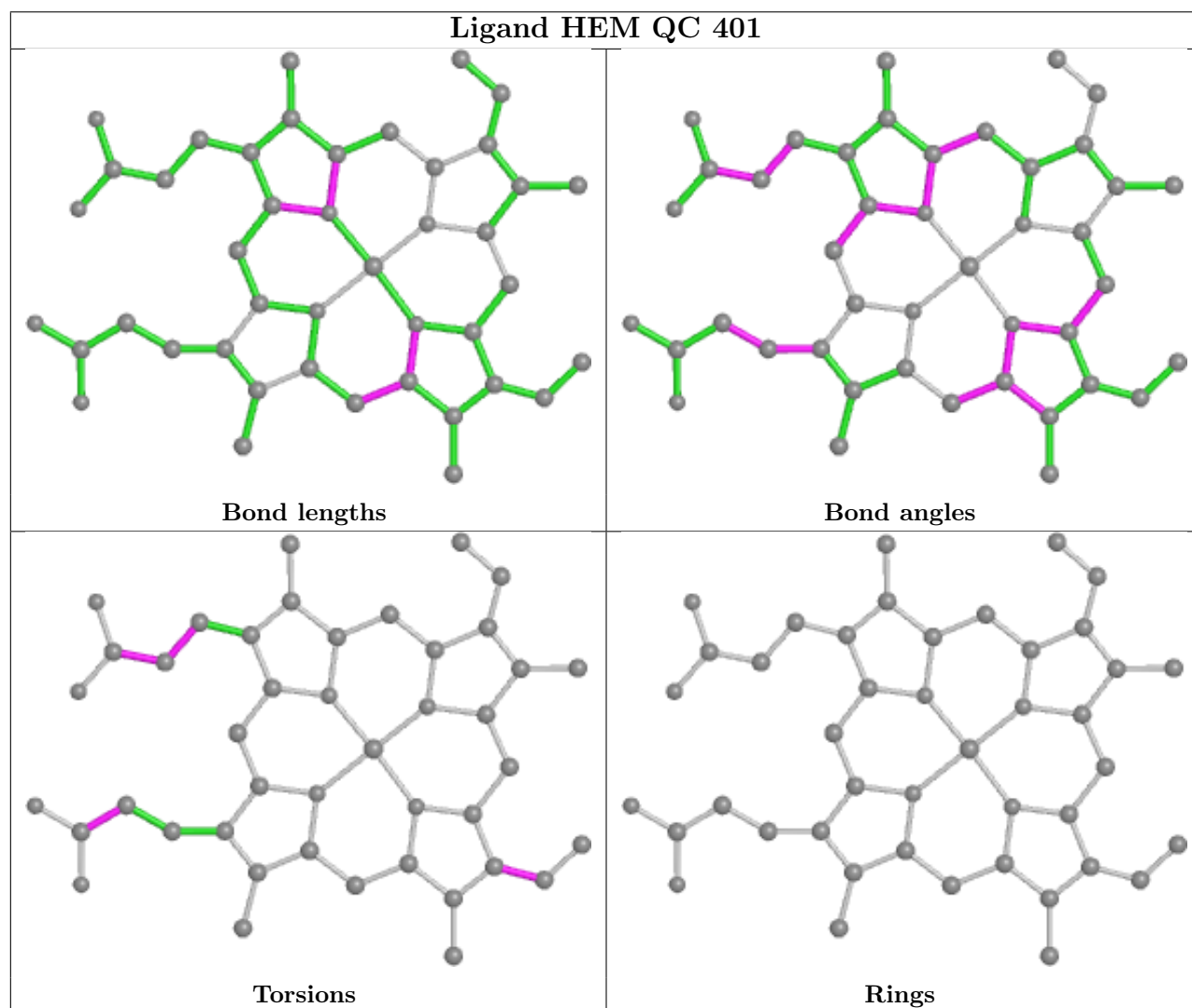
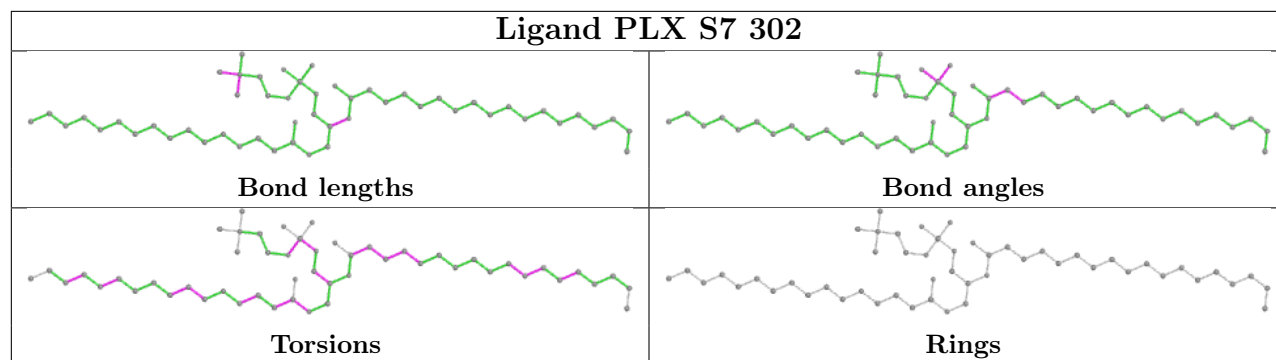


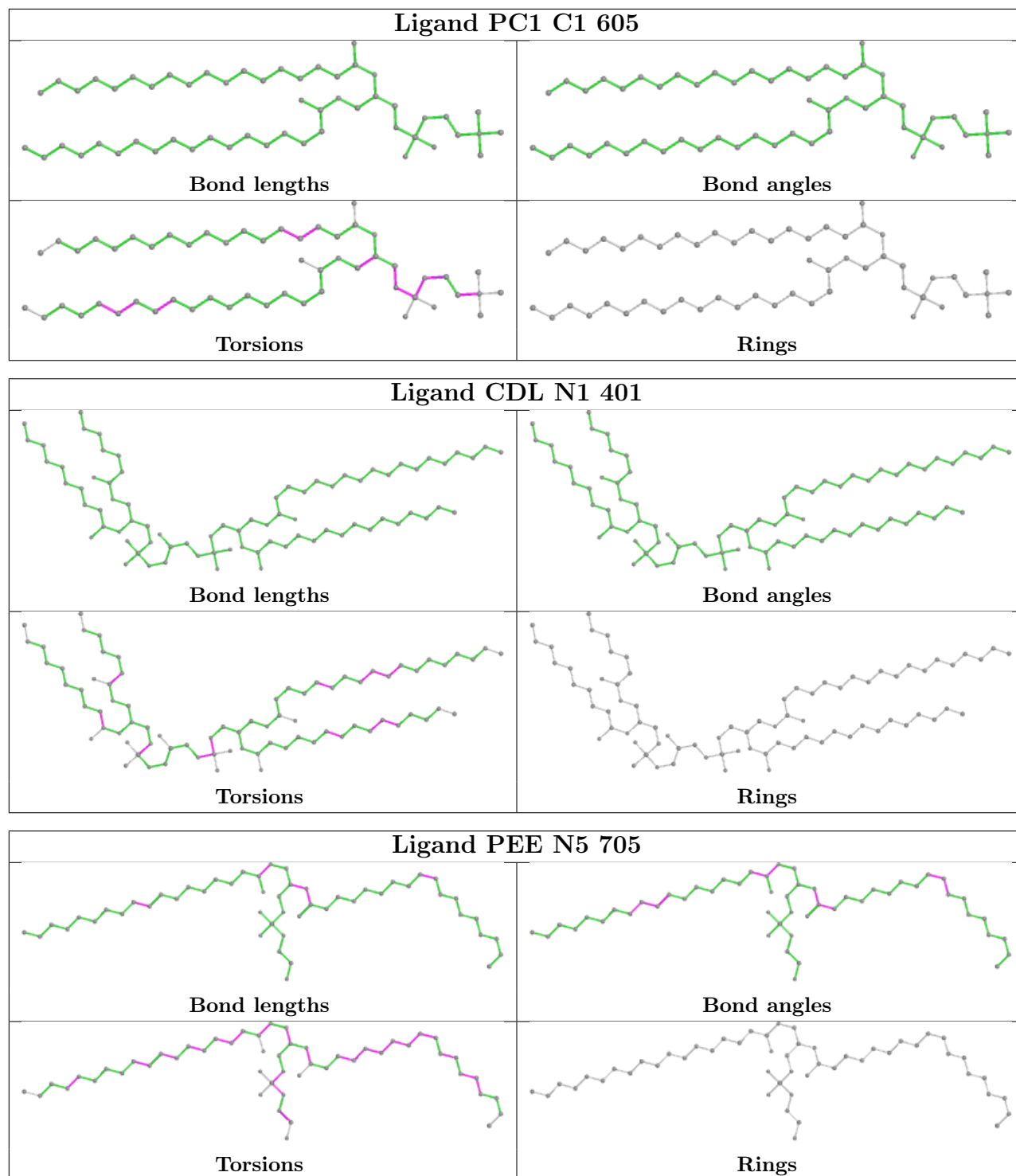


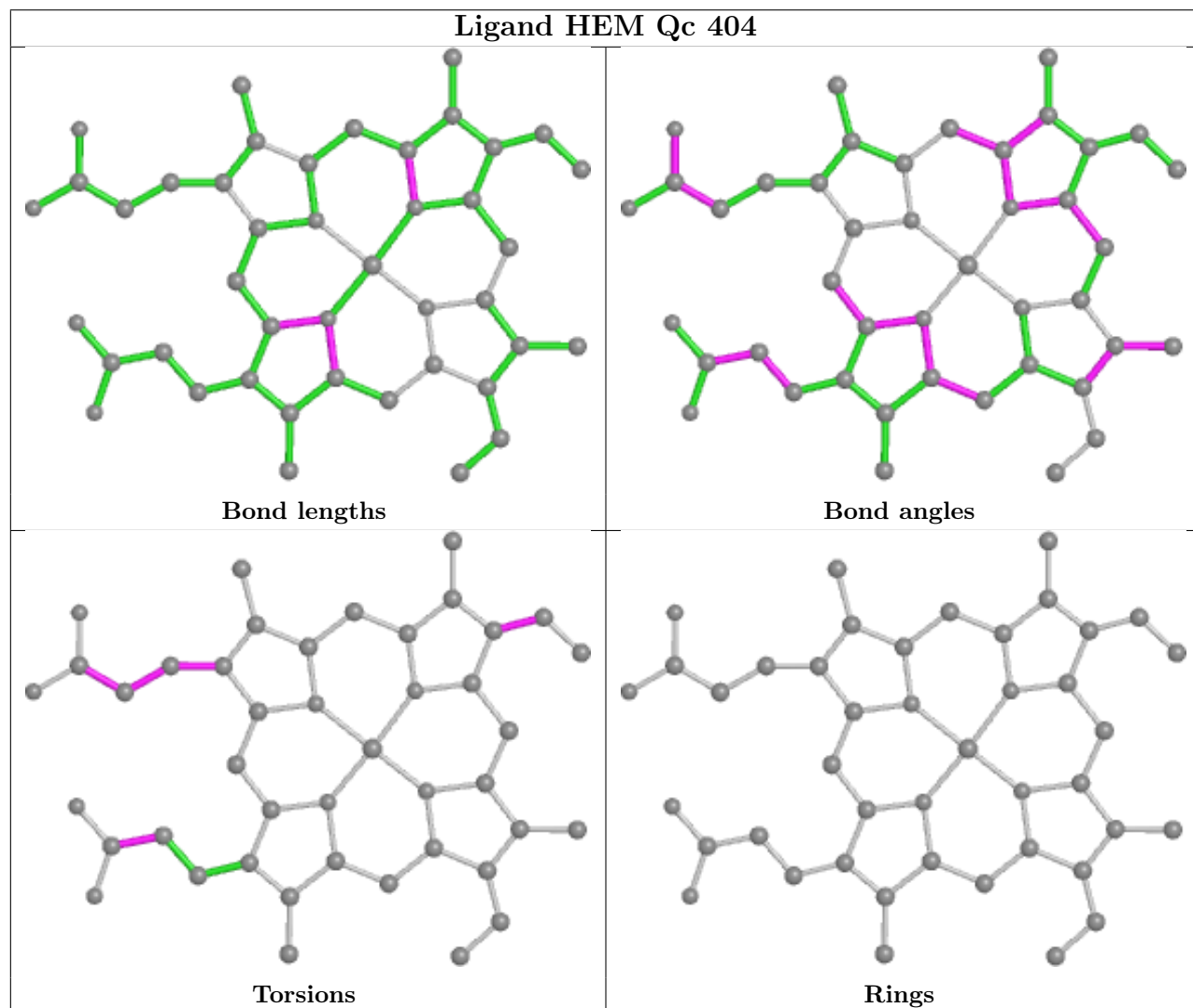
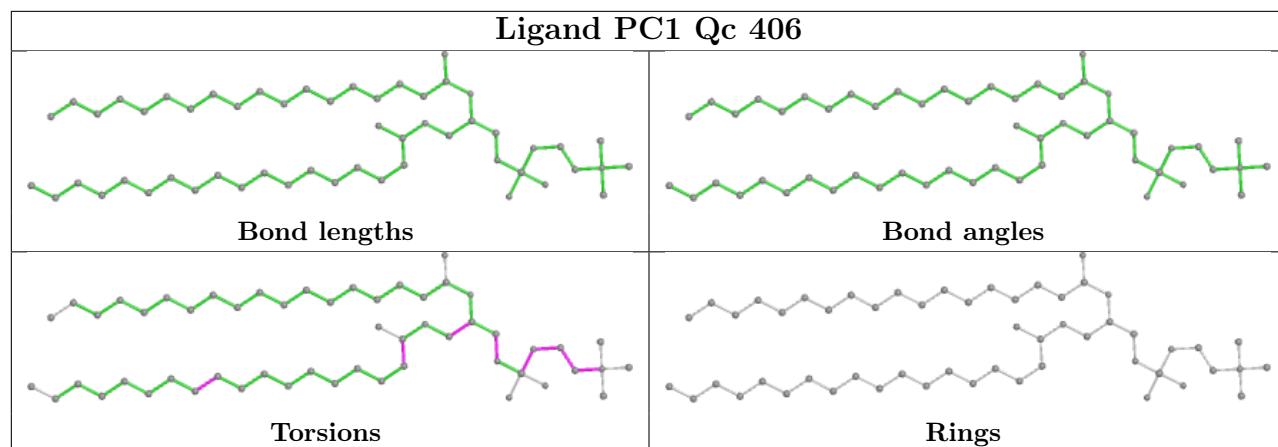


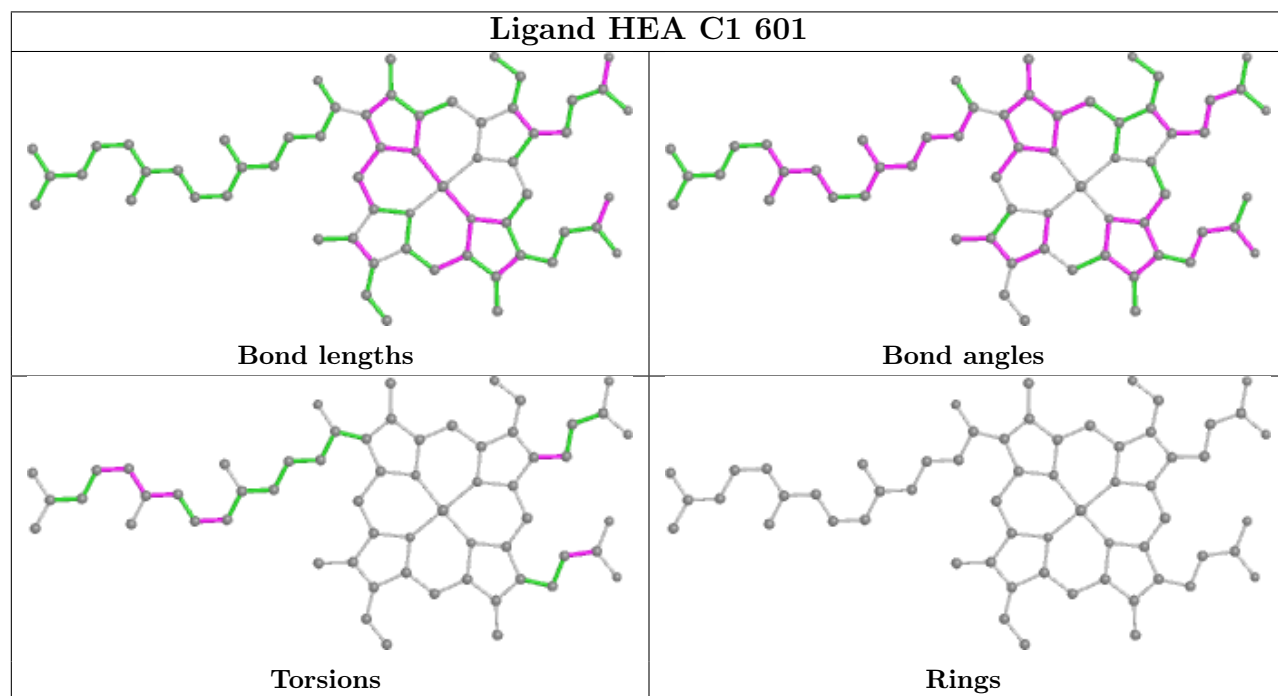
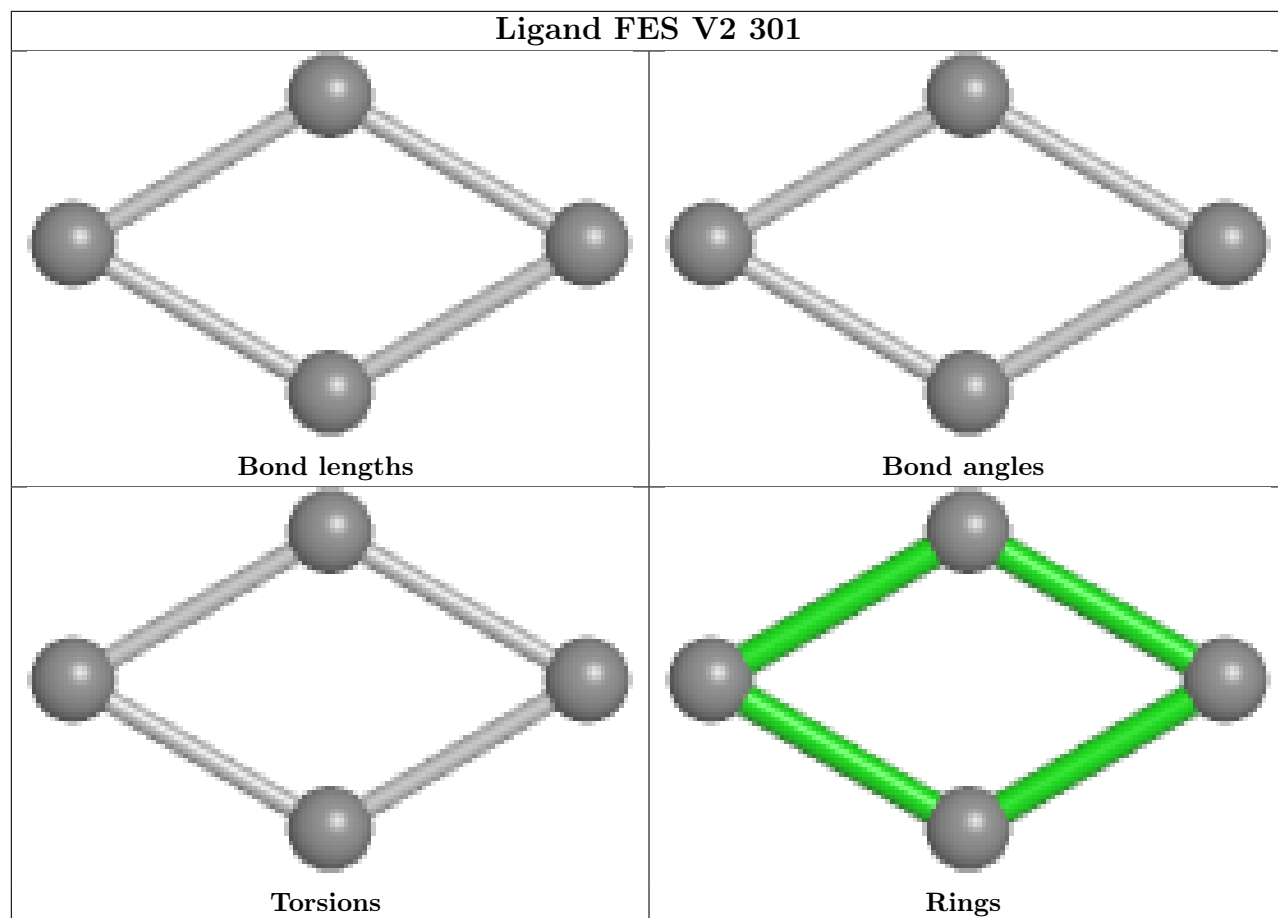


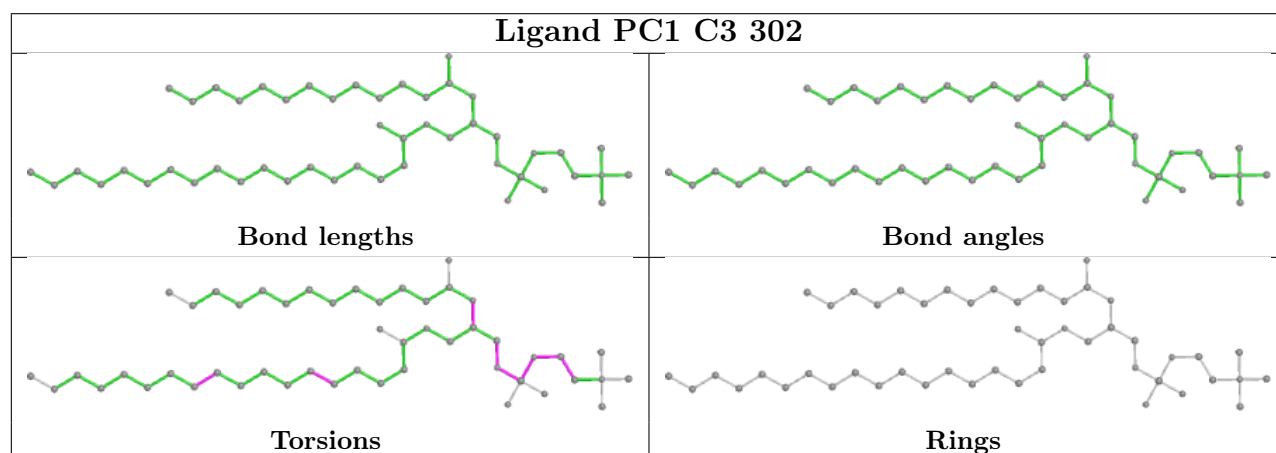
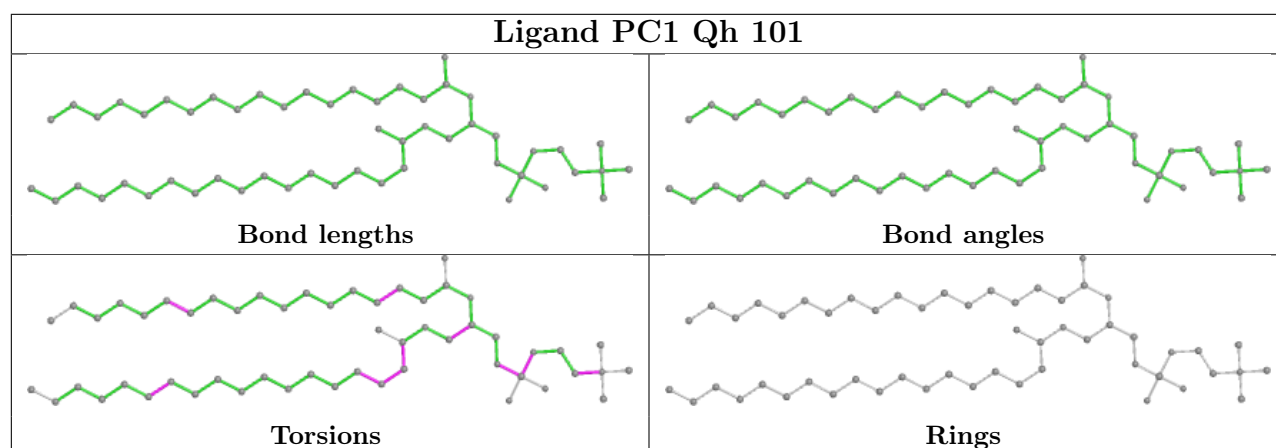
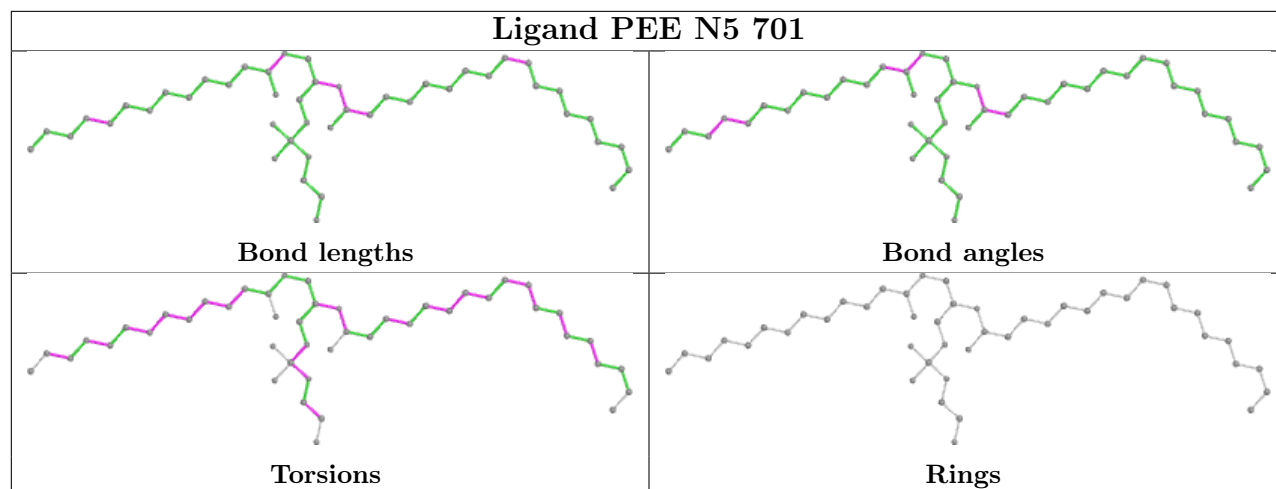


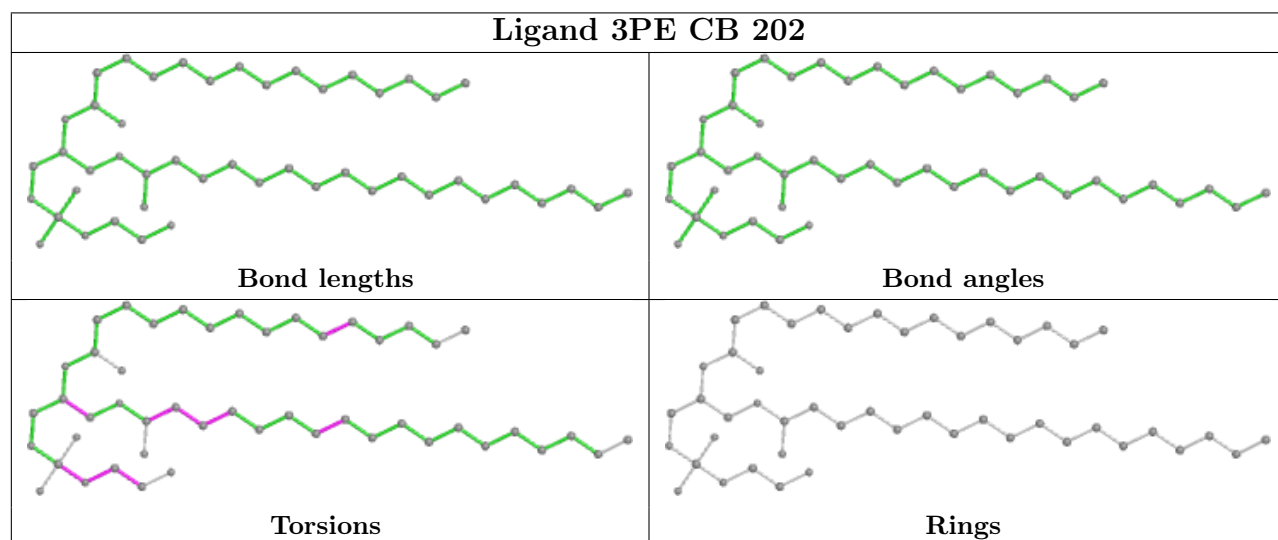
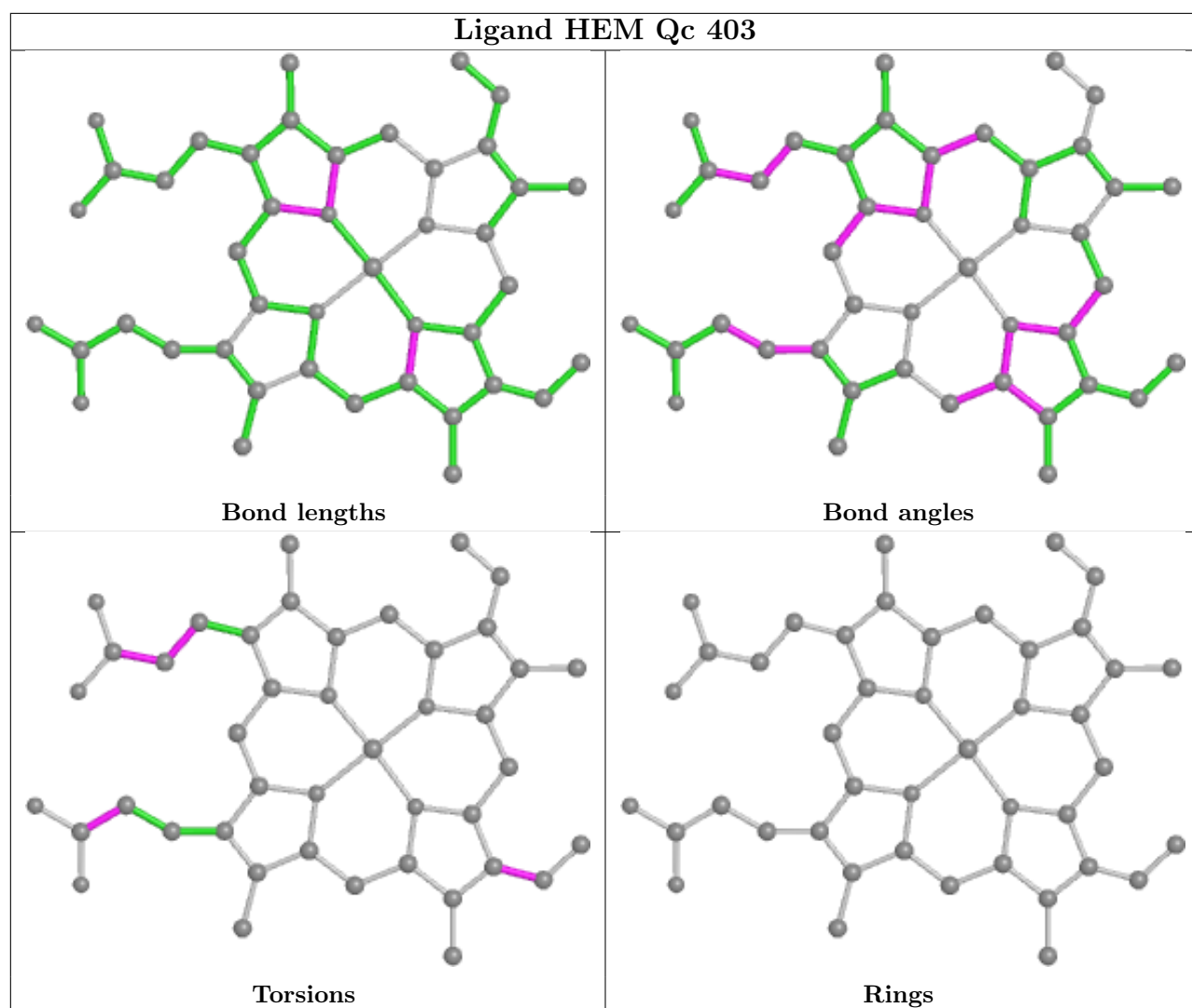


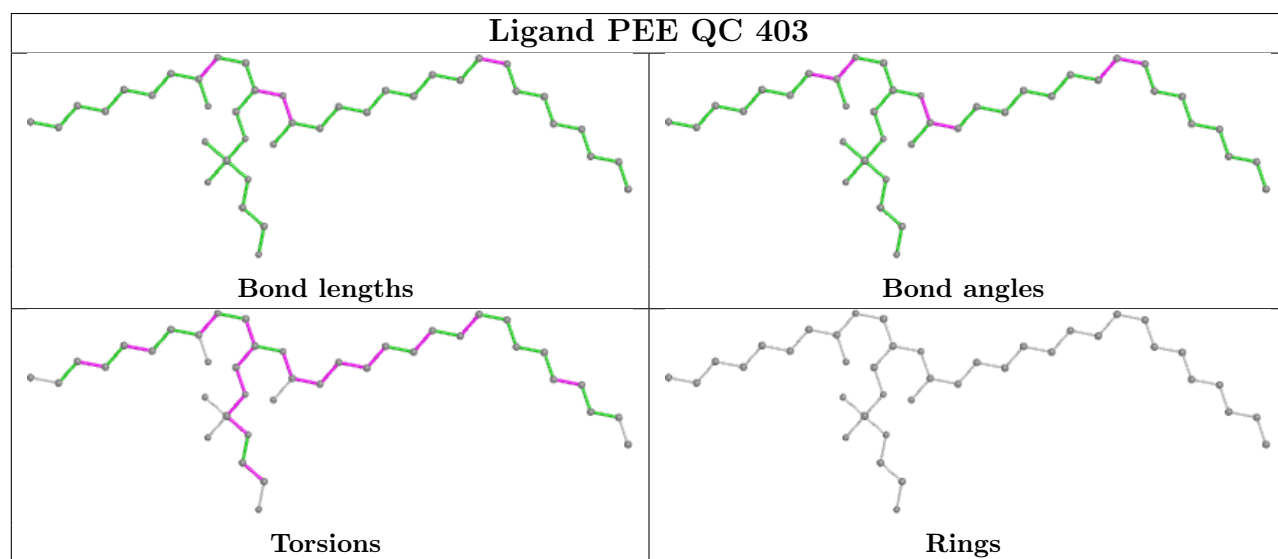
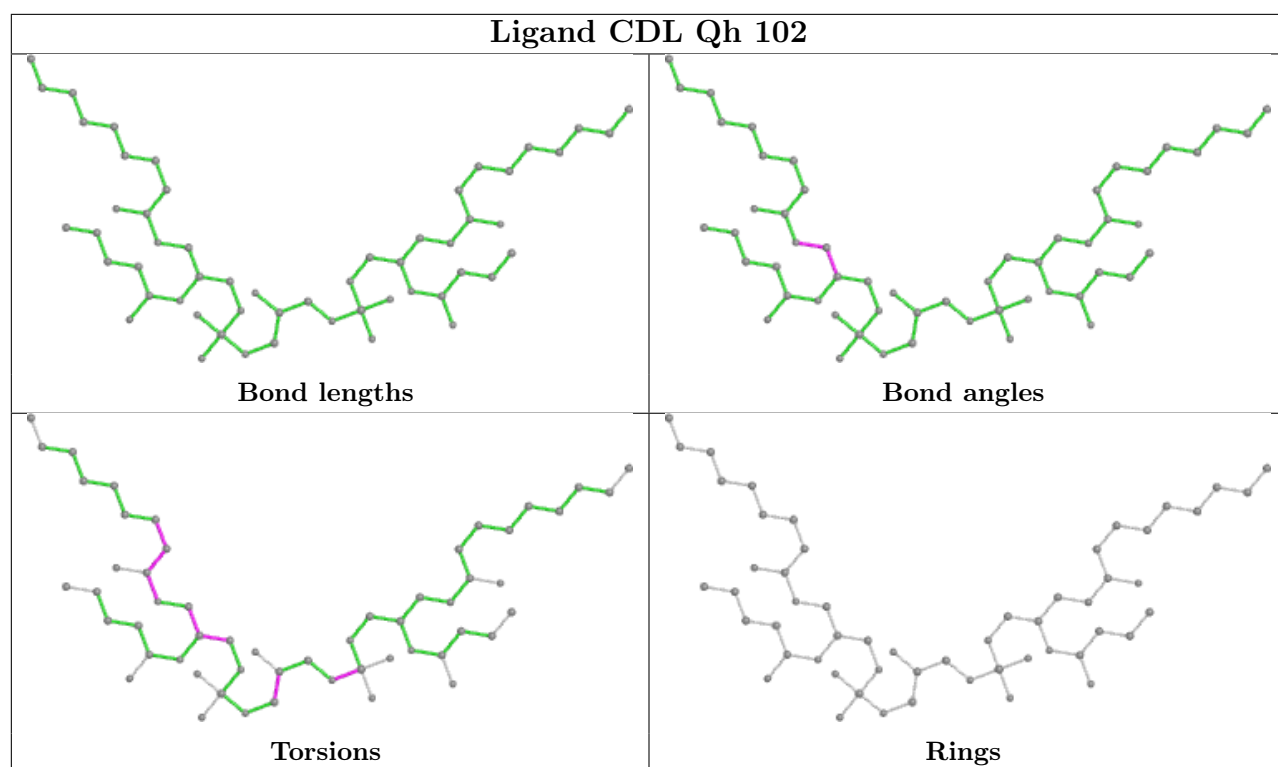


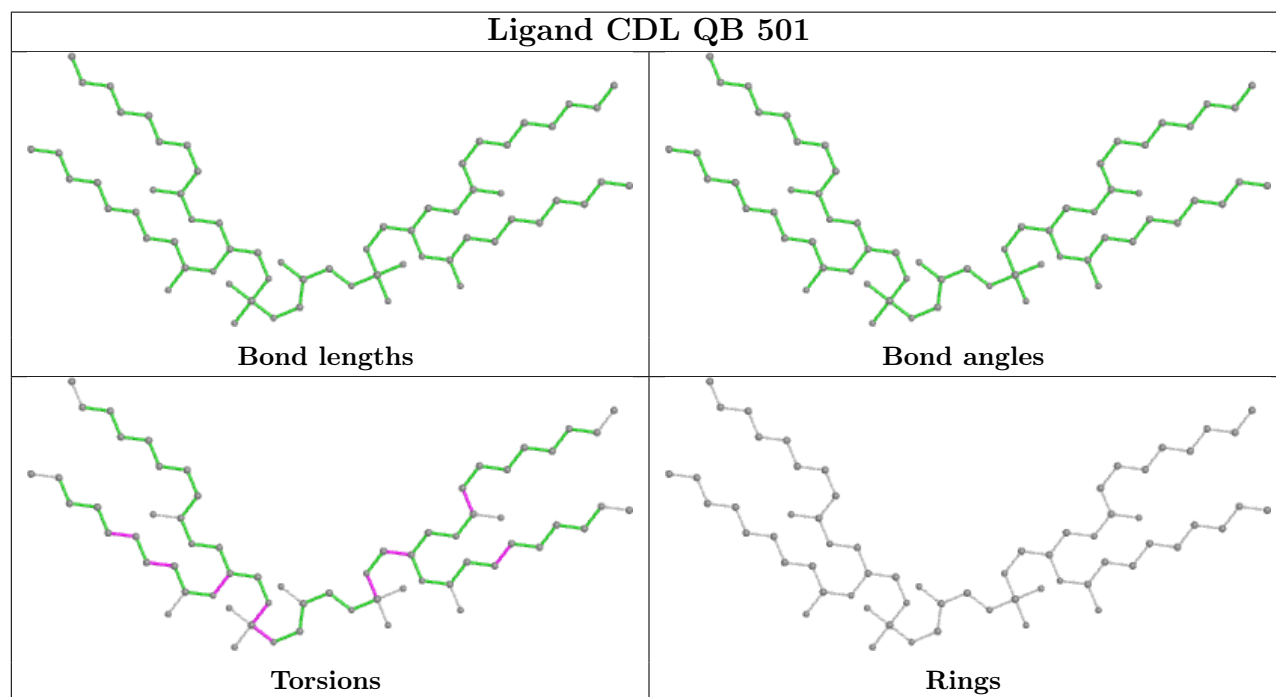
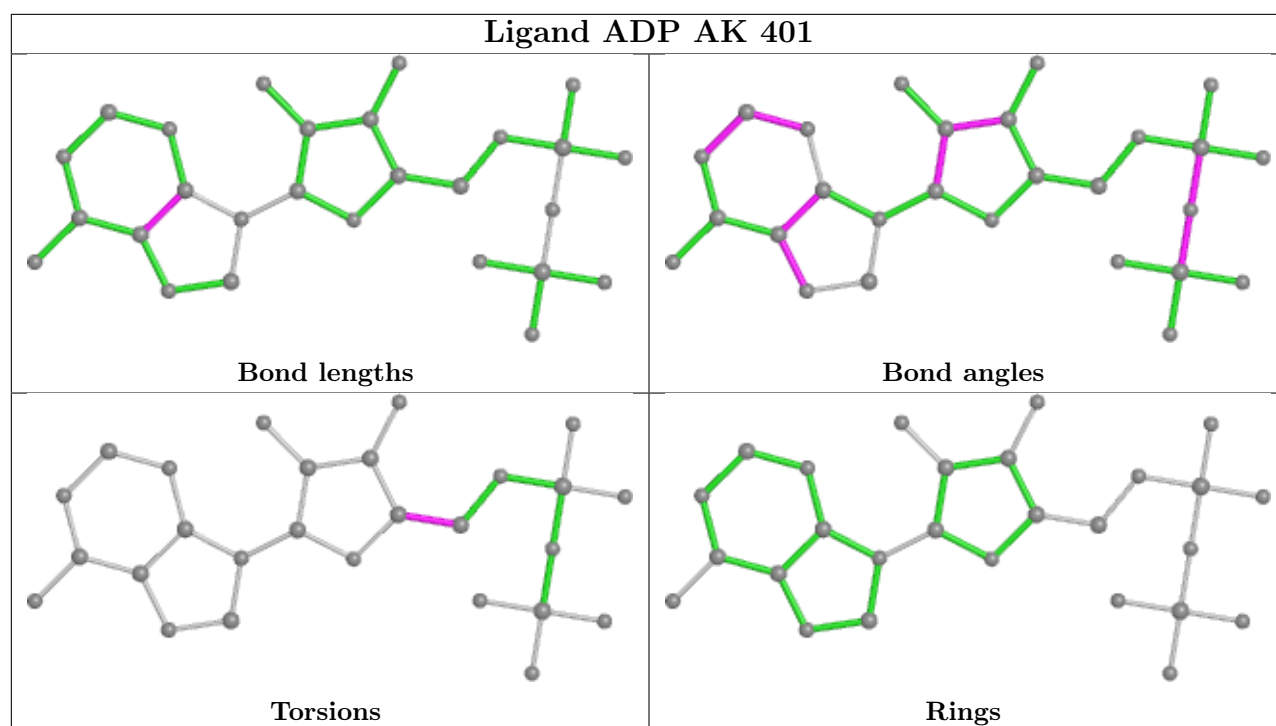




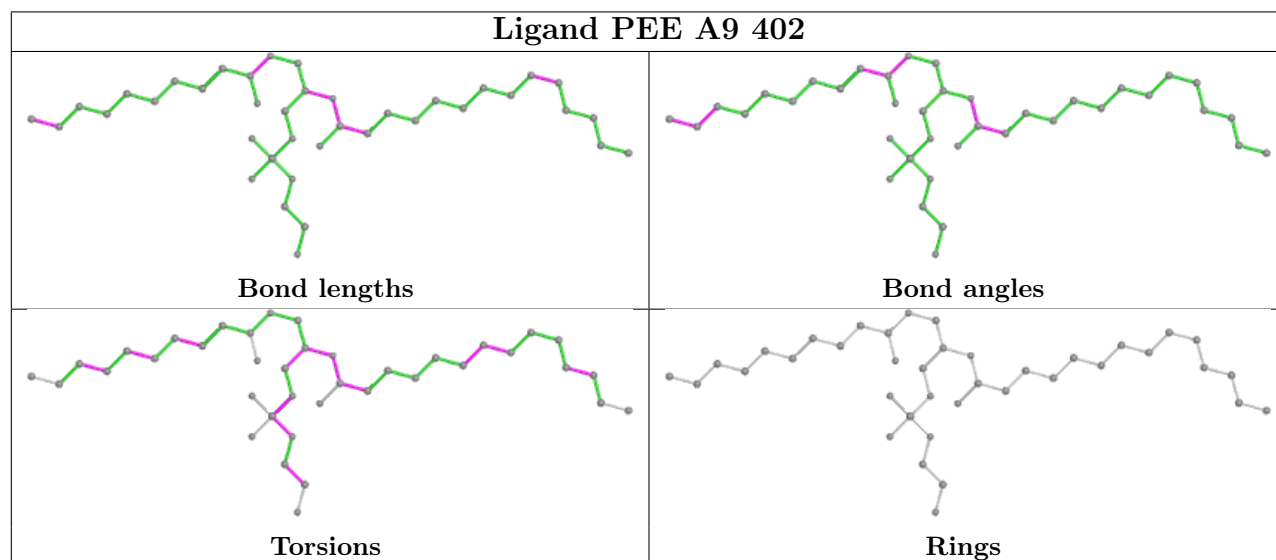
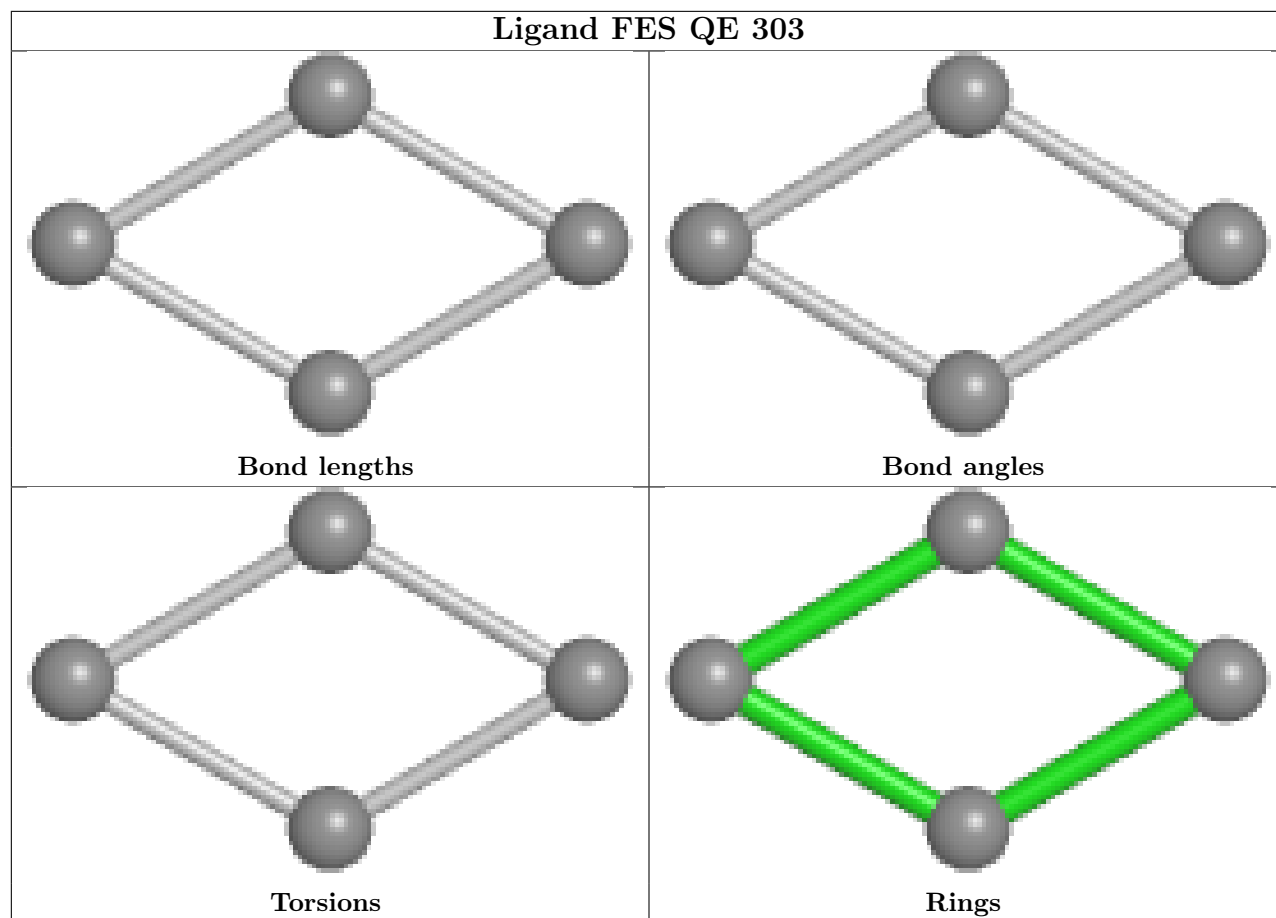


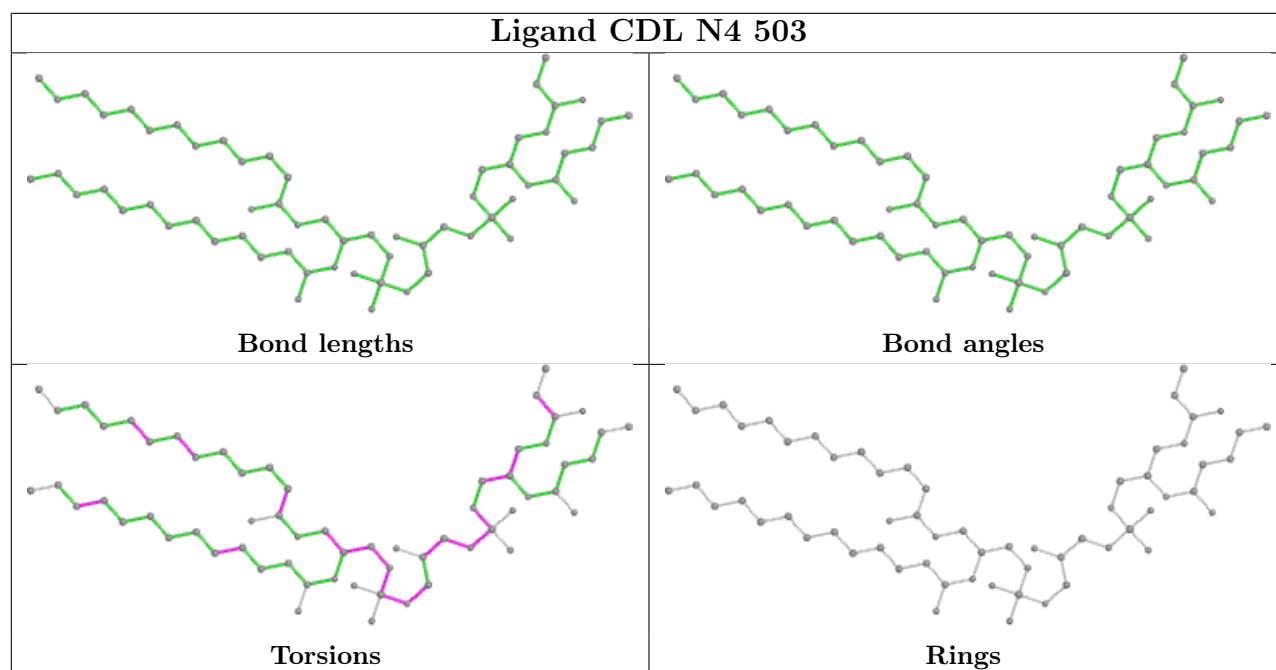
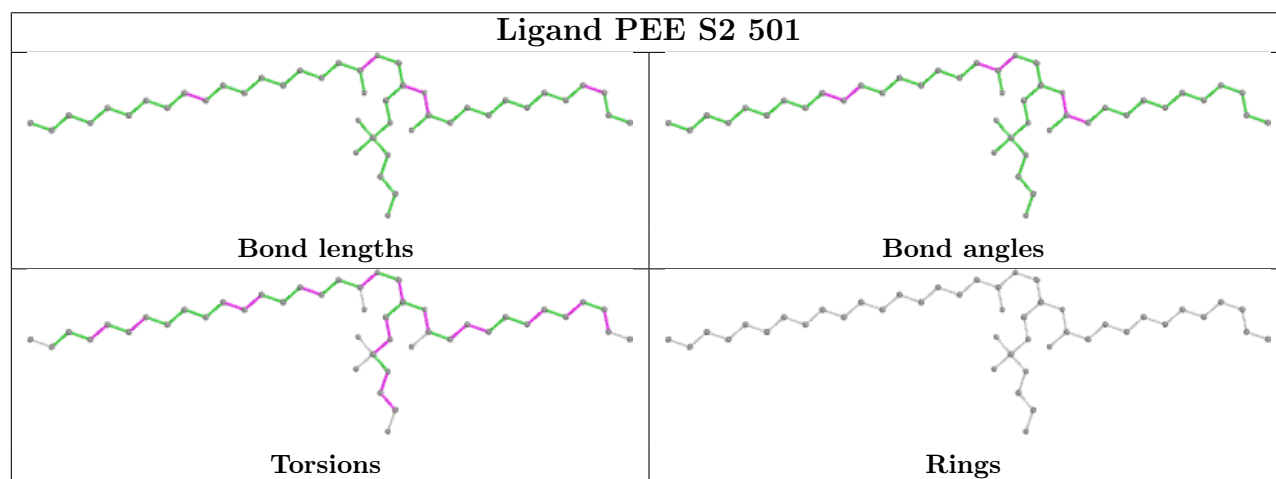
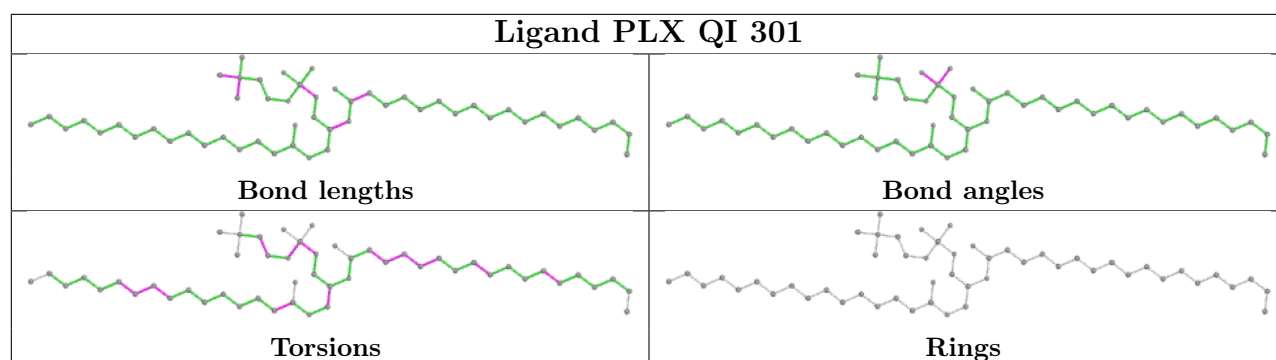


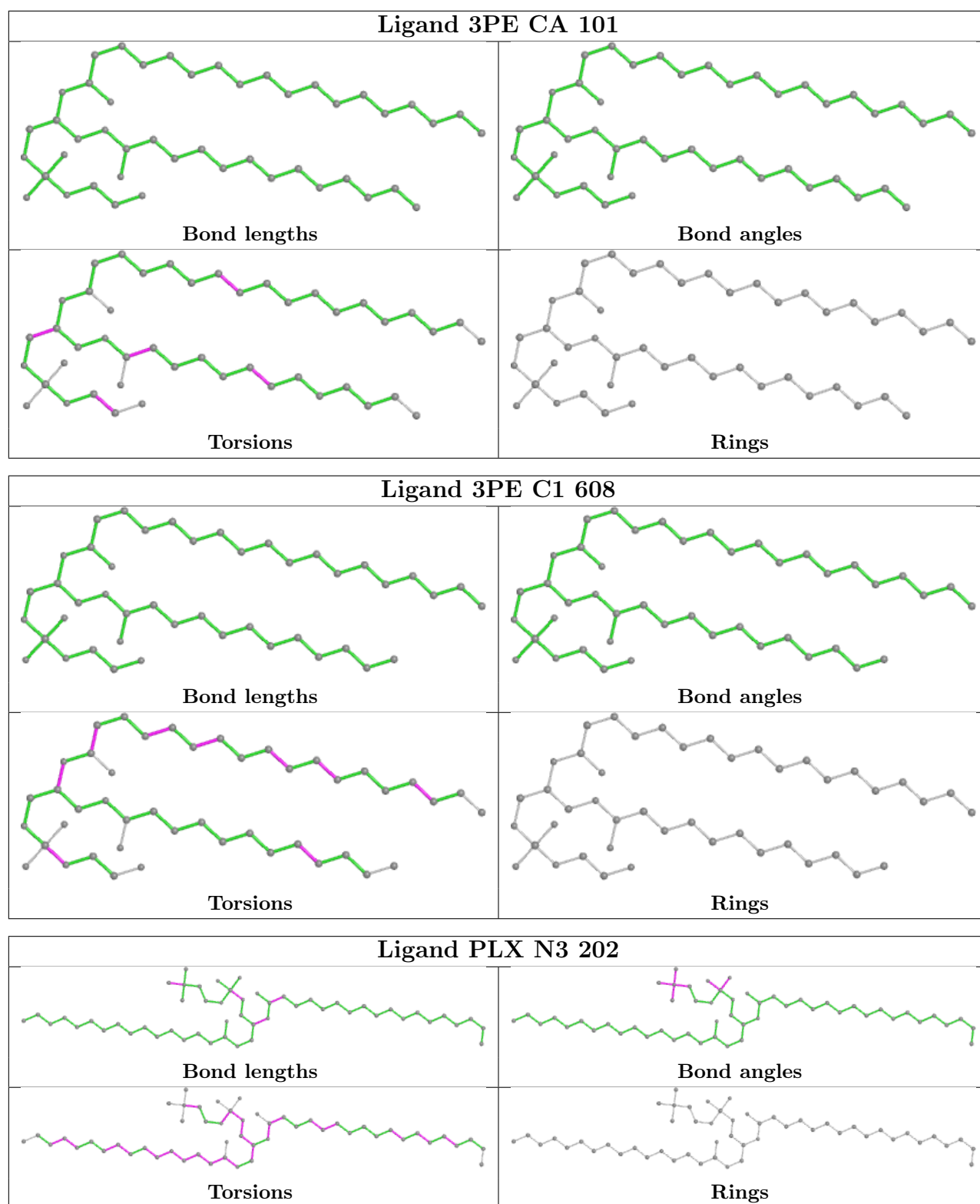


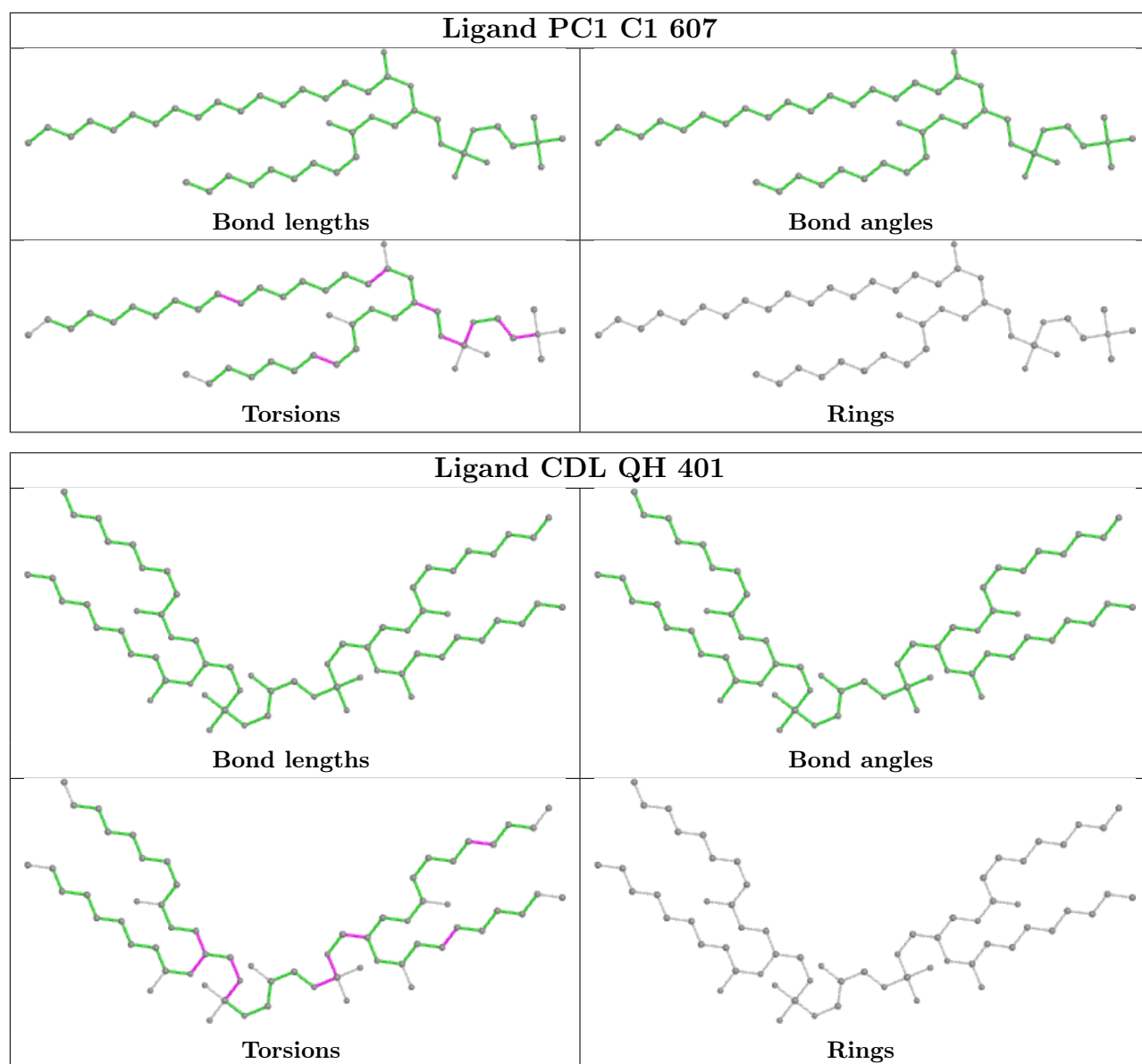


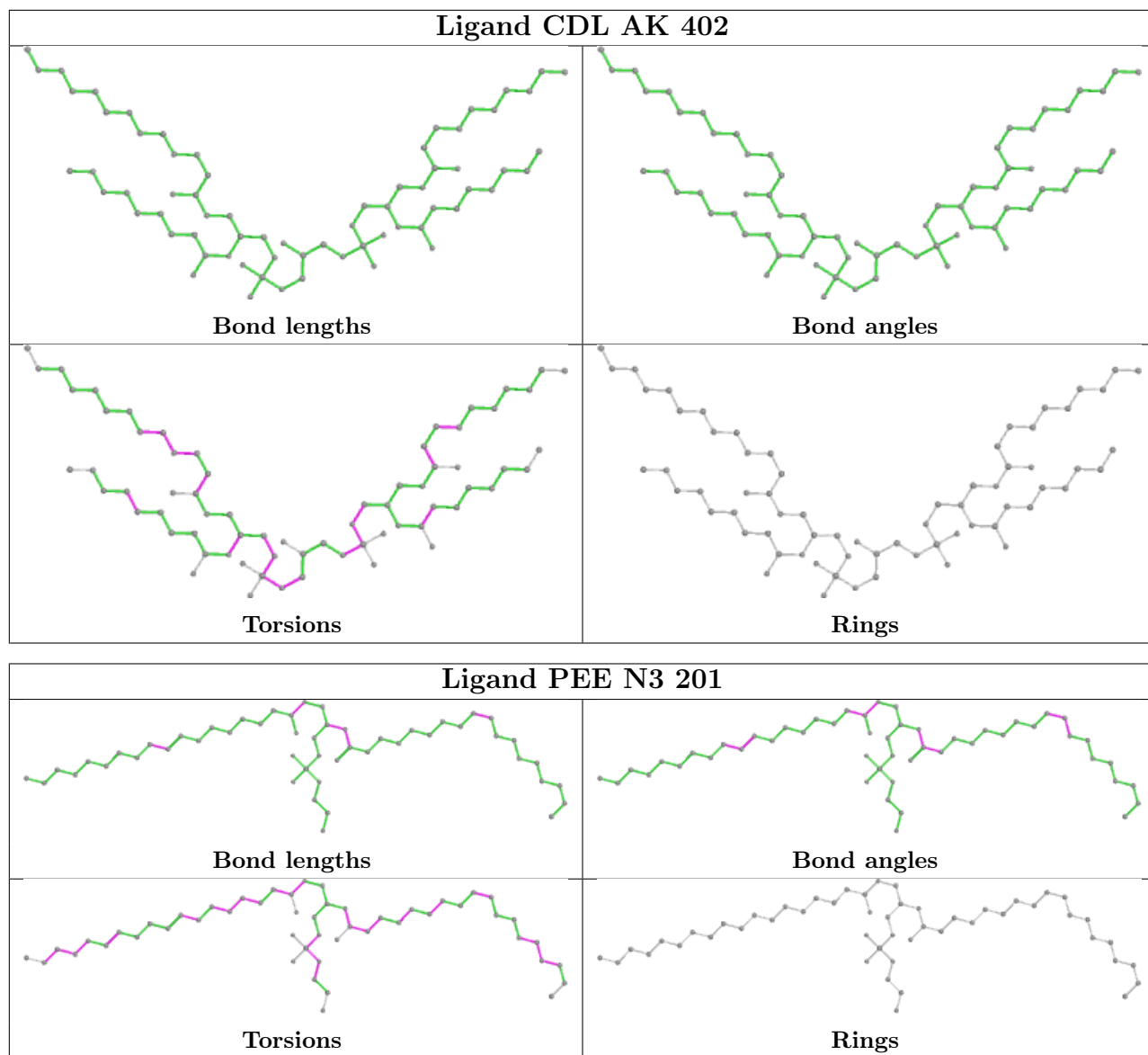


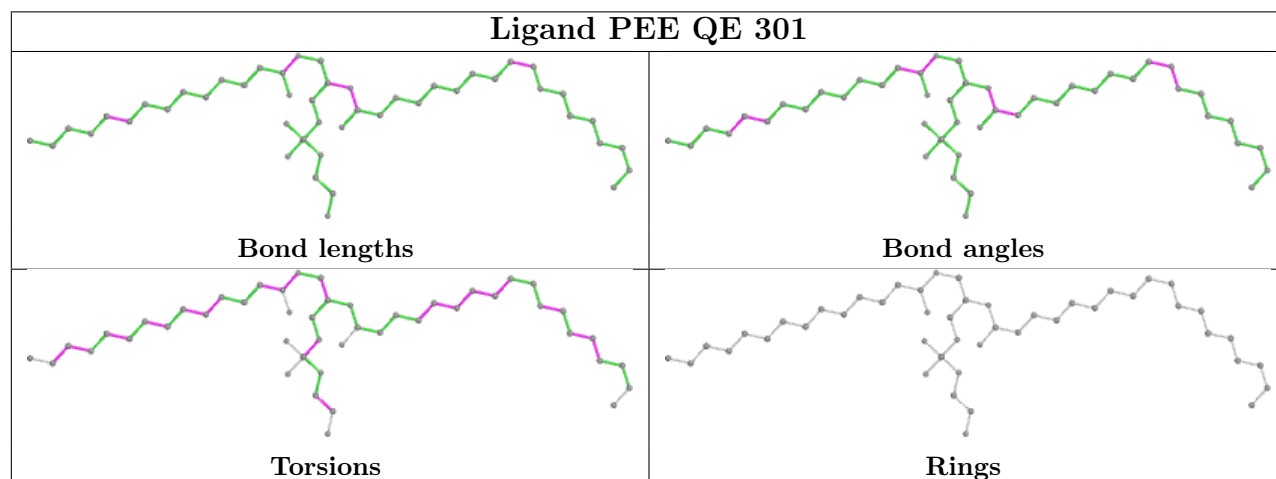
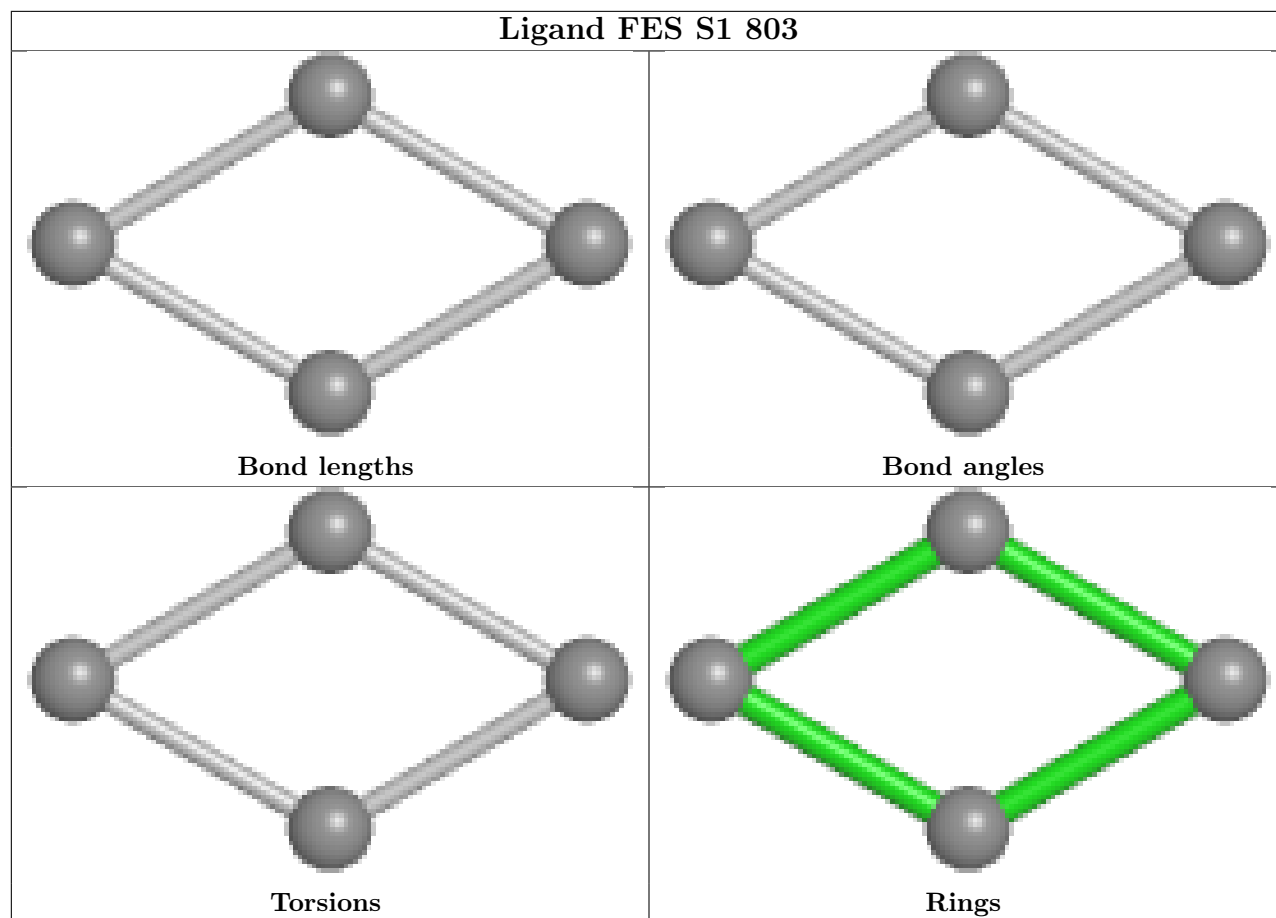


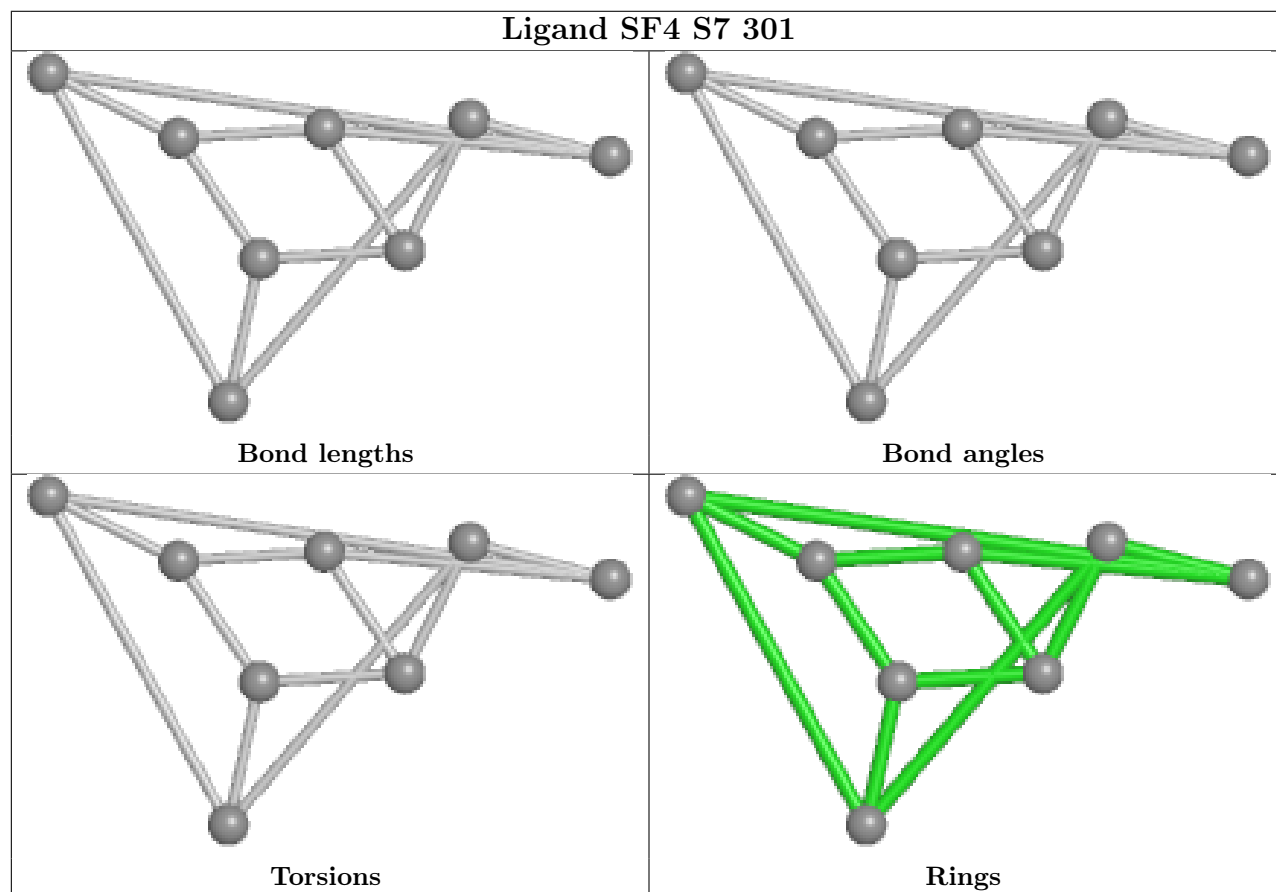
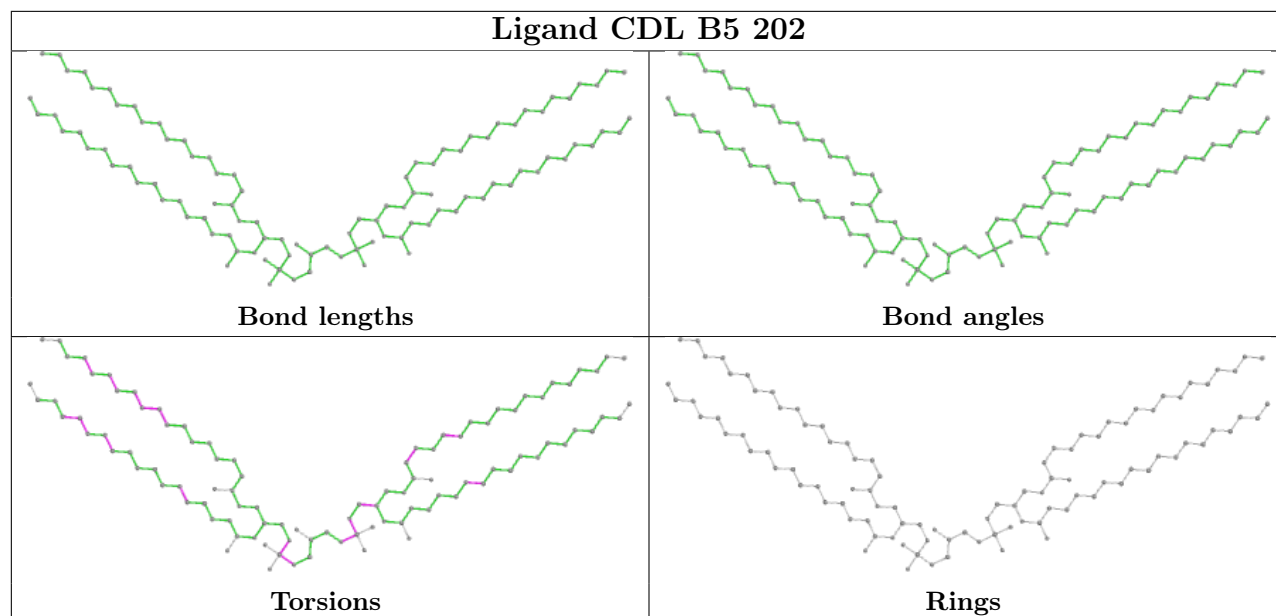


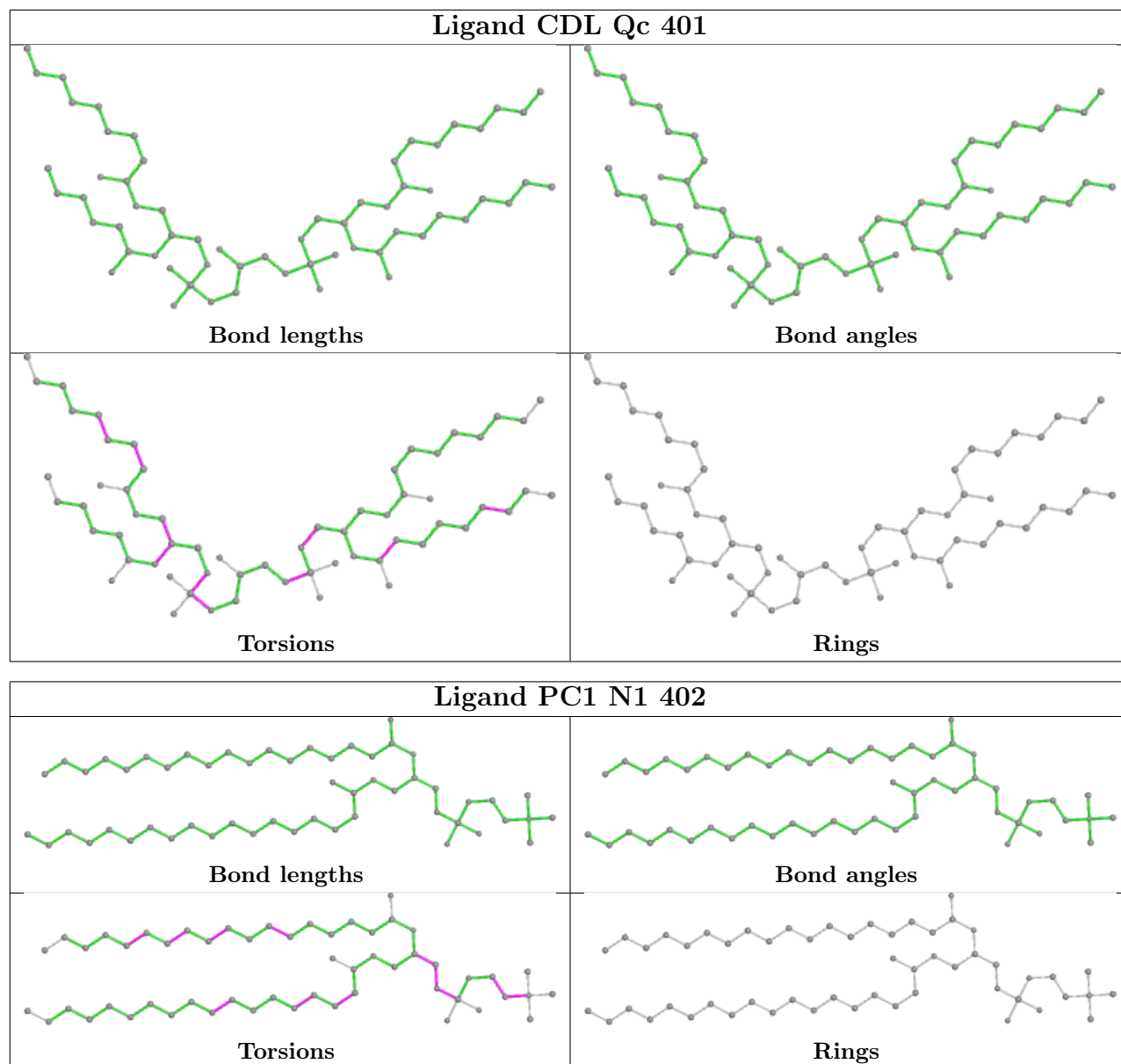




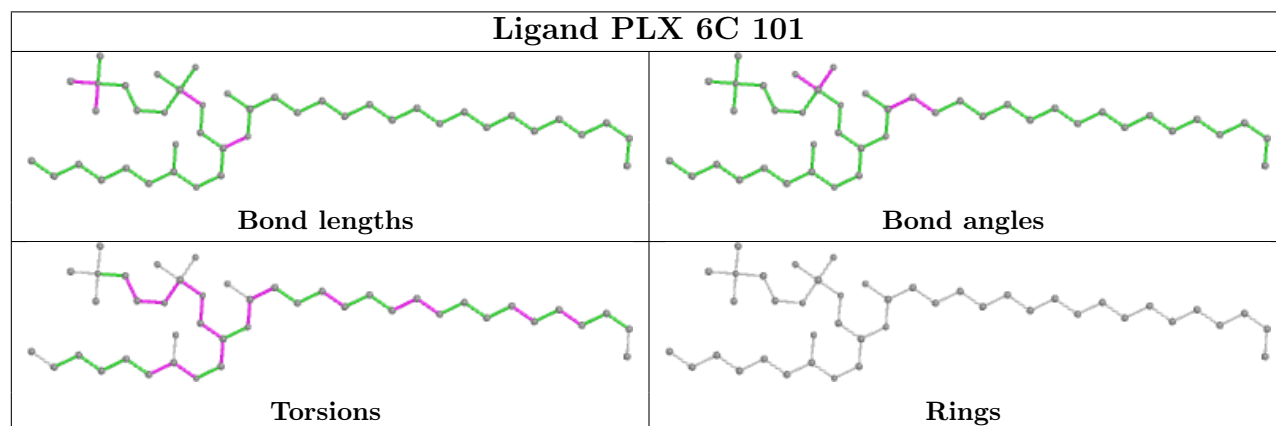
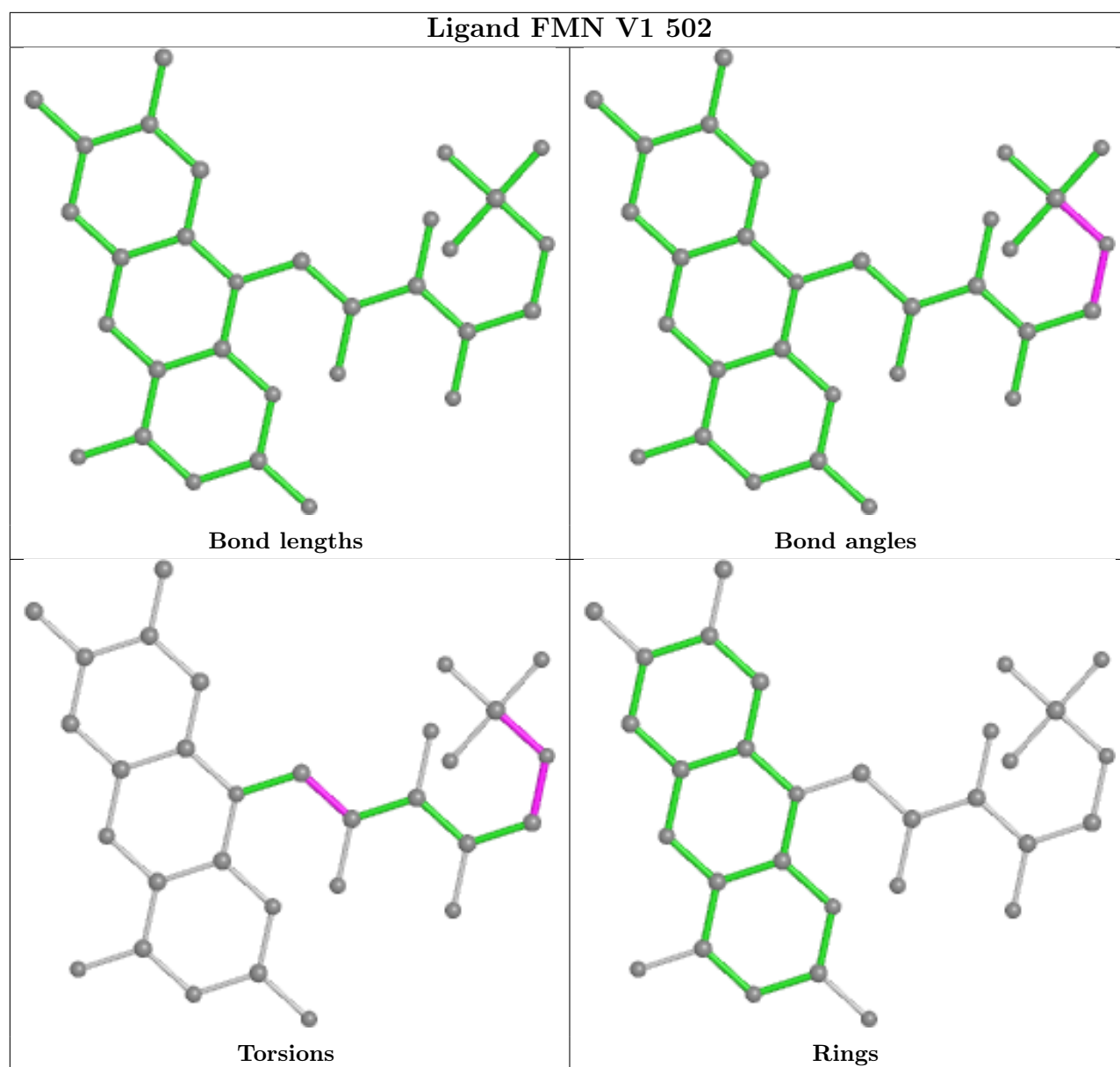


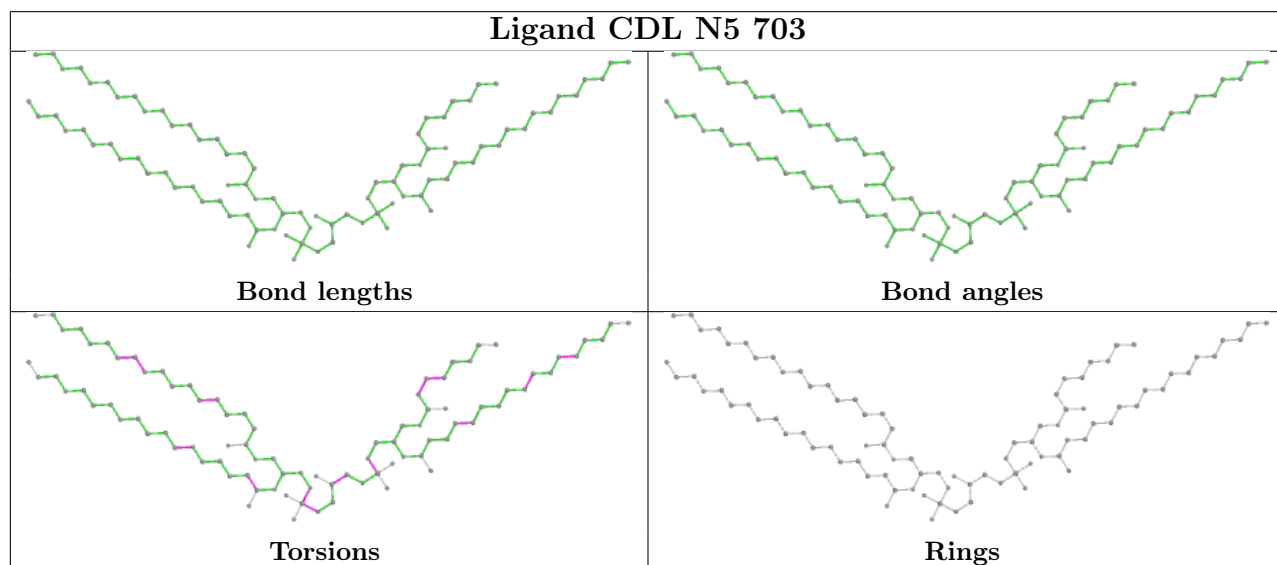
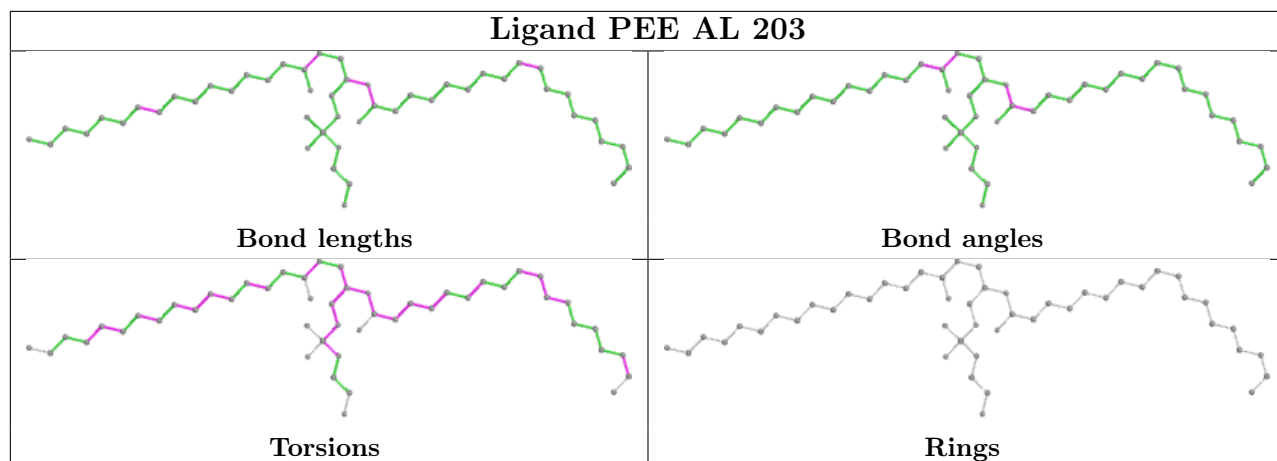


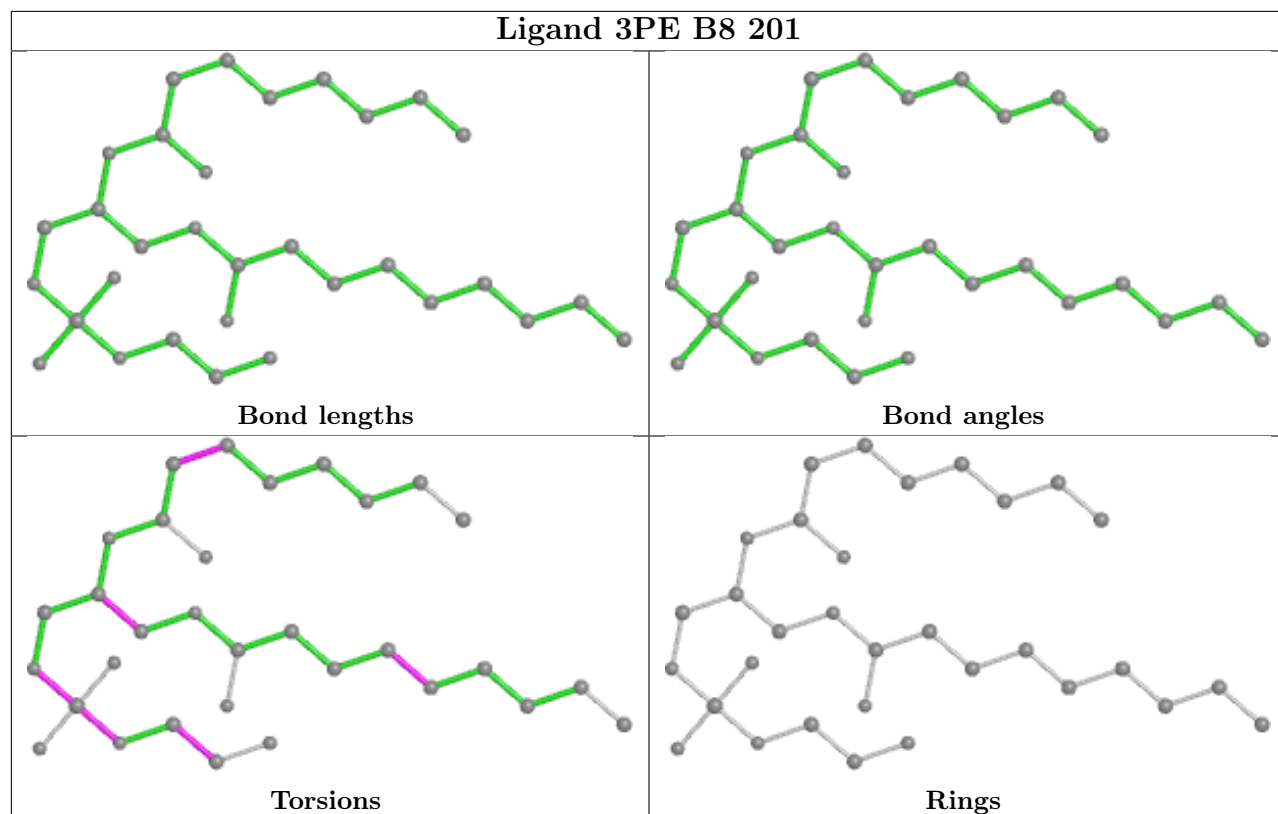
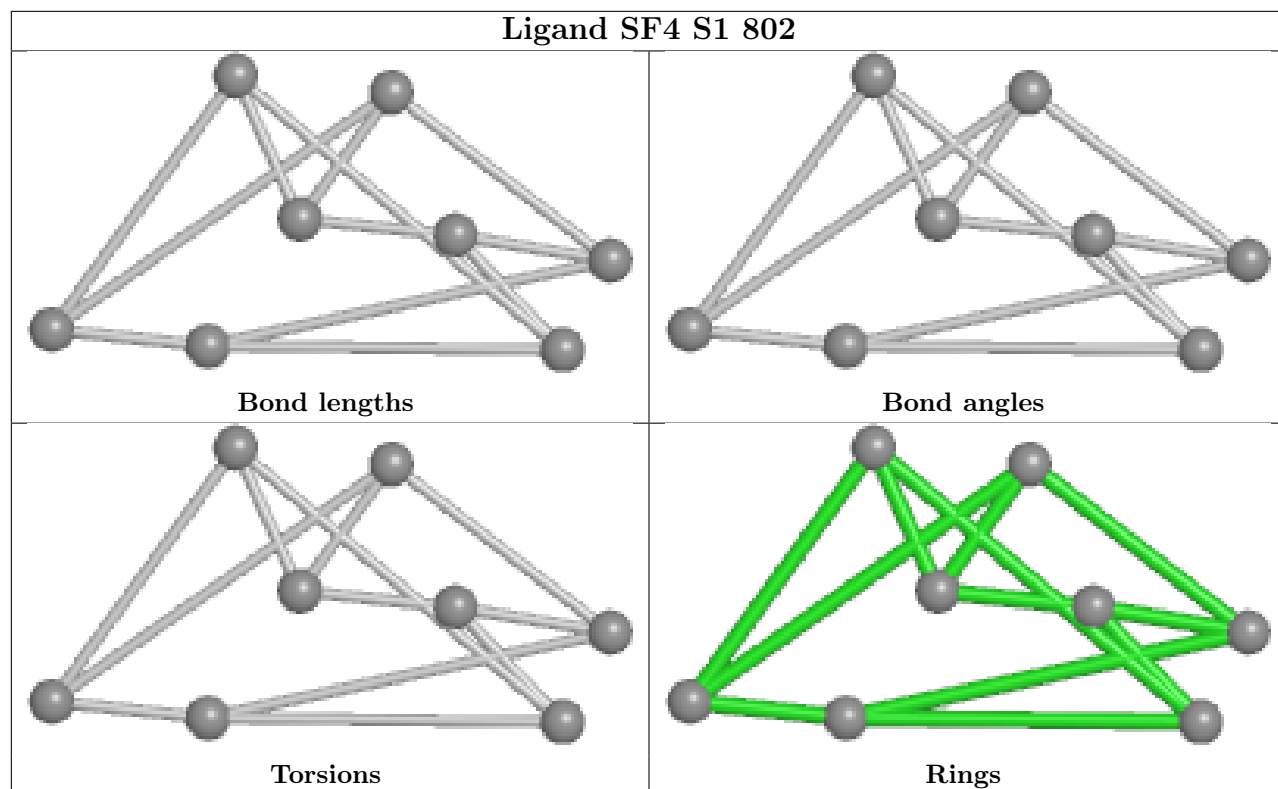


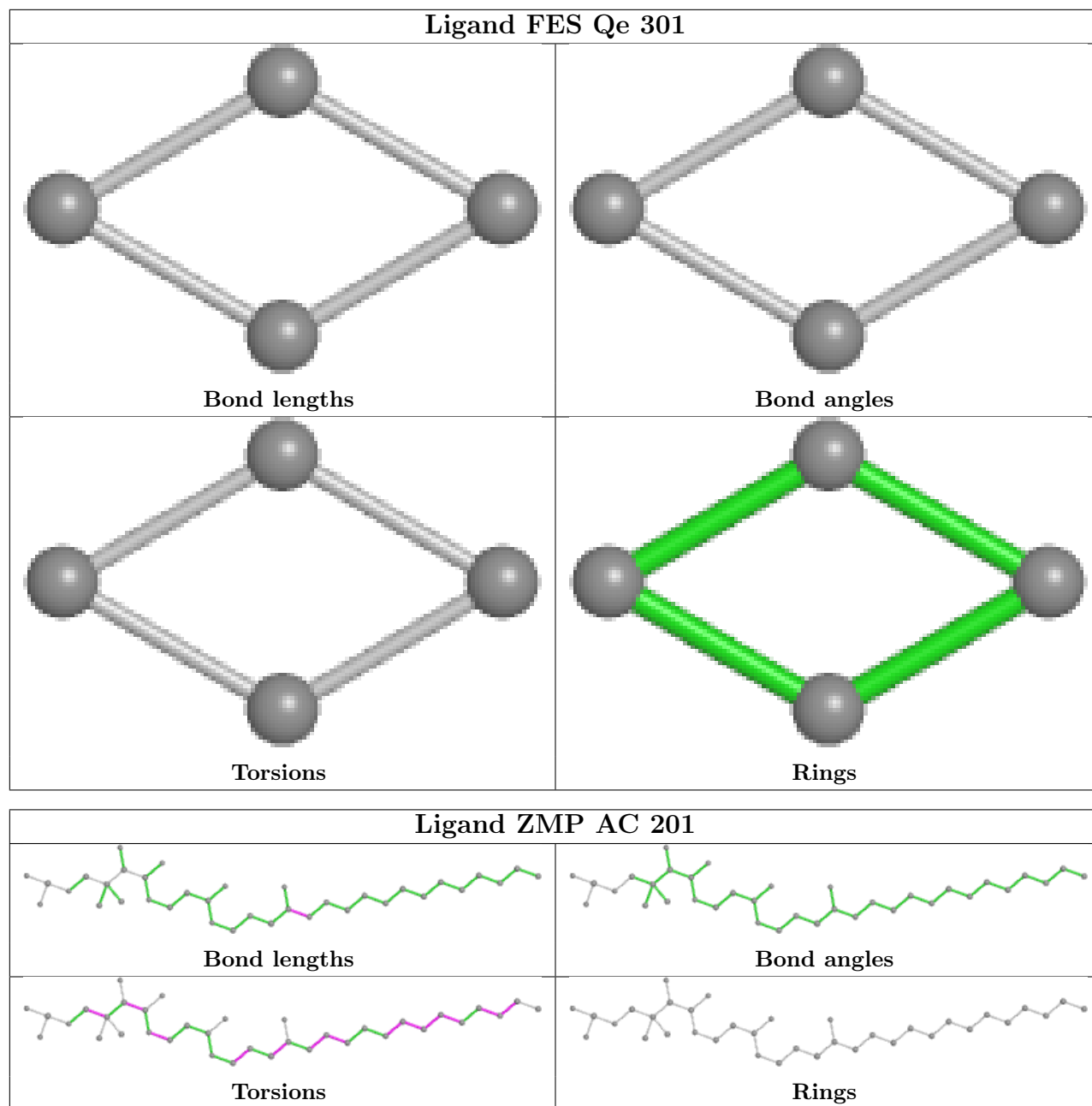


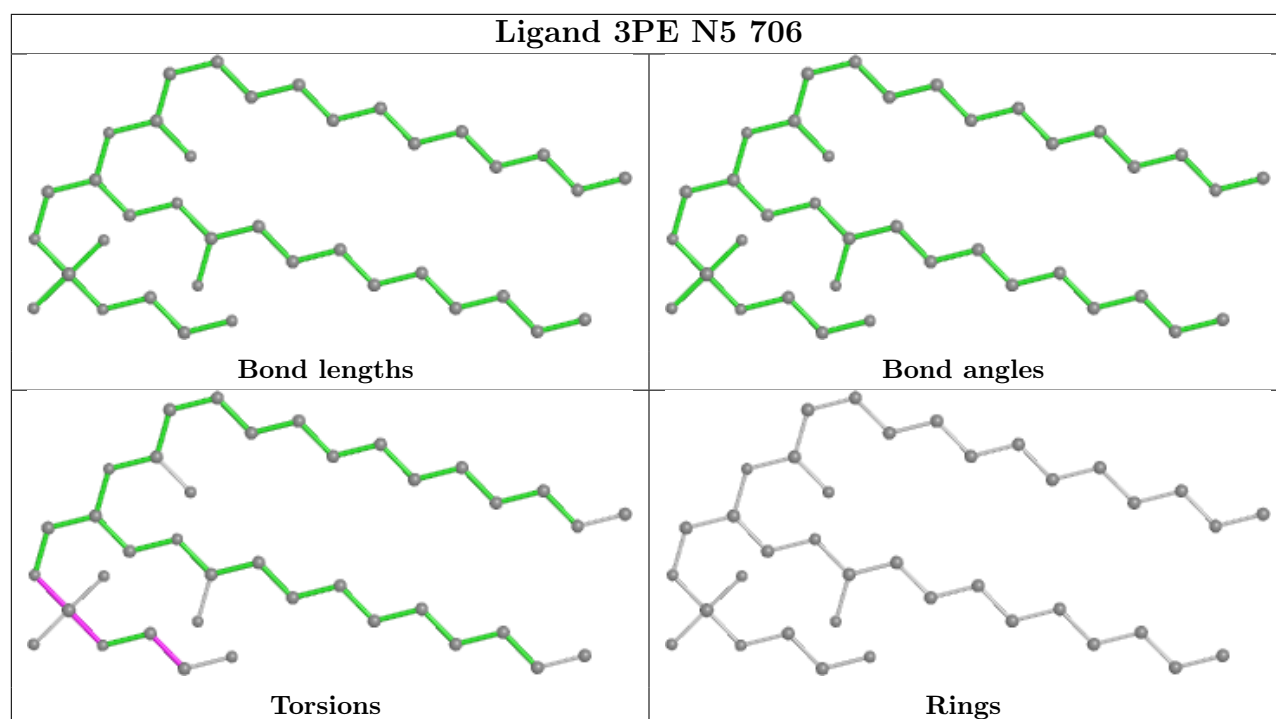












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

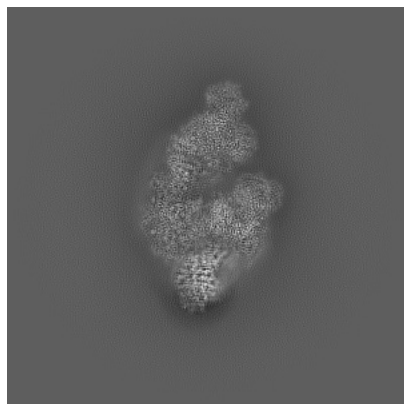
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-60421. These allow visual inspection of the internal detail of the map and identification of artifacts.

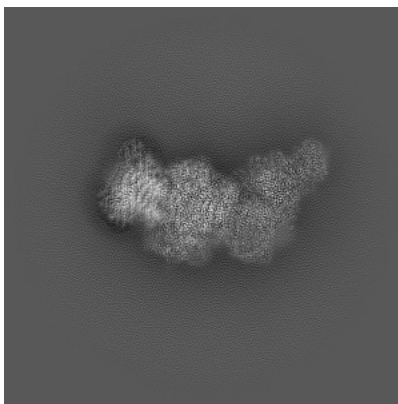
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

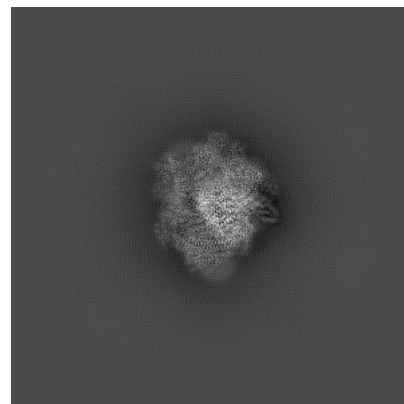
#### 6.1.1 Primary map



X

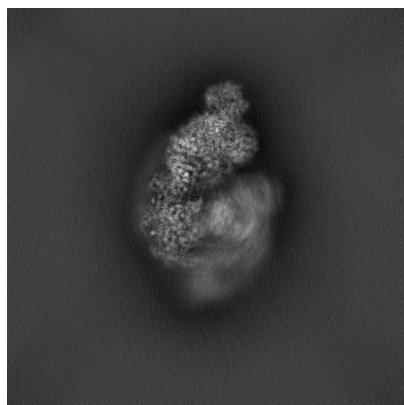


Y

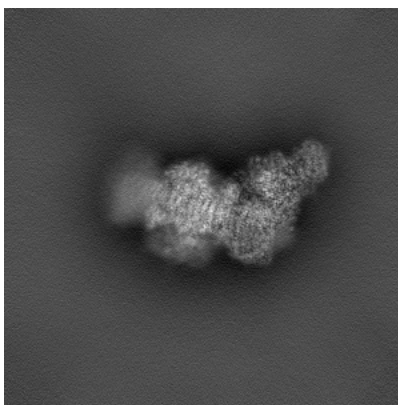


Z

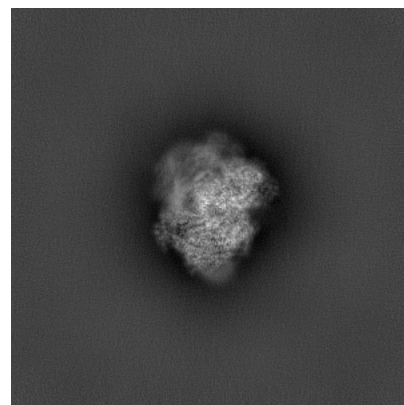
#### 6.1.2 Raw map



X



Y

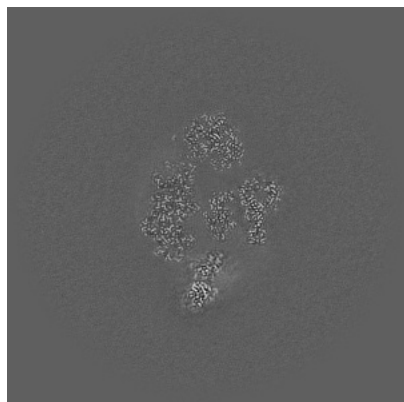


Z

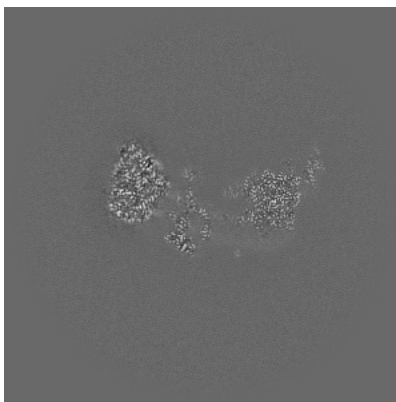
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

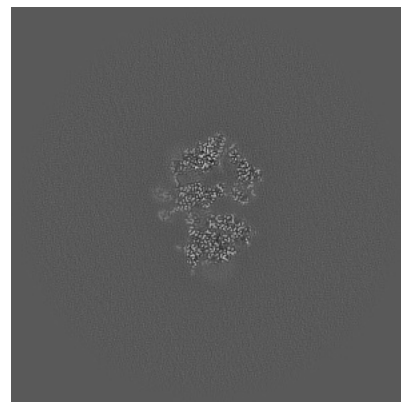
### 6.2.1 Primary map



X Index: 240

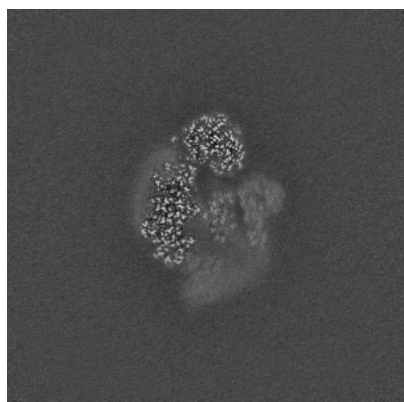


Y Index: 240

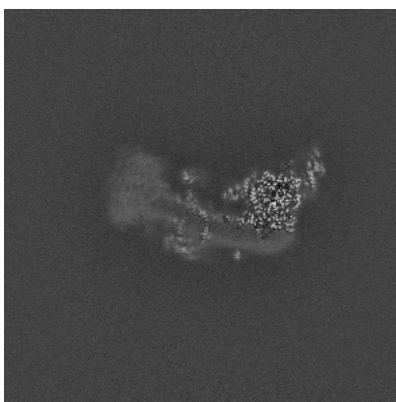


Z Index: 240

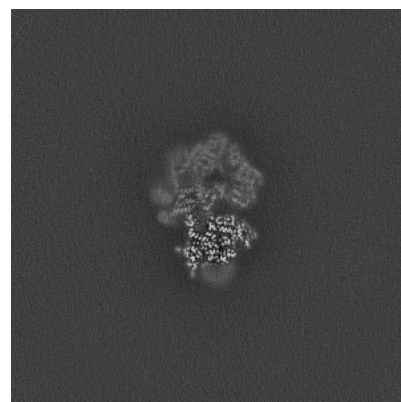
### 6.2.2 Raw map



X Index: 240



Y Index: 240

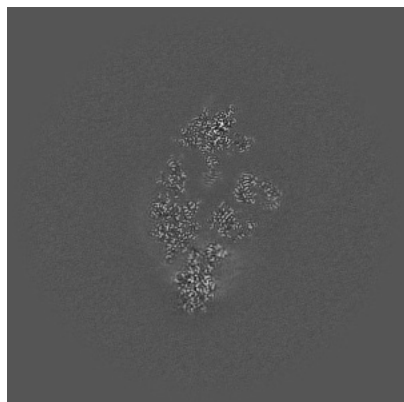


Z Index: 240

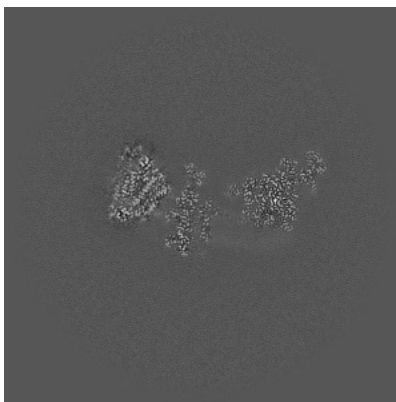
The images above show central slices of the map in three orthogonal directions.

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

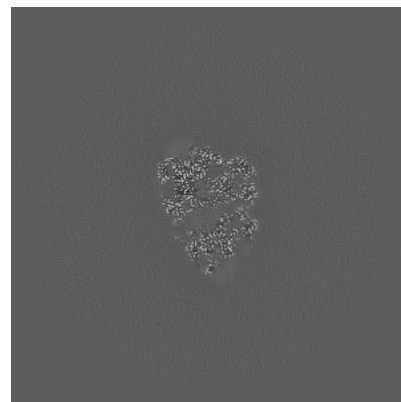
### 6.3.1 Primary map



X Index: 256

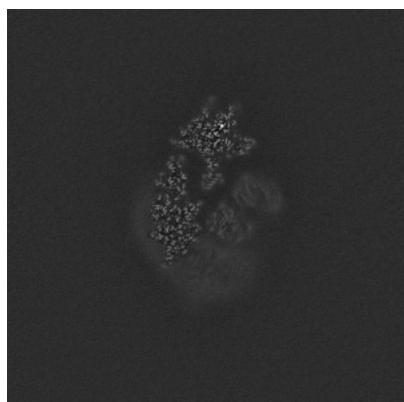


Y Index: 244

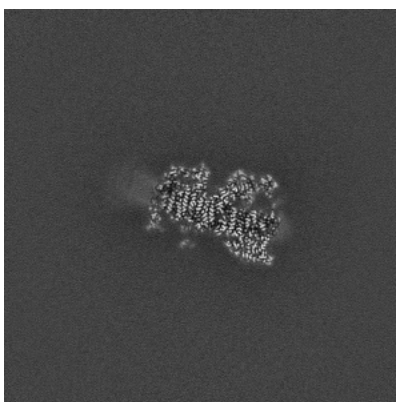


Z Index: 217

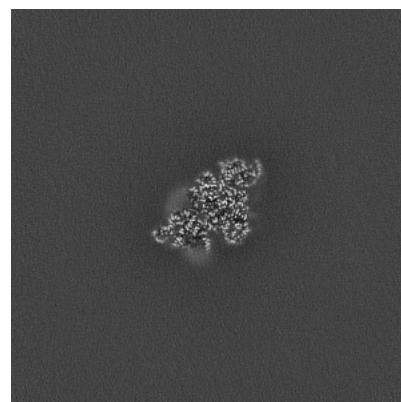
### 6.3.2 Raw map



X Index: 256



Y Index: 205



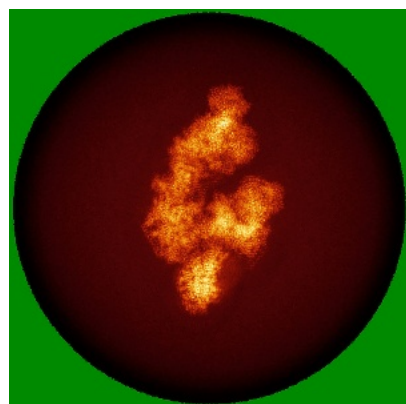
Z Index: 315

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

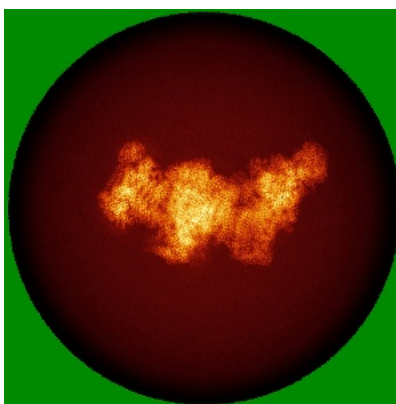


## 6.4 Orthogonal standard-deviation projections (False-color) [i](#)

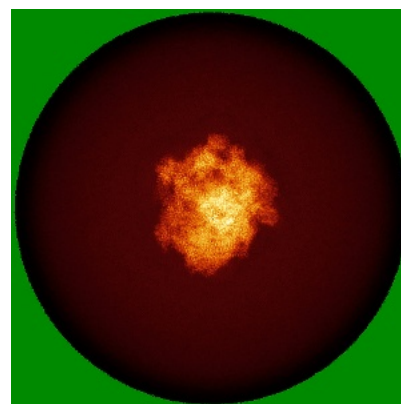
### 6.4.1 Primary map



X

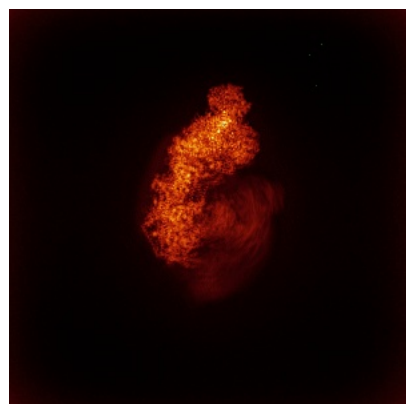


Y

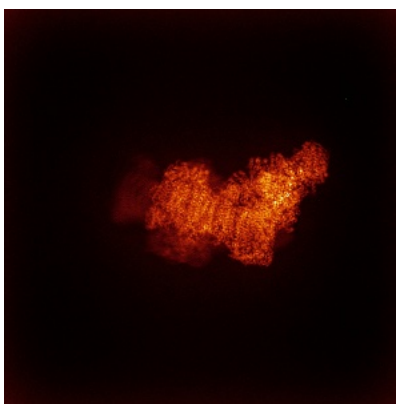


Z

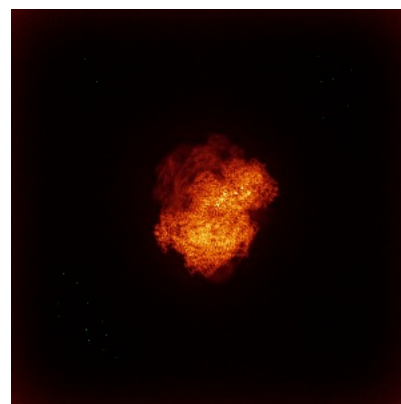
### 6.4.2 Raw map



X



Y

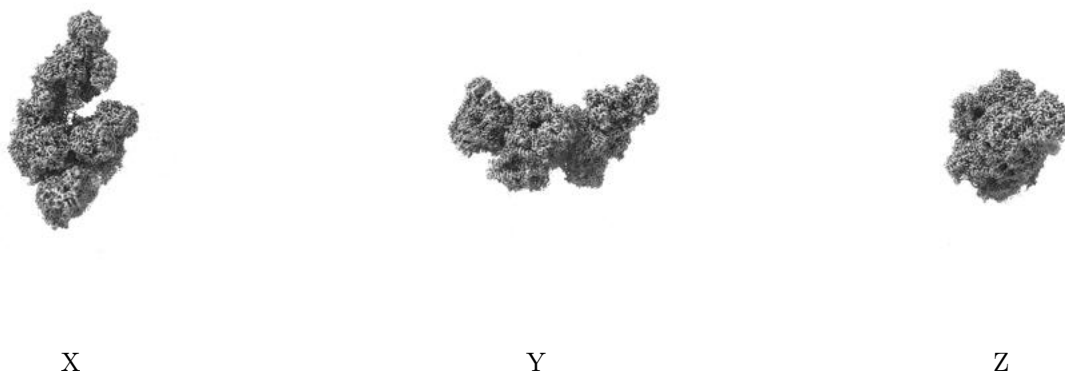


Z

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

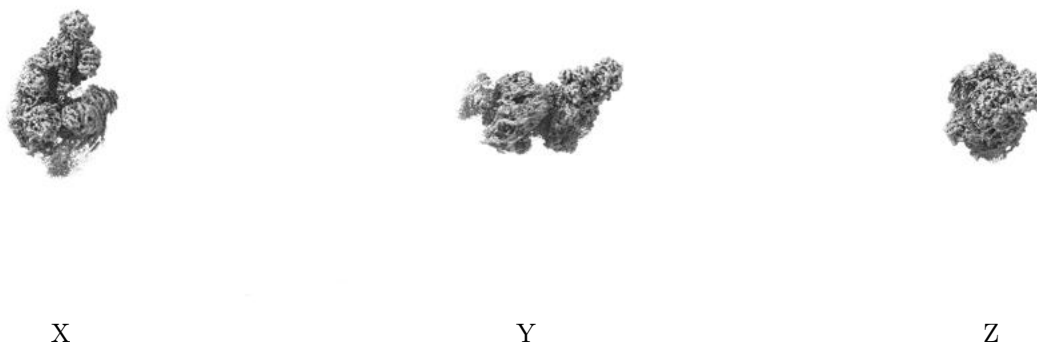
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 5.0. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.5.2 Raw map



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

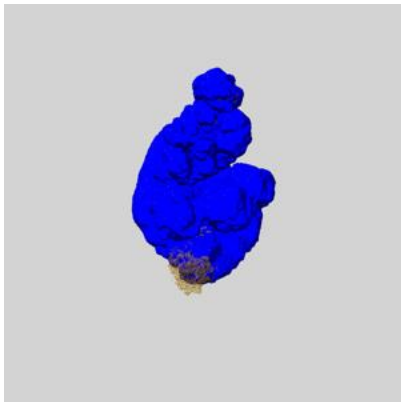
## 6.6 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

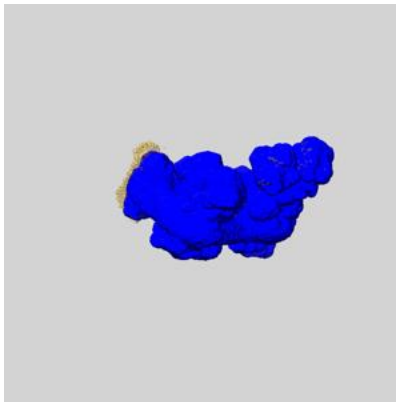
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

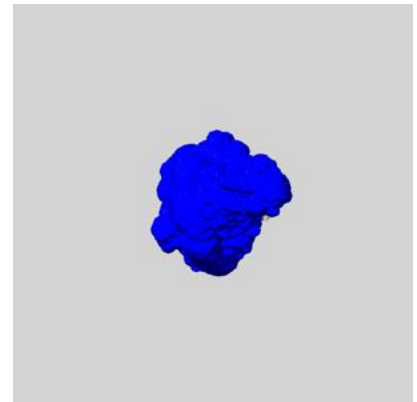
### 6.6.1 emd\_60421\_msk\_1.map [i](#)



X



Y

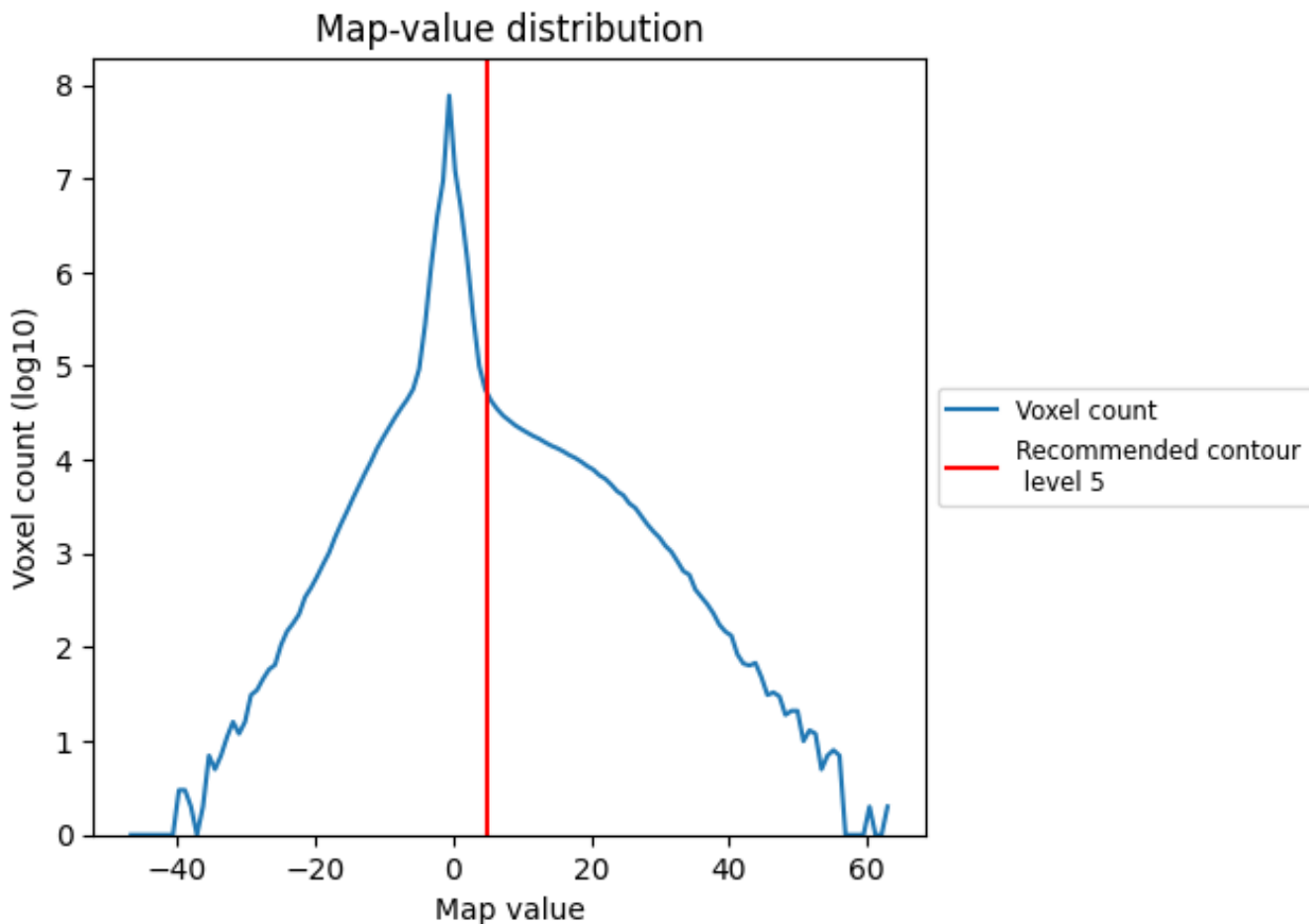


Z

## 7 Map analysis [i](#)

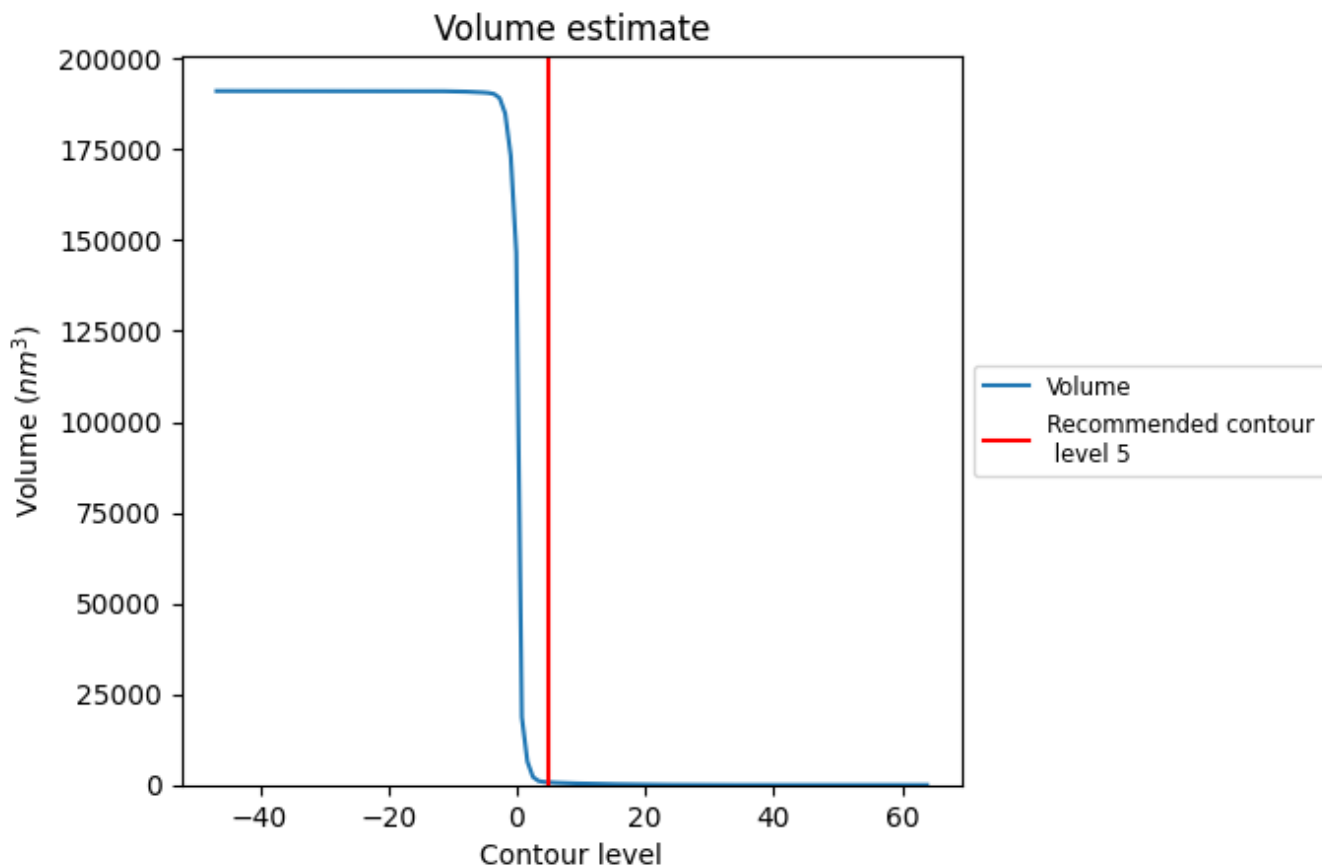
This section contains the results of statistical analysis of the map.

### 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.

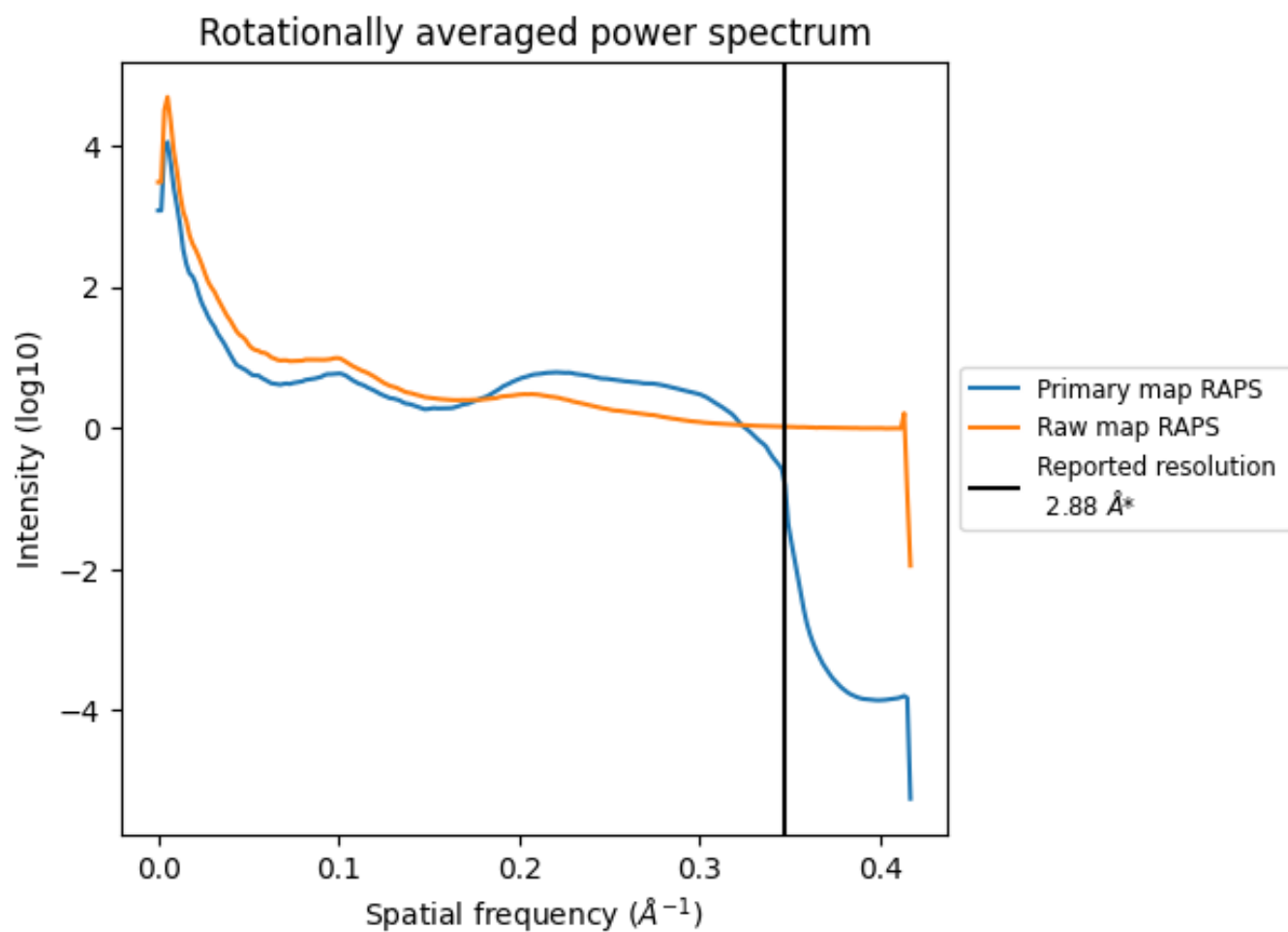
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 716 nm<sup>3</sup>; this corresponds to an approximate mass of 647 kDa.

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

### 7.3 Rotationally averaged power spectrum i

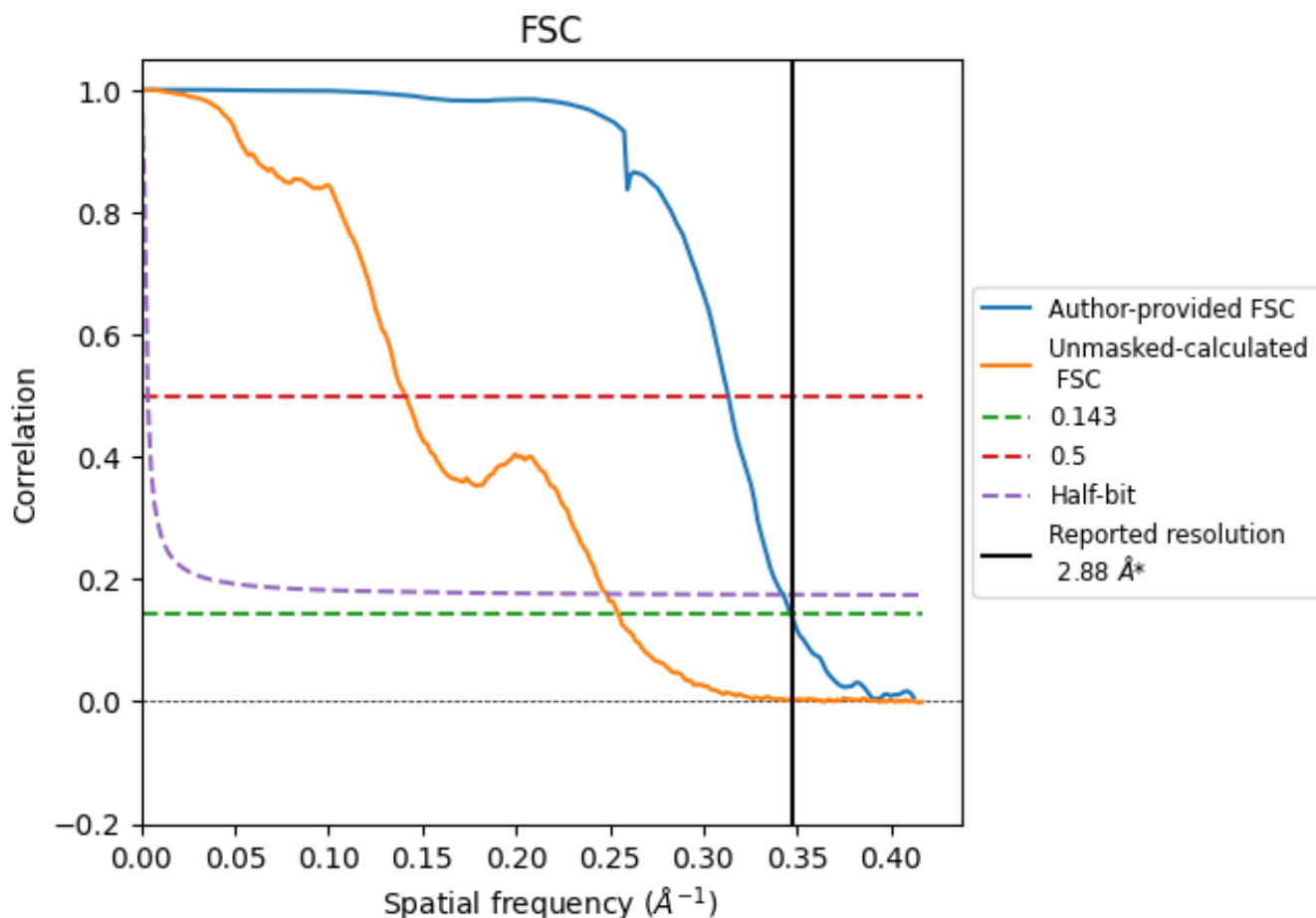


\*Reported resolution corresponds to spatial frequency of 0.347 Å<sup>-1</sup>

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

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

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of  $0.347 \text{\AA}^{-1}$

## 8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.88	-	-
Author-provided FSC curve	2.89	3.19	2.92
Unmasked-calculated*	3.93	7.10	4.03

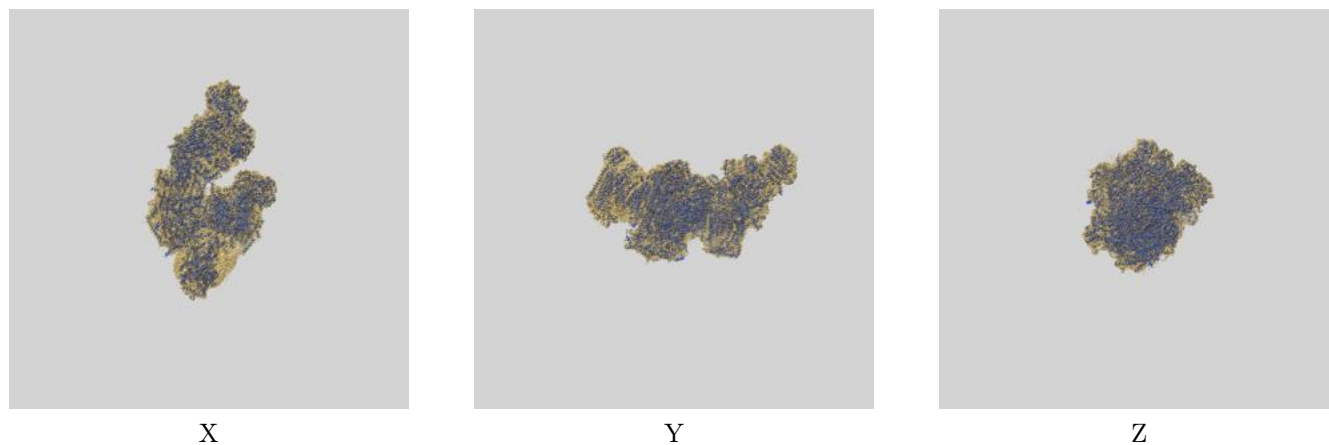
\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.93 differs from the reported value 2.88 by more than 10 %



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

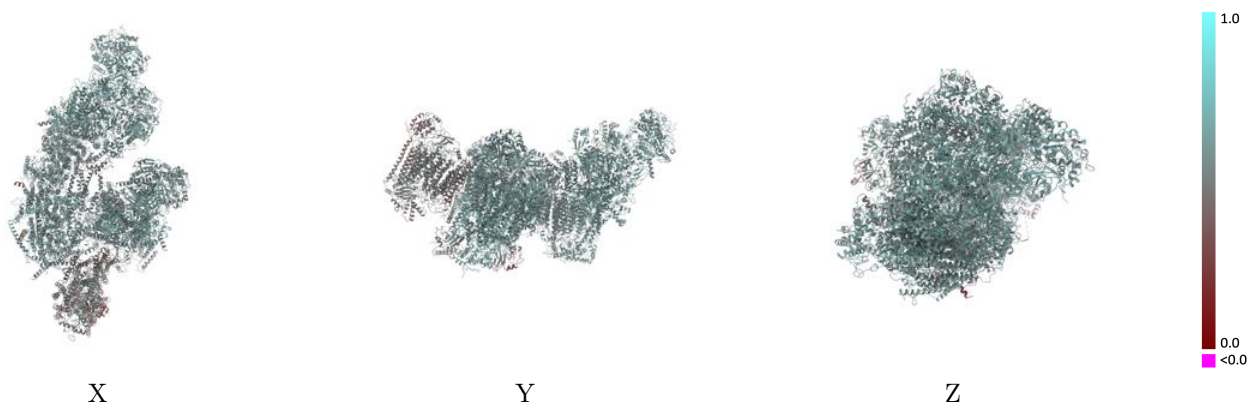
This section contains information regarding the fit between EMDB map EMD-60421 and PDB model 8ZSN. Per-residue inclusion information can be found in section [3](#) on page [30](#).

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



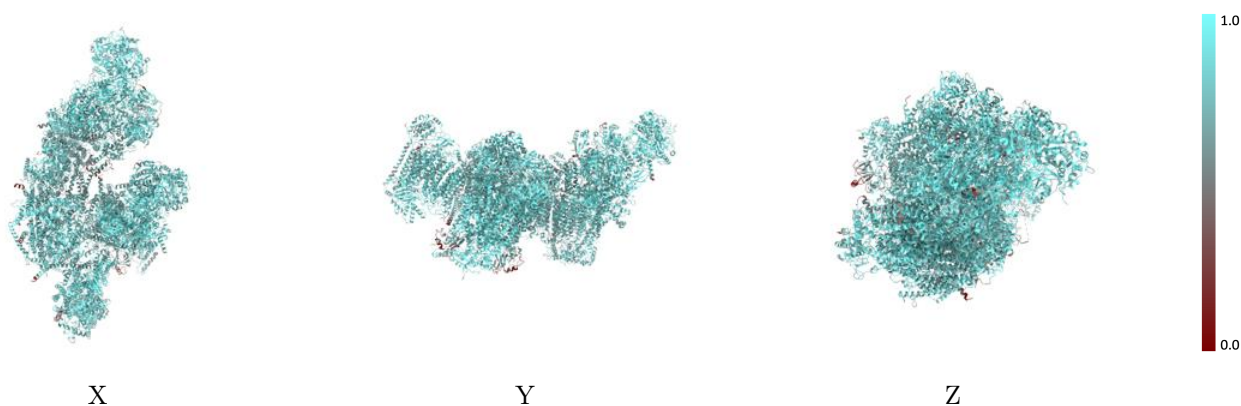
The images above show the 3D surface view of the map at the recommended contour level 5.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



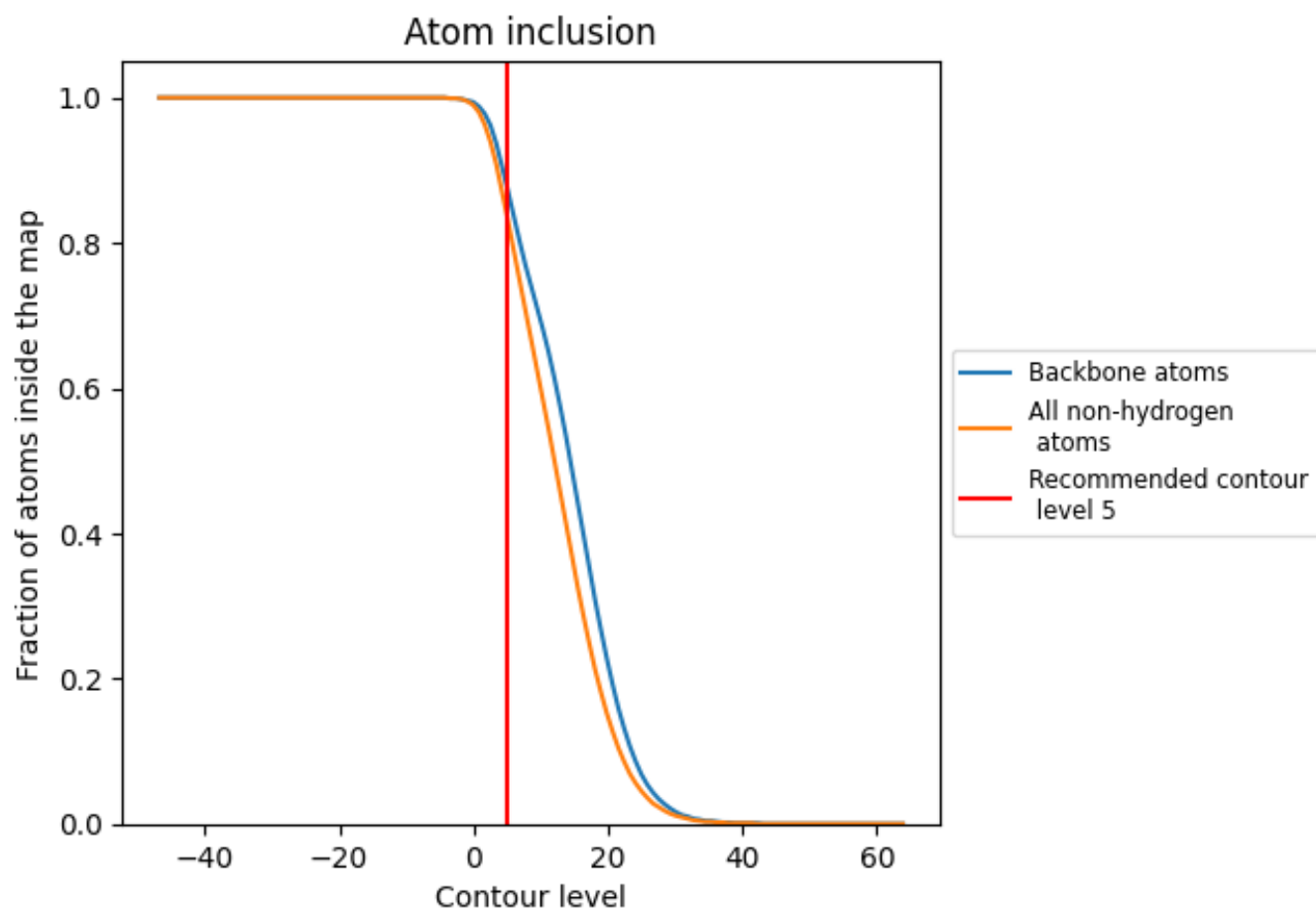
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

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



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (5).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 88% of all backbone atoms, 84% 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 (5) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8360	 0.5670
4L	 0.8320	 0.5910
5A	 0.7580	 0.4290
5B	 0.8440	 0.4410
6A	 0.8670	 0.4580
6B	 0.8750	 0.4400
6C	 0.7060	 0.4420
7A	 0.7560	 0.4210
7B	 0.5610	 0.4390
7C	 0.8920	 0.4830
8B	 0.8250	 0.4710
A1	 0.8580	 0.5950
A2	 0.7710	 0.5700
A3	 0.8110	 0.5750
A5	 0.8060	 0.5810
A6	 0.8090	 0.5860
A7	 0.7690	 0.5660
A8	 0.8270	 0.5880
A9	 0.8570	 0.5960
AB	 0.5740	 0.4850
AC	 0.8440	 0.5780
AK	 0.7820	 0.5590
AL	 0.7140	 0.5670
AM	 0.8010	 0.5860
AN	 0.8170	 0.5810
B1	 0.7260	 0.5310
B2	 0.8140	 0.5720
B3	 0.7570	 0.5410
B4	 0.8350	 0.5810
B5	 0.8620	 0.5980
B6	 0.7710	 0.5350
B7	 0.8020	 0.5510
B8	 0.8410	 0.5850
B9	 0.8460	 0.5860
BK	 0.8310	 0.5800









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Chain	Atom inclusion	Q-score
BL	0.8290	0.5720
C1	0.8910	0.5040
C2	0.8580	0.4780
C3	0.8700	0.4750
C4	0.7870	0.4500
CA	0.7320	0.5710
CB	0.8510	0.5870
N1	0.8470	0.5940
N2	0.8870	0.5990
N3	0.7770	0.5890
N4	0.8770	0.5940
N5	0.8600	0.5910
N6	0.7830	0.5590
QA	0.8670	0.5770
QB	0.8530	0.5800
QC	0.8900	0.5960
QD	0.8740	0.5850
QE	0.6060	0.5110
QF	0.7330	0.5180
QG	0.8490	0.5810
QH	0.8350	0.5740
QI	0.8390	0.5780
QJ	0.7340	0.5490
QK	0.7470	0.5590
Qa	0.8610	0.5790
Qb	0.8690	0.5830
Qc	0.8800	0.5900
Qd	0.8940	0.5950
Qe	0.6060	0.4870
Qf	0.7540	0.5370
Qg	0.8190	0.5740
Qh	0.7890	0.5740
Qi	0.8320	0.5720
Qj	0.7970	0.5620
S1	0.8530	0.5890
S2	0.8800	0.6060
S3	0.9200	0.6210
S4	0.8470	0.6040
S5	0.7870	0.5730
S6	0.8280	0.5920
S7	0.8920	0.6080
S8	0.9180	0.6170

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Chain	Atom inclusion	Q-score
V1	 0.8480	 0.5840
V2	 0.8290	 0.5760
V3	 0.7990	 0.5690