



## wwPDB EM Validation Summary Report ⓘ

Nov 24, 2024 – 03:33 AM JST

PDB ID : 8IAO  
EMDB ID : EMD-35313  
Title : Respiratory complex CI:CIII2, type I, Wild type mouse under thermoneutral temperature  
Authors : Shin, Y.-C.; Liao, M.  
Deposited on : 2023-02-09  
Resolution : 4.20 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

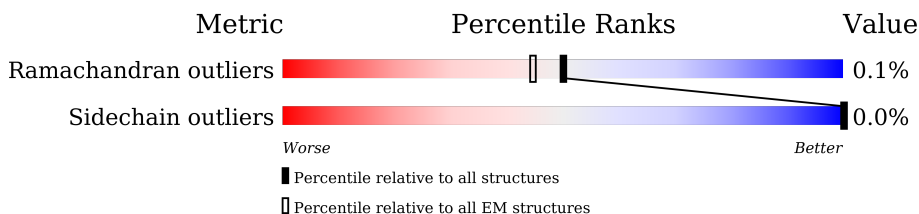
EMDB validation analysis : 0.0.1.dev113  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.40

# 1 Overall quality at a glance

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

The reported resolution of this entry is 4.20 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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

Mol	Chain	Length	Quality of chain
1	A	115	
2	B	224	
3	C	263	
4	D	463	
5	E	248	
6	F	464	
7	G	727	
8	H	318	
9	I	212	

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Mol	Chain	Length	Quality of chain
10	J	172	27% 97%
11	K	98	97%
12	L	607	97%
13	M	459	97%
14	N	345	98%
15	O	355	11% 87% 10%
16	P	377	47% 89% 10%
17	Q	175	23% 65% 33%
18	R	116	24% 72% 28%
19	S	99	48% 83% 16%
20	T	156	36% 47% 52%
20	U	156	54% 44%
21	V	116	23% 93%
22	W	131	35% 86% 13%
23	X	172	98%
24	Y	143	6% 98%
25	Z	144	6% 97%
26	a	70	96%
27	b	84	5% 93% 6%
28	c	76	12% 59% 38%
29	d	120	12% 99%
30	e	106	95%
31	f	57	11% 91% 9%
32	g	151	66% 33%
33	h	189	73% 27%

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Mol	Chain	Length	Quality of chain
34	i	128	7% 77% 22%
35	j	105	6% 65% 35%
36	k	104	5% 70% 27%
37	l	186	83% 16%
38	m	129	97%
39	n	179	97%
40	o	137	18% 89% 10%
41	p	176	6% 97%
42	q	145	28% 94%
43	r	113	35% 83% 16%
44	s	104	14% 21% 79%
45	AA	480	32% 84% 16%
45	Aa	480	85% 14%
46	AB	453	40% 92% 8%
46	Ab	453	12% 91% 9%
47	AC	381	39% 97%
47	Ac	381	18% 98%
48	AD	325	30% 74% 26%
48	Ad	325	25% 74% 26%
49	AE	274	52% 68% 31%
49	AI	274	10% 10% 89%
49	Ae	274	47% 68% 31%
49	Ai	274	8% 10% 90%
50	AF	111	16% 88% 12%
50	Af	111	18% 88% 12%

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Mol	Chain	Length	Quality of chain
51	AG	82	<p>48% 93% 7%</p>
51	Ag	82	<p>20% 93% 7%</p>
52	AH	89	<p>36% 76% 24%</p>
52	Ah	89	<p>30% 76% 24%</p>
53	AJ	64	<p>39% 64% 36%</p>
53	Aj	64	<p>41% 75% 25%</p>
54	AK	56	<p>70% 86% 12%</p>
54	Ak	56	<p>70% 88% 12%</p>

## 2 Entry composition

There are 70 unique types of molecules in this entry. The entry contains 98999 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 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	92	754	523	107	119	5	0	0

- Molecule 2 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 7, mitochondrial.

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	198	1641	1060	279	299	3	0	0

- Molecule 4 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	424	3416	2184	587	621	24	0	0

- Molecule 5 is a protein called NADH dehydrogenase [ubiquinone] flavoprotein 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E	210	1635	1039	275	310	11	0	0

- Molecule 6 is a protein called NADH dehydrogenase [ubiquinone] flavoprotein 1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	F	426	3288	2073	588	605	22	0	0

- Molecule 7 is a protein called NADH-ubiquinone oxidoreductase 75 kDa subunit, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	G	687	5287	3316	918	1012	41	0	0

- Molecule 8 is a protein called NADH-ubiquinone oxidoreductase chain 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	H	317	2532	1702	383	425	22	0	0

- Molecule 9 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 8, mitochondrial.

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

- Molecule 10 is a protein called NADH-ubiquinone oxidoreductase chain 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	J	169	1287	866	183	223	15	0	0

- Molecule 11 is a protein called NADH-ubiquinone oxidoreductase chain 4L.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	K	97	729	473	111	135	10	0	0

- Molecule 12 is a protein called NADH-ubiquinone oxidoreductase chain 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	L	606	4798	3181	746	826	45	0	0

- Molecule 13 is a protein called NADH-ubiquinone oxidoreductase chain 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	M	459	3630	2407	567	616	40	0	0

- Molecule 14 is a protein called NADH-ubiquinone oxidoreductase chain 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	N	344	2694	1790	416	451	37	0	0

- Molecule 15 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 10, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	O	319	2599	1668	430	491	10	0	0

- Molecule 16 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 9, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	P	339	2720	1759	476	478	7	0	0

- Molecule 17 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 4, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	Q	118	957	608	165	180	4	0	0

- Molecule 18 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 6, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	R	83	660	411	120	126	3	0	0

- Molecule 19 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	S	83	667	419	126	119	3	0	0



- Molecule 20 is a protein called Acyl carrier protein, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	T	75	604	388	89	122	5	0	0
20	U	87	700	450	103	142	5	0	0

- Molecule 21 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	V	112	915	596	152	164	3	0	0

- Molecule 22 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 6.

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

- Molecule 23 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	X	169	1385	882	248	245	10	0	0

- Molecule 24 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 11.

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

- Molecule 25 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
25	Z	139	1152	741	204	199	8	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
26	a	67	548	356	97	91	4	0	0

- Molecule 27 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
27	b	79	620	408	98	110	4	0	0

- Molecule 28 is a protein called NADH dehydrogenase [ubiquinone] 1 subunit C1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
28	c	47	389	255	67	66	1	0	0

- Molecule 29 is a protein called NADH dehydrogenase [ubiquinone] 1 subunit C2.

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

- Molecule 30 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
30	e	103	859	544	157	150	8	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	f	52	447	290	80	75	2	0	0

- Molecule 32 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 11, mitochondrial.

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

- Molecule 33 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 5, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	h	138	1162	762	194	203	3	0	0

- Molecule 34 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	i	100	839	546	146	144	3	0	0

- Molecule 35 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	j	68	578	378	96	103	1	0	0

- Molecule 36 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	k	76	618	410	105	101	2	0	0

- Molecule 37 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 8, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
37	l	156	1312	846	219	236	11	0	0

- Molecule 38 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 4.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
38	m	125	1044	673	188	183	0	0

- Molecule 39 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 9.

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
40	o	123	1050	661	198	182	9	0	0

- Molecule 41 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
41	p	172	1452	911	260	273	8	0	0

- Molecule 42 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 12.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
42	q	143	1192	766	212	210	4	0	0

- Molecule 43 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
43	r	95	764	482	143	136	3	0	0

- Molecule 44 is a protein called NADH dehydrogenase [ubiquinone] flavoprotein 3, mitochondrial.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
44	s	22	189	124	29	36	0	0

- Molecule 45 is a protein called Cytochrome b-c1 complex subunit 1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
45	AA	403	3153	1970	560	607	16	0	0

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Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
45	Aa	412	3225	2016	569	624	16	0	0

- Molecule 46 is a protein called Cytochrome b-c1 complex subunit 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
46	AB	418	3137	1970	552	606	9	0	0
46	Ab	412	3094	1945	542	598	9	0	0

- Molecule 47 is a protein called Cytochrome b.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
47	AC	373	2988	2018	461	489	20	0	0
47	Ac	373	2988	2018	461	489	20	0	0

- Molecule 48 is a protein called Cytochrome c1, heme protein, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
48	AD	240	1912	1221	328	349	14	0	0
48	Ad	240	1912	1221	328	349	14	0	0

- Molecule 49 is a protein called Cytochrome b-c1 complex subunit Rieske, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
49	AE	188	1451	916	254	274	7	0	0
49	AI	30	217	138	42	37		0	0
49	Ae	188	1451	916	254	274	7	0	0
49	Ai	28	207	133	40	34		0	0

- Molecule 50 is a protein called Cytochrome b-c1 complex subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	AF	98	Total	C	N	O	S	0	0
			864	552	154	155	3		
50	Af	98	Total	C	N	O	S	0	0
			864	552	154	155	3		

- Molecule 51 is a protein called Cytochrome b-c1 complex subunit 8.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	AG	76	Total	C	N	O	S	0	0
			643	418	116	108	1		
51	Ag	76	Total	C	N	O	S	0	0
			643	418	116	108	1		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
52	AH	68	Total	C	N	O	S	0	0
			562	343	103	111	5		
52	Ah	68	Total	C	N	O	S	0	0
			562	343	103	111	5		

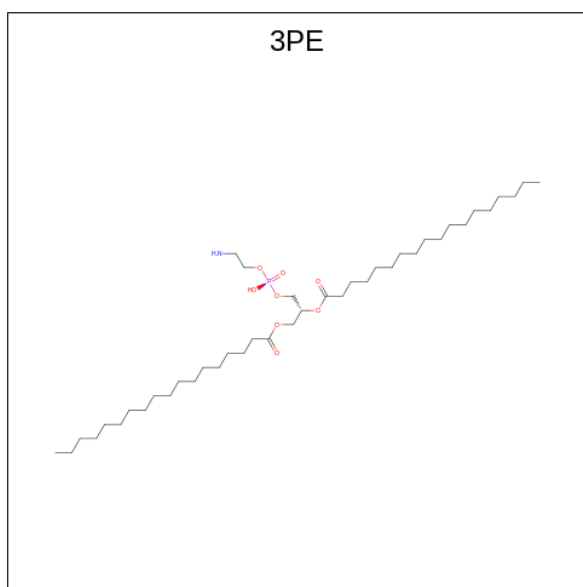
- Molecule 53 is a protein called Cytochrome b-c1 complex subunit 9.

Mol	Chain	Residues	Atoms				AltConf	Trace
53	AJ	41	Total	C	N	O	0	0
			332	216	57	59		
53	Aj	48	Total	C	N	O	0	0
			391	257	66	68		

- Molecule 54 is a protein called Cytochrome b-c1 complex subunit 10.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	AK	49	Total	C	N	O	S	0	0
			401	266	71	63	1		
54	Ak	49	Total	C	N	O	S	0	0
			401	266	71	63	1		

- Molecule 55 is 1,2-Distearoyl-sn-glycerophosphoethanolamine (three-letter code: 3PE) (formula: C<sub>41</sub>H<sub>82</sub>NO<sub>8</sub>P) (labeled as "Ligand of Interest" by depositor).



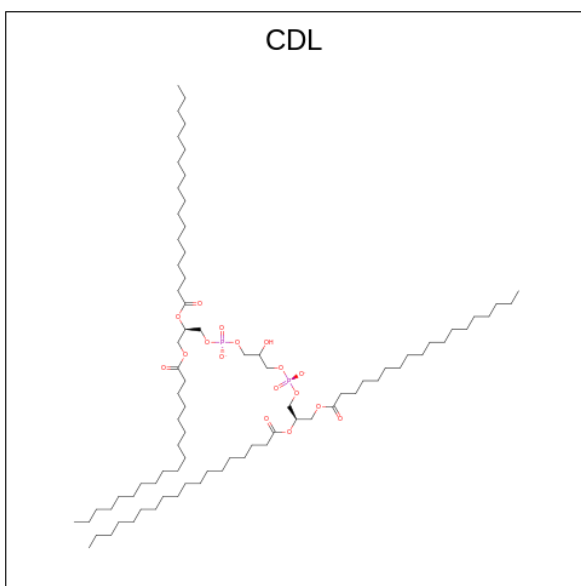
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
55	A	1	Total 46	36	1	8	1	0
55	H	1	Total 46	36	1	8	1	0
55	J	1	Total 46	36	1	8	1	0
55	L	1	Total 49	39	1	8	1	0
55	L	1	Total 38	28	1	8	1	0
55	M	1	Total 37	27	1	8	1	0
55	M	1	Total 51	41	1	8	1	0
55	Y	1	Total 39	29	1	8	1	0
55	b	1	Total 46	36	1	8	1	0
55	i	1	Total 40	30	1	8	1	0
55	m	1	Total 51	41	1	8	1	0
55	m	1	Total 41	31	1	8	1	0
55	AC	1	Total 23	13	1	8	1	0
55	AC	1	Total 35	25	1	8	1	0

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
55	AG	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	Aa	1	Total	C	N	O	P	0
			23	13	1	8	1	
55	Ac	1	Total	C	N	O	P	0
			35	25	1	8	1	
55	Ag	1	Total	C	N	O	P	0
			51	41	1	8	1	

- Molecule 56 is CARDIOLIPIN (three-letter code: CDL) (formula:  $C_{81}H_{156}O_{17}P_2$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	O	P	
56	A	1	Total	C	O	P	0
			92	73	17	2	
56	L	1	Total	C	O	P	0
			74	55	17	2	
56	M	1	Total	C	O	P	0
			79	60	17	2	
56	Y	1	Total	C	O	P	0
			81	62	17	2	
56	d	1	Total	C	O	P	0
			84	65	17	2	
56	h	1	Total	C	O	P	0
			93	74	17	2	
56	q	1	Total	C	O	P	0
			57	38	17	2	

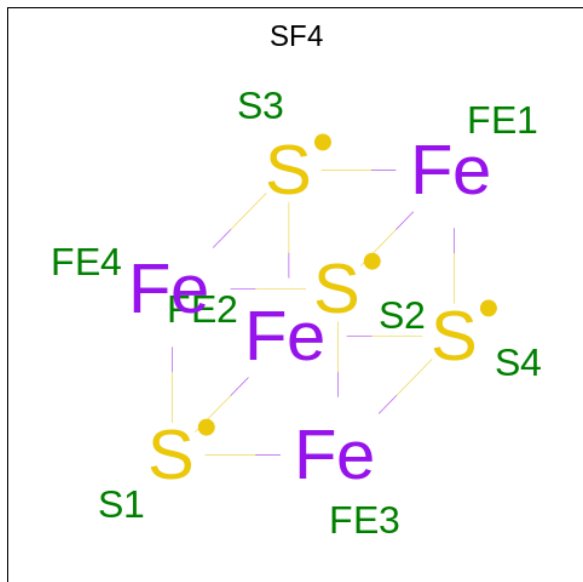
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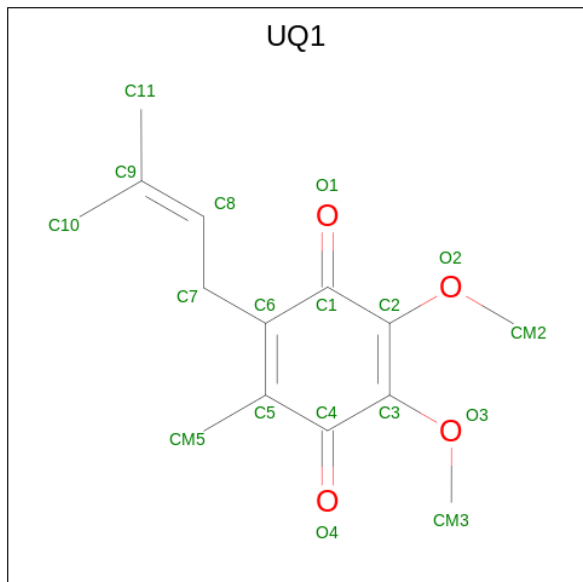
Mol	Chain	Residues	Atoms				AltConf
			Total	C	O	P	
56	AG	1	Total 42	C 23	O 17	P 2	0
56	AG	1	Total 56	C 37	O 17	P 2	0
56	Aa	1	Total 46	C 27	O 17	P 2	0
56	Ag	1	Total 42	C 23	O 17	P 2	0
56	Ag	1	Total 56	C 37	O 17	P 2	0

- Molecule 57 is IRON/SULFUR CLUSTER (three-letter code: SF4) (formula: Fe<sub>4</sub>S<sub>4</sub>) (labeled as "Ligand of Interest" by depositor).



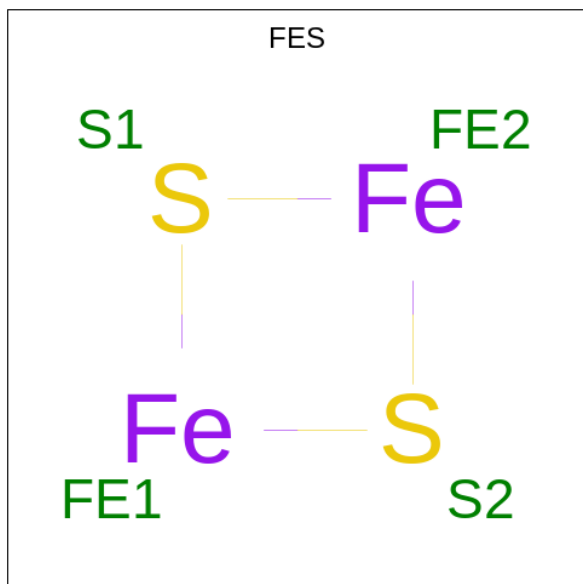
Mol	Chain	Residues	Atoms			AltConf
			Total	Fe	S	
57	B	1	Total 8	Fe 4	S 4	0
57	F	1	Total 8	Fe 4	S 4	0
57	G	1	Total 8	Fe 4	S 4	0
57	G	1	Total 8	Fe 4	S 4	0
57	I	1	Total 8	Fe 4	S 4	0
57	I	1	Total 8	Fe 4	S 4	0

- Molecule 58 is UBIQUINONE-1 (three-letter code: UQ1) (formula:  $C_{14}H_{18}O_4$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			AltConf
			Total	C	O	
58	D	1	18	14	4	0

- Molecule 59 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula:  $Fe_2S_2$ ) (labeled as "Ligand of Interest" by depositor).



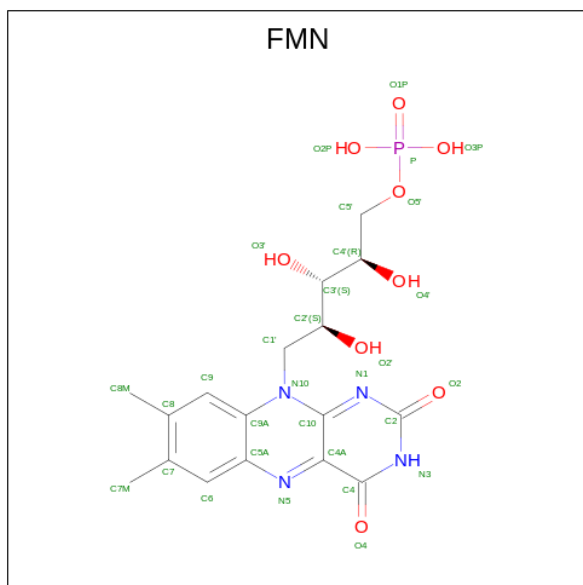
Mol	Chain	Residues	Atoms			AltConf
			Total	Fe	S	
59	E	1	4	2	2	0

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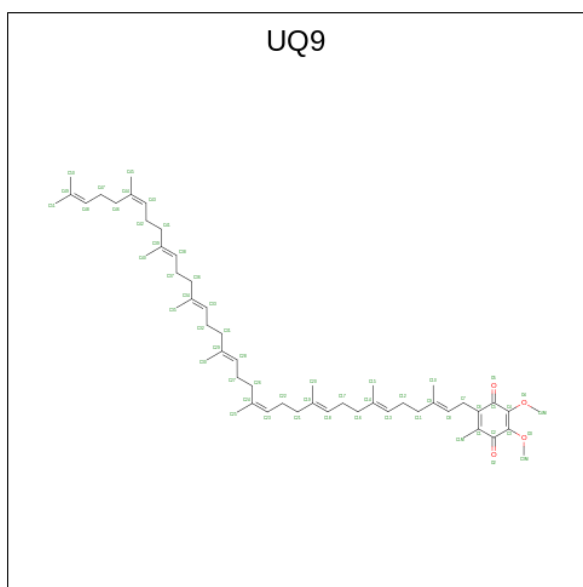
Mol	Chain	Residues	Atoms			AltConf
			Total	Fe	S	
59	G	1	4	2	2	0

- Molecule 60 is FLAVIN MONONUCLEOTIDE (three-letter code: FMN) (formula:  $C_{17}H_{21}N_4O_9P$ ) (labeled as "Ligand of Interest" by depositor).



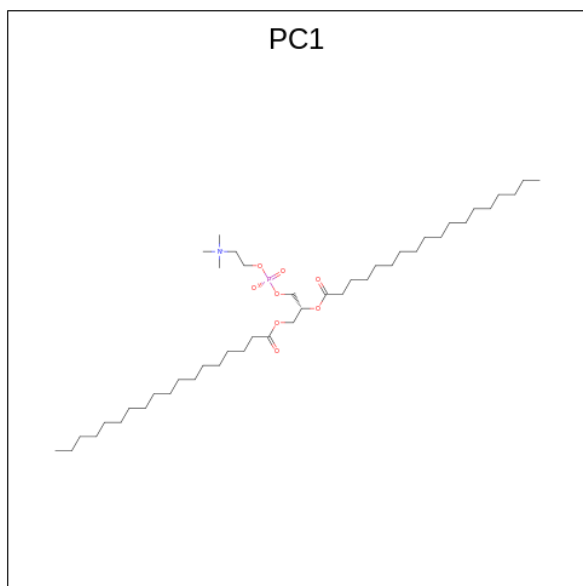
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
60	F	1	31	17	4	9	1	0

- Molecule 61 is Ubiquinone-9 (three-letter code: UQ9) (formula:  $C_{54}H_{82}O_4$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			AltConf
			Total	C	O	
61	H	1	35	31	4	0

- Molecule 62 is 1,2-DIACYL-SN-GLYCERO-3-PHOSPHOCHOLINE (three-letter code: PC1) (formula:  $C_{44}H_{88}NO_8P$ ) (labeled as "Ligand of Interest" by depositor).



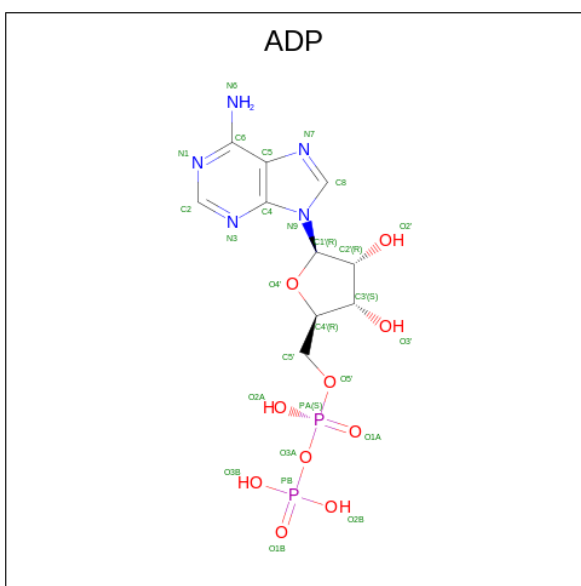
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
62	I	1	47	37	1	8	1	0
62	L	1	48	38	1	8	1	0

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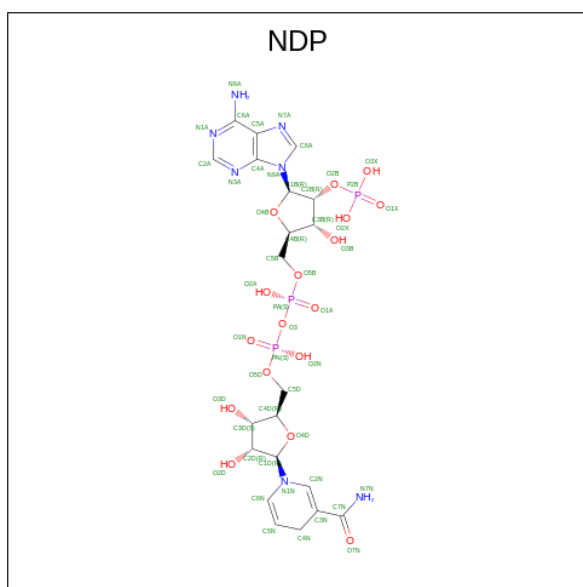
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
62	l	1	Total	C	N	O	P	0
			50	40	1	8	1	
62	q	1	Total	C	N	O	P	0
			35	25	1	8	1	
62	Ae	1	Total	C	N	O	P	0
			35	25	1	8	1	

- Molecule 63 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: 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	
63	O	1	Total	C	N	O	P	0
			27	10	5	10	2	

- Molecule 64 is NADPH DIHYDRO-NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NDP) (formula:  $C_{21}H_{30}N_7O_{17}P_3$ ) (labeled as "Ligand of Interest" by depositor).

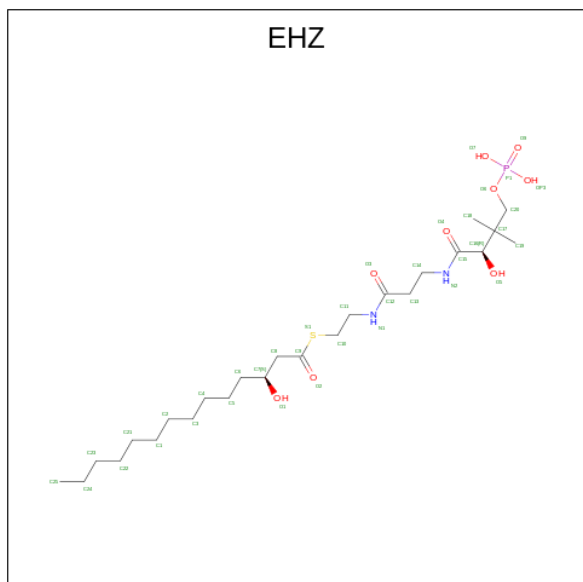


Mol	Chain	Residues	Atoms					AltConf
64	P	1	Total	C	N	O	P	0
			48	21	7	17	3	

- Molecule 65 is ZINC ION (three-letter code: ZN) (formula: Zn).

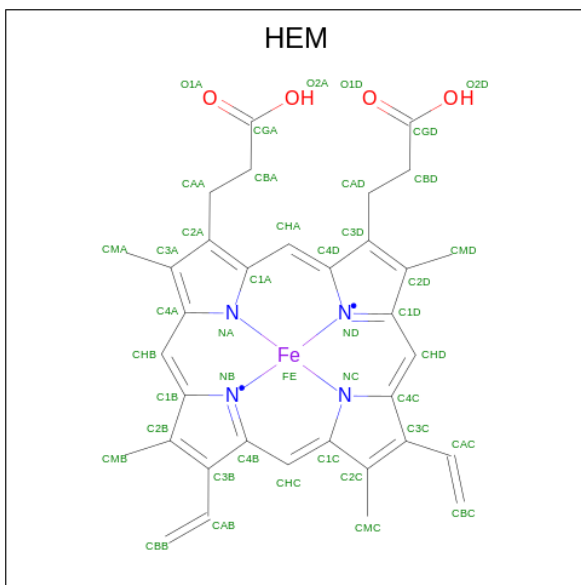
Mol	Chain	Residues	Atoms		AltConf
65	R	1	Total	Zn	0
			1	1	

- Molecule 66 is {S}-[2-[3-[(2 {R})-3,3-dimethyl-2-oxidanyl-4-phosphonoxy-butanoyl]amino]propanoylamino]ethyl] (3 {S})-3-oxidanyltetradecanethioate (three-letter code: EHZ) (formula: C<sub>25</sub>H<sub>49</sub>N<sub>2</sub>O<sub>9</sub>PS) (labeled as "Ligand of Interest" by depositor).



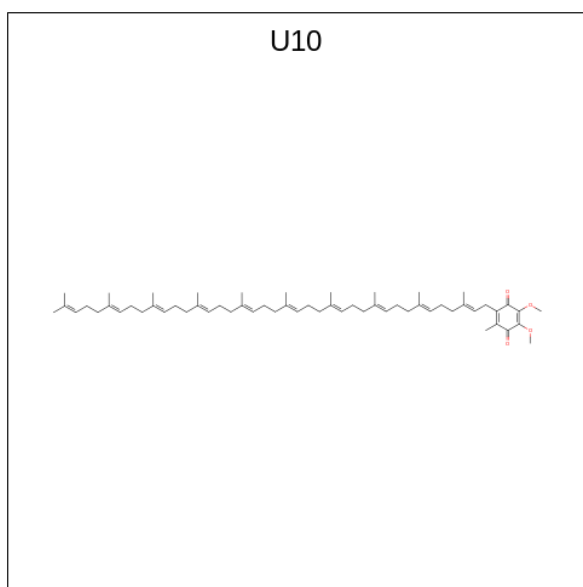
Mol	Chain	Residues	Atoms					AltConf	
66	W	1	Total	C	N	O	P	S	0
			32	19	2	9	1	1	
66	n	1	Total	C	N	O	P	S	0
			32	19	2	9	1	1	

- Molecule 67 is PROTOPORPHYRIN IX CONTAINING FE (three-letter code: HEM) (formula:  $C_{34}H_{32}FeN_4O_4$ ) (labeled as "Ligand of Interest" by depositor).



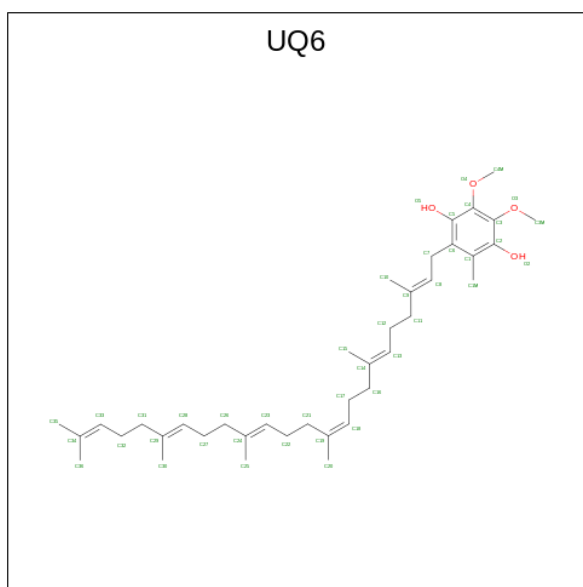
Mol	Chain	Residues	Atoms					AltConf
67	AC	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
67	AC	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
67	Ac	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
67	Ac	1	Total	C	Fe	N	O	0
			43	34	1	4	4	

- Molecule 68 is UBIQUINONE-10 (three-letter code: U10) (formula:  $C_{59}H_{90}O_4$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			AltConf
68	AC	1	Total	C	O	0
			23	19	4	
68	Ac	1	Total	C	O	0
			23	19	4	

- Molecule 69 is 5-(3,7,11,15,19,23-HEXAMETHYL-TETRACOSA-2,6,10,14,18,22-HEXAENYL)-2,3-DIMETHOXY-6-METHYL-BENZENE-1,4-DIOL (three-letter code: UQ6) (formula:  $C_{39}H_{60}O_4$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			AltConf
69	AC	1	Total	C	O	0
			28	24	4	

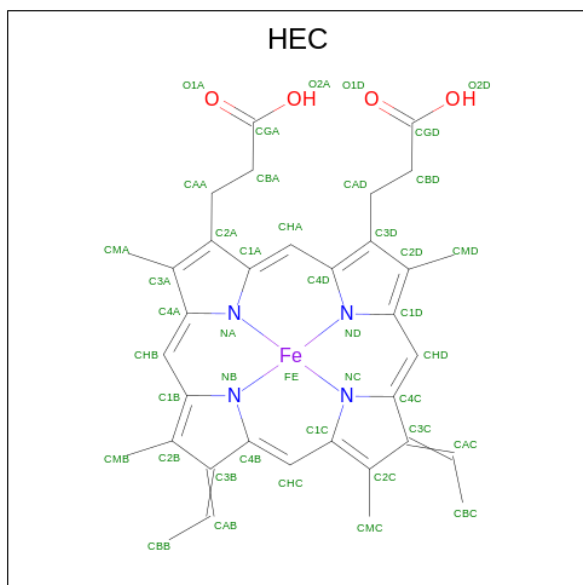
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Mol	Chain	Residues	Atoms			AltConf
			Total	C	O	
69	Ac	1	28	24	4	0

- Molecule 70 is HEME C (three-letter code: HEC) (formula:  $C_{34}H_{34}FeN_4O_4$ ) (labeled as "Ligand of Interest" by depositor).

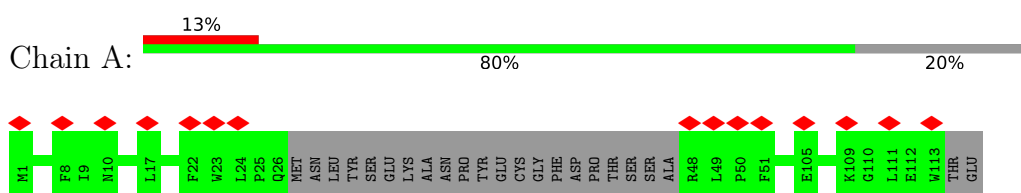


Mol	Chain	Residues	Atoms					AltConf
			Total	C	Fe	N	O	
70	AD	1	43	34	1	4	4	0
70	Ad	1	43	34	1	4	4	0

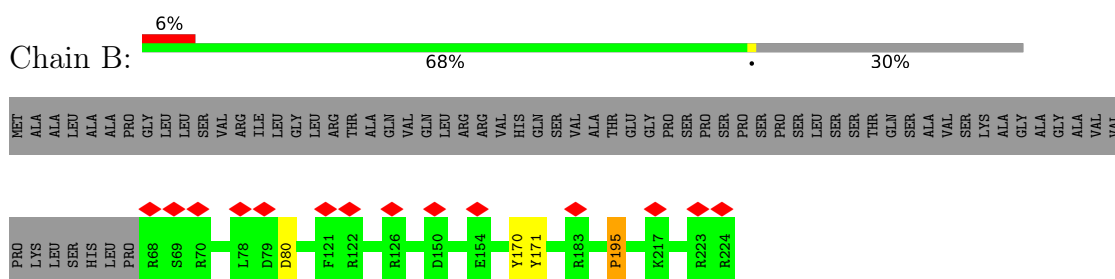
### 3 Residue-property plots [i](#)

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.

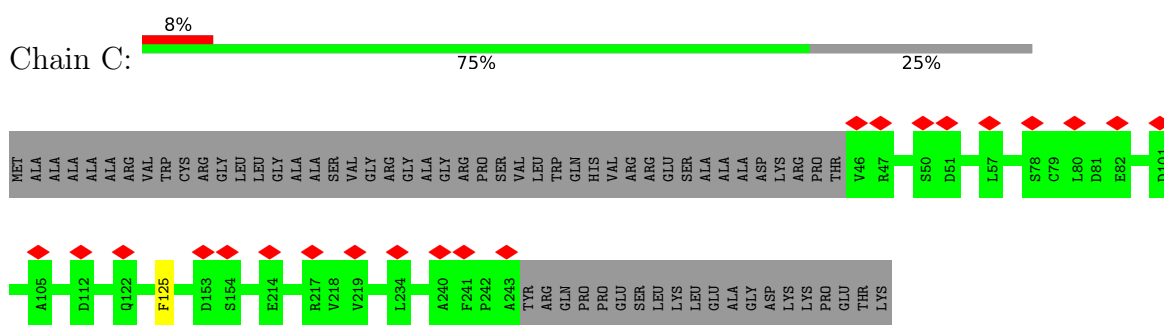
- Molecule 1: NADH-ubiquinone oxidoreductase chain 3



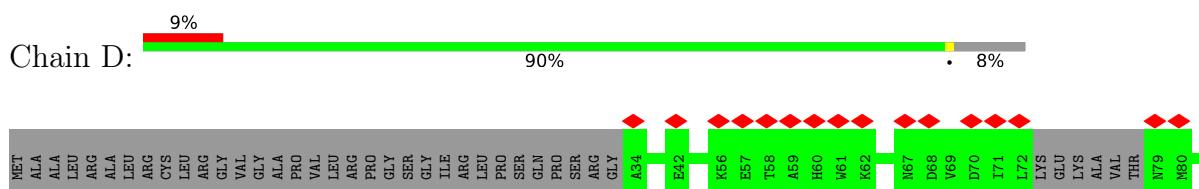
- Molecule 2: NADH dehydrogenase [ubiquinone] iron-sulfur protein 7, mitochondrial



- Molecule 3: NADH dehydrogenase [ubiquinone] iron-sulfur protein 3, mitochondrial

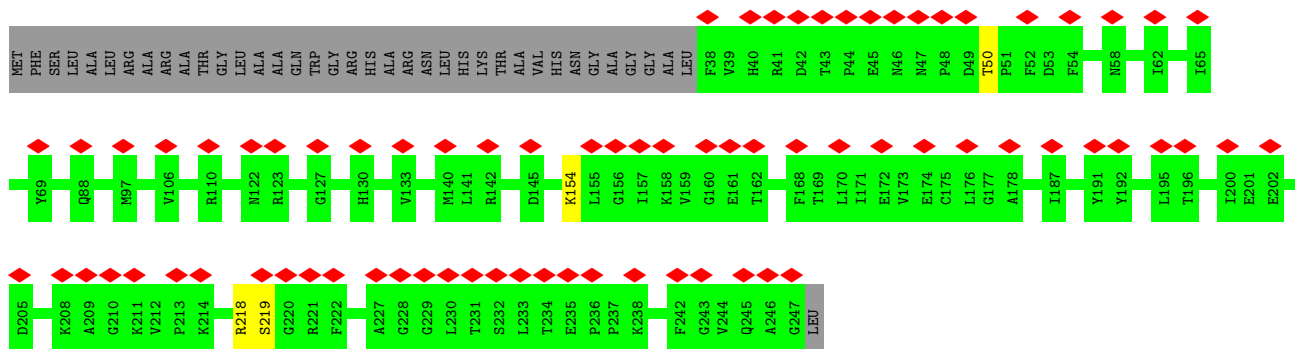
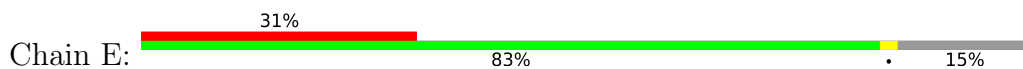


- Molecule 4: NADH dehydrogenase [ubiquinone] iron-sulfur protein 2, mitochondrial

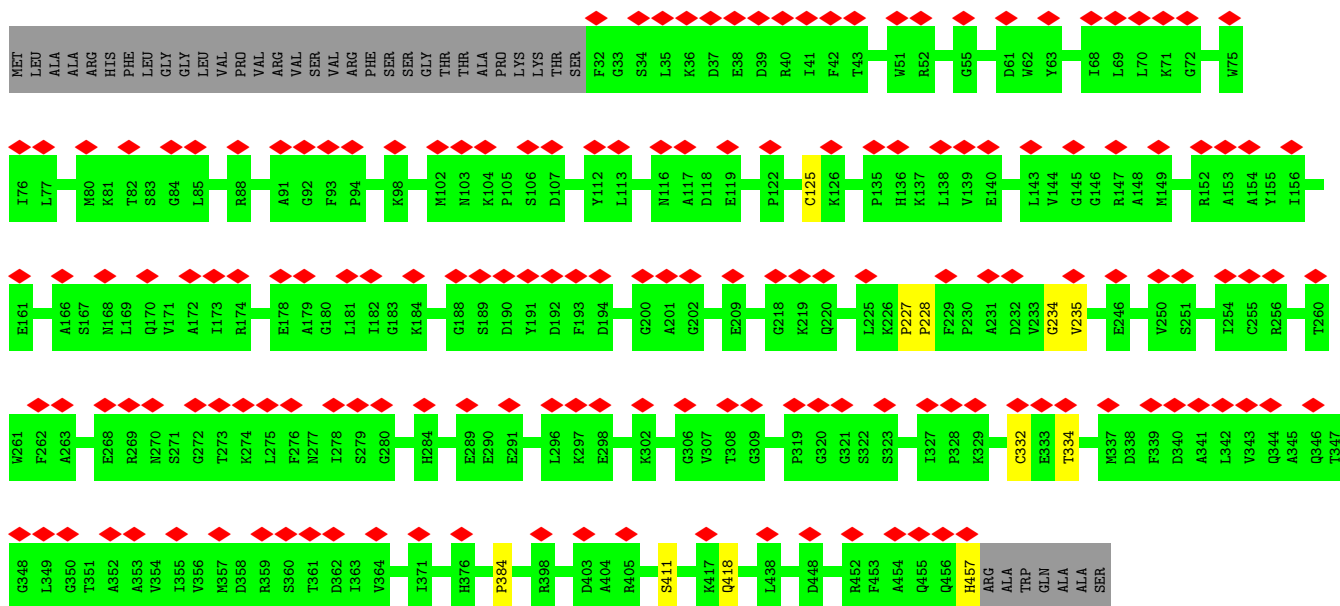
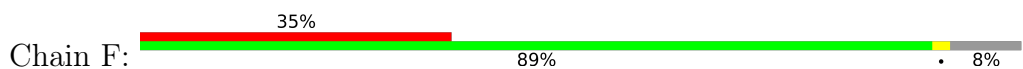




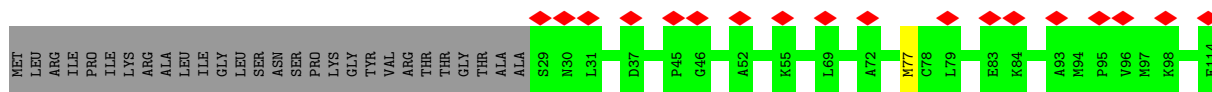
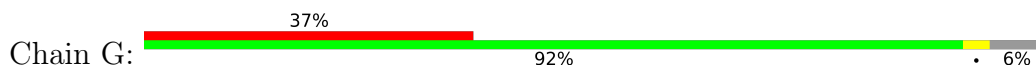
- Molecule 5: NADH dehydrogenase [ubiquinone] flavoprotein 2, mitochondrial

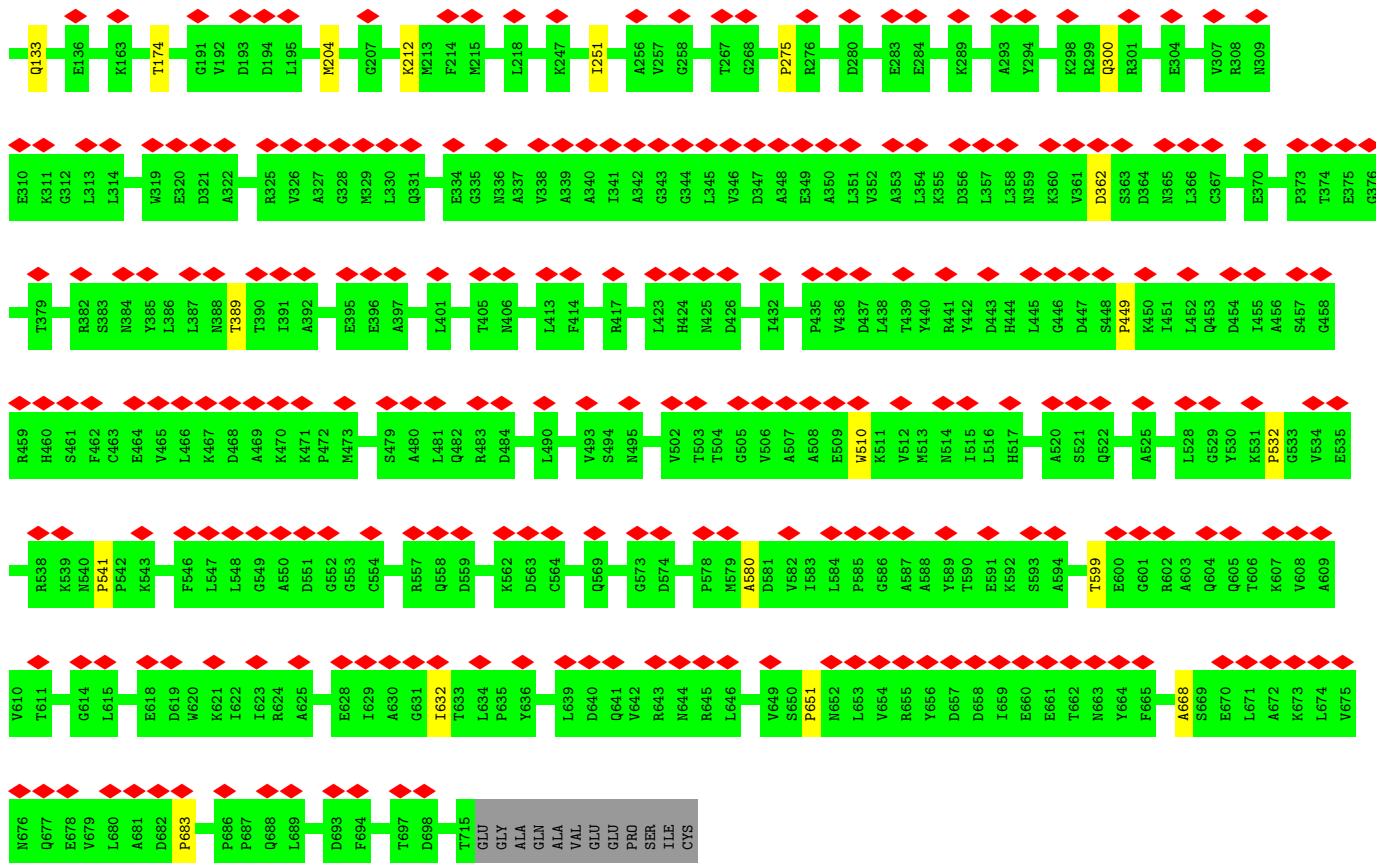


- Molecule 6: NADH dehydrogenase [ubiquinone] flavoprotein 1, mitochondrial

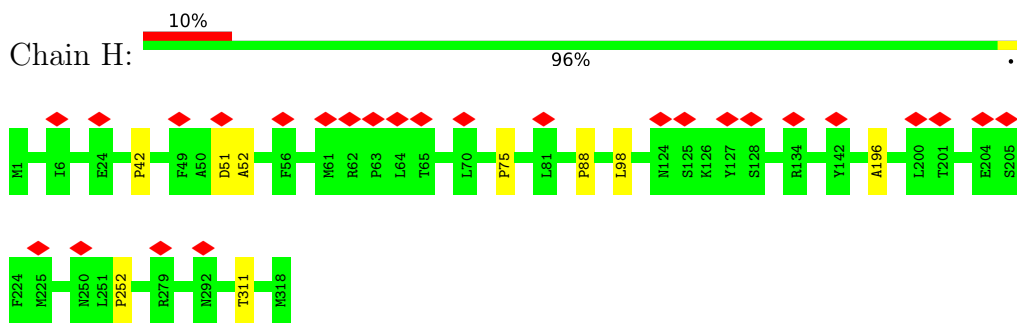


- Molecule 7: NADH-ubiquinone oxidoreductase 75 kDa subunit, mitochondrial

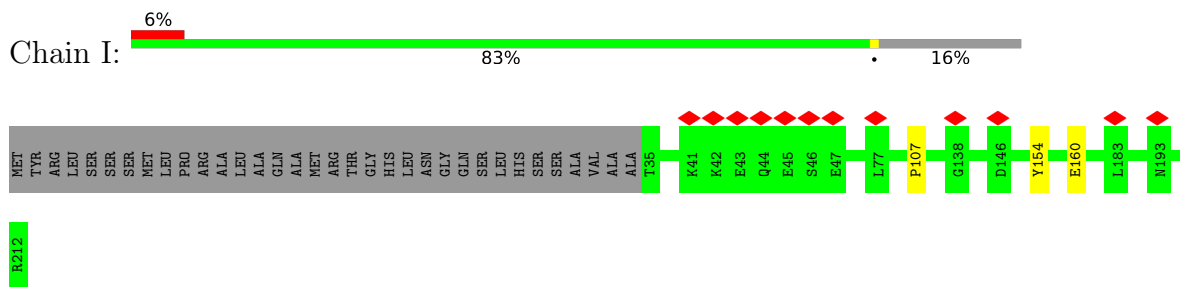




• Molecule 8: NADH-ubiquinone oxidoreductase chain 1

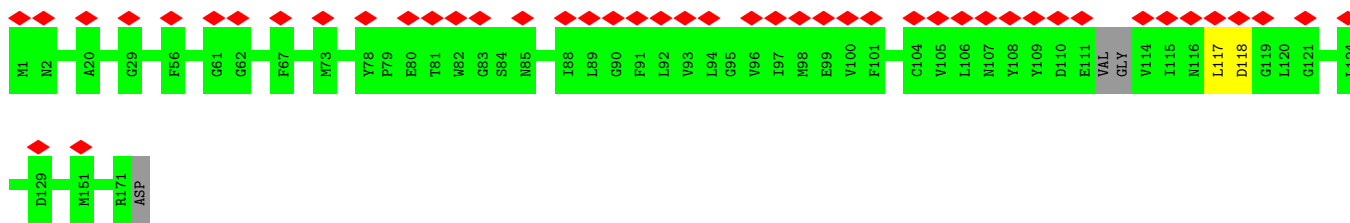


• Molecule 9: NADH dehydrogenase [ubiquinone] iron-sulfur protein 8, mitochondrial

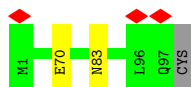


• Molecule 10: NADH-ubiquinone oxidoreductase chain 6

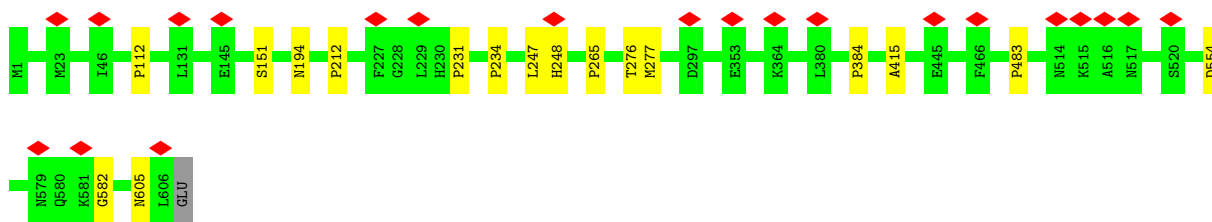




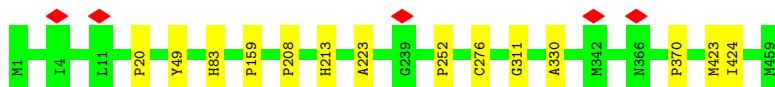
- Molecule 11: NADH-ubiquinone oxidoreductase chain 4L



- Molecule 12: NADH-ubiquinone oxidoreductase chain 5



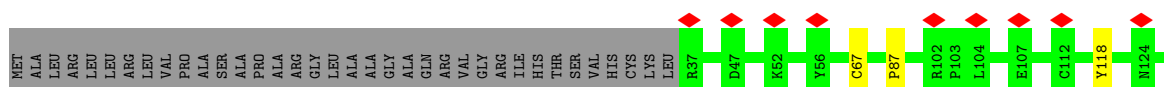
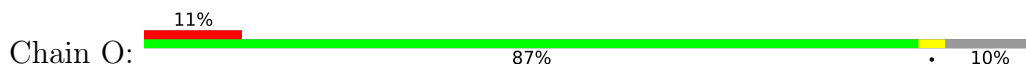
- Molecule 13: NADH-ubiquinone oxidoreductase chain 4

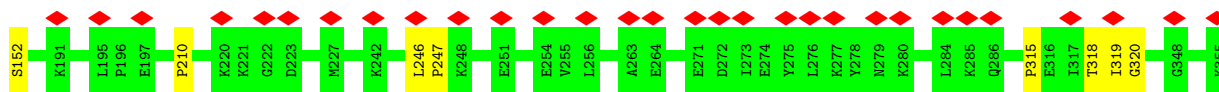


- Molecule 14: NADH-ubiquinone oxidoreductase chain 2

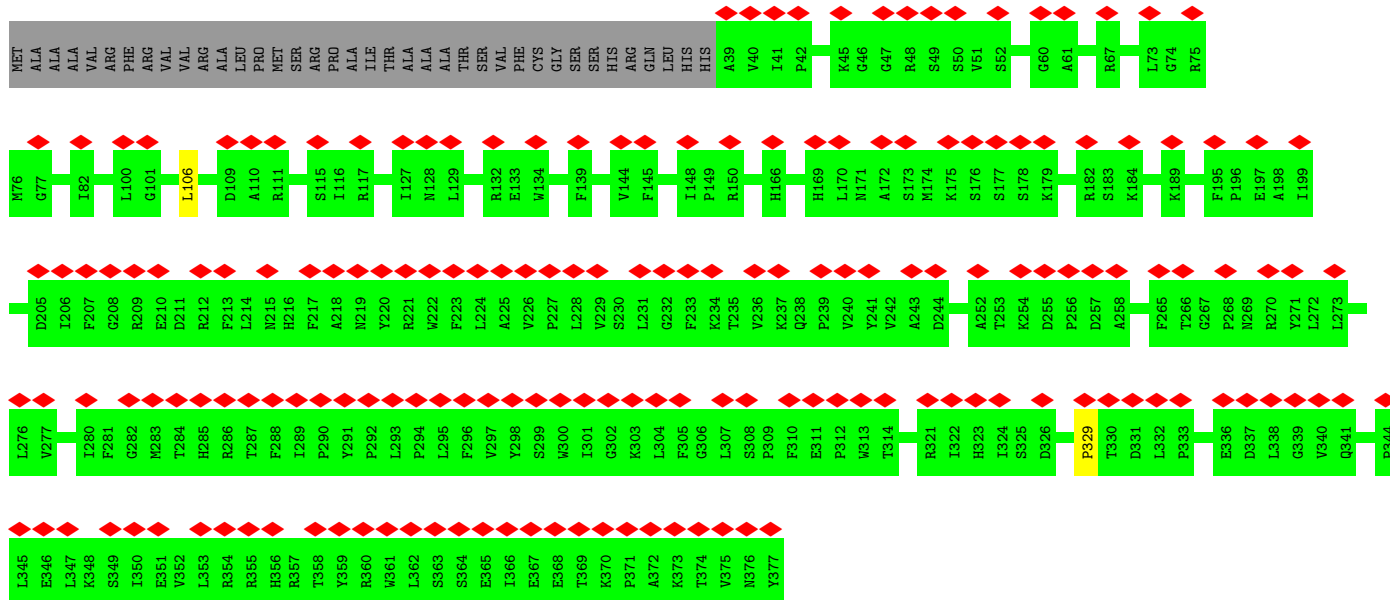
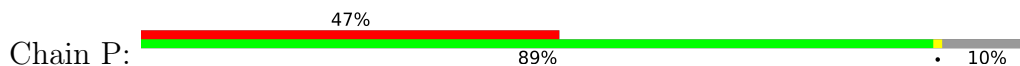


- Molecule 15: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 10, mitochondrial

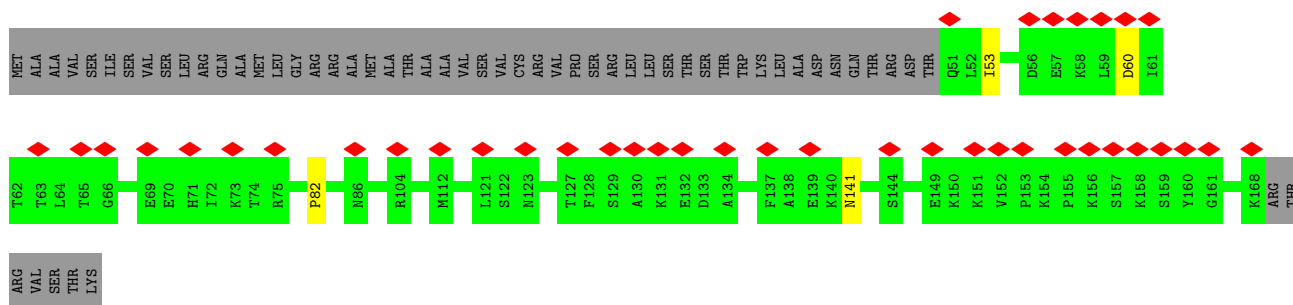




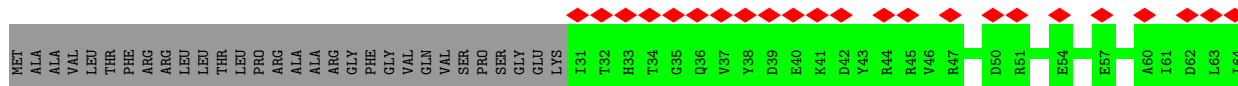
- Molecule 16: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 9, mitochondrial

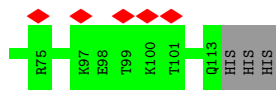


- Molecule 17: NADH dehydrogenase [ubiquinone] iron-sulfur protein 4, mitochondrial

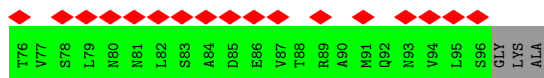
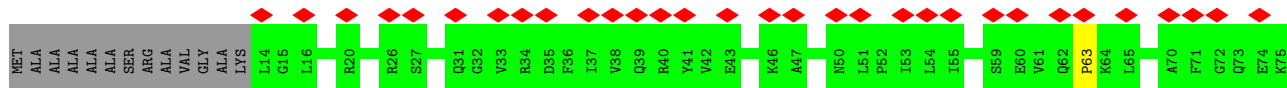
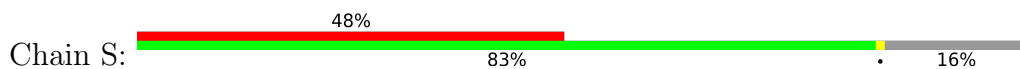


- Molecule 18: NADH dehydrogenase [ubiquinone] iron-sulfur protein 6, mitochondrial

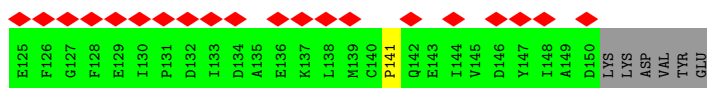
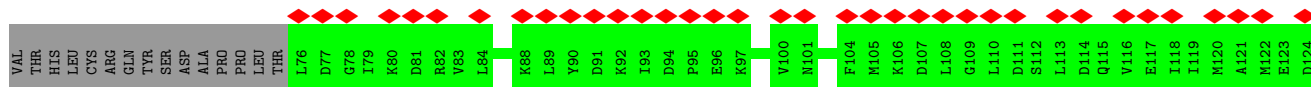




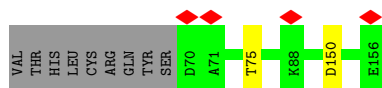
- Molecule 19: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 2



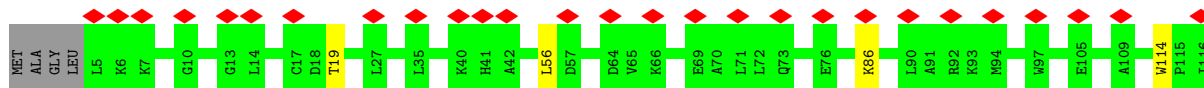
- Molecule 20: Acyl carrier protein, mitochondrial



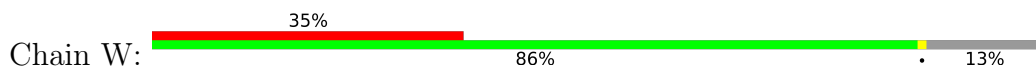
- Molecule 20: Acyl carrier protein, mitochondrial

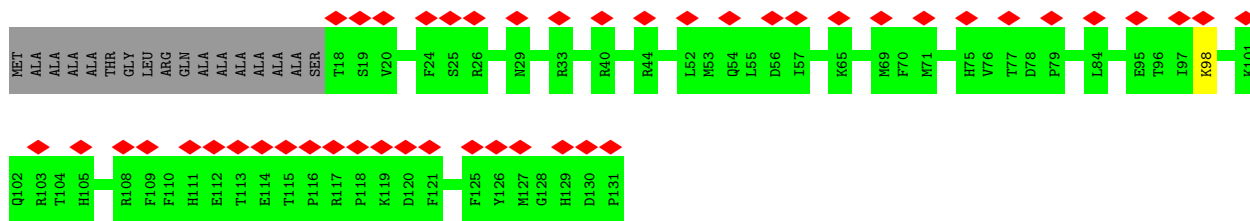


- Molecule 21: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 5

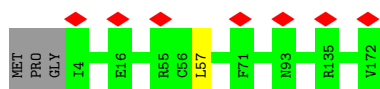


- Molecule 22: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 6

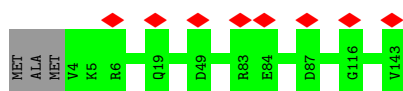




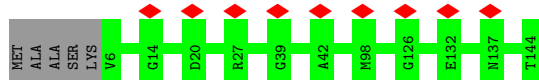
- Molecule 23: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 8



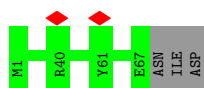
- Molecule 24: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 11



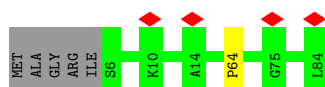
- Molecule 25: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 13



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



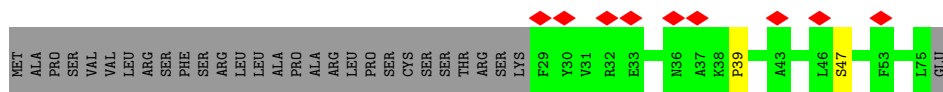
- Molecule 27: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 3



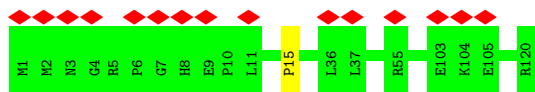
- Molecule 28: NADH dehydrogenase [ubiquinone] 1 subunit C1, mitochondrial



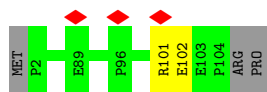




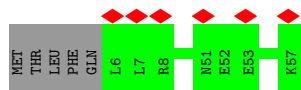
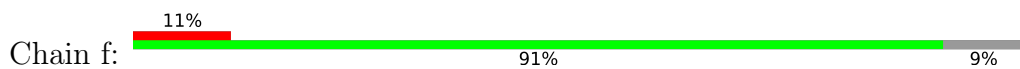
- Molecule 29: NADH dehydrogenase [ubiquinone] 1 subunit C2



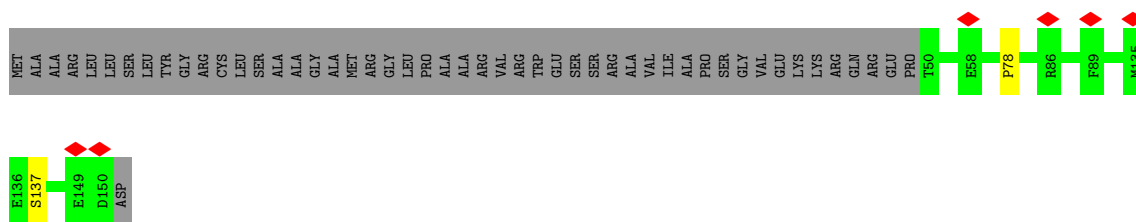
- Molecule 30: NADH dehydrogenase [ubiquinone] iron-sulfur protein 5



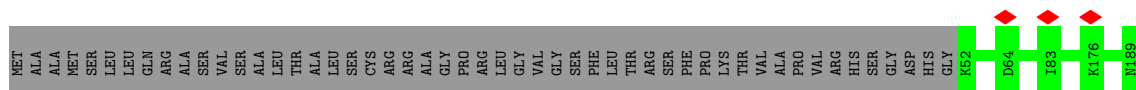
- Molecule 31: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 1



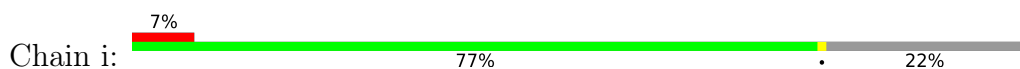
- Molecule 32: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 11, mitochondrial

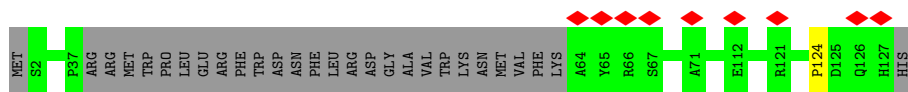


- Molecule 33: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 5, mitochondrial

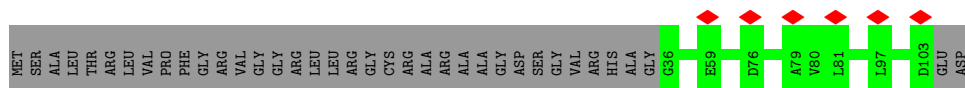


- Molecule 34: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 6

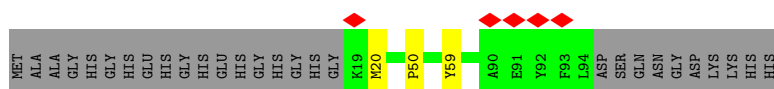




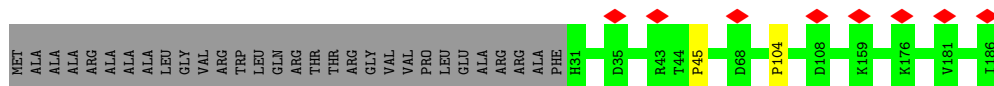
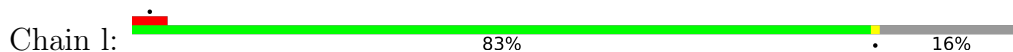
- Molecule 35: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 2, mitochondrial



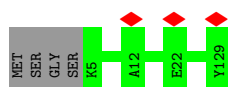
- Molecule 36: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 3



- Molecule 37: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 8, mitochondrial



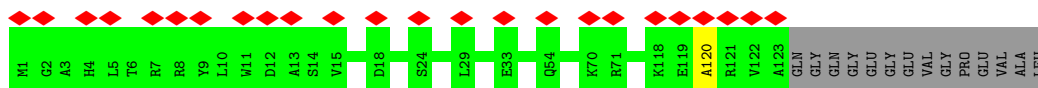
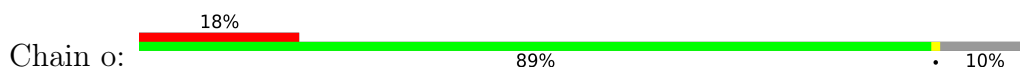
- Molecule 38: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 4



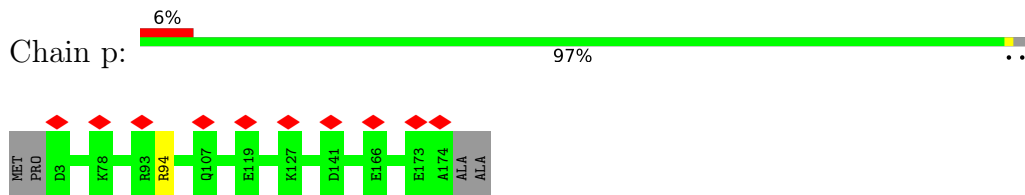
- Molecule 39: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 9



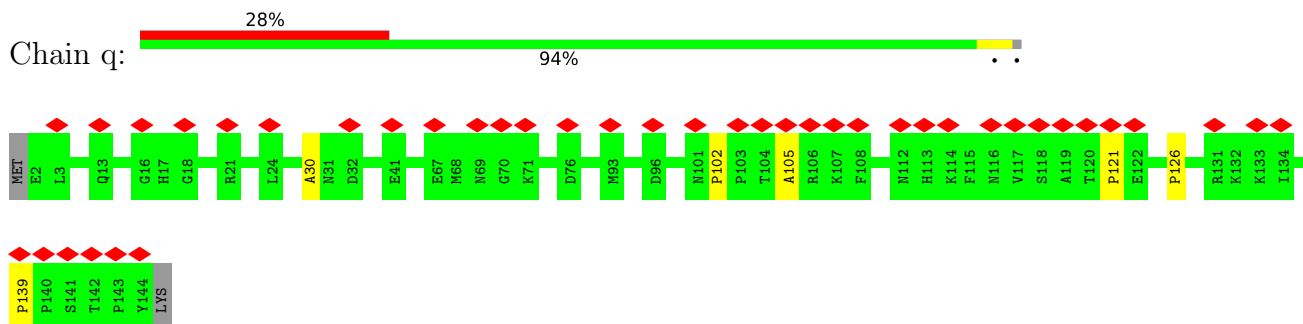
- Molecule 40: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 7



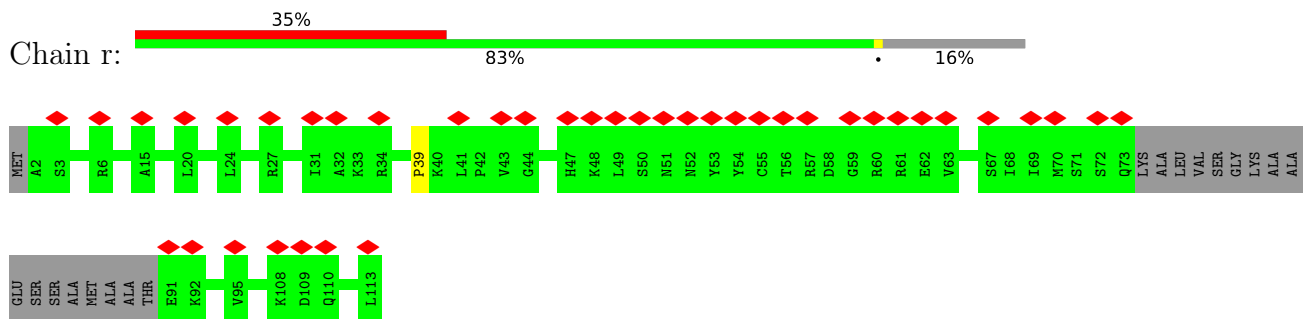
- Molecule 41: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 10



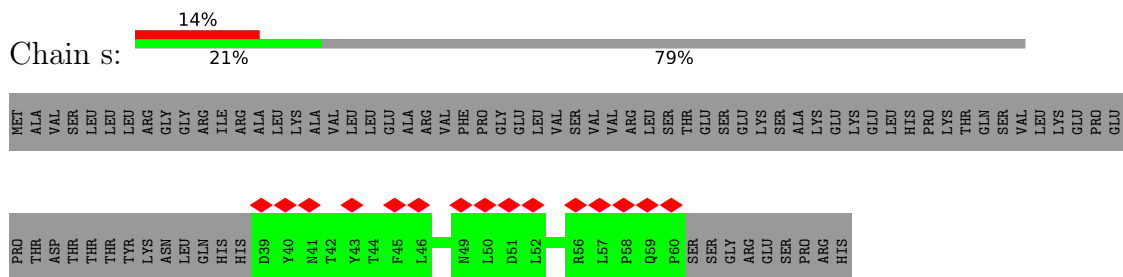
- Molecule 42: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 12



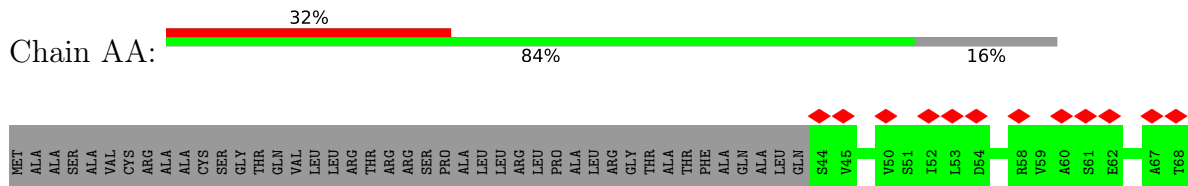
- Molecule 43: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 7

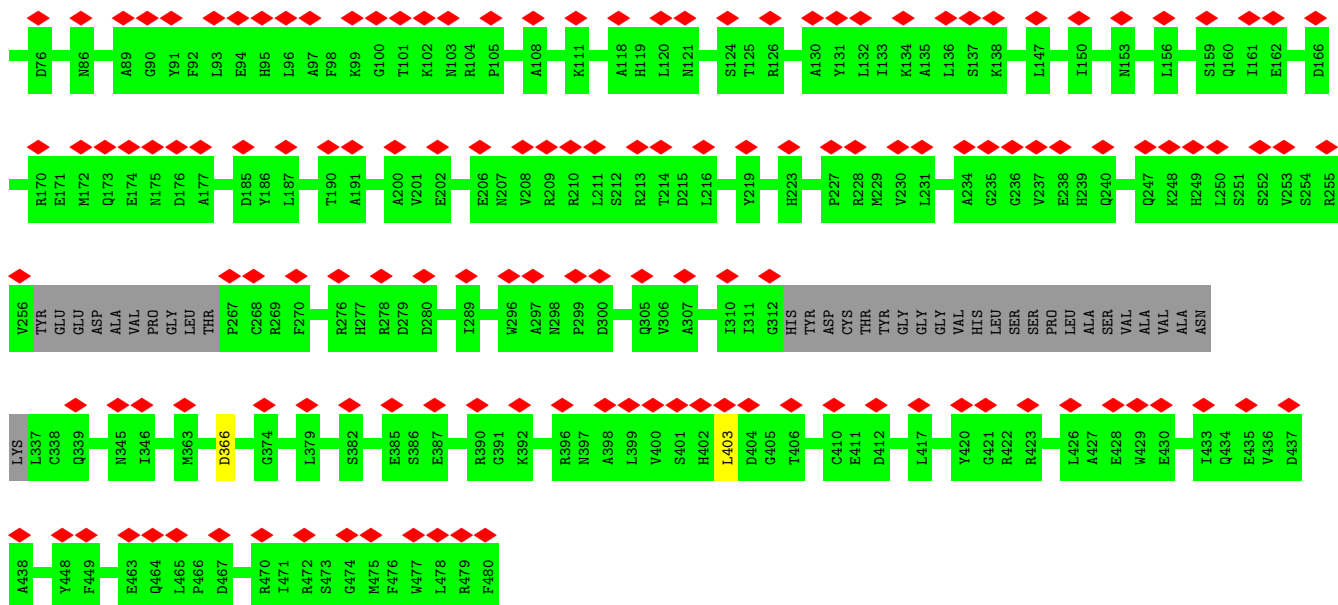


- Molecule 44: NADH dehydrogenase [ubiquinone] flavoprotein 3, mitochondrial

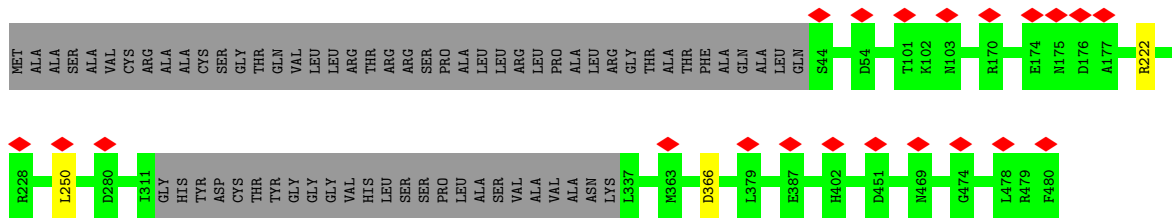
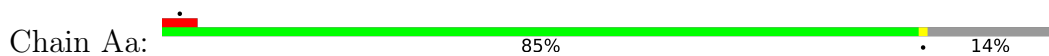


- Molecule 45: Cytochrome b-c1 complex subunit 1, mitochondrial

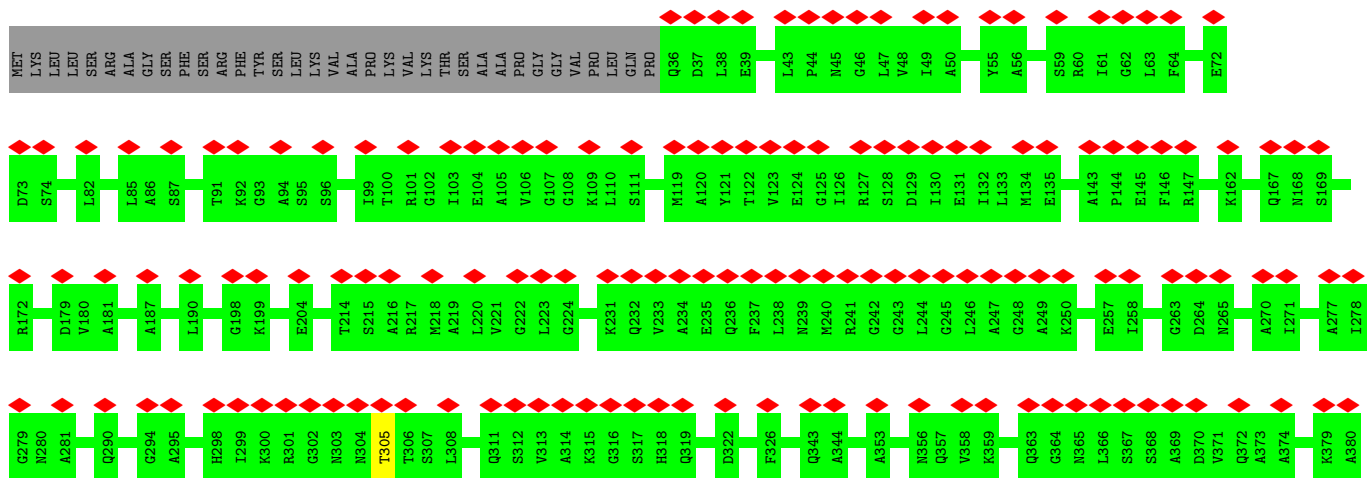
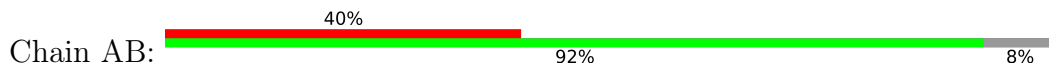


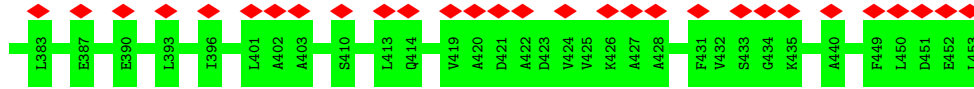


• Molecule 45: Cytochrome b-c1 complex subunit 1, mitochondrial

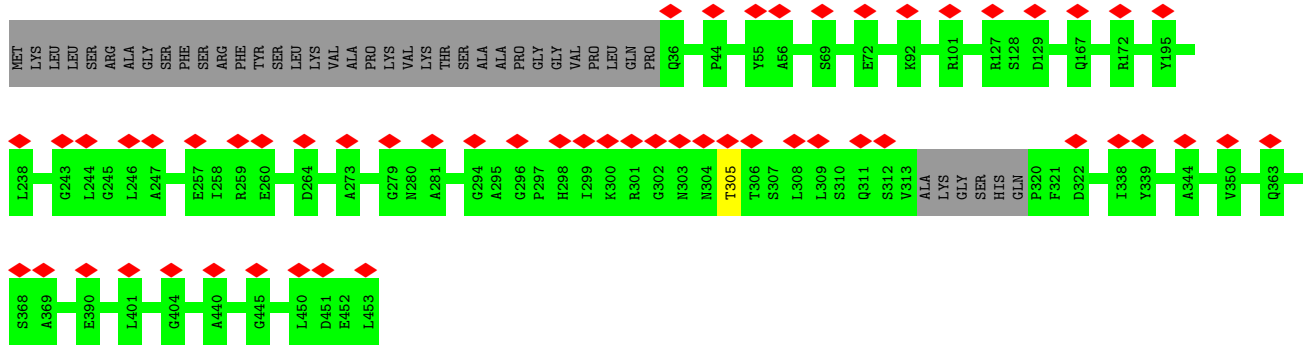
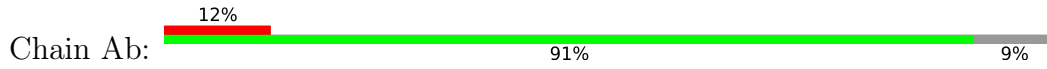


• Molecule 46: Cytochrome b-c1 complex subunit 2, mitochondrial

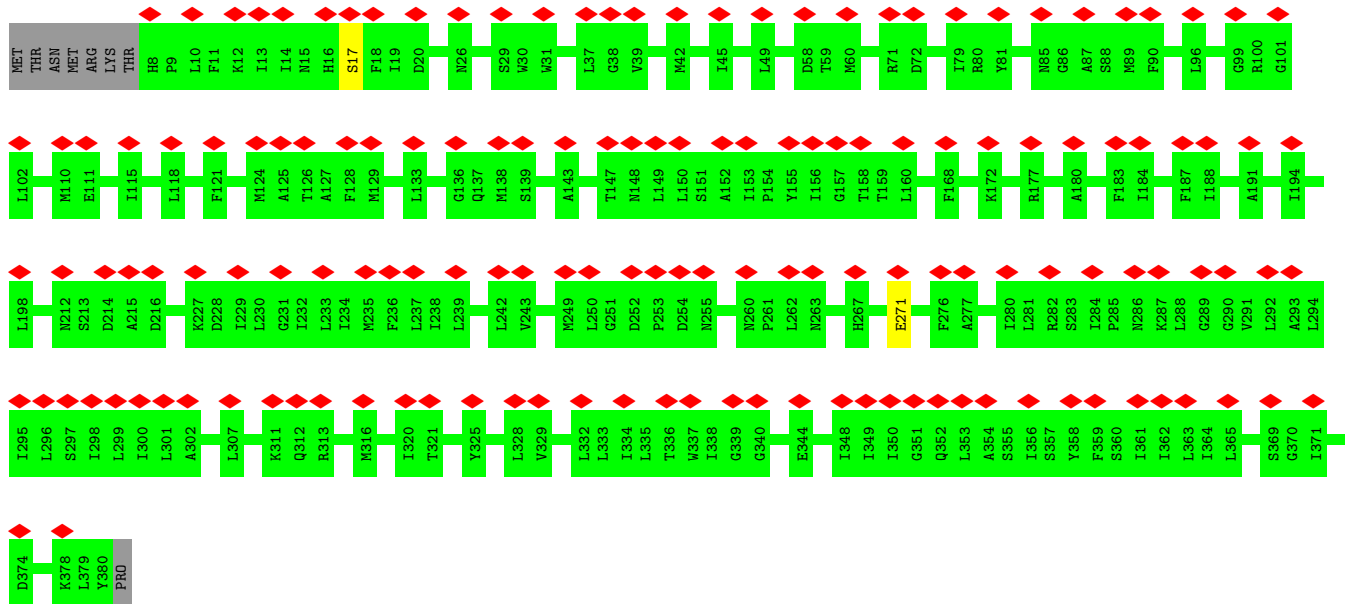
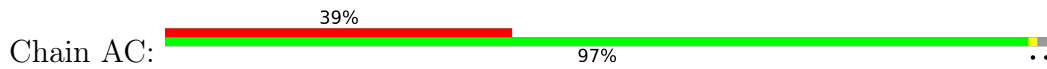




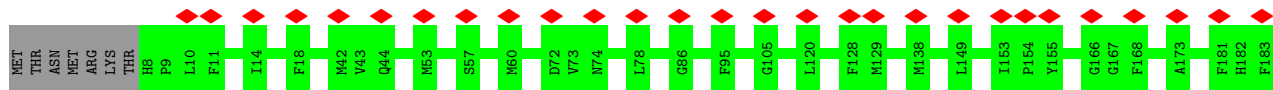
• Molecule 46: Cytochrome b-c1 complex subunit 2, mitochondrial

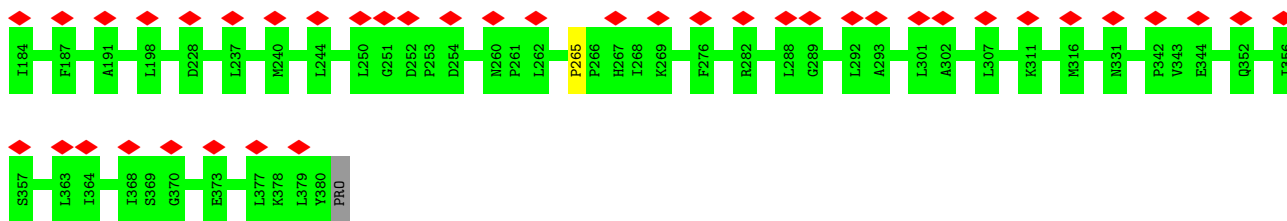


• Molecule 47: Cytochrome b

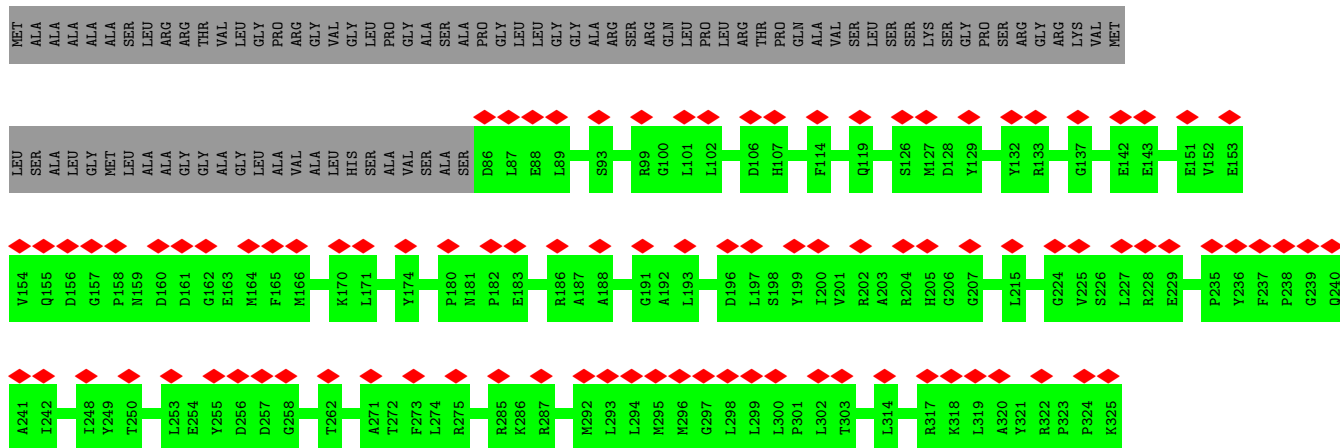
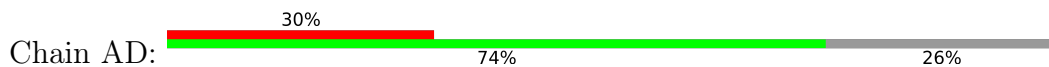


• Molecule 47: Cytochrome b

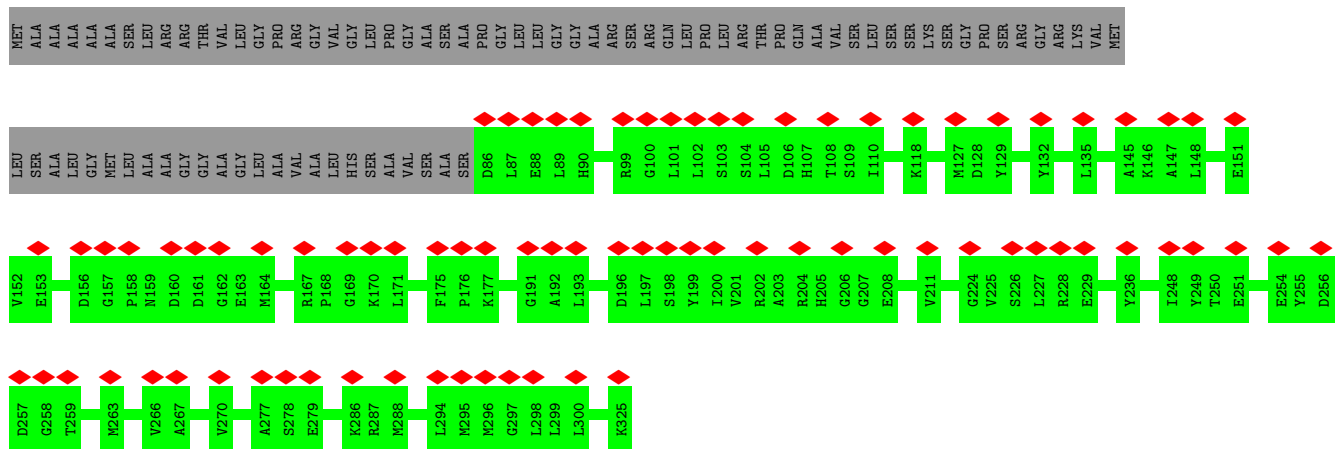
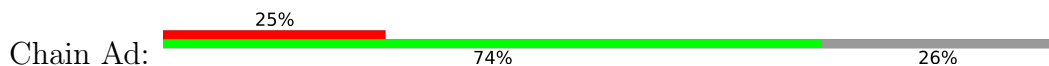




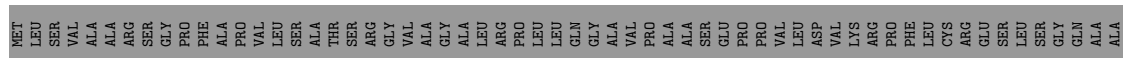
• Molecule 48: Cytochrome c1, heme protein, mitochondrial



• Molecule 48: Cytochrome c1, heme protein, mitochondrial



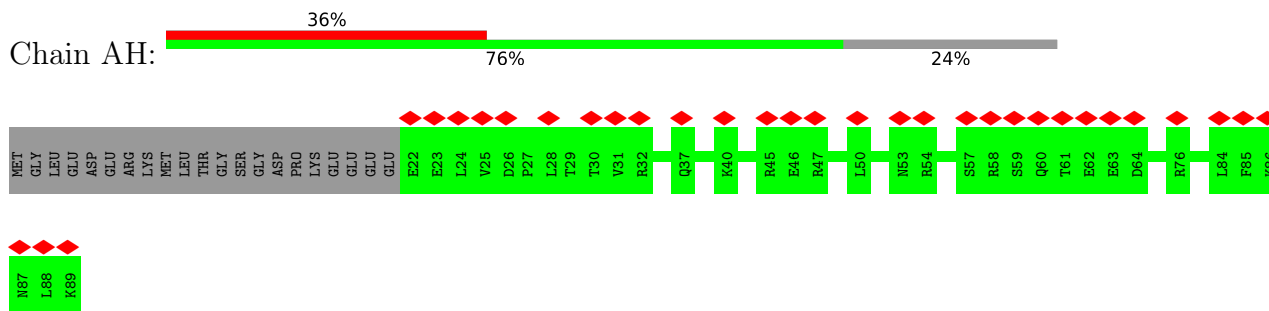
• Molecule 49: Cytochrome b-c1 complex subunit Rieske, mitochondrial



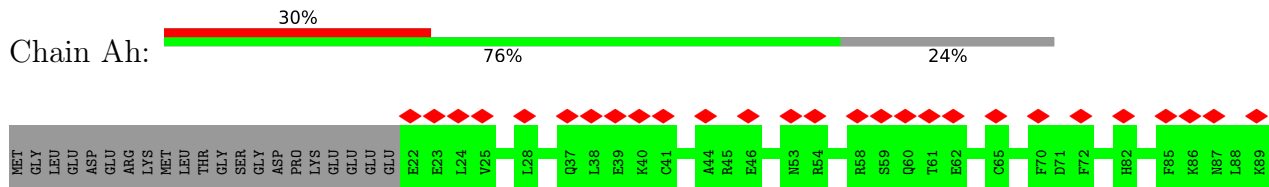




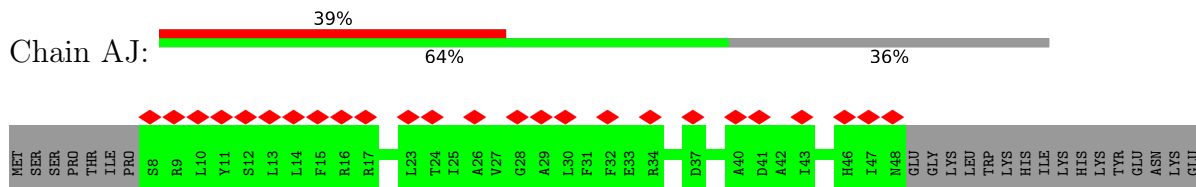




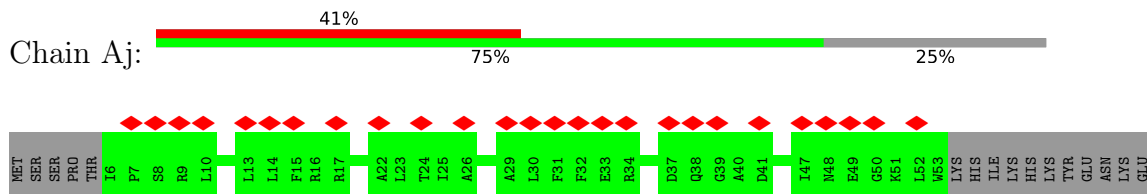
- Molecule 52: Cytochrome b-c1 complex subunit 6, mitochondrial



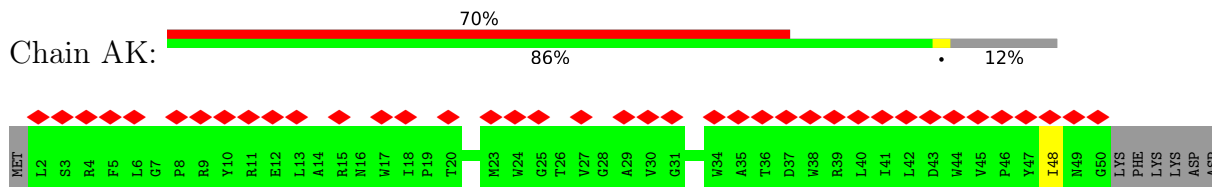
- Molecule 53: Cytochrome b-c1 complex subunit 9



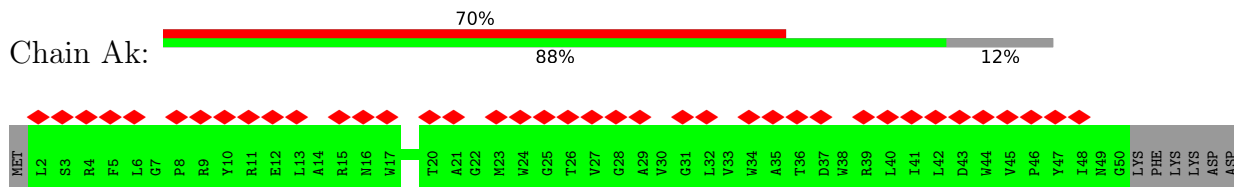
- Molecule 53: Cytochrome b-c1 complex subunit 9



- Molecule 54: Cytochrome b-c1 complex subunit 10



- Molecule 54: Cytochrome b-c1 complex subunit 10



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	28091	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	200	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	46.6	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.121	Depositor
Minimum map value	-0.035	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.015	Depositor
Map size ( $\text{\AA}$ )	422.40002, 422.40002, 422.40002	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.1, 1.1, 1.1	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: EHZ, HEM, UQ1, ZN, NDP, HEC, 3PE, U10, FMN, UQ9, PC1, UQ6, ADP, SF4, CDL, FES

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.50	0/774	0.66	0/1056
2	B	0.61	0/1289	0.83	2/1744 (0.1%)
3	C	0.55	0/1687	0.78	1/2297 (0.0%)
4	D	0.62	1/3505 (0.0%)	0.90	6/4748 (0.1%)
5	E	0.46	0/1675	0.67	4/2282 (0.2%)
6	F	0.61	4/3363 (0.1%)	0.83	7/4543 (0.2%)
7	G	0.65	5/5374 (0.1%)	0.97	18/7281 (0.2%)
8	H	0.68	3/2608 (0.1%)	0.84	8/3563 (0.2%)
9	I	0.62	1/1461 (0.1%)	0.88	2/1974 (0.1%)
10	J	0.59	2/1318 (0.2%)	0.69	1/1791 (0.1%)
11	K	0.60	0/740	0.83	2/1005 (0.2%)
12	L	0.69	5/4921 (0.1%)	0.90	18/6696 (0.3%)
13	M	0.69	5/3717 (0.1%)	0.91	11/5062 (0.2%)
14	N	0.67	2/2756 (0.1%)	0.85	7/3751 (0.2%)
15	O	0.70	6/2666 (0.2%)	0.79	14/3615 (0.4%)
16	P	0.49	0/2793	0.67	1/3787 (0.0%)
17	Q	0.59	2/980 (0.2%)	0.79	2/1324 (0.2%)
18	R	0.47	0/671	0.58	0/903
19	S	0.64	1/678 (0.1%)	0.85	1/915 (0.1%)
20	T	0.50	1/613 (0.2%)	0.67	1/826 (0.1%)
20	U	0.64	0/712	0.86	2/962 (0.2%)
21	V	0.54	0/937	0.81	4/1270 (0.3%)
22	W	0.50	0/993	0.62	2/1335 (0.1%)
23	X	0.48	0/1422	0.70	0/1921
24	Y	0.53	0/1061	0.64	0/1439
25	Z	0.45	0/1183	0.64	0/1597
26	a	0.55	0/561	0.61	0/755
27	b	0.56	1/643 (0.2%)	0.58	0/884
28	c	0.82	1/400 (0.2%)	0.91	3/544 (0.6%)
29	d	0.61	1/1028 (0.1%)	0.63	2/1387 (0.1%)
30	e	0.57	2/881 (0.2%)	0.65	0/1173
31	f	0.52	0/459	0.53	0/618

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
32	g	0.65	1/878 (0.1%)	0.93	3/1196 (0.3%)
33	h	0.52	0/1197	0.75	0/1621
34	i	0.58	1/867 (0.1%)	0.73	0/1179
35	j	0.51	0/603	0.67	0/825
36	k	0.83	2/638 (0.3%)	0.91	3/862 (0.3%)
37	l	0.68	2/1367 (0.1%)	0.76	1/1866 (0.1%)
38	m	0.53	0/1073	0.70	0/1455
39	n	0.66	2/1596 (0.1%)	0.78	2/2162 (0.1%)
40	o	0.54	1/1075 (0.1%)	0.61	0/1442
41	p	0.49	0/1485	0.68	1/2007 (0.0%)
42	q	0.76	4/1234 (0.3%)	0.86	7/1681 (0.4%)
43	r	0.40	0/782	0.59	0/1058
44	s	0.32	0/194	0.57	0/264
45	AA	0.34	0/3213	0.60	1/4355 (0.0%)
45	Aa	0.38	1/3288 (0.0%)	0.60	2/4462 (0.0%)
46	AB	0.32	0/3187	0.57	1/4308 (0.0%)
46	Ab	0.34	0/3142	0.56	1/4246 (0.0%)
47	AC	0.37	1/3089 (0.0%)	0.55	1/4221 (0.0%)
47	Ac	0.38	1/3089 (0.0%)	0.56	0/4221
48	AD	0.33	0/1971	0.53	0/2677
48	Ad	0.37	0/1971	0.50	0/2677
49	AE	0.45	0/1483	0.62	1/2007 (0.0%)
49	AI	0.87	2/219 (0.9%)	0.98	3/296 (1.0%)
49	Ae	0.45	0/1483	0.62	1/2007 (0.0%)
49	Ai	0.65	1/209 (0.5%)	0.72	1/283 (0.4%)
50	AF	0.32	0/884	0.50	0/1184
50	Af	0.33	0/884	0.50	0/1184
51	AG	0.37	0/662	0.55	0/895
51	Ag	0.38	0/662	0.56	0/895
52	AH	0.33	0/569	0.59	0/763
52	Ah	0.33	0/569	0.59	0/763
53	AJ	0.35	0/339	0.48	0/457
53	Aj	0.37	0/401	0.47	0/542
54	AK	0.33	0/416	0.64	1/571 (0.2%)
54	Ak	0.34	0/416	0.52	0/571
All	All	0.55	62/99004 (0.1%)	0.74	149/134251 (0.1%)

The worst 5 of 62 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
15	O	247	PRO	N-CD	16.50	1.71	1.47
12	L	265	PRO	N-CD	13.78	1.67	1.47

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
36	k	50	PRO	N-CD	-13.76	1.28	1.47
14	N	255	PRO	N-CD	-13.61	1.28	1.47
42	q	139	PRO	N-CD	-13.44	1.29	1.47

The worst 5 of 149 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
36	k	50	PRO	CA-N-CD	9.96	125.64	111.70
14	N	255	PRO	CA-N-CD	9.86	125.51	111.70
42	q	139	PRO	CA-N-CD	9.58	125.11	111.70
45	AA	366	ASP	CB-CG-OD1	9.44	126.79	118.30
45	Aa	366	ASP	CB-CG-OD1	9.42	126.78	118.30

There are no chirality outliers.

There are no planarity outliers.

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

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

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	88/115 (76%)	83 (94%)	5 (6%)	0	100	100
2	B	155/224 (69%)	146 (94%)	7 (4%)	2 (1%)	10	42
3	C	196/263 (74%)	186 (95%)	10 (5%)	0	100	100
4	D	420/463 (91%)	401 (96%)	19 (4%)	0	100	100
5	E	208/248 (84%)	203 (98%)	5 (2%)	0	100	100
6	F	424/464 (91%)	409 (96%)	15 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
7	G	685/727 (94%)	633 (92%)	52 (8%)	0	100	100
8	H	313/318 (98%)	298 (95%)	14 (4%)	1 (0%)	37	71
9	I	176/212 (83%)	175 (99%)	1 (1%)	0	100	100
10	J	165/172 (96%)	157 (95%)	8 (5%)	0	100	100
11	K	95/98 (97%)	93 (98%)	2 (2%)	0	100	100
12	L	604/607 (100%)	571 (94%)	33 (6%)	0	100	100
13	M	457/459 (100%)	440 (96%)	17 (4%)	0	100	100
14	N	342/345 (99%)	331 (97%)	10 (3%)	1 (0%)	37	71
15	O	317/355 (89%)	303 (96%)	14 (4%)	0	100	100
16	P	337/377 (89%)	308 (91%)	28 (8%)	1 (0%)	37	71
17	Q	116/175 (66%)	114 (98%)	2 (2%)	0	100	100
18	R	81/116 (70%)	78 (96%)	3 (4%)	0	100	100
19	S	81/99 (82%)	77 (95%)	4 (5%)	0	100	100
20	T	73/156 (47%)	69 (94%)	4 (6%)	0	100	100
20	U	85/156 (54%)	83 (98%)	2 (2%)	0	100	100
21	V	110/116 (95%)	106 (96%)	4 (4%)	0	100	100
22	W	112/131 (86%)	110 (98%)	2 (2%)	0	100	100
23	X	167/172 (97%)	154 (92%)	13 (8%)	0	100	100
24	Y	138/143 (96%)	135 (98%)	3 (2%)	0	100	100
25	Z	137/144 (95%)	133 (97%)	4 (3%)	0	100	100
26	a	65/70 (93%)	62 (95%)	3 (5%)	0	100	100
27	b	77/84 (92%)	72 (94%)	5 (6%)	0	100	100
28	c	45/76 (59%)	45 (100%)	0	0	100	100
29	d	118/120 (98%)	117 (99%)	1 (1%)	0	100	100
30	e	101/106 (95%)	93 (92%)	8 (8%)	0	100	100
31	f	50/57 (88%)	50 (100%)	0	0	100	100
32	g	99/151 (66%)	93 (94%)	6 (6%)	0	100	100
33	h	136/189 (72%)	130 (96%)	6 (4%)	0	100	100
34	i	96/128 (75%)	87 (91%)	9 (9%)	0	100	100
35	j	66/105 (63%)	60 (91%)	6 (9%)	0	100	100
36	k	74/104 (71%)	71 (96%)	3 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
37	l	154/186 (83%)	142 (92%)	12 (8%)	0	100	100
38	m	123/129 (95%)	116 (94%)	7 (6%)	0	100	100
39	n	176/179 (98%)	167 (95%)	8 (4%)	1 (1%)	22	59
40	o	121/137 (88%)	117 (97%)	4 (3%)	0	100	100
41	p	170/176 (97%)	157 (92%)	13 (8%)	0	100	100
42	q	141/145 (97%)	138 (98%)	3 (2%)	0	100	100
43	r	91/113 (80%)	81 (89%)	9 (10%)	1 (1%)	12	46
44	s	20/104 (19%)	20 (100%)	0	0	100	100
45	AA	397/480 (83%)	388 (98%)	9 (2%)	0	100	100
45	Aa	408/480 (85%)	395 (97%)	13 (3%)	0	100	100
46	AB	416/453 (92%)	406 (98%)	10 (2%)	0	100	100
46	Ab	408/453 (90%)	396 (97%)	12 (3%)	0	100	100
47	AC	371/381 (97%)	367 (99%)	4 (1%)	0	100	100
47	Ac	371/381 (97%)	368 (99%)	3 (1%)	0	100	100
48	AD	238/325 (73%)	230 (97%)	8 (3%)	0	100	100
48	Ad	238/325 (73%)	225 (94%)	13 (6%)	0	100	100
49	AE	184/274 (67%)	171 (93%)	13 (7%)	0	100	100
49	AI	26/274 (10%)	23 (88%)	3 (12%)	0	100	100
49	Ae	184/274 (67%)	171 (93%)	13 (7%)	0	100	100
49	Ai	24/274 (9%)	23 (96%)	1 (4%)	0	100	100
50	AF	96/111 (86%)	96 (100%)	0	0	100	100
50	Af	96/111 (86%)	96 (100%)	0	0	100	100
51	AG	74/82 (90%)	74 (100%)	0	0	100	100
51	Ag	74/82 (90%)	74 (100%)	0	0	100	100
52	AH	66/89 (74%)	66 (100%)	0	0	100	100
52	Ah	66/89 (74%)	66 (100%)	0	0	100	100
53	AJ	39/64 (61%)	39 (100%)	0	0	100	100
53	Aj	46/64 (72%)	46 (100%)	0	0	100	100
54	AK	47/56 (84%)	46 (98%)	1 (2%)	0	100	100
54	Ak	47/56 (84%)	45 (96%)	2 (4%)	0	100	100
All	All	11921/14392 (83%)	11425 (96%)	489 (4%)	7 (0%)	50	82

5 of 7 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
14	N	109	ALA
8	H	88	PRO
16	P	329	PRO
2	B	171	TYR
43	r	39	PRO

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

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	84/104 (81%)	84 (100%)	0	100	100
2	B	133/185 (72%)	132 (99%)	1 (1%)	79	84
3	C	180/227 (79%)	180 (100%)	0	100	100
4	D	366/395 (93%)	366 (100%)	0	100	100
5	E	182/206 (88%)	182 (100%)	0	100	100
6	F	341/370 (92%)	341 (100%)	0	100	100
7	G	579/610 (95%)	579 (100%)	0	100	100
8	H	279/280 (100%)	279 (100%)	0	100	100
9	I	152/178 (85%)	152 (100%)	0	100	100
10	J	136/138 (99%)	136 (100%)	0	100	100
11	K	87/88 (99%)	87 (100%)	0	100	100
12	L	549/550 (100%)	549 (100%)	0	100	100
13	M	415/415 (100%)	415 (100%)	0	100	100
14	N	307/308 (100%)	307 (100%)	0	100	100
15	O	283/309 (92%)	283 (100%)	0	100	100
16	P	296/325 (91%)	296 (100%)	0	100	100
17	Q	105/153 (69%)	105 (100%)	0	100	100
18	R	70/96 (73%)	70 (100%)	0	100	100
19	S	74/80 (92%)	74 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
20	T	69/135 (51%)	69 (100%)	0	100	100
20	U	80/135 (59%)	80 (100%)	0	100	100
21	V	100/102 (98%)	100 (100%)	0	100	100
22	W	108/114 (95%)	108 (100%)	0	100	100
23	X	152/154 (99%)	151 (99%)	1 (1%)	81	86
24	Y	105/107 (98%)	105 (100%)	0	100	100
25	Z	120/123 (98%)	120 (100%)	0	100	100
26	a	57/60 (95%)	57 (100%)	0	100	100
27	b	70/73 (96%)	70 (100%)	0	100	100
28	c	41/67 (61%)	41 (100%)	0	100	100
29	d	107/107 (100%)	107 (100%)	0	100	100
30	e	91/94 (97%)	91 (100%)	0	100	100
31	f	48/53 (91%)	48 (100%)	0	100	100
32	g	92/129 (71%)	92 (100%)	0	100	100
33	h	123/162 (76%)	123 (100%)	0	100	100
34	i	94/120 (78%)	94 (100%)	0	100	100
35	j	62/87 (71%)	62 (100%)	0	100	100
36	k	59/78 (76%)	59 (100%)	0	100	100
37	l	141/161 (88%)	141 (100%)	0	100	100
38	m	111/114 (97%)	111 (100%)	0	100	100
39	n	163/164 (99%)	163 (100%)	0	100	100
40	o	112/121 (93%)	112 (100%)	0	100	100
41	p	156/158 (99%)	156 (100%)	0	100	100
42	q	129/131 (98%)	129 (100%)	0	100	100
43	r	85/96 (88%)	85 (100%)	0	100	100
44	s	22/95 (23%)	22 (100%)	0	100	100
45	AA	341/398 (86%)	340 (100%)	1 (0%)	91	92
45	Aa	349/398 (88%)	348 (100%)	1 (0%)	91	92
46	AB	328/356 (92%)	328 (100%)	0	100	100
46	Ab	324/356 (91%)	324 (100%)	0	100	100
47	AC	325/333 (98%)	325 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
47	Ac	325/333 (98%)	325 (100%)	0	100	100
48	AD	205/260 (79%)	205 (100%)	0	100	100
48	Ad	205/260 (79%)	205 (100%)	0	100	100
49	AE	158/224 (70%)	158 (100%)	0	100	100
49	AI	23/224 (10%)	23 (100%)	0	100	100
49	Ae	158/224 (70%)	158 (100%)	0	100	100
49	Ai	22/224 (10%)	22 (100%)	0	100	100
50	AF	90/99 (91%)	90 (100%)	0	100	100
50	Af	90/99 (91%)	90 (100%)	0	100	100
51	AG	69/74 (93%)	69 (100%)	0	100	100
51	Ag	69/74 (93%)	69 (100%)	0	100	100
52	AH	65/83 (78%)	65 (100%)	0	100	100
52	Ah	65/83 (78%)	65 (100%)	0	100	100
53	AJ	33/55 (60%)	33 (100%)	0	100	100
53	Aj	39/55 (71%)	39 (100%)	0	100	100
54	AK	39/46 (85%)	39 (100%)	0	100	100
54	Ak	39/46 (85%)	39 (100%)	0	100	100
All	All	10476/12261 (85%)	10472 (100%)	4 (0%)	100	100

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

Mol	Chain	Res	Type
2	B	170	TYR
23	X	57	LEU
45	AA	403	LEU
45	Aa	222	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 207 such sidechains are listed below:

Mol	Chain	Res	Type
16	P	341	GLN
33	h	170	GLN
46	Ab	415	GLN
17	Q	88	GLN
23	X	140	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 61 ligands modelled in this entry, 1 is monoatomic - leaving 60 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
55	3PE	Y	201	-	38,38,50	1.03	2 (5%)	41,43,55	1.11	3 (7%)
55	3PE	m	201	-	50,50,50	0.91	2 (4%)	53,55,55	1.07	4 (7%)
67	HEM	Ac	402	47	41,50,50	1.25	3 (7%)	45,82,82	1.71	8 (17%)
55	3PE	AC	404	-	34,34,50	1.10	2 (5%)	37,39,55	1.14	3 (8%)
55	3PE	J	201	-	45,45,50	0.96	2 (4%)	48,50,55	1.08	3 (6%)
62	PC1	L	701	-	47,47,53	0.99	2 (4%)	53,55,61	1.09	3 (5%)
67	HEM	AC	403	47	41,50,50	1.27	3 (7%)	45,82,82	1.72	9 (20%)
55	3PE	b	201	-	45,45,50	0.97	2 (4%)	48,50,55	1.10	3 (6%)
55	3PE	AC	401	-	22,22,50	0.47	0	25,27,55	0.73	1 (4%)
56	CDL	d	201	-	83,83,99	1.00	4 (4%)	89,95,111	1.10	5 (5%)
56	CDL	Ag	102	-	55,55,99	0.39	0	61,67,111	0.33	0
57	SF4	I	302	9	0,12,12	-	-	-	-	-
55	3PE	L	704	-	37,37,50	1.05	2 (5%)	40,42,55	1.18	4 (10%)
63	ADP	O	401	-	24,29,29	0.94	1 (4%)	29,45,45	1.42	4 (13%)
56	CDL	AG	101	-	41,41,99	1.40	4 (9%)	47,53,111	1.33	6 (12%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
68	U10	Ac	404	-	23,23,63	1.24	3 (13%)	28,31,79	2.08	7 (25%)
68	U10	AC	405	-	23,23,63	1.24	3 (13%)	28,31,79	2.10	7 (25%)
69	UQ6	AC	406	-	28,28,43	0.81	1 (3%)	33,37,55	0.75	0
62	PC1	I	301	-	46,46,53	0.99	2 (4%)	52,54,61	1.10	3 (5%)
56	CDL	h	201	-	92,92,99	0.94	4 (4%)	98,104,111	1.12	6 (6%)
55	3PE	L	702	-	48,48,50	0.92	2 (4%)	51,53,55	1.09	3 (5%)
58	UQ1	D	501	-	18,18,18	1.32	3 (16%)	22,25,25	1.61	5 (22%)
56	CDL	Ag	101	-	41,41,99	1.40	4 (9%)	47,53,111	1.35	6 (12%)
57	SF4	G	801	7	0,12,12	-	-	-	-	-
55	3PE	Ag	103	-	50,50,50	0.31	0	53,55,55	0.29	0
55	3PE	H	402	-	45,45,50	0.92	2 (4%)	48,50,55	1.33	5 (10%)
56	CDL	A	402	-	91,91,99	0.95	4 (4%)	97,103,111	1.09	6 (6%)
55	3PE	AG	103	-	50,50,50	0.92	2 (4%)	53,55,55	1.06	3 (5%)
67	HEM	AC	402	47	41,50,50	1.23	4 (9%)	45,82,82	1.70	8 (17%)
56	CDL	M	503	-	78,78,99	1.02	4 (5%)	84,90,111	1.11	6 (7%)
56	CDL	AG	102	-	55,55,99	1.20	4 (7%)	61,67,111	1.25	6 (9%)
59	FES	E	301	5	0,4,4	-	-	-	-	-
59	FES	G	803	7	0,4,4	-	-	-	-	-
62	PC1	l	201	-	49,49,53	0.96	2 (4%)	55,57,61	1.01	4 (7%)
55	3PE	Ac	403	-	34,34,50	1.09	2 (5%)	37,39,55	1.21	3 (8%)
66	EHZ	W	201	-	27,31,37	1.73	5 (18%)	37,41,47	1.55	5 (13%)
66	EHZ	n	201	-	27,31,37	1.88	7 (25%)	37,41,47	1.69	8 (21%)
67	HEM	Ac	401	47	41,50,50	1.22	4 (9%)	45,82,82	1.68	8 (17%)
70	HEC	AD	401	48	32,50,50	2.16	3 (9%)	24,82,82	1.62	5 (20%)
70	HEC	Ad	401	48	32,50,50	2.17	3 (9%)	24,82,82	1.64	5 (20%)
62	PC1	q	202	-	34,34,53	1.14	2 (5%)	40,42,61	1.20	4 (10%)
61	UQ9	H	401	-	35,35,58	0.84	3 (8%)	42,45,73	0.63	1 (2%)
55	3PE	i	201	-	39,39,50	1.05	2 (5%)	42,44,55	1.03	2 (4%)
55	3PE	M	502	-	50,50,50	0.90	2 (4%)	53,55,55	1.08	3 (5%)
55	3PE	Aa	501	-	22,22,50	1.37	2 (9%)	25,27,55	1.20	2 (8%)
56	CDL	Y	202	-	80,80,99	1.01	4 (5%)	86,92,111	1.13	6 (6%)
56	CDL	Aa	502	-	45,45,99	1.34	4 (8%)	51,57,111	1.36	6 (11%)
57	SF4	G	802	7	0,12,12	-	-	-	-	-
69	UQ6	Ac	405	-	28,28,43	0.81	1 (3%)	33,37,55	0.75	0
64	NDP	P	401	-	45,52,52	0.96	2 (4%)	53,80,80	1.20	4 (7%)
57	SF4	I	303	9	0,12,12	-	-	-	-	-

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
55	3PE	m	202	-	40,40,50	1.01	2 (5%)	43,45,55	1.21	5 (11%)
60	FMN	F	501	-	33,33,33	1.38	5 (15%)	48,50,50	1.23	7 (14%)
57	SF4	B	301	2	0,12,12	-	-	-	-	-
55	3PE	M	501	-	36,36,50	1.06	2 (5%)	39,41,55	1.07	3 (7%)
62	PC1	Ae	301	-	34,34,53	1.17	2 (5%)	40,42,61	1.18	4 (10%)
56	CDL	q	201	-	56,56,99	1.19	4 (7%)	62,68,111	1.26	6 (9%)
55	3PE	A	401	-	45,45,50	1.11	5 (11%)	48,50,55	1.27	3 (6%)
56	CDL	L	703	-	73,73,99	1.06	4 (5%)	79,85,111	1.15	5 (6%)
57	SF4	F	502	6	0,12,12	-	-	-	-	-

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
55	3PE	Y	201	-	-	5/42/42/54	-
55	3PE	m	201	-	-	14/54/54/54	-
67	HEM	Ac	402	47	-	6/12/54/54	-
55	3PE	AC	404	-	-	1/38/38/54	-
55	3PE	J	201	-	-	12/49/49/54	-
62	PC1	L	701	-	-	11/51/51/57	-
67	HEM	AC	403	47	-	6/12/54/54	-
55	3PE	b	201	-	-	10/49/49/54	-
55	3PE	AC	401	-	-	7/26/26/54	-
56	CDL	d	201	-	-	17/94/94/110	-
56	CDL	Ag	102	-	-	13/66/66/110	-
63	ADP	O	401	-	-	3/12/32/32	0/3/3/3
55	3PE	L	704	-	-	7/41/41/54	-
57	SF4	I	302	9	-	-	0/6/5/5
56	CDL	AG	101	-	-	8/52/52/110	-
68	U10	Ac	404	-	-	6/15/39/87	0/1/1/1
68	U10	AC	405	-	-	6/15/39/87	0/1/1/1
69	UQ6	AC	406	-	-	13/21/21/39	0/1/1/1
62	PC1	I	301	-	-	10/50/50/57	-
56	CDL	h	201	-	-	27/103/103/110	-
55	3PE	L	702	-	-	14/52/52/54	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
58	UQ1	D	501	-	-	6/9/33/33	0/1/1/1
56	CDL	Ag	101	-	-	7/52/52/110	-
57	SF4	G	801	7	-	-	0/6/5/5
55	3PE	Ag	103	-	-	10/54/54/54	-
55	3PE	H	402	-	-	11/49/49/54	-
56	CDL	A	402	-	-	24/102/102/110	-
55	3PE	AG	103	-	-	9/54/54/54	-
67	HEM	AC	402	47	-	7/12/54/54	-
56	CDL	M	503	-	-	26/89/89/110	-
56	CDL	AG	102	-	-	15/66/66/110	-
62	PC1	l	201	-	-	8/53/53/57	-
66	EHZ	W	201	-	-	12/39/39/45	-
66	EHZ	n	201	-	-	19/39/39/45	-
55	3PE	Ac	403	-	-	3/38/38/54	-
70	HEC	AD	401	48	-	0/10/54/54	-
59	FES	E	301	5	-	-	0/1/1/1
67	HEM	Ac	401	47	-	7/12/54/54	-
59	FES	G	803	7	-	-	0/1/1/1
70	HEC	Ad	401	48	-	0/10/54/54	-
62	PC1	q	202	-	-	14/38/38/57	-
61	UQ9	H	401	-	-	15/30/54/81	0/1/1/1
55	3PE	i	201	-	-	13/43/43/54	-
55	3PE	M	502	-	-	13/54/54/54	-
55	3PE	Aa	501	-	-	7/26/26/54	-
56	CDL	Y	202	-	-	24/91/91/110	-
56	CDL	Aa	502	-	-	13/56/56/110	-
69	UQ6	Ac	405	-	-	13/21/21/39	0/1/1/1
57	SF4	G	802	7	-	-	0/6/5/5
64	NDP	P	401	-	-	2/30/77/77	0/5/5/5
57	SF4	I	303	9	-	-	0/6/5/5
55	3PE	m	202	-	-	8/44/44/54	-
60	FMN	F	501	-	-	0/18/18/18	0/3/3/3
57	SF4	B	301	2	-	-	0/6/5/5
55	3PE	M	501	-	-	11/40/40/54	-
62	PC1	Ae	301	-	-	7/38/38/57	-
56	CDL	q	201	-	-	15/67/67/110	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
55	3PE	A	401	-	-	18/49/49/54	-
56	CDL	L	703	-	-	18/84/84/110	-
57	SF4	F	502	6	-	-	0/6/5/5

The worst 5 of 143 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
70	Ad	401	HEC	C3C-C2C	-6.46	1.34	1.40
70	AD	401	HEC	C3C-C2C	-6.40	1.34	1.40
70	Ad	401	HEC	C2B-C3B	-6.15	1.34	1.40
70	AD	401	HEC	C2B-C3B	-6.07	1.34	1.40
70	Ad	401	HEC	C3D-C2D	5.48	1.53	1.37

The worst 5 of 226 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
68	AC	405	U10	C6-C1-C2	7.80	125.35	119.18
68	Ac	404	U10	C6-C1-C2	7.71	125.28	119.18
66	W	201	EHZ	C8-C9-S1	6.05	121.11	113.63
66	n	201	EHZ	C8-C9-S1	5.26	120.14	113.63
67	AC	402	HEM	CHC-C4B-NB	4.74	129.58	124.43

There are no chirality outliers.

5 of 551 torsion outliers are listed below:

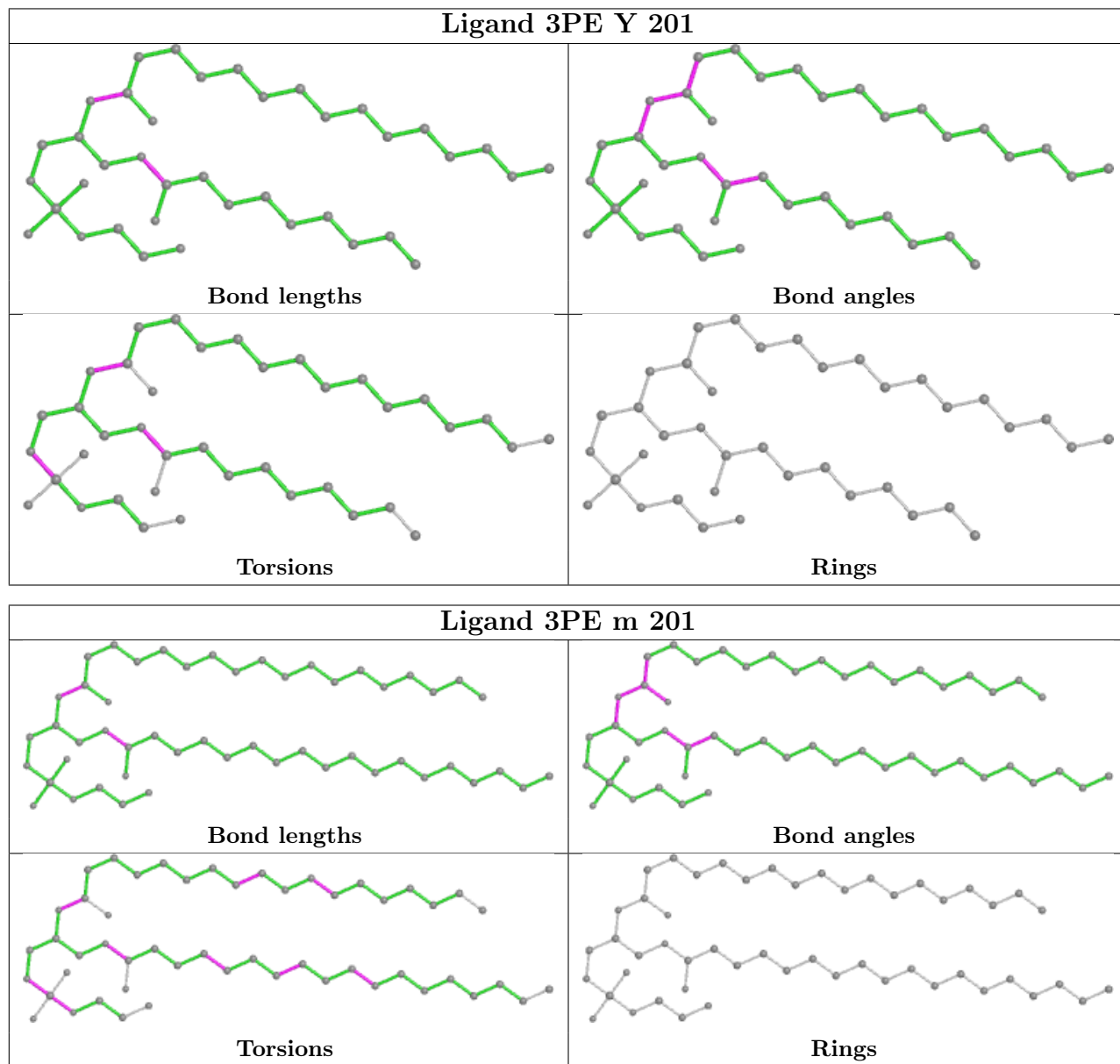
Mol	Chain	Res	Type	Atoms
55	A	401	3PE	O22-C21-O21-C2
55	H	402	3PE	C11-O13-P-O11
55	H	402	3PE	C11-O13-P-O12
55	H	402	3PE	C11-O13-P-O14
55	H	402	3PE	O13-C11-C12-N

There are no ring outliers.

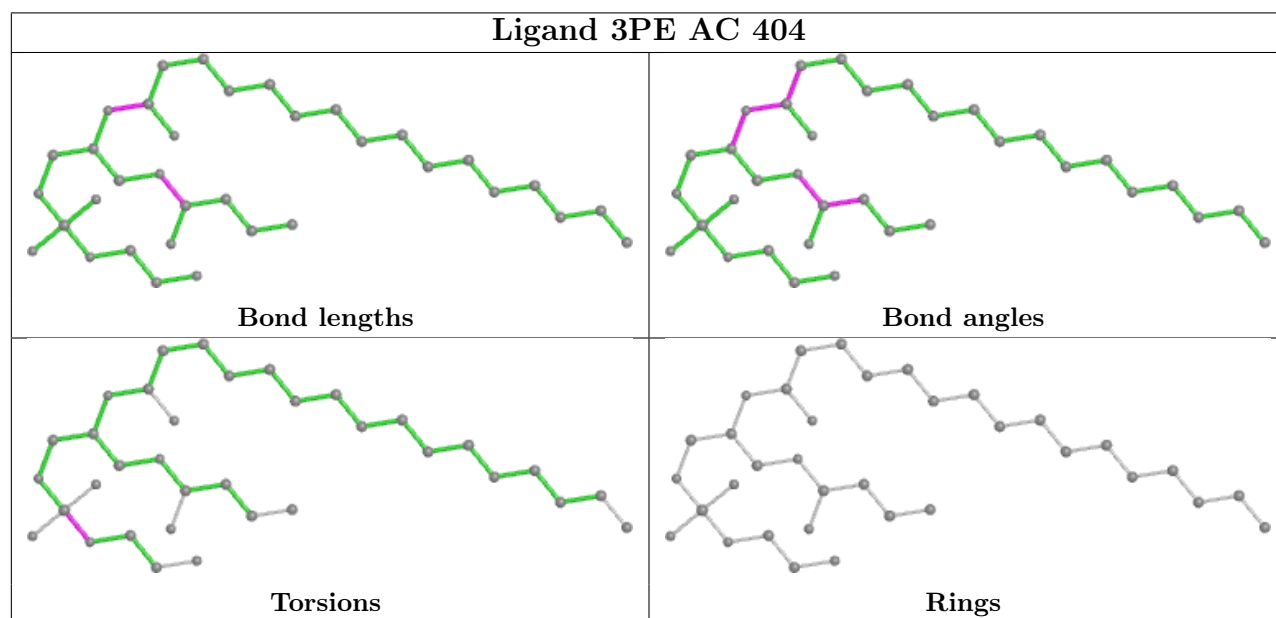
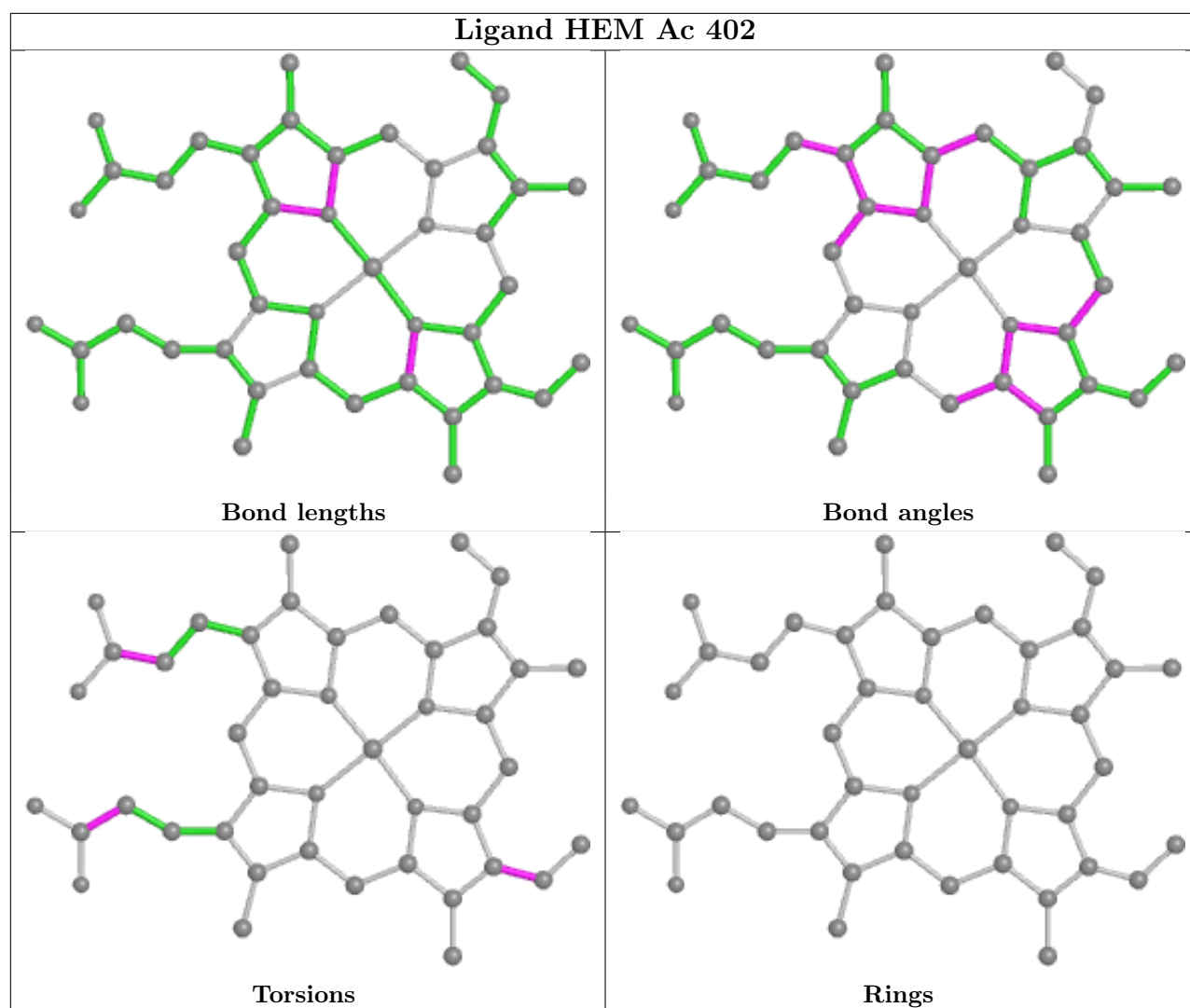
No monomer is involved in short contacts.

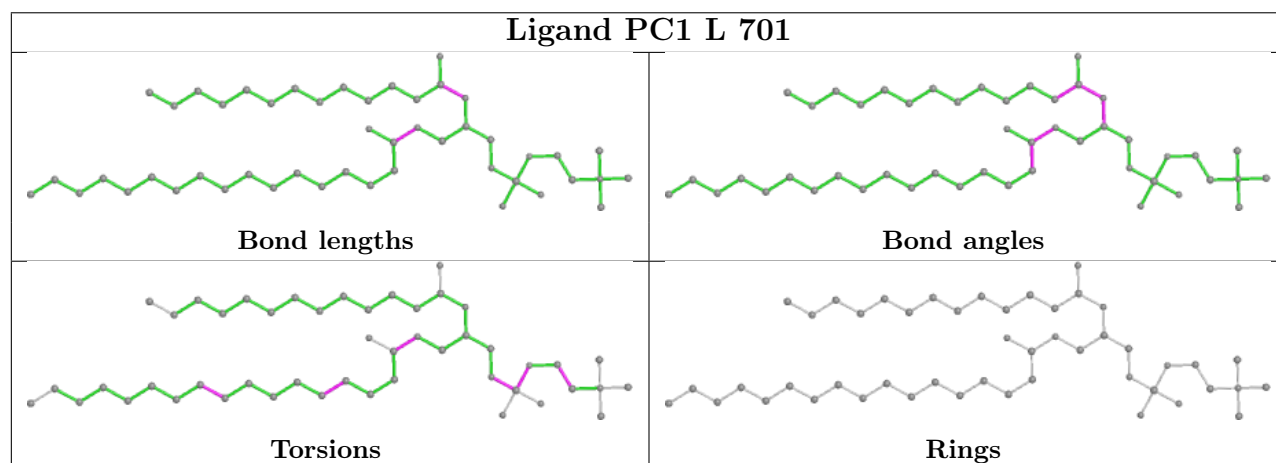
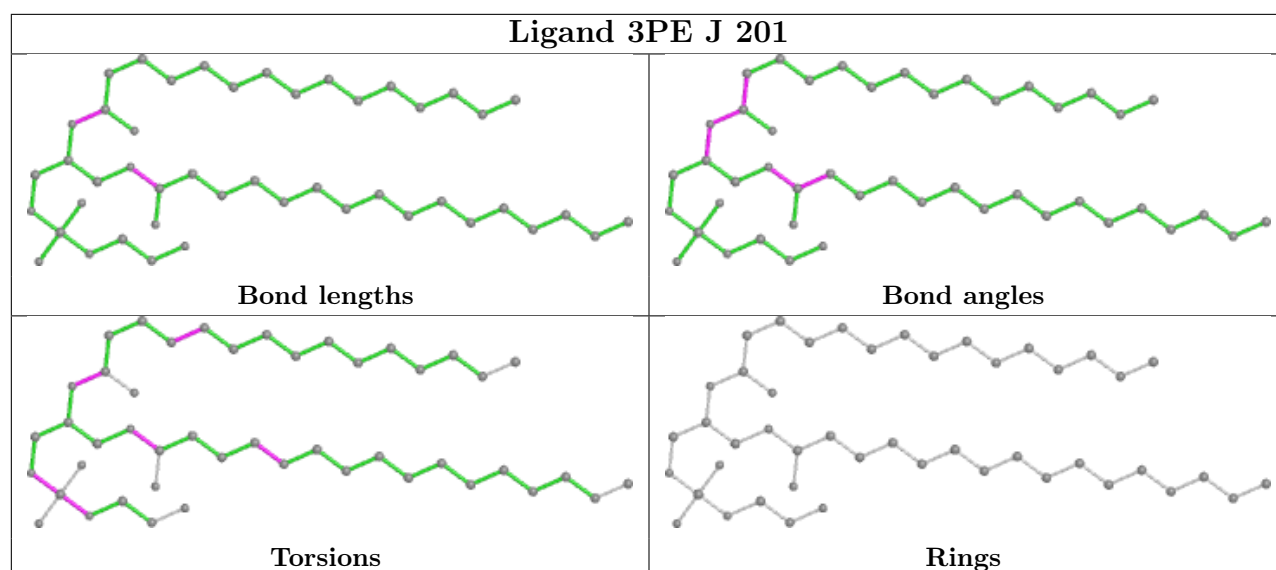
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be

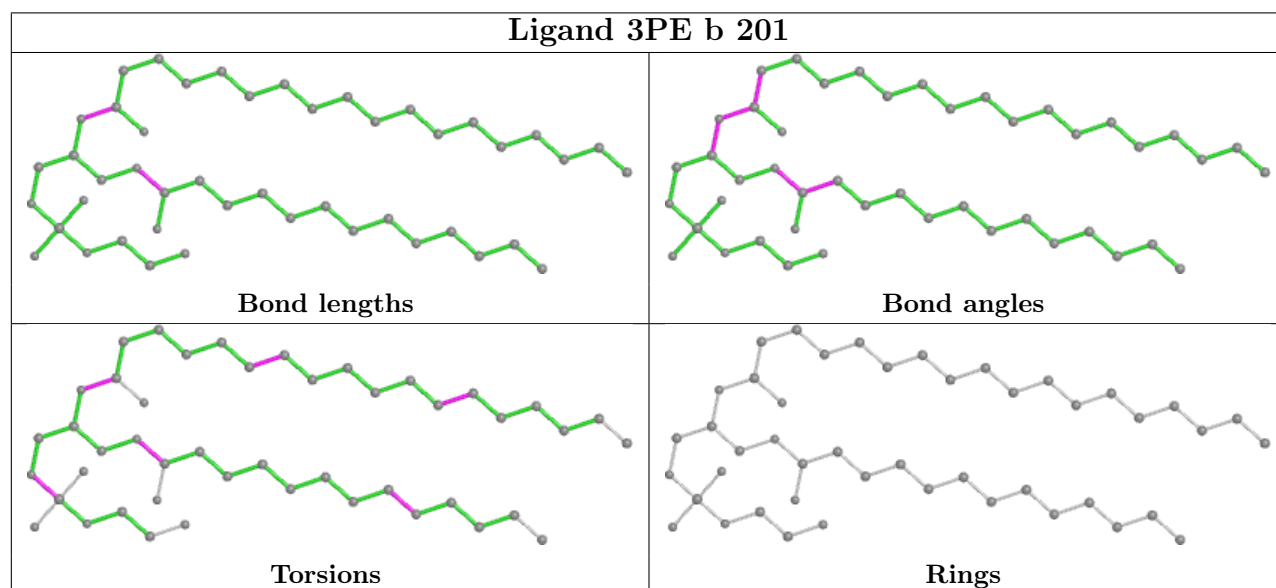
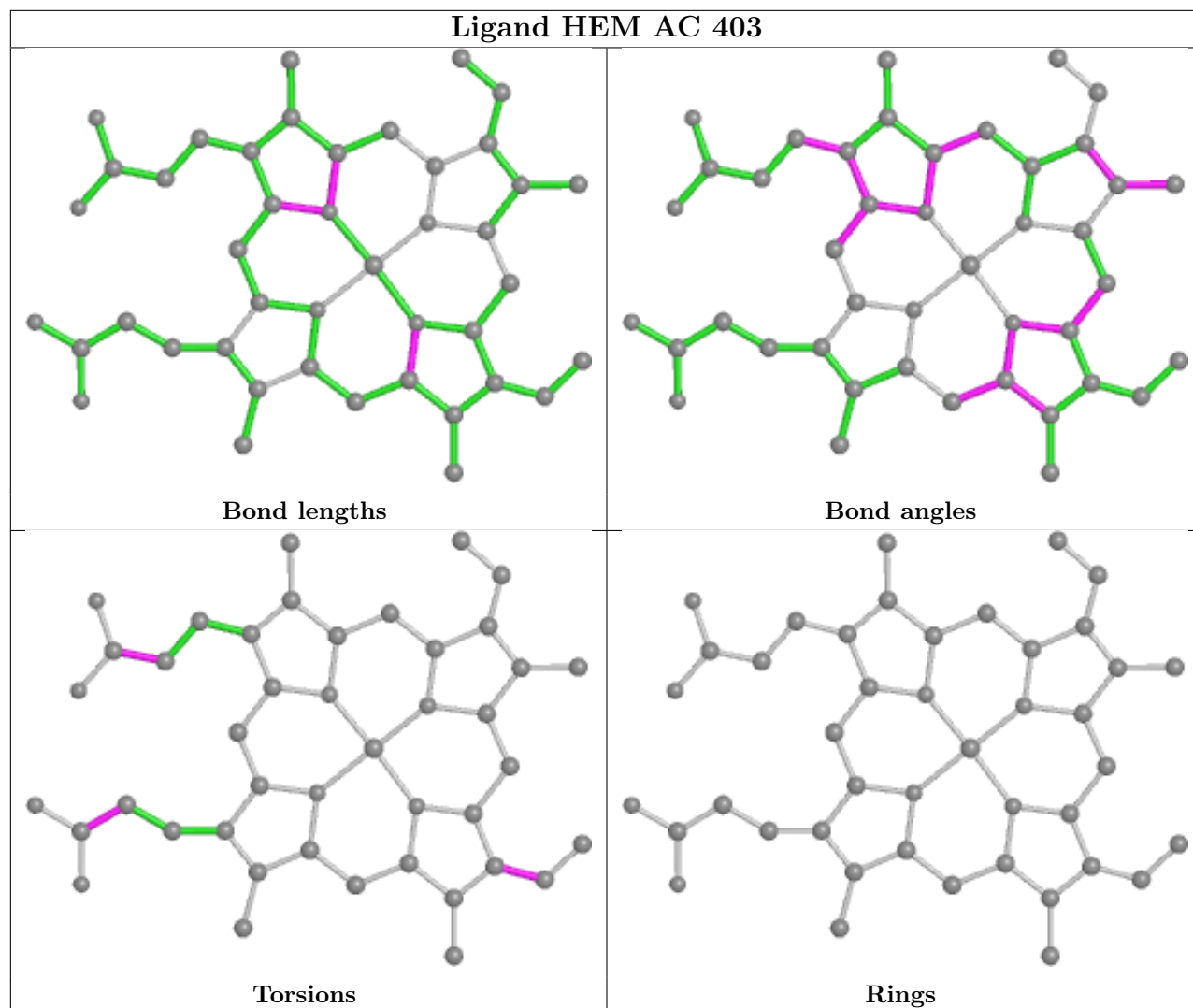
highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

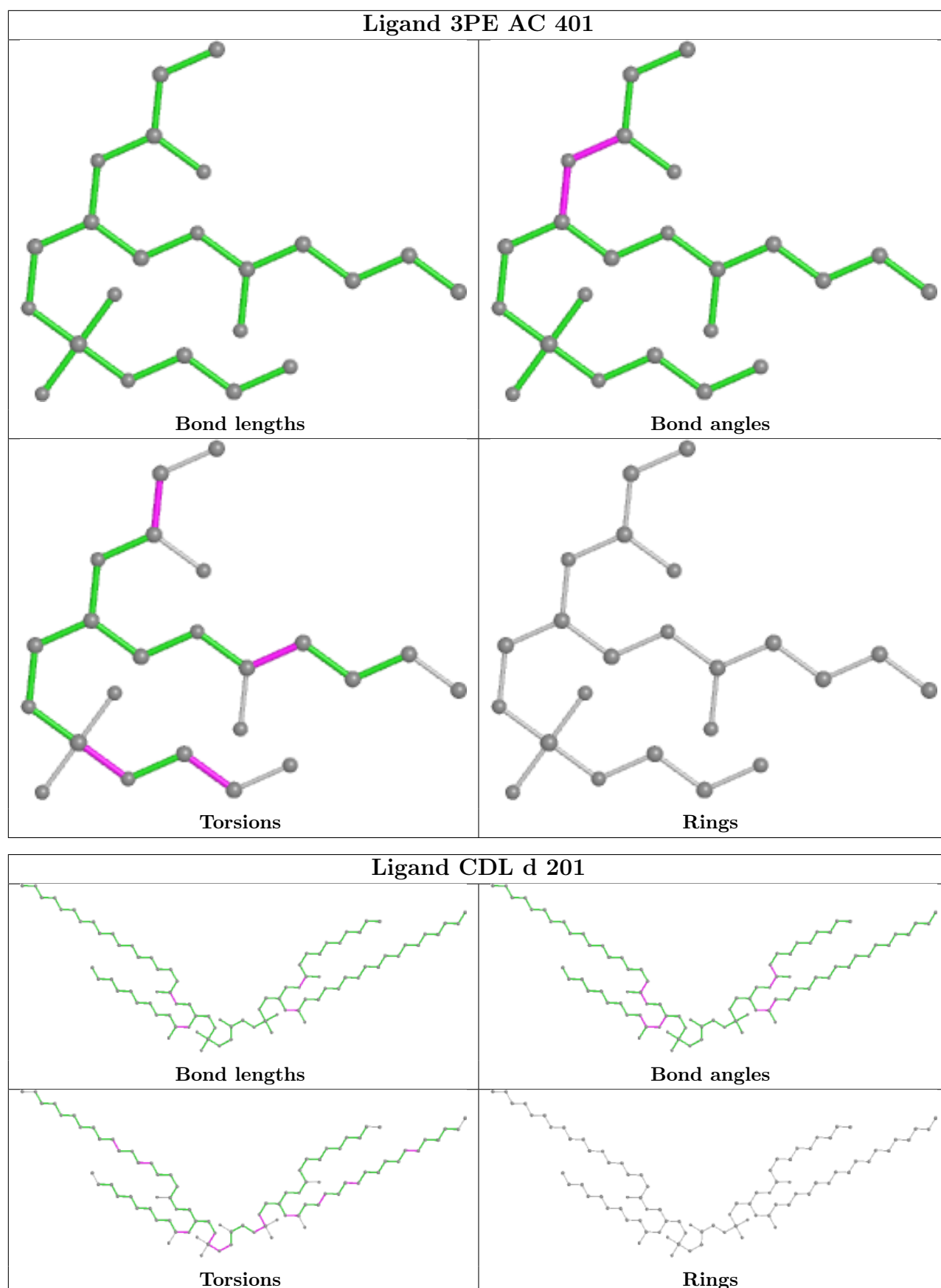


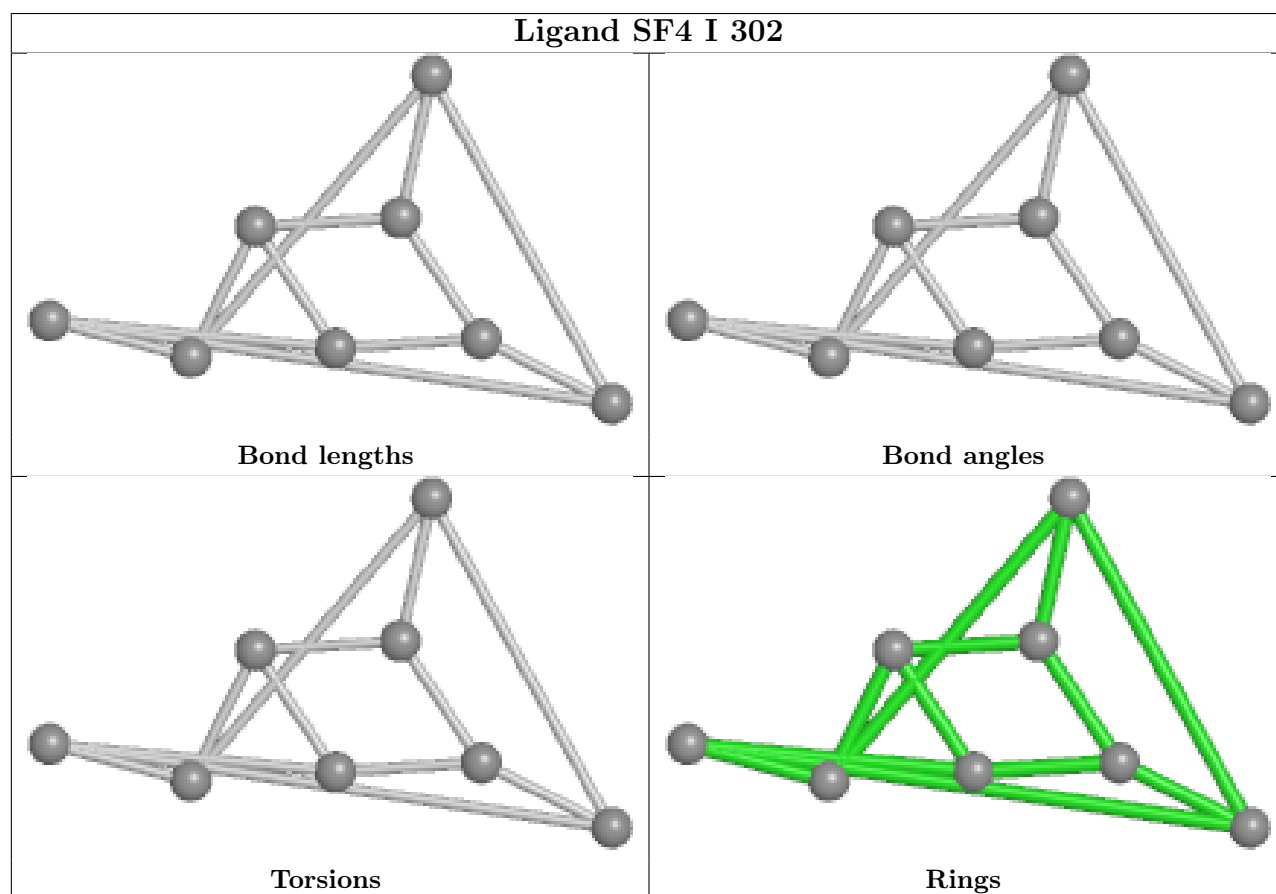
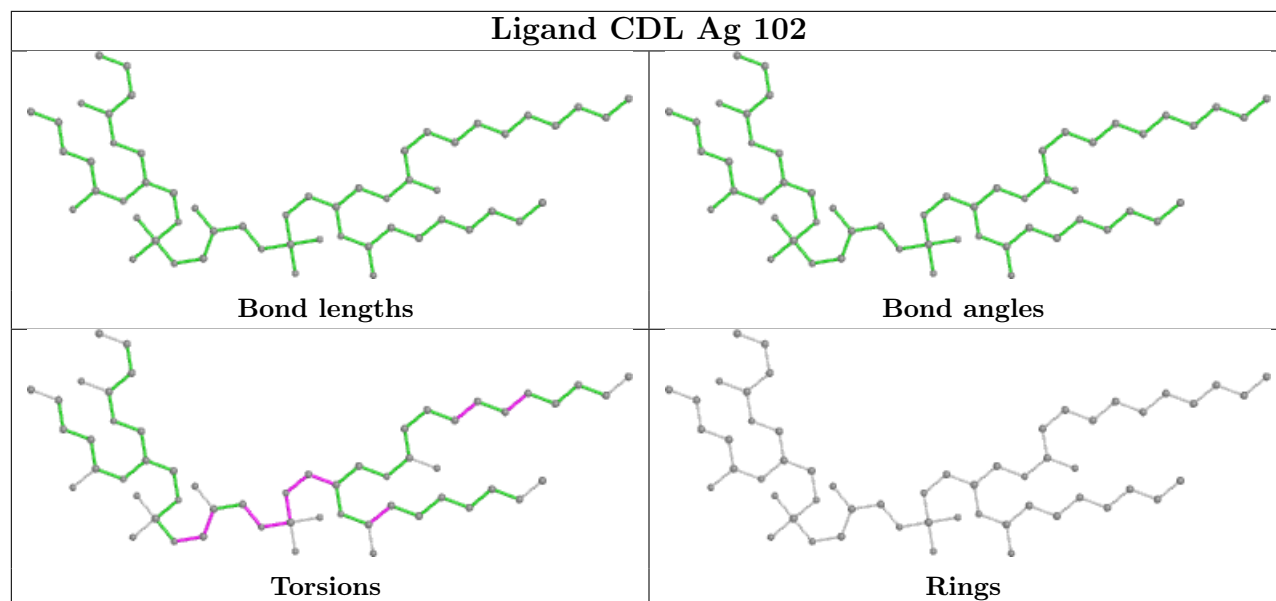


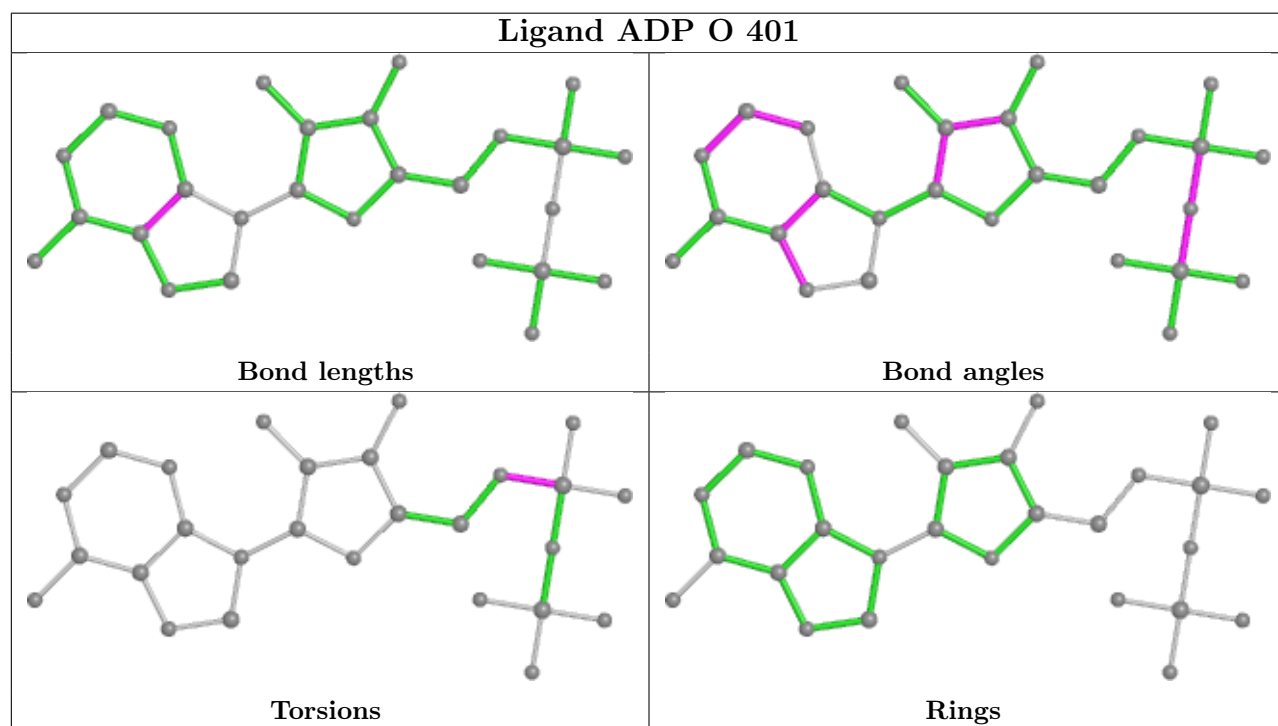
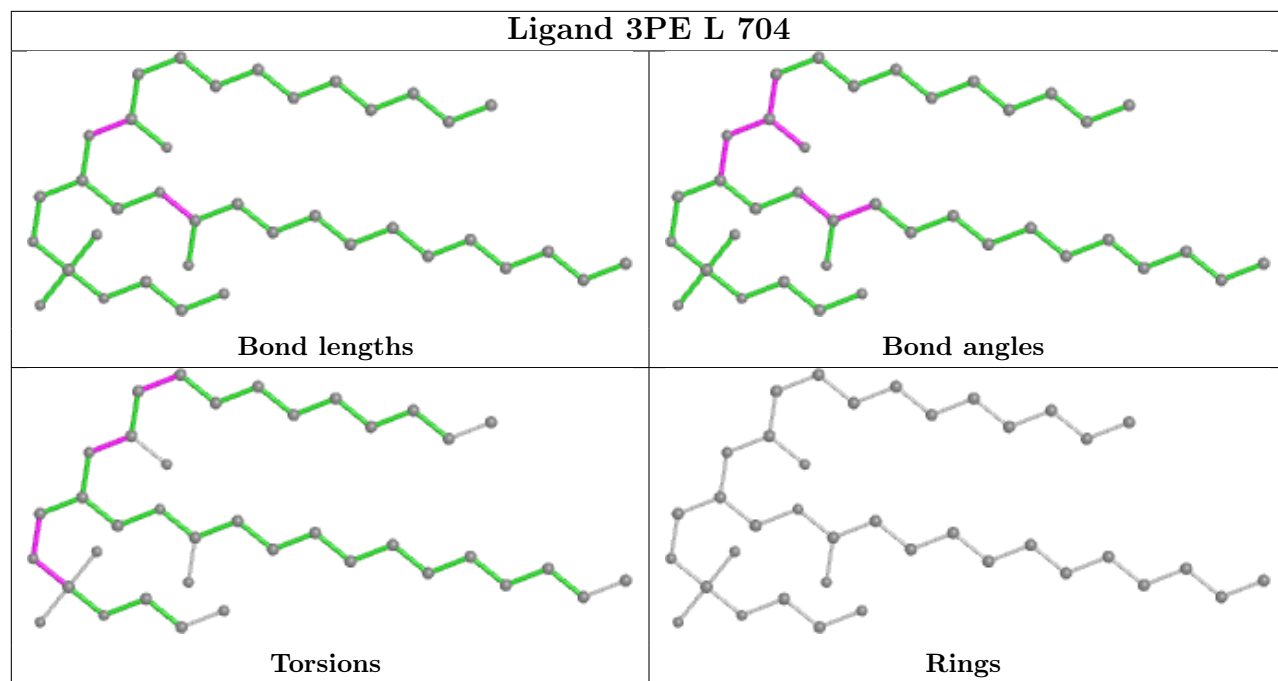


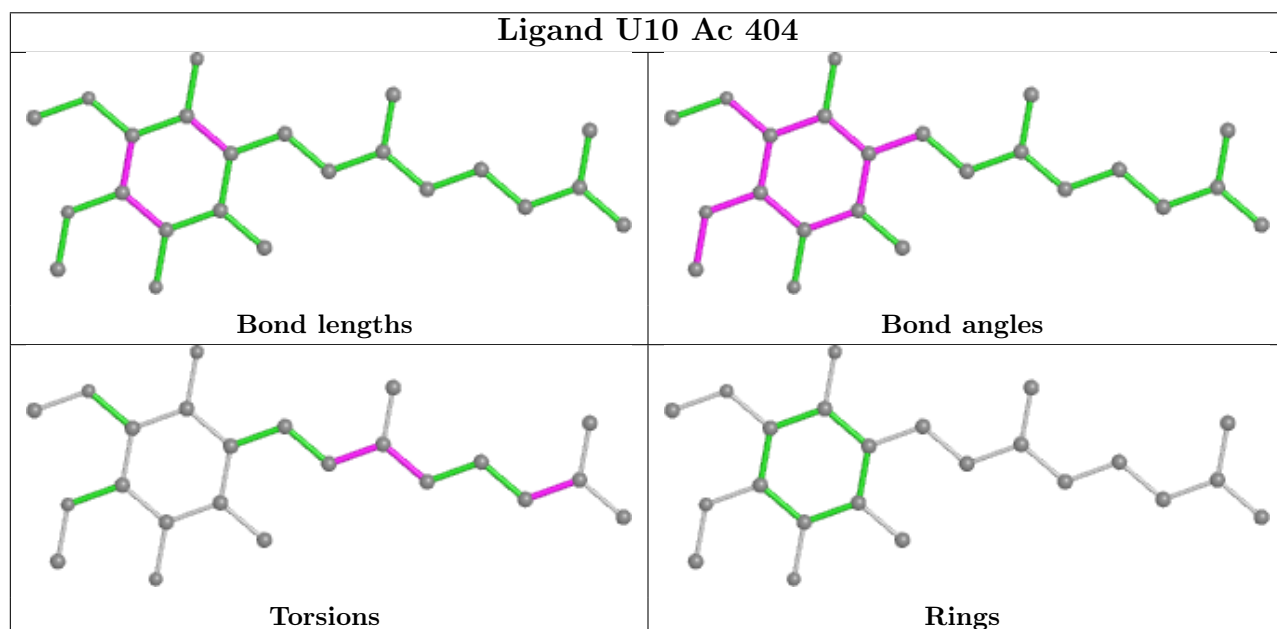
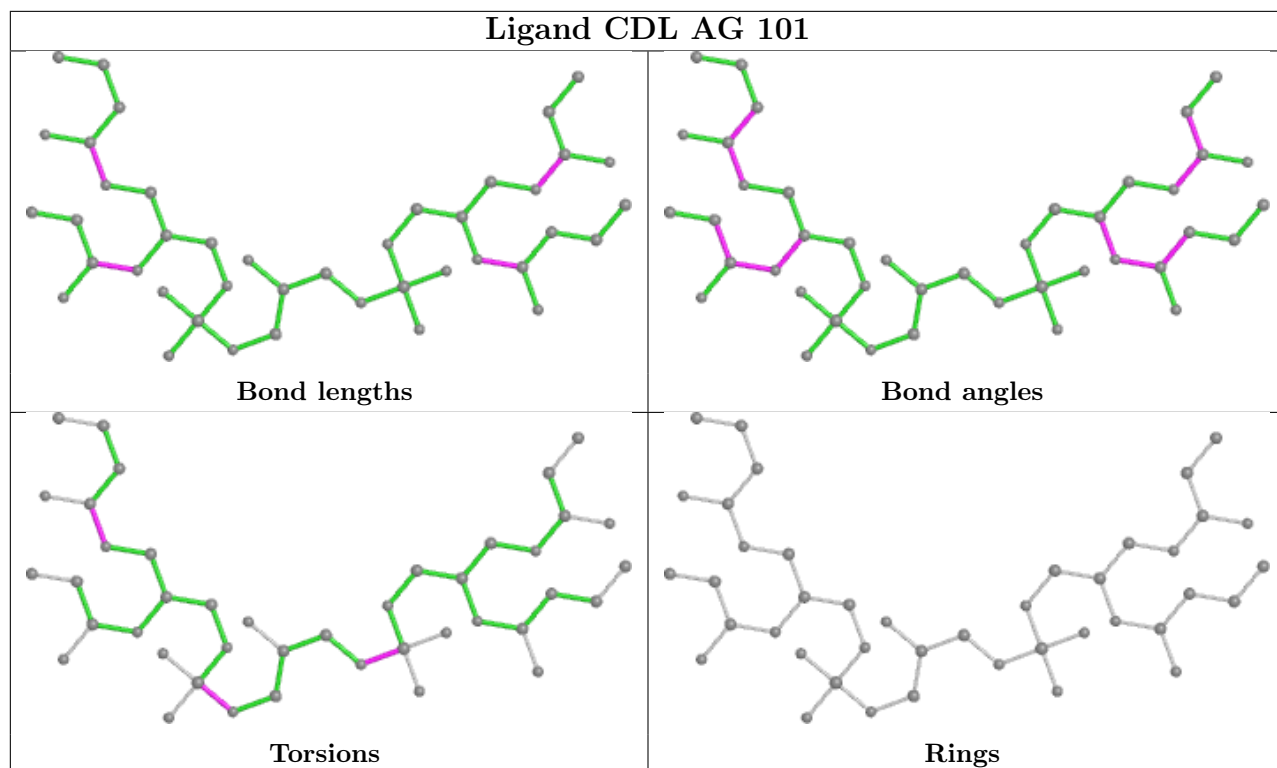


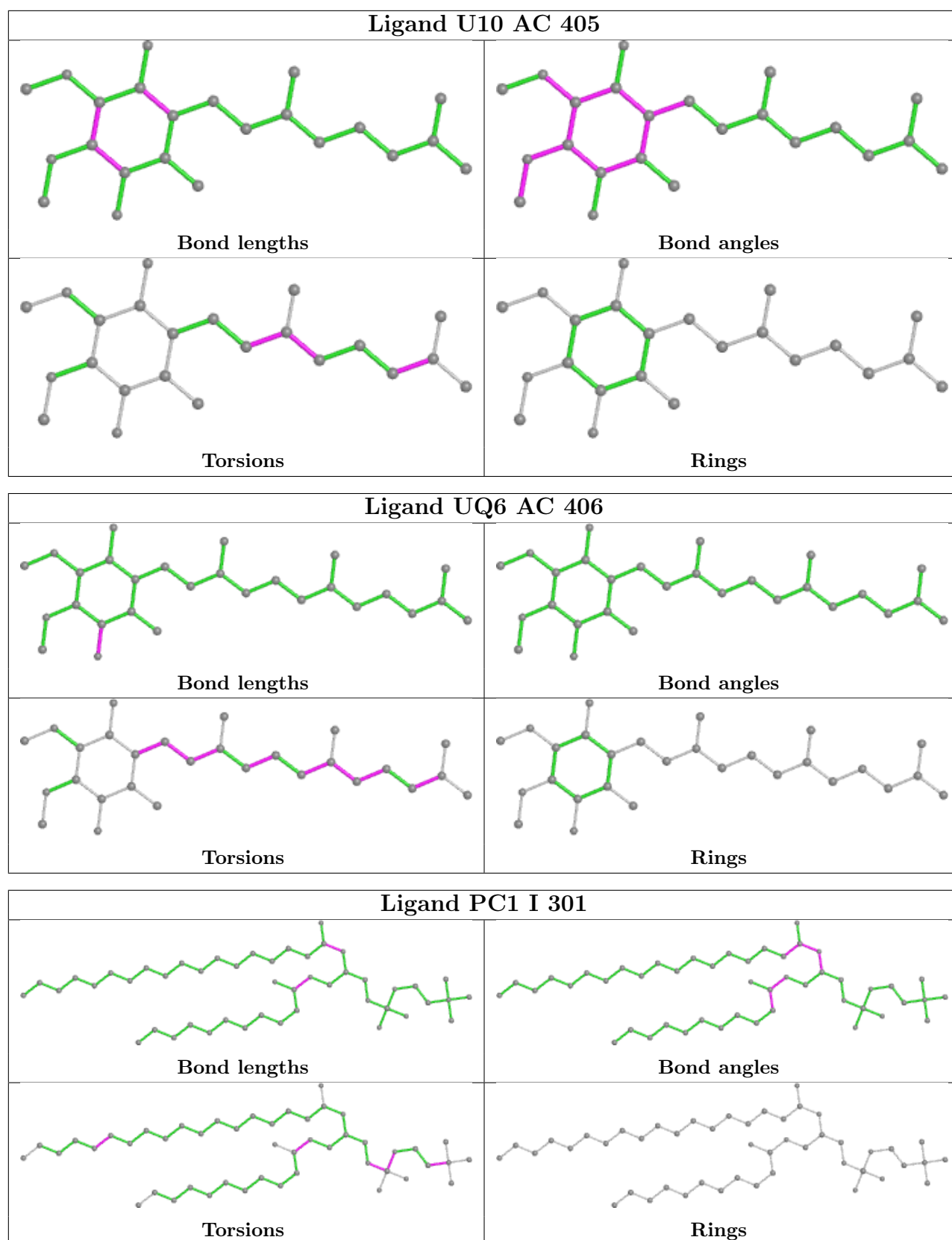




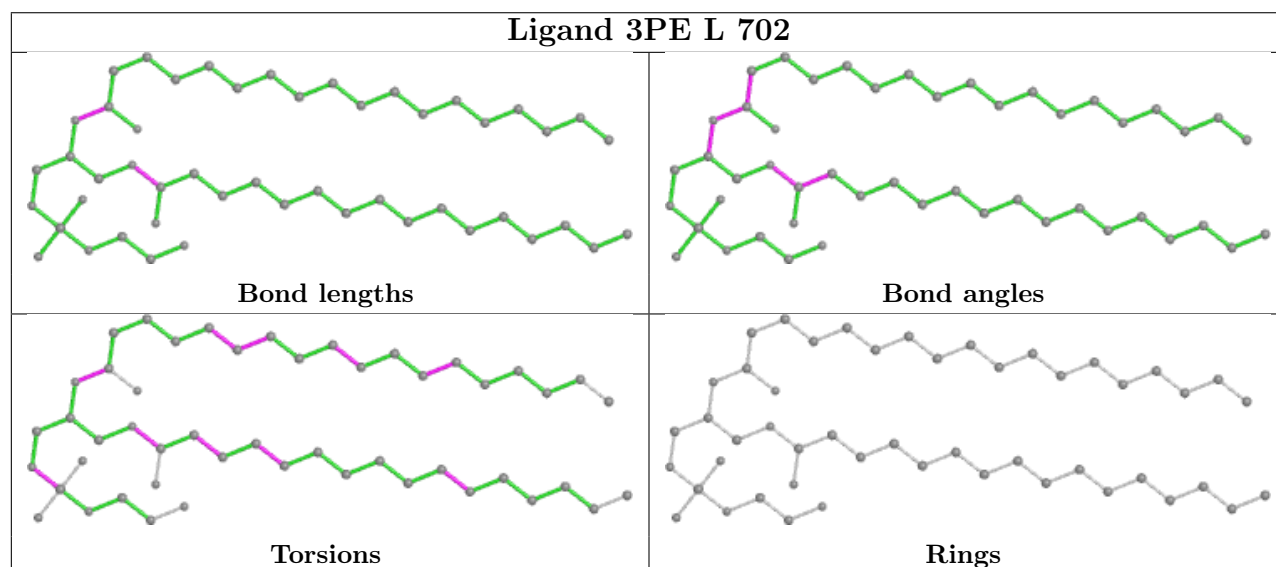
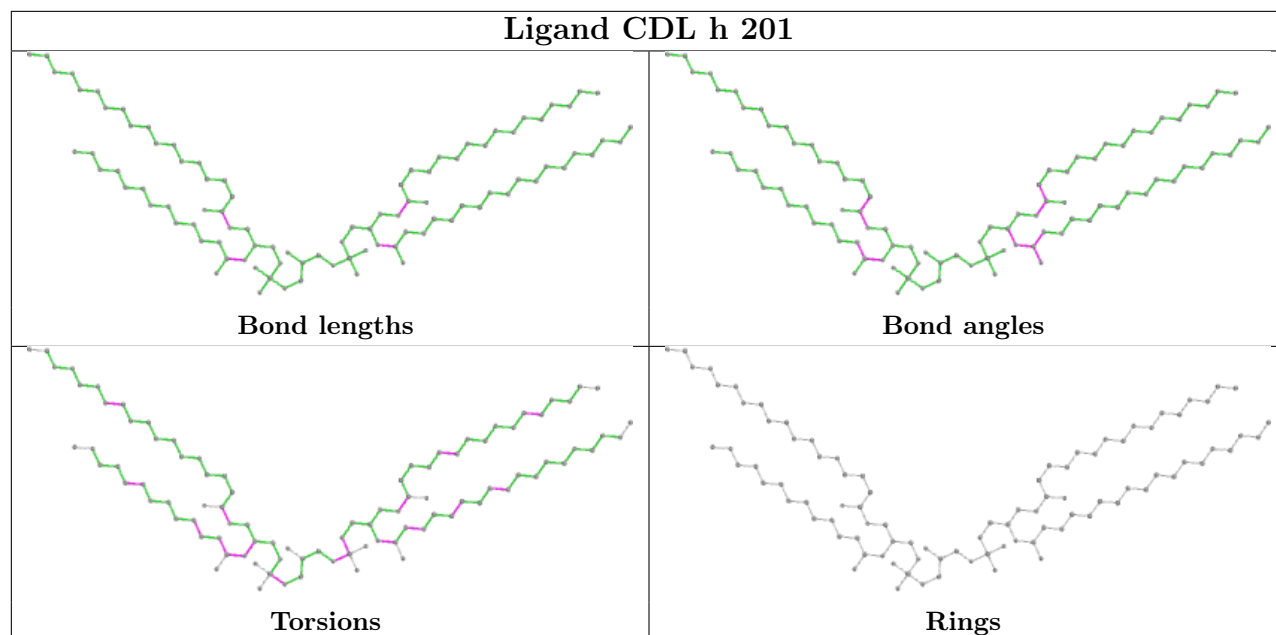


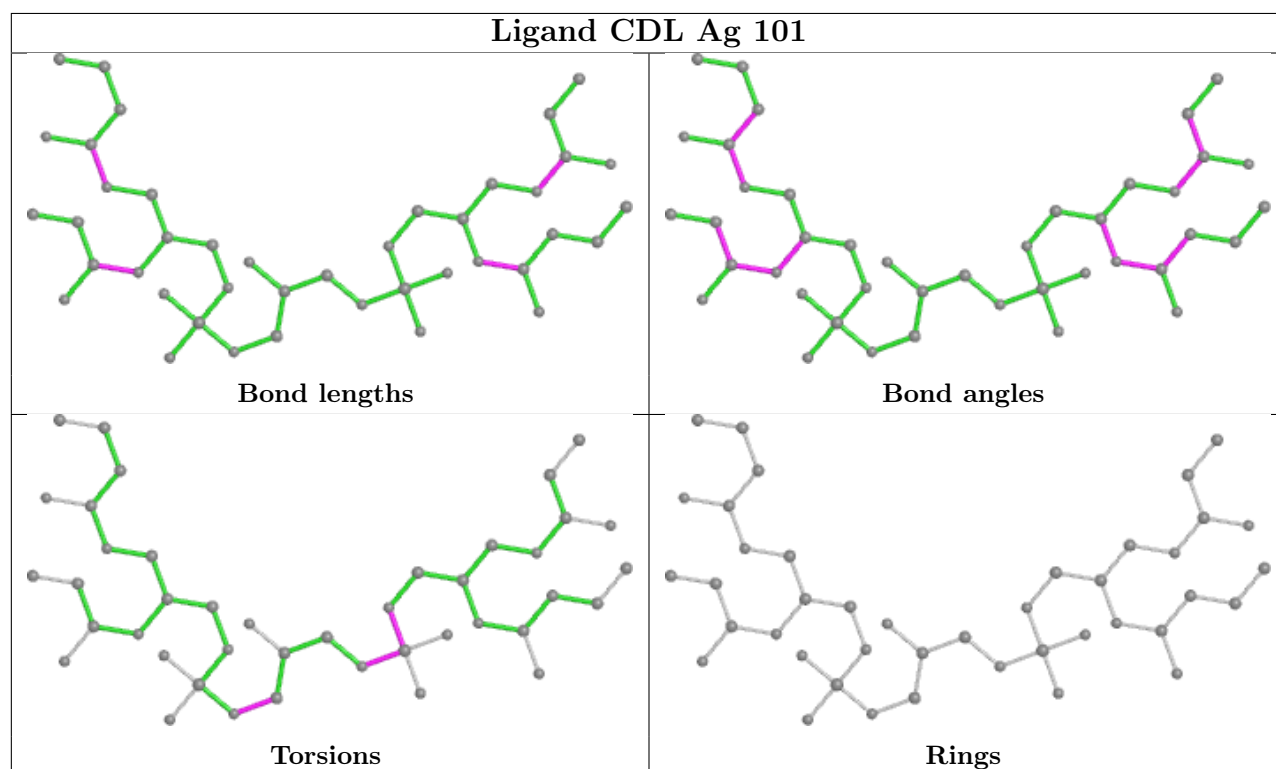
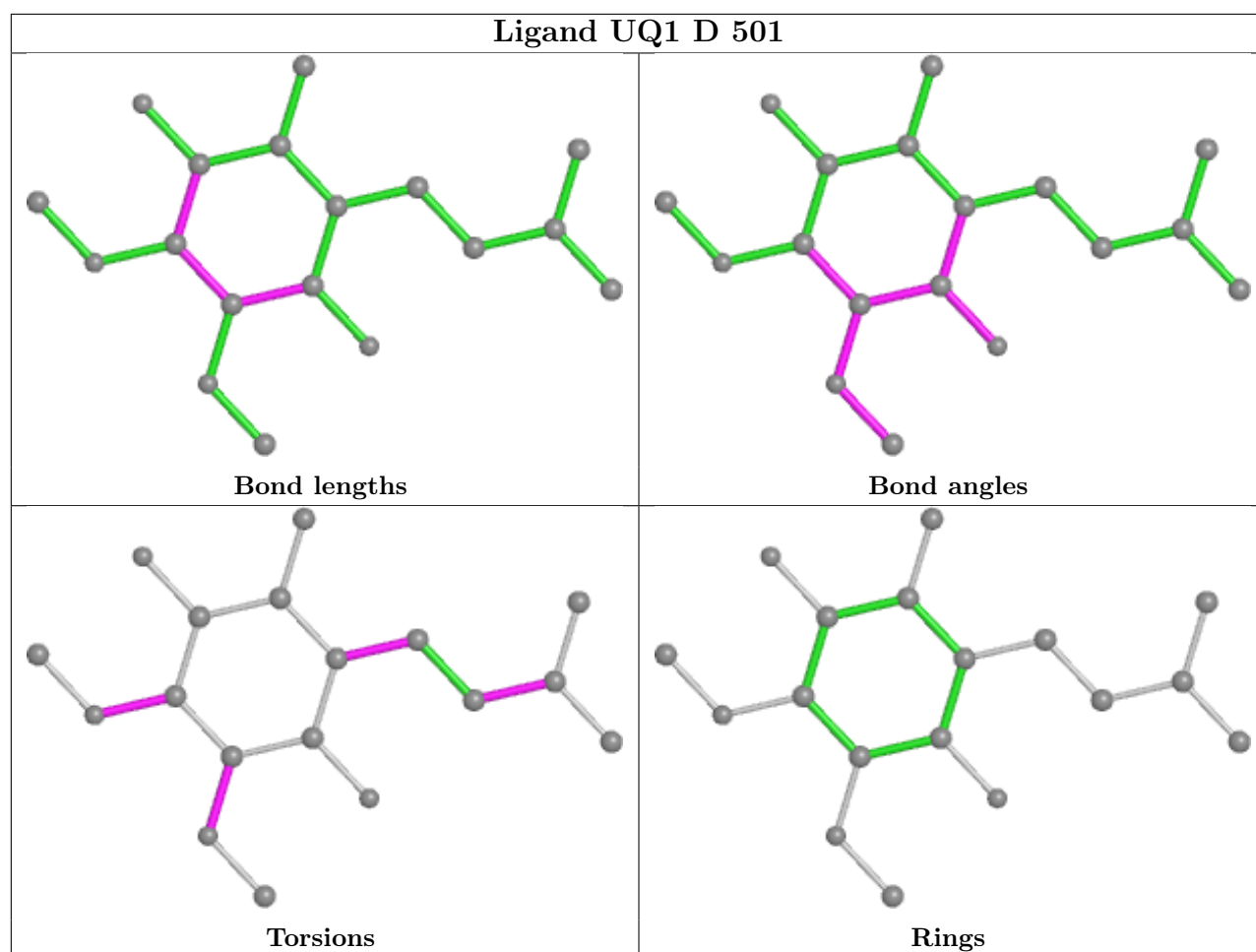


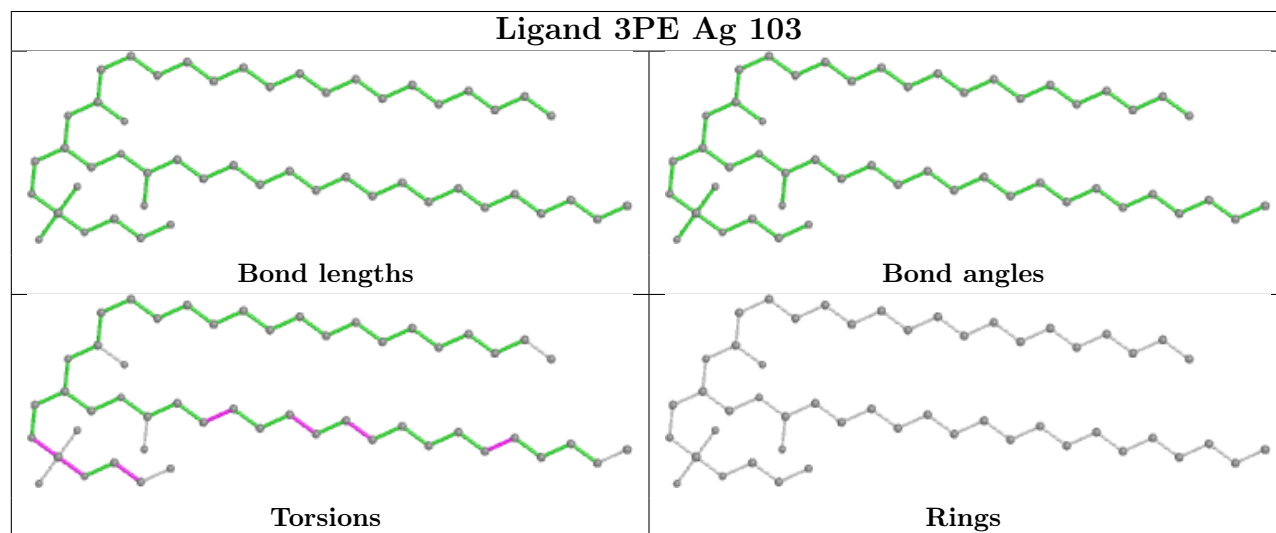
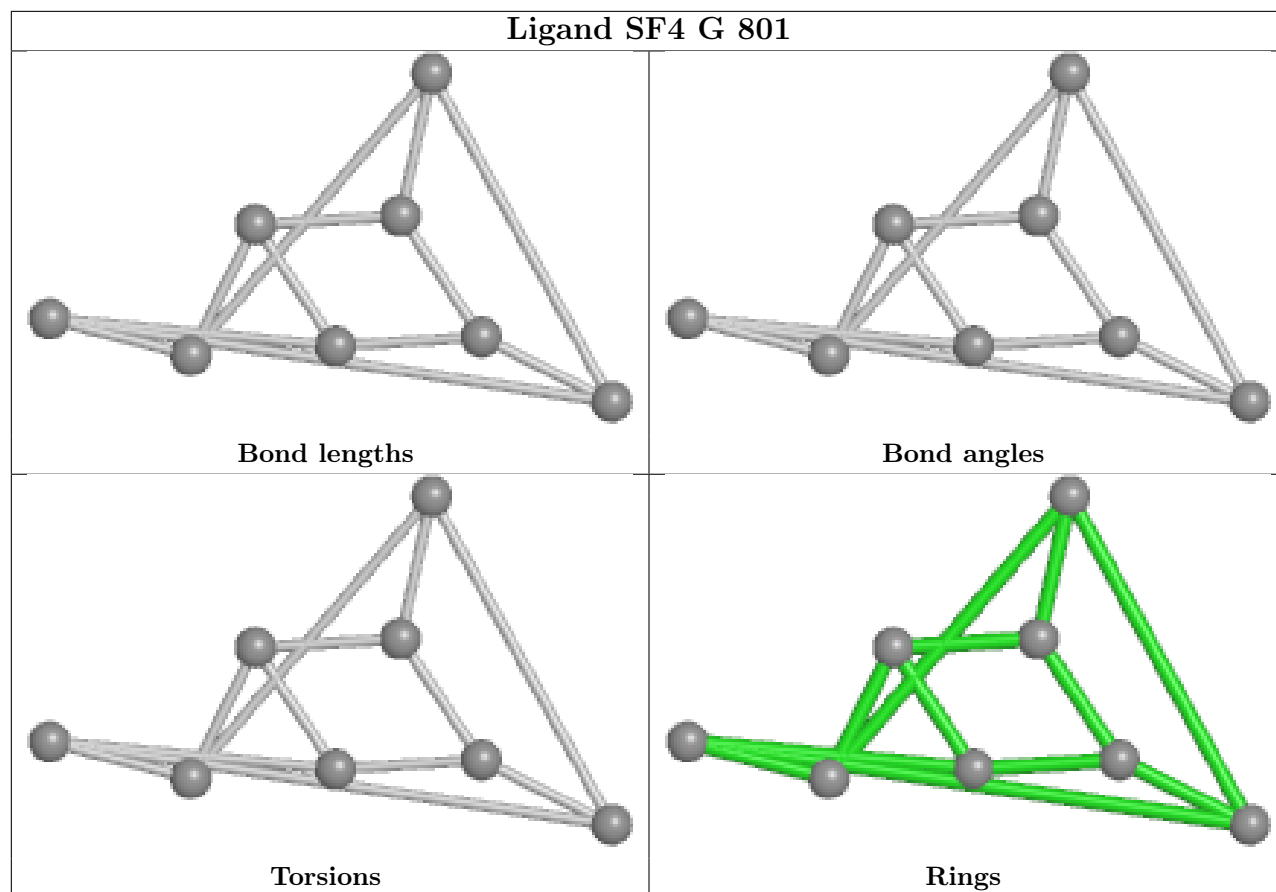


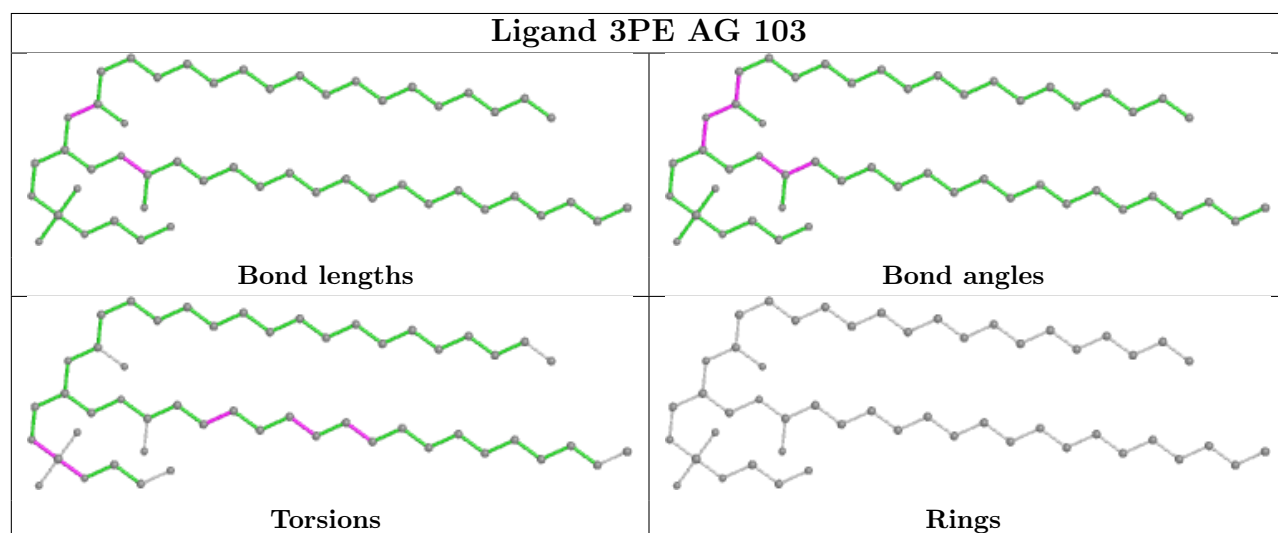
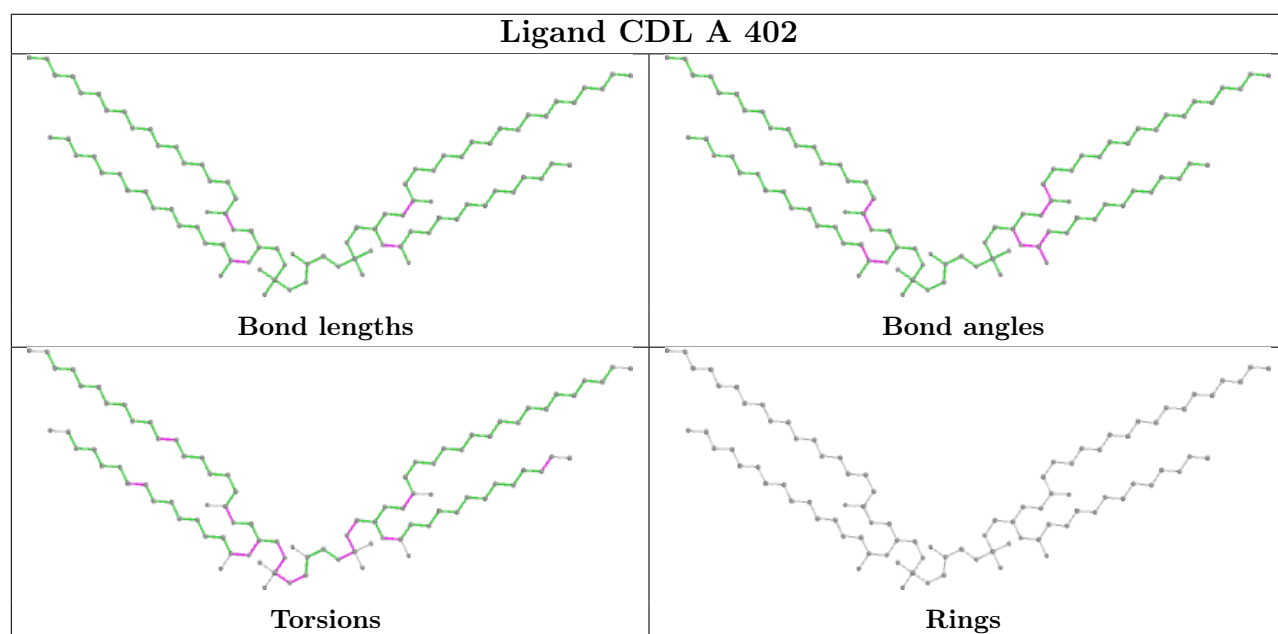
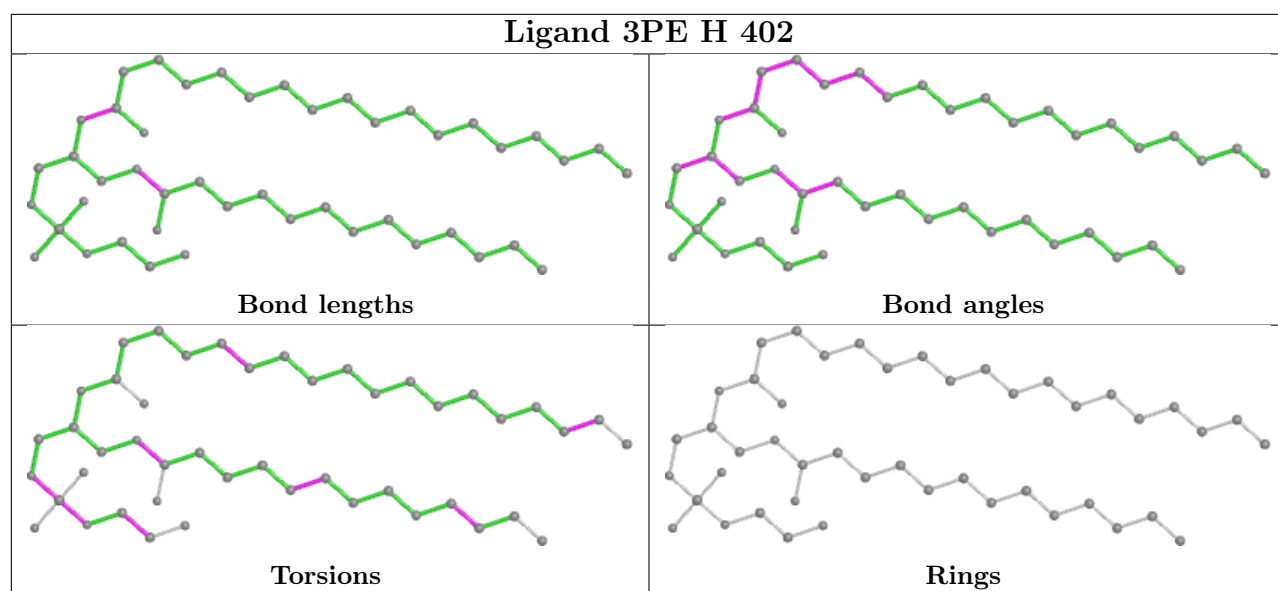


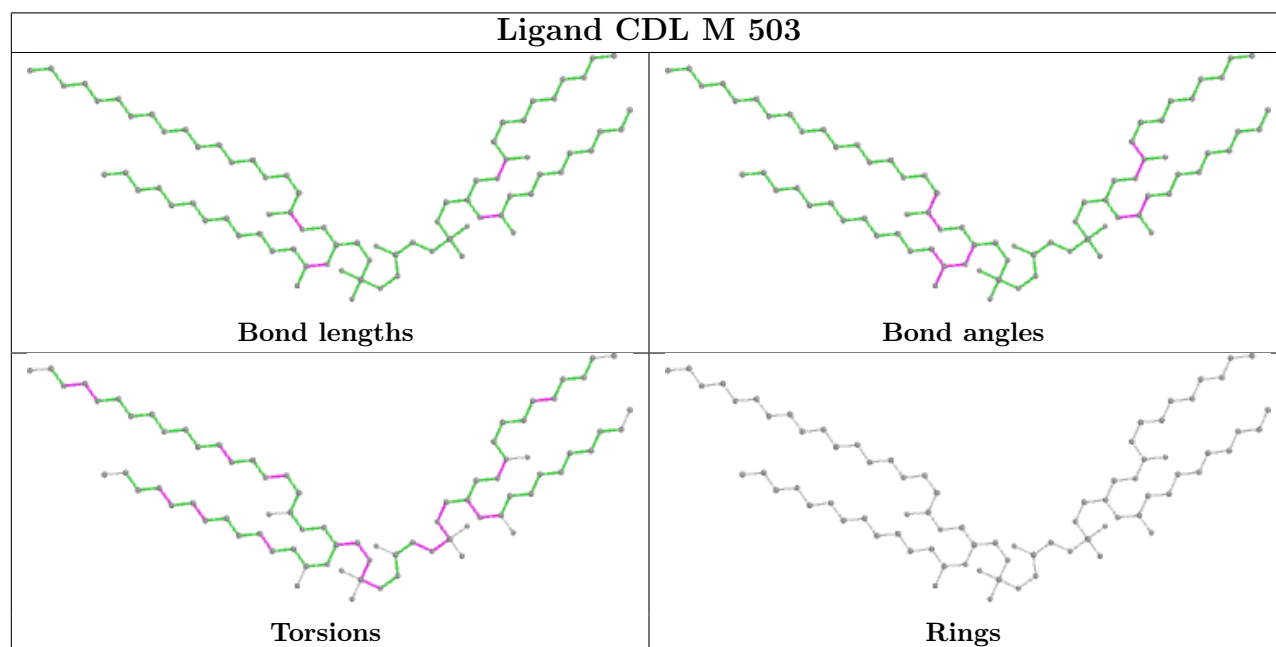
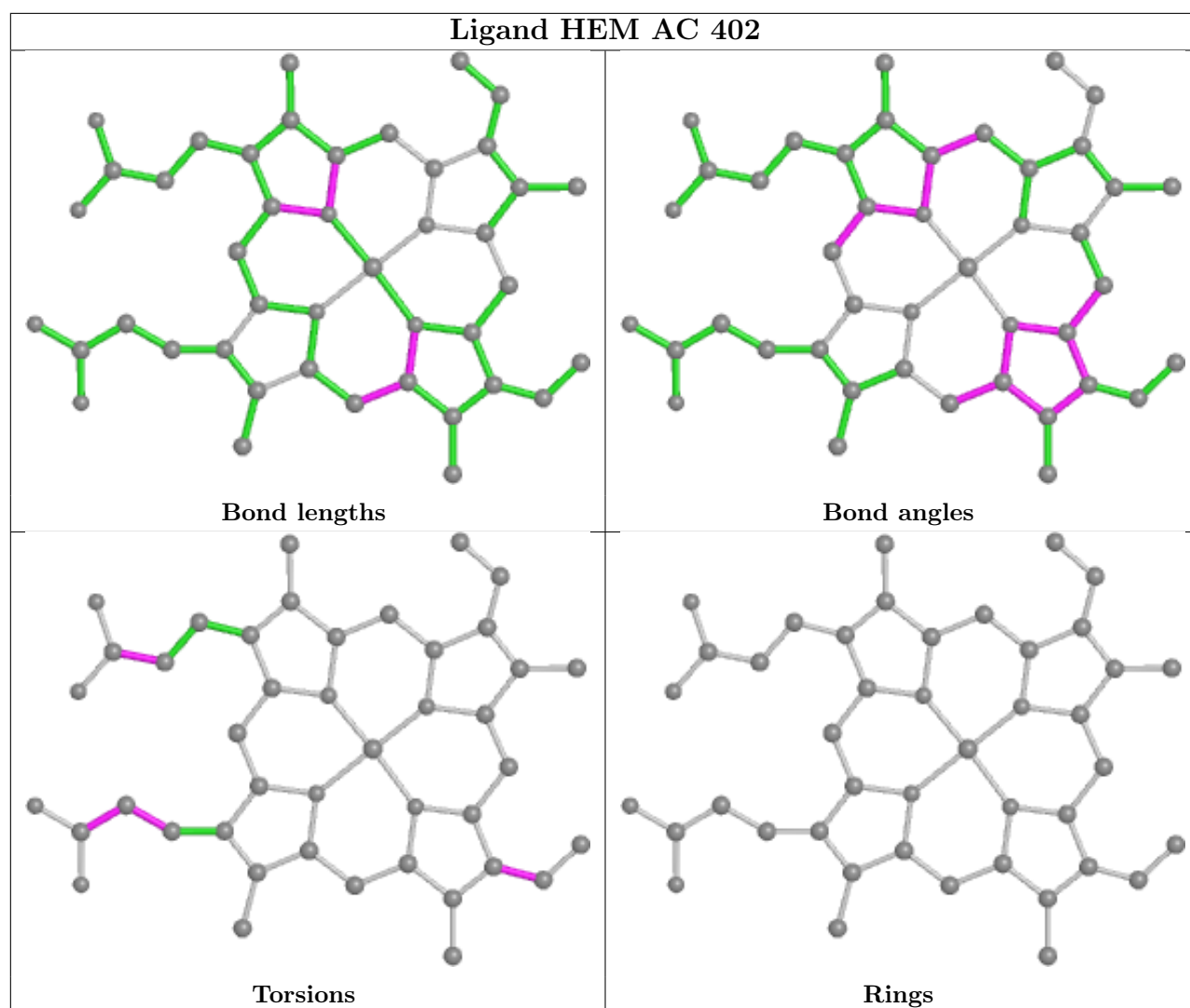


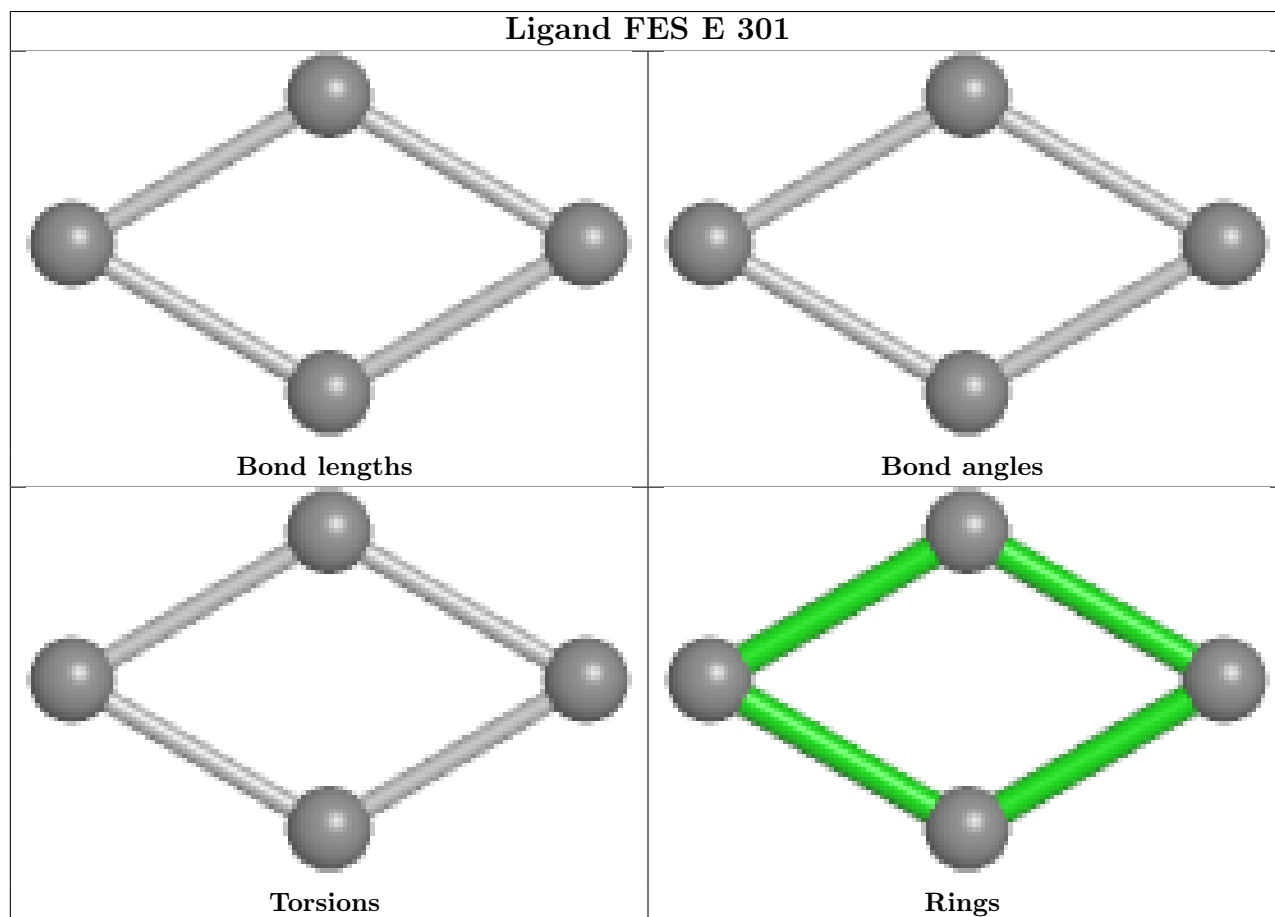
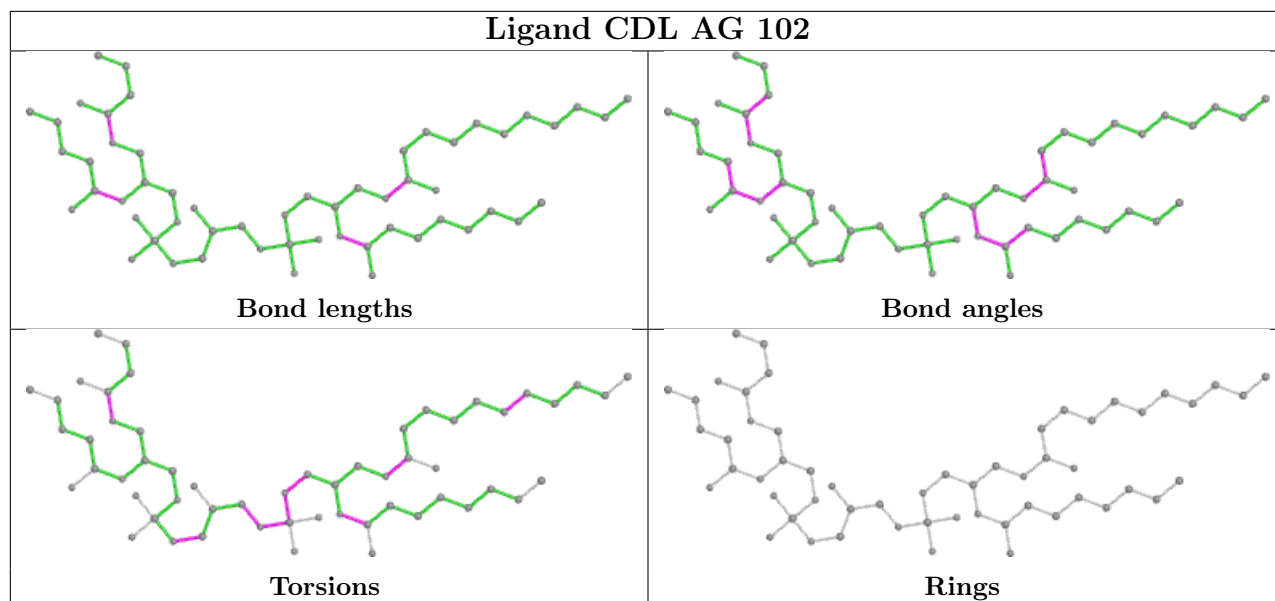


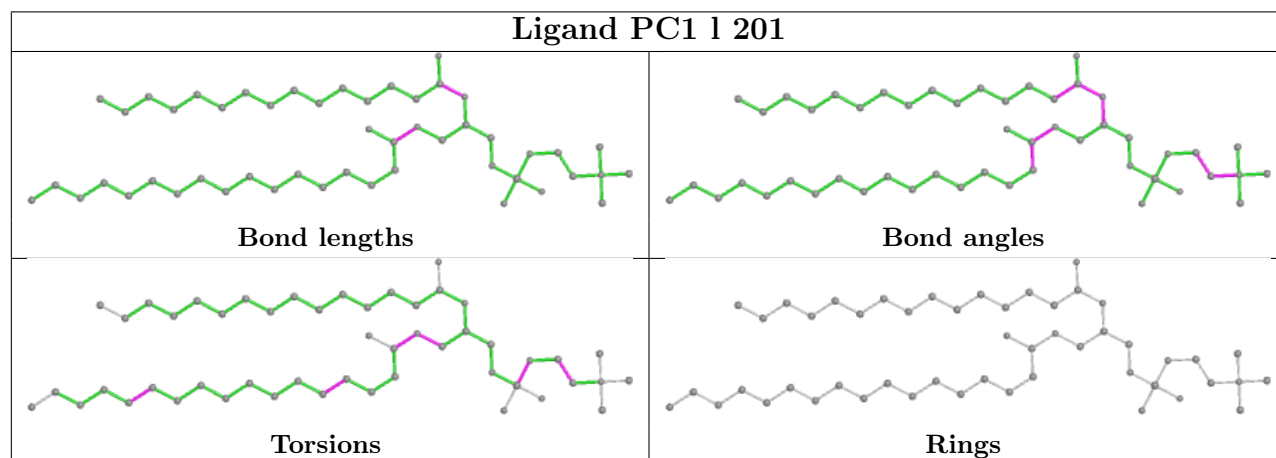
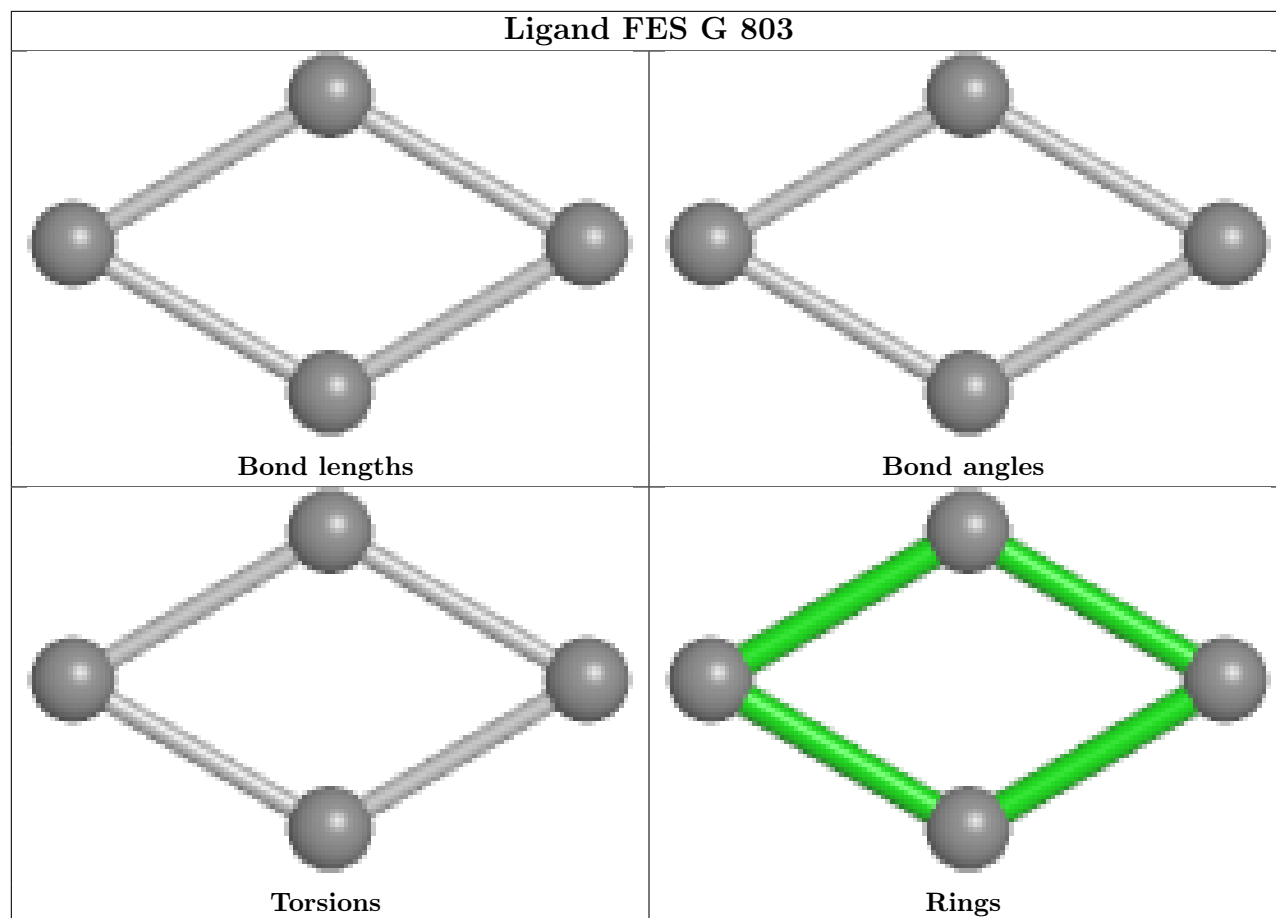


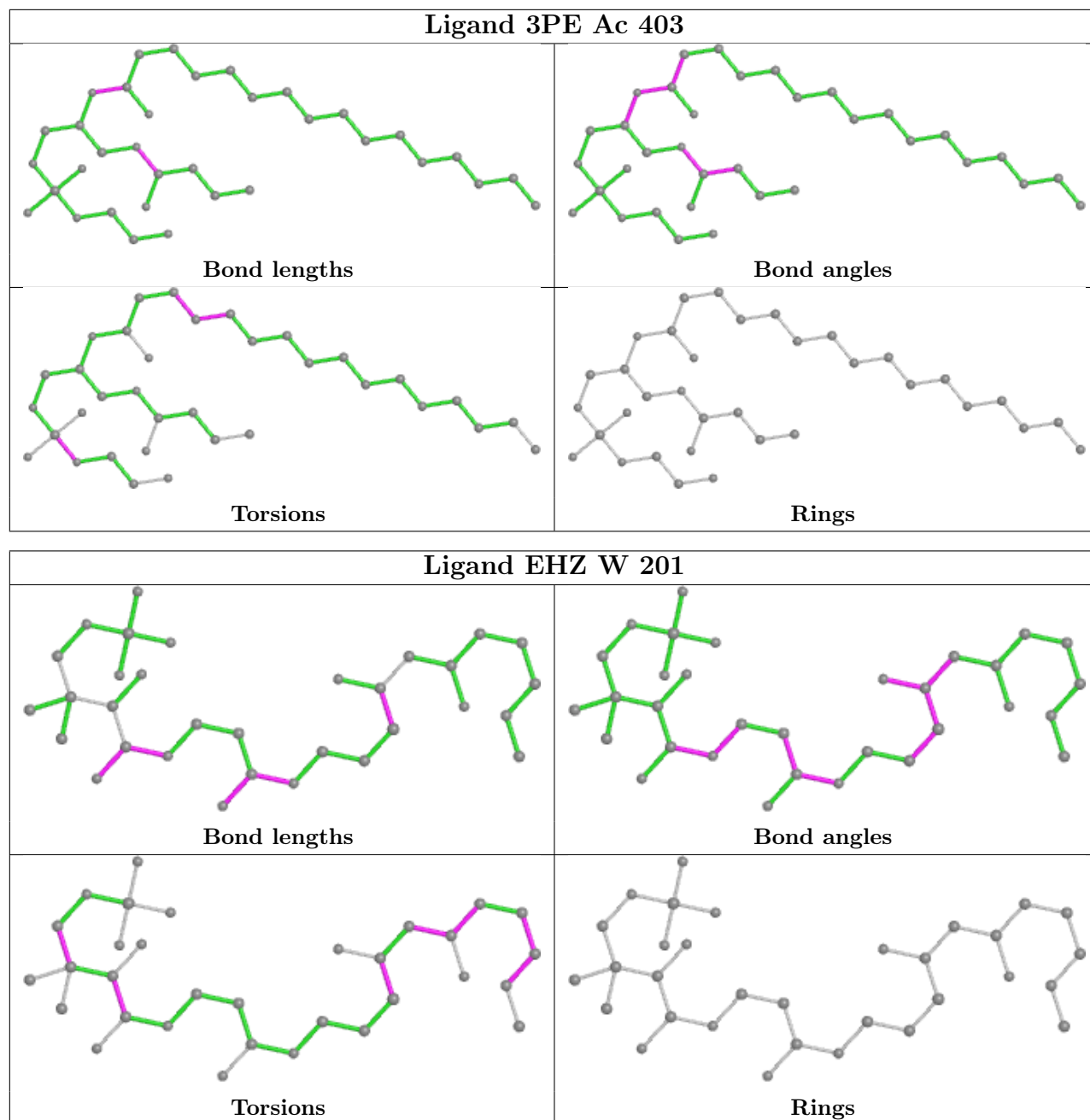




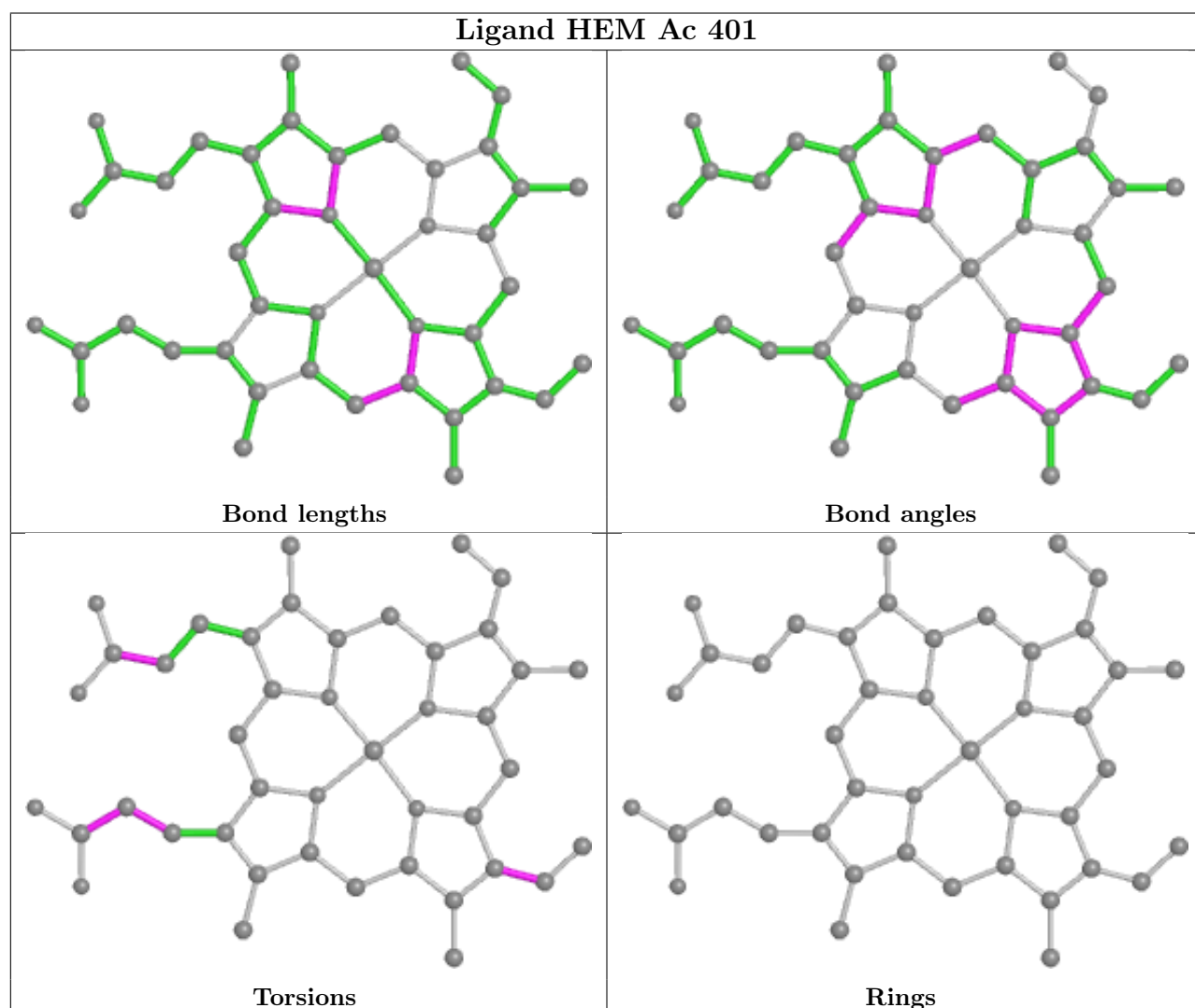
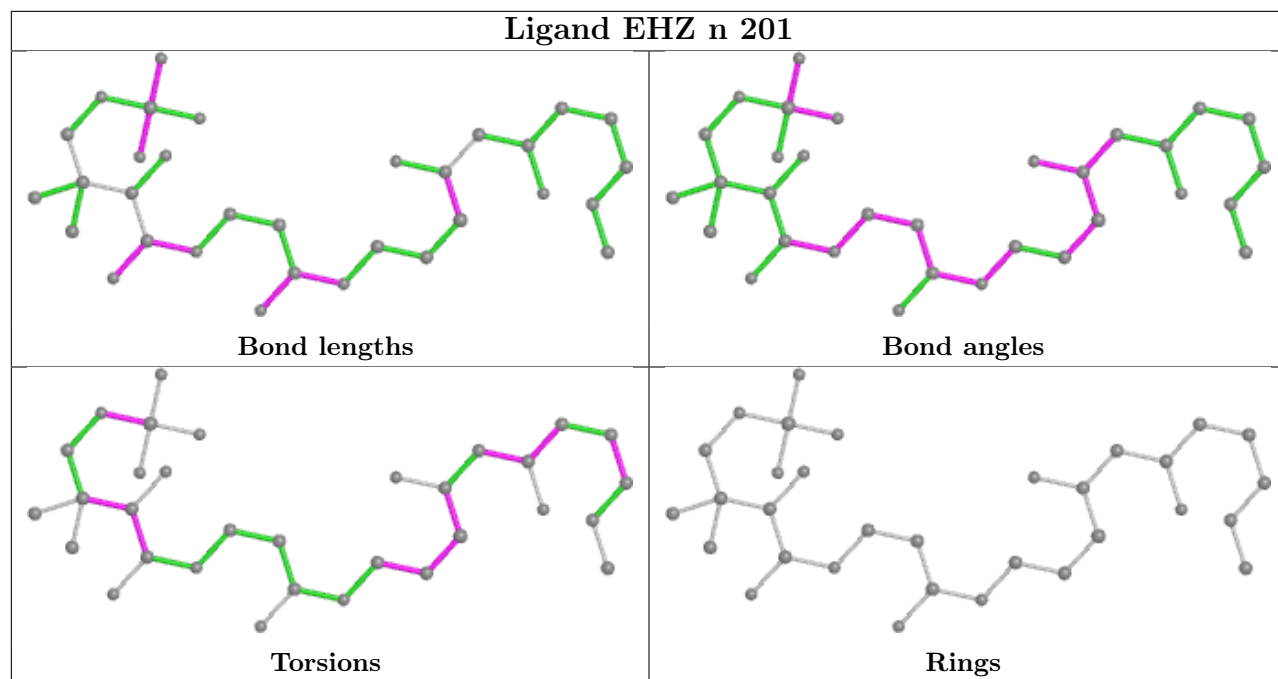


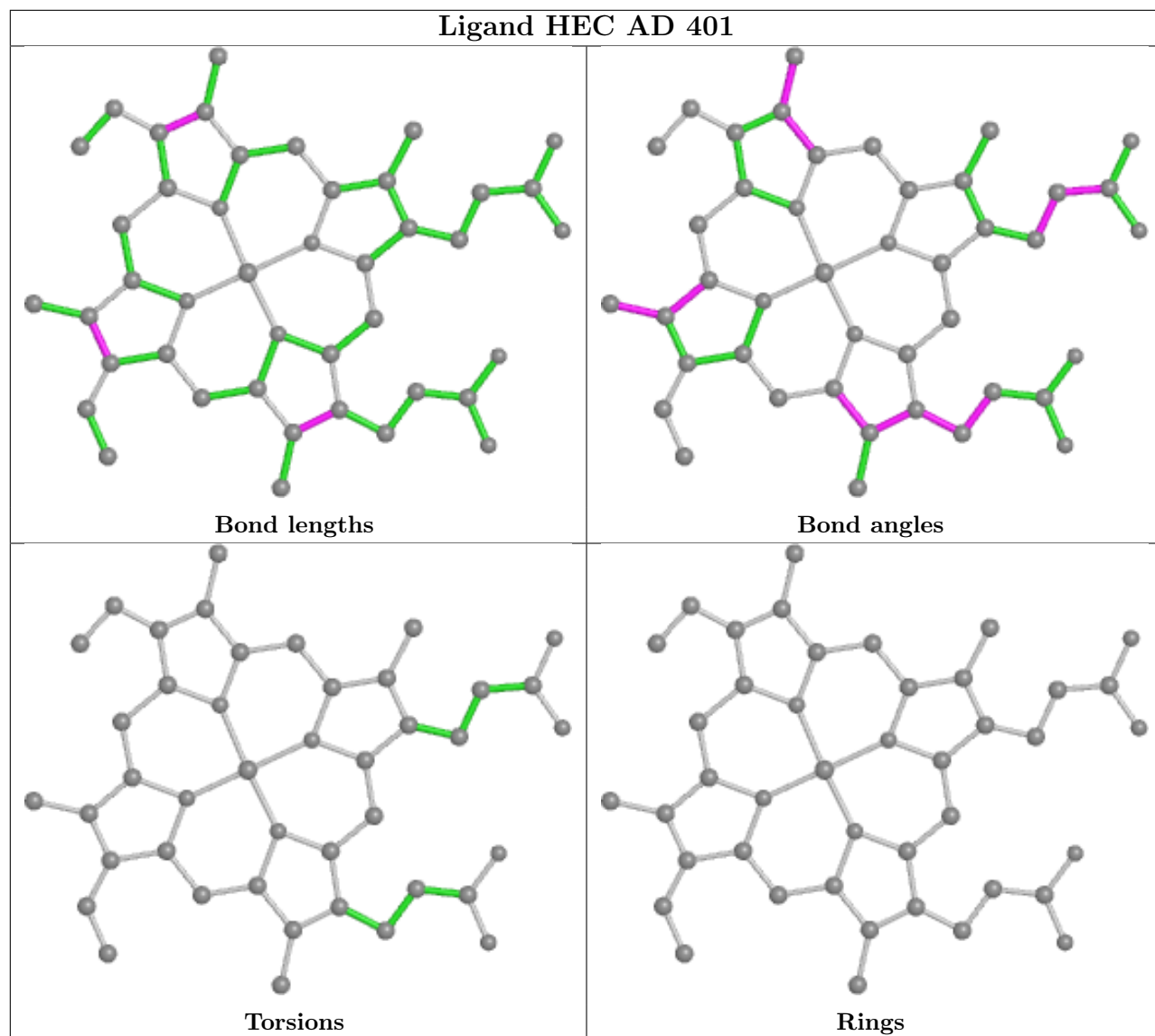


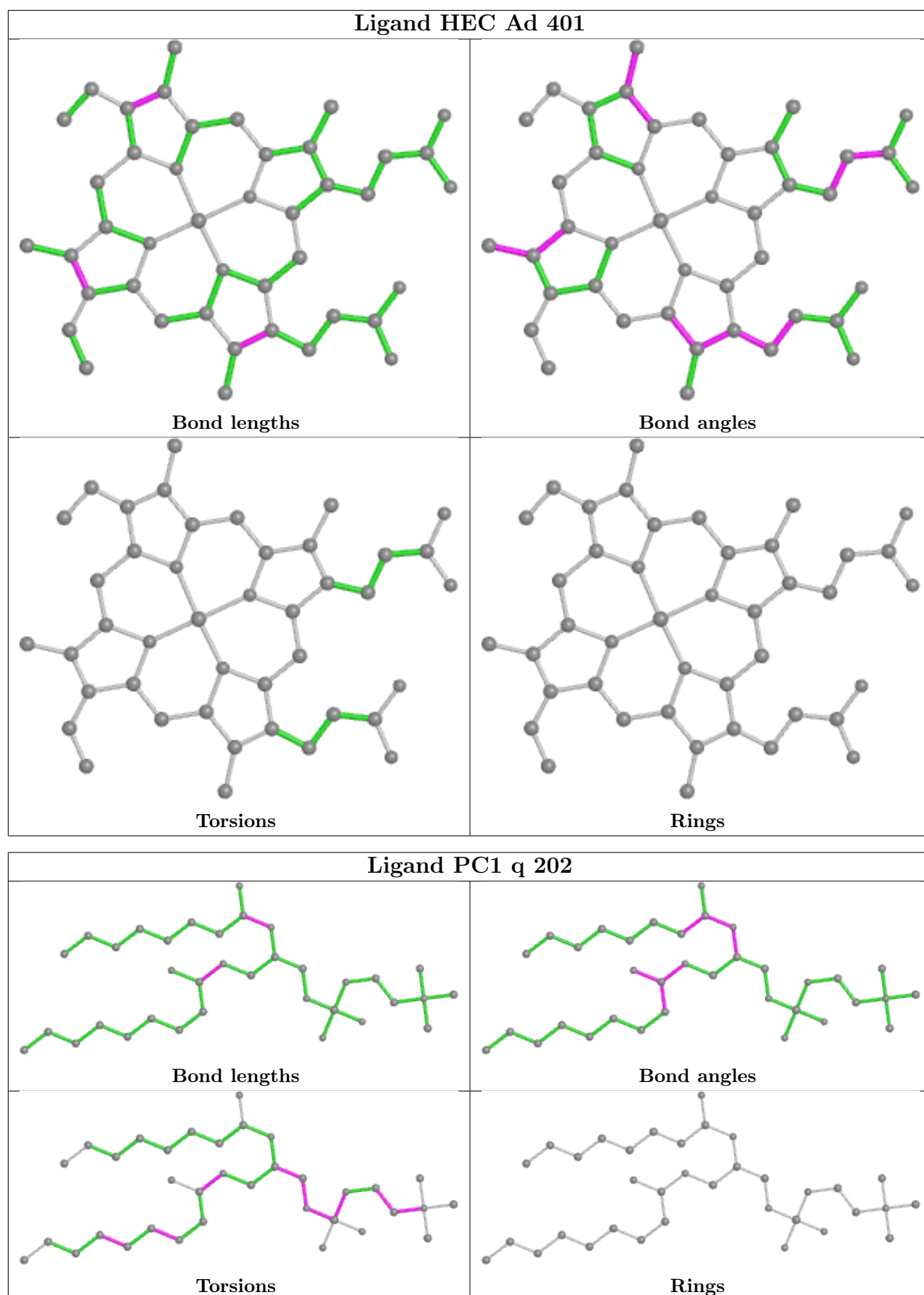


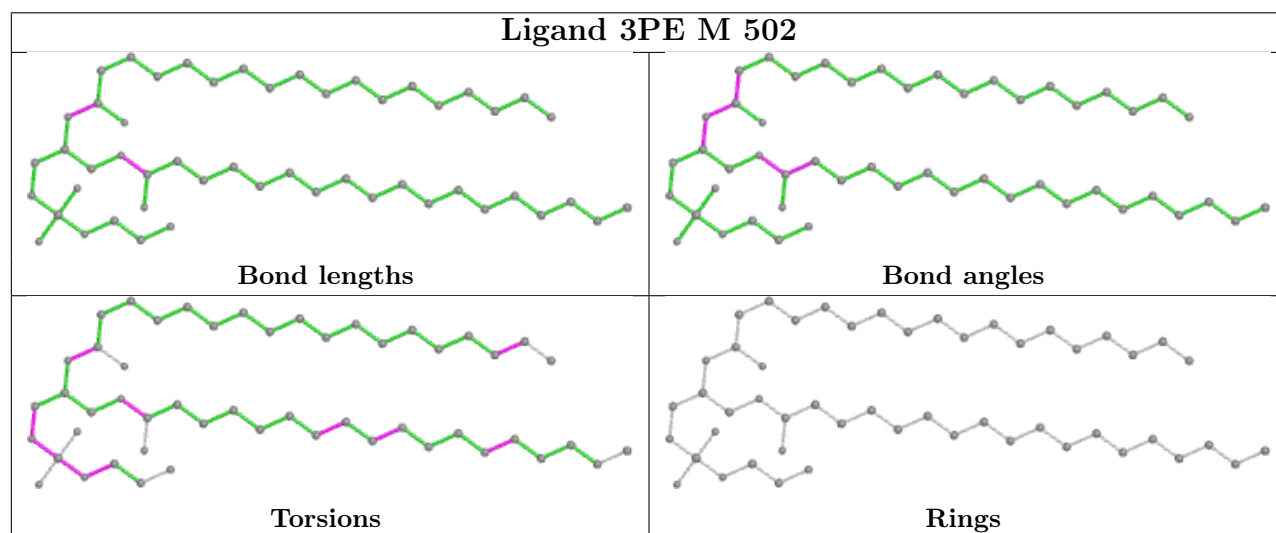
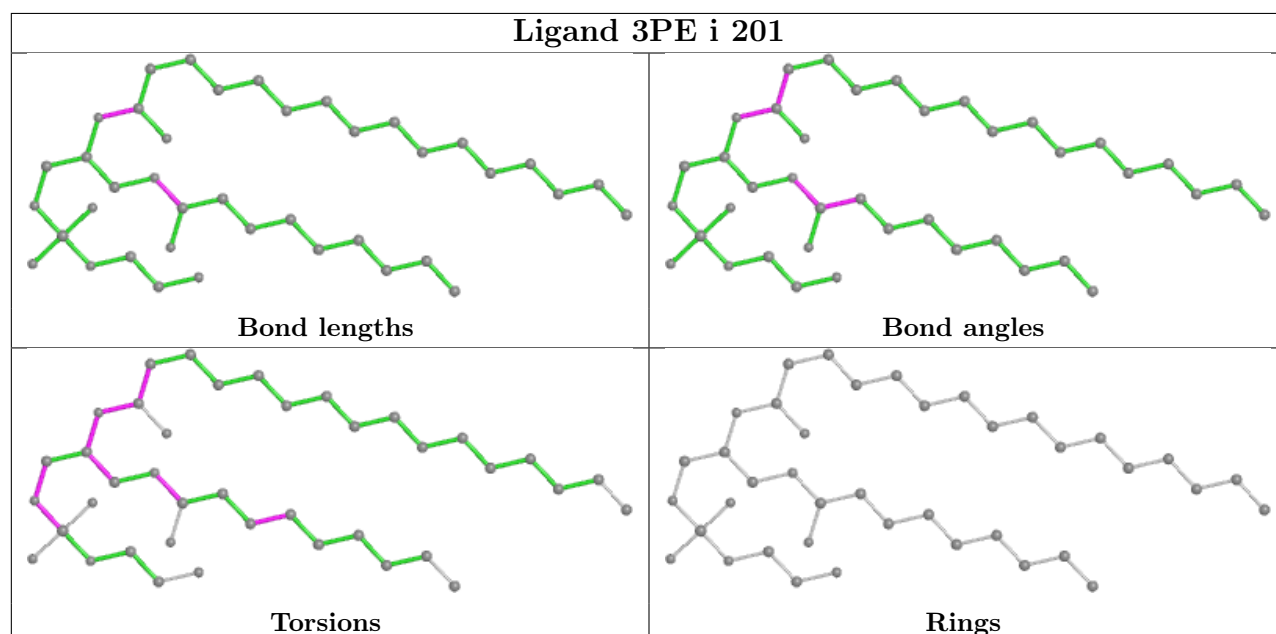
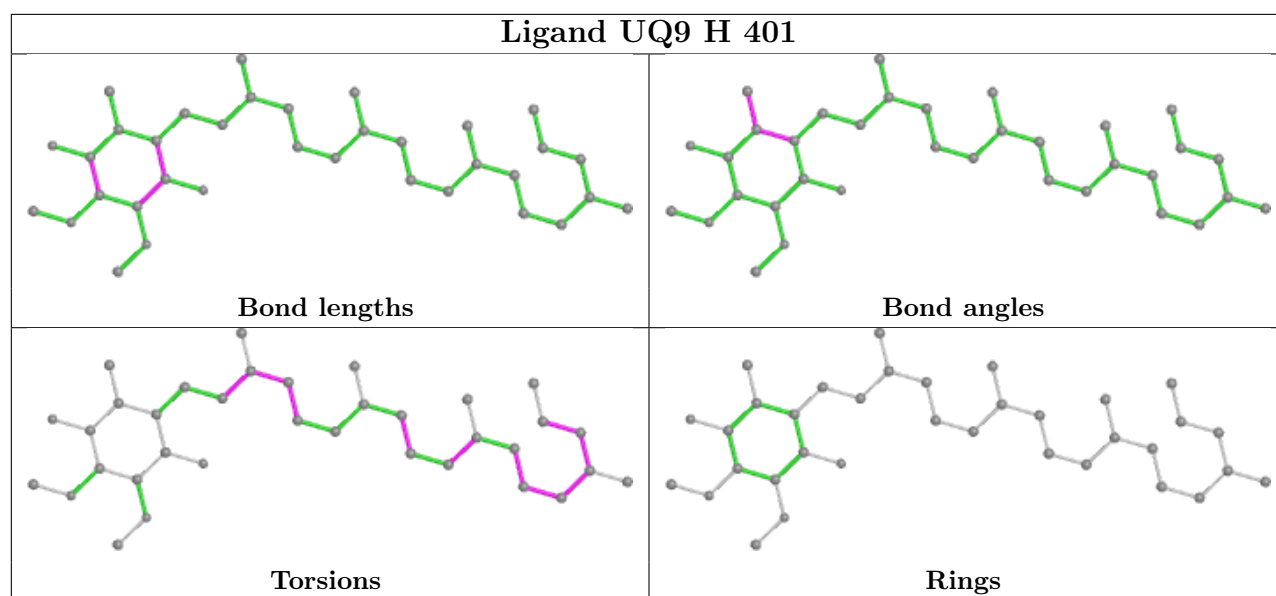


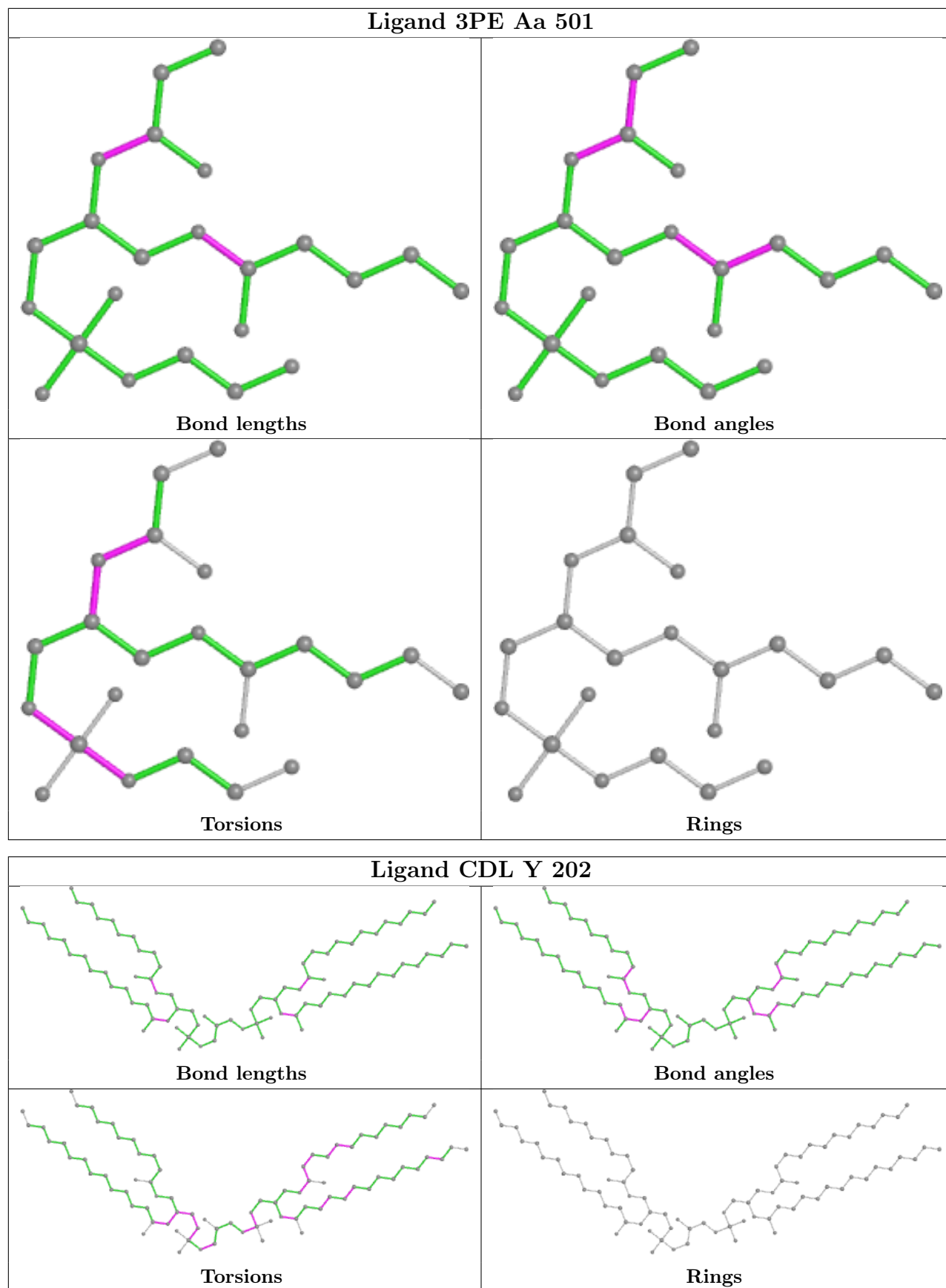


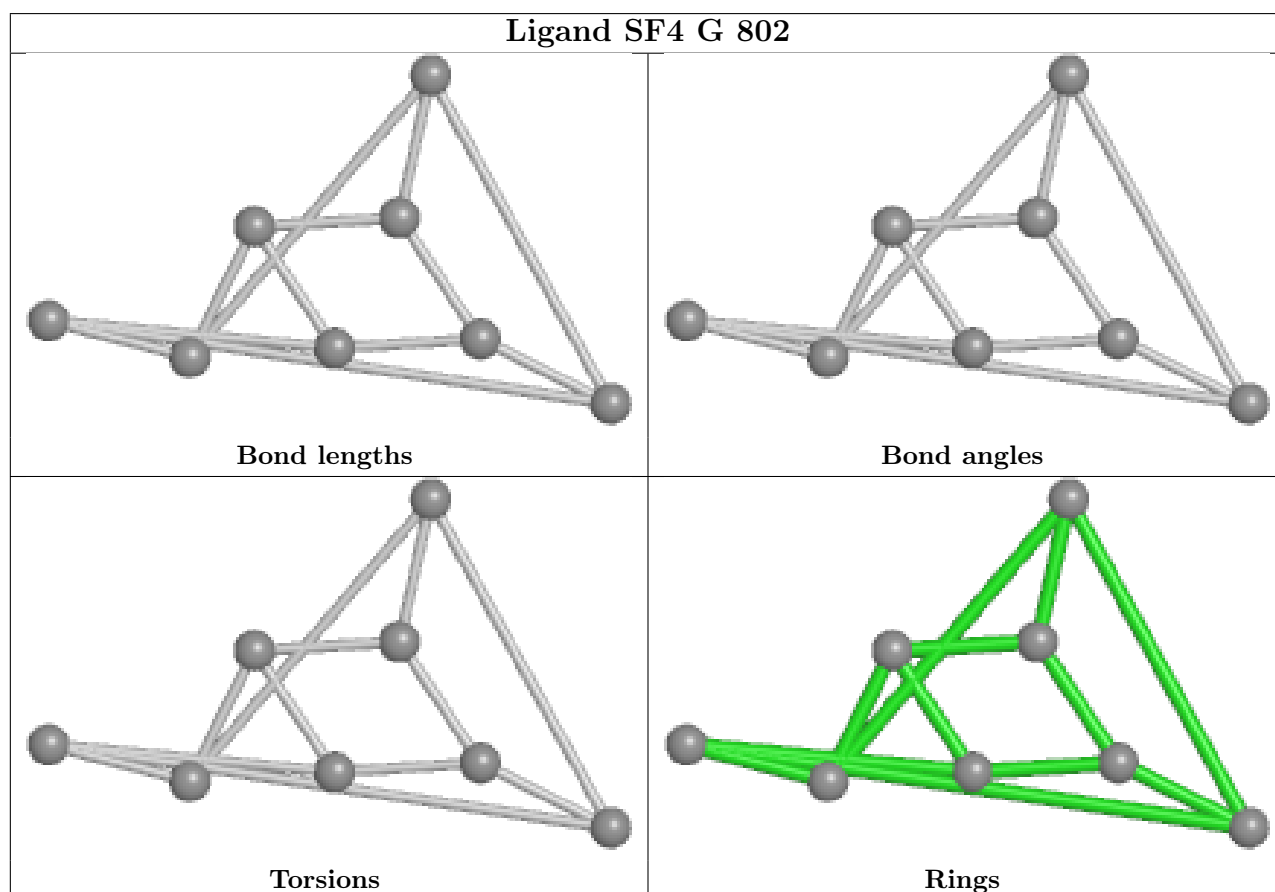
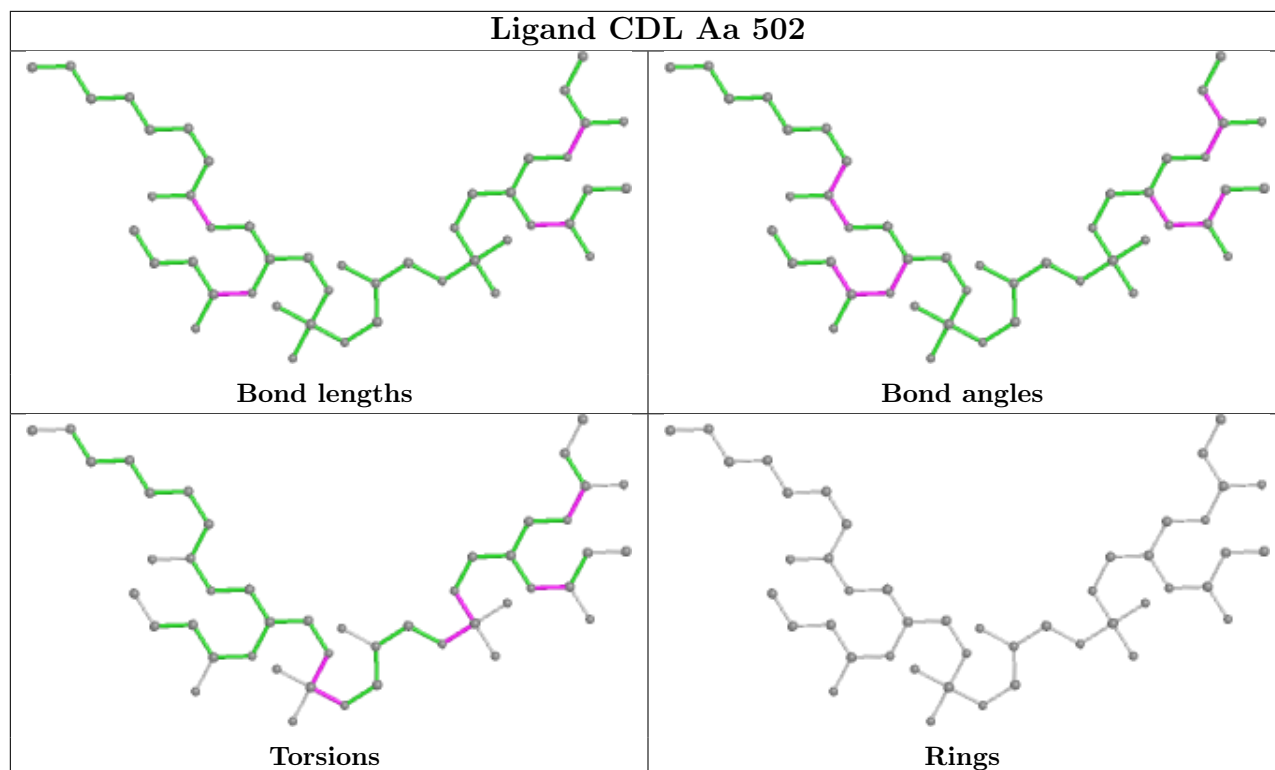


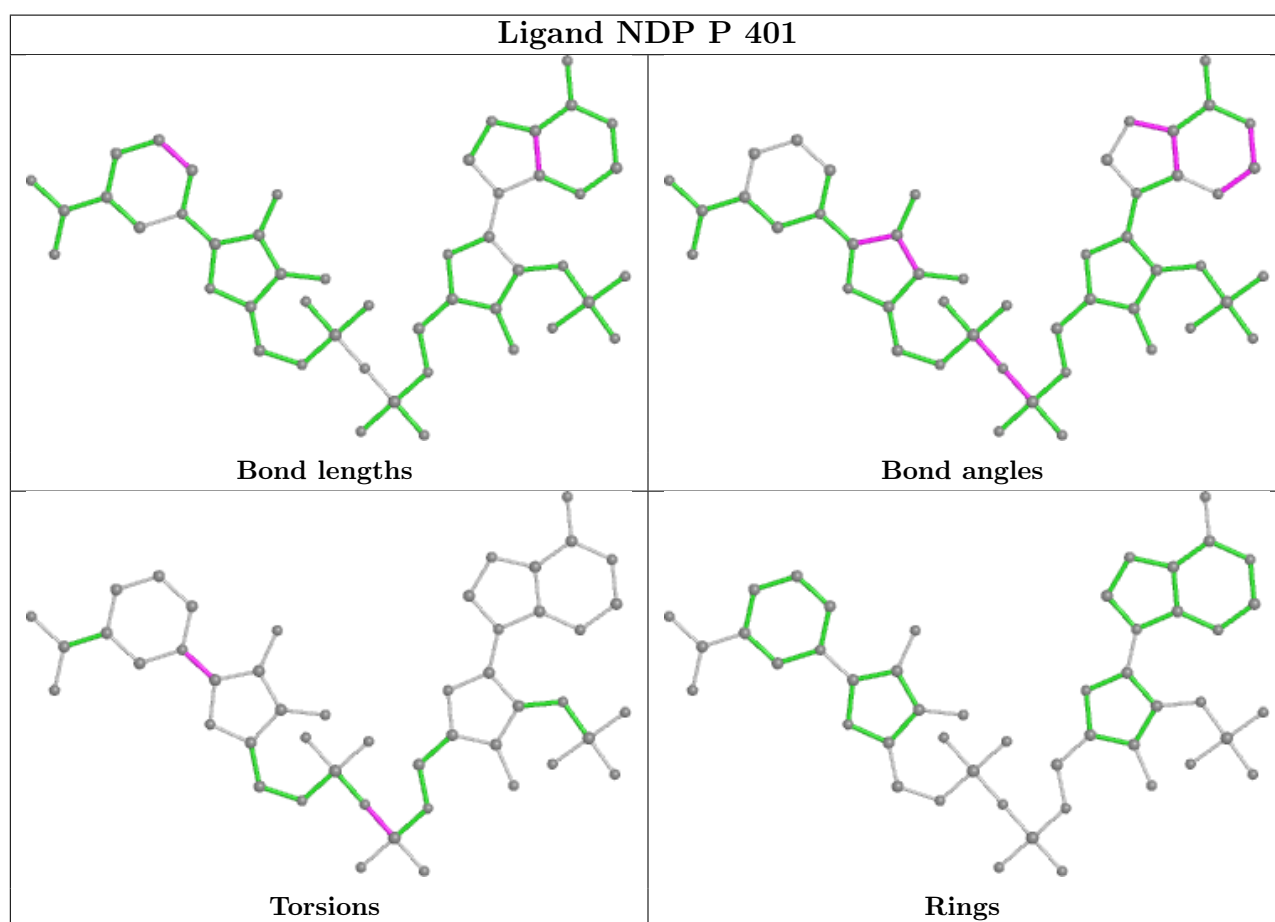
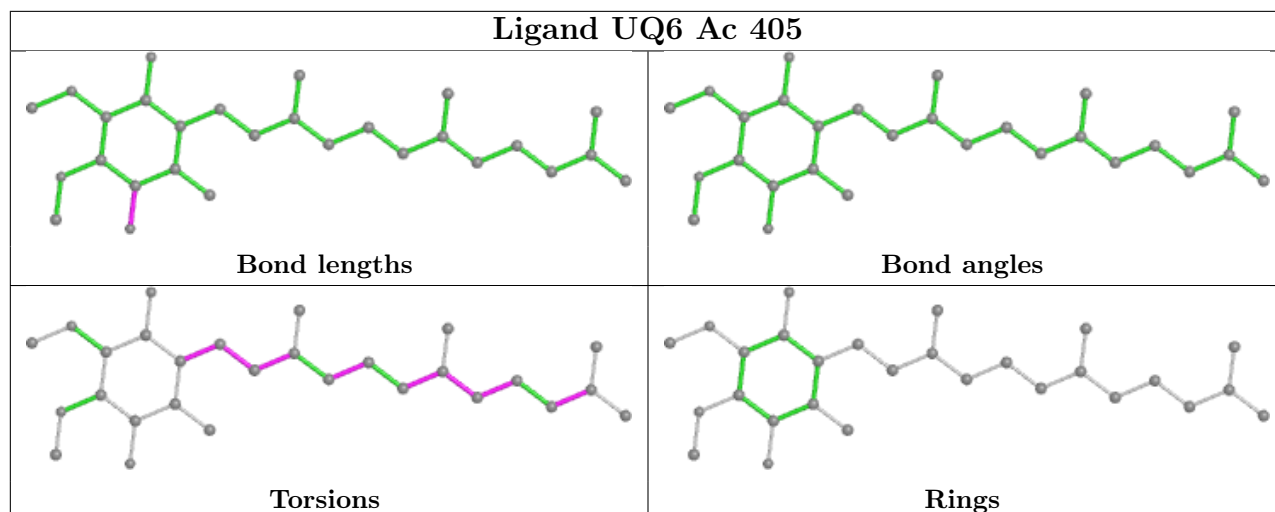


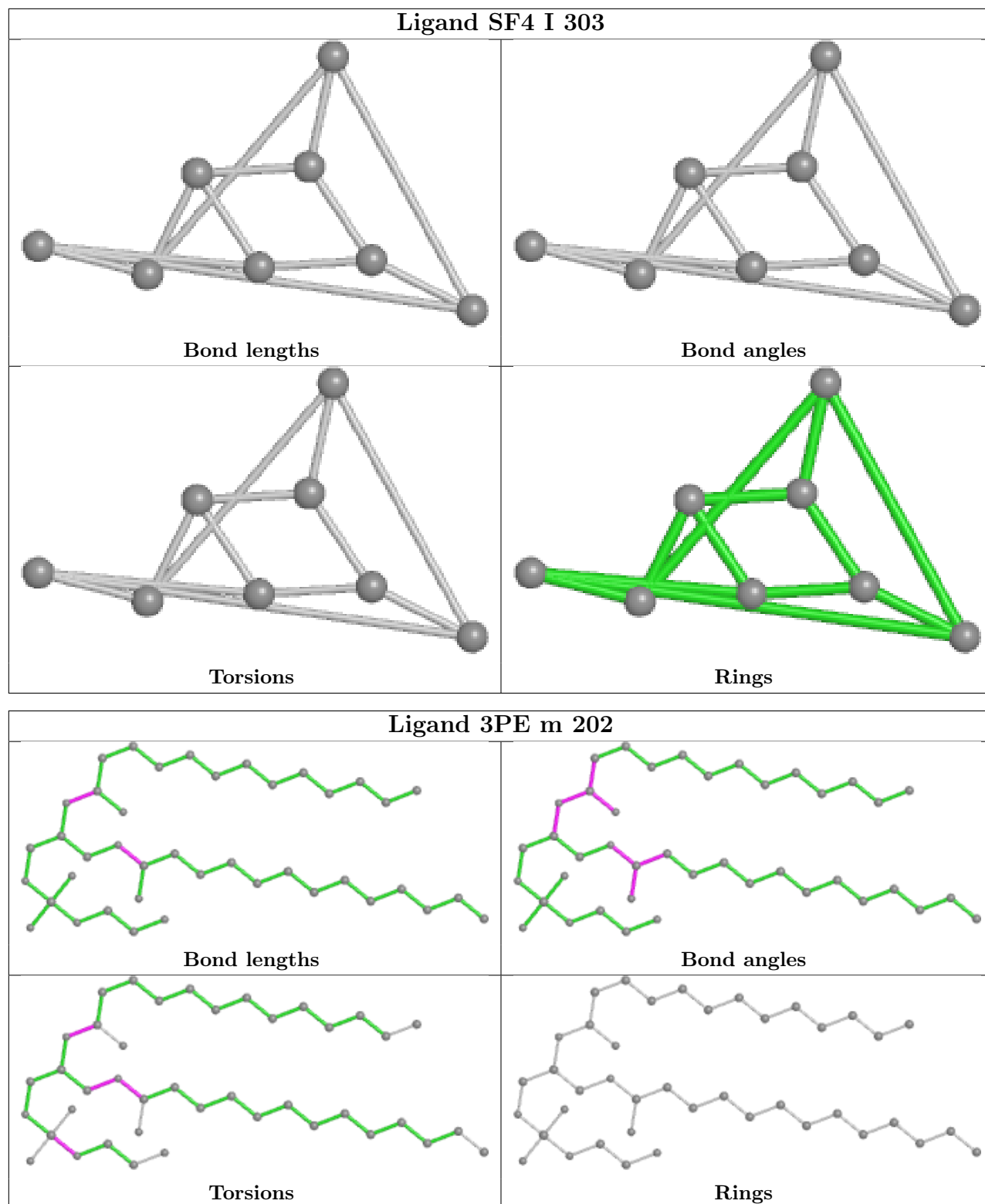




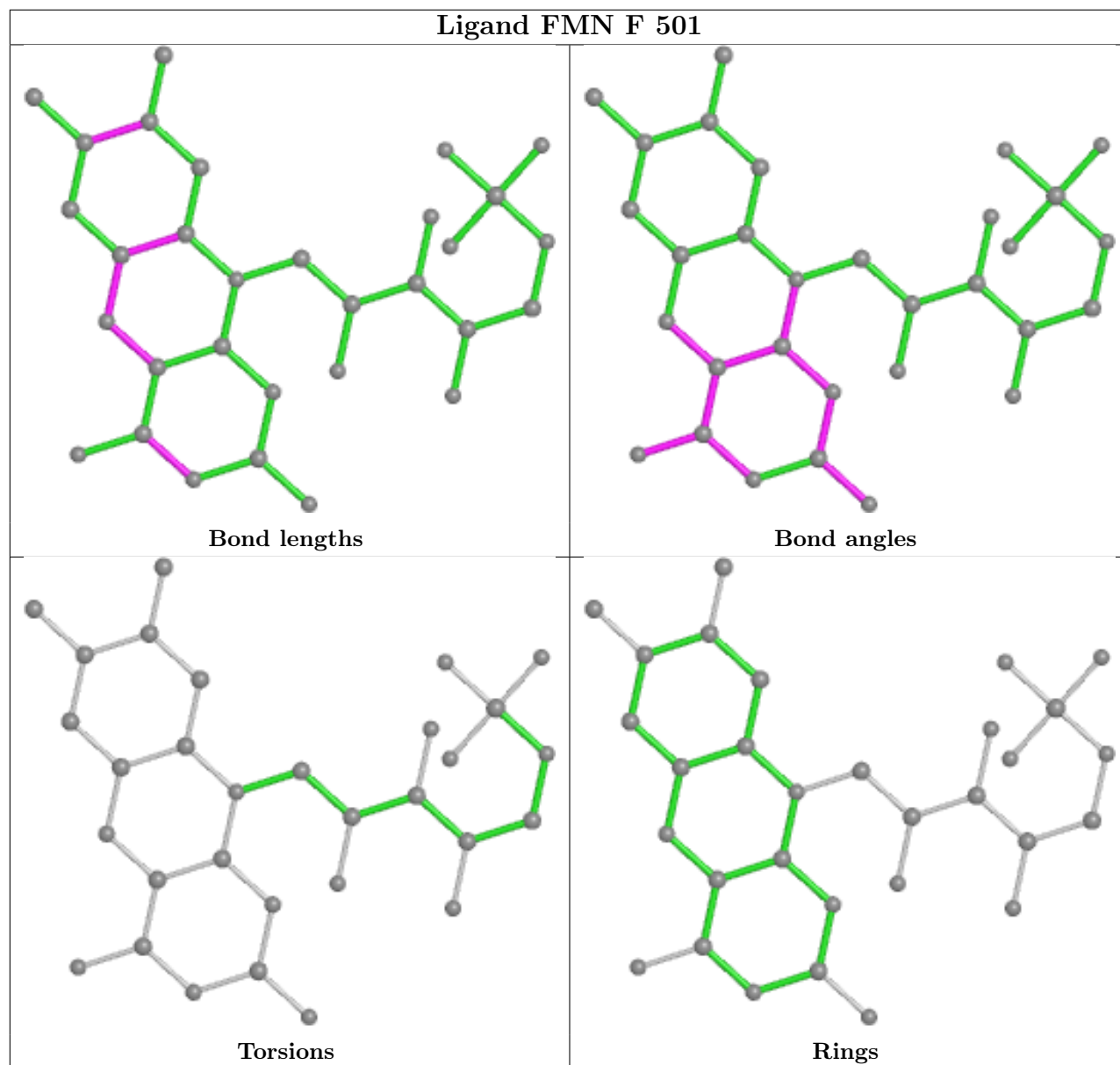


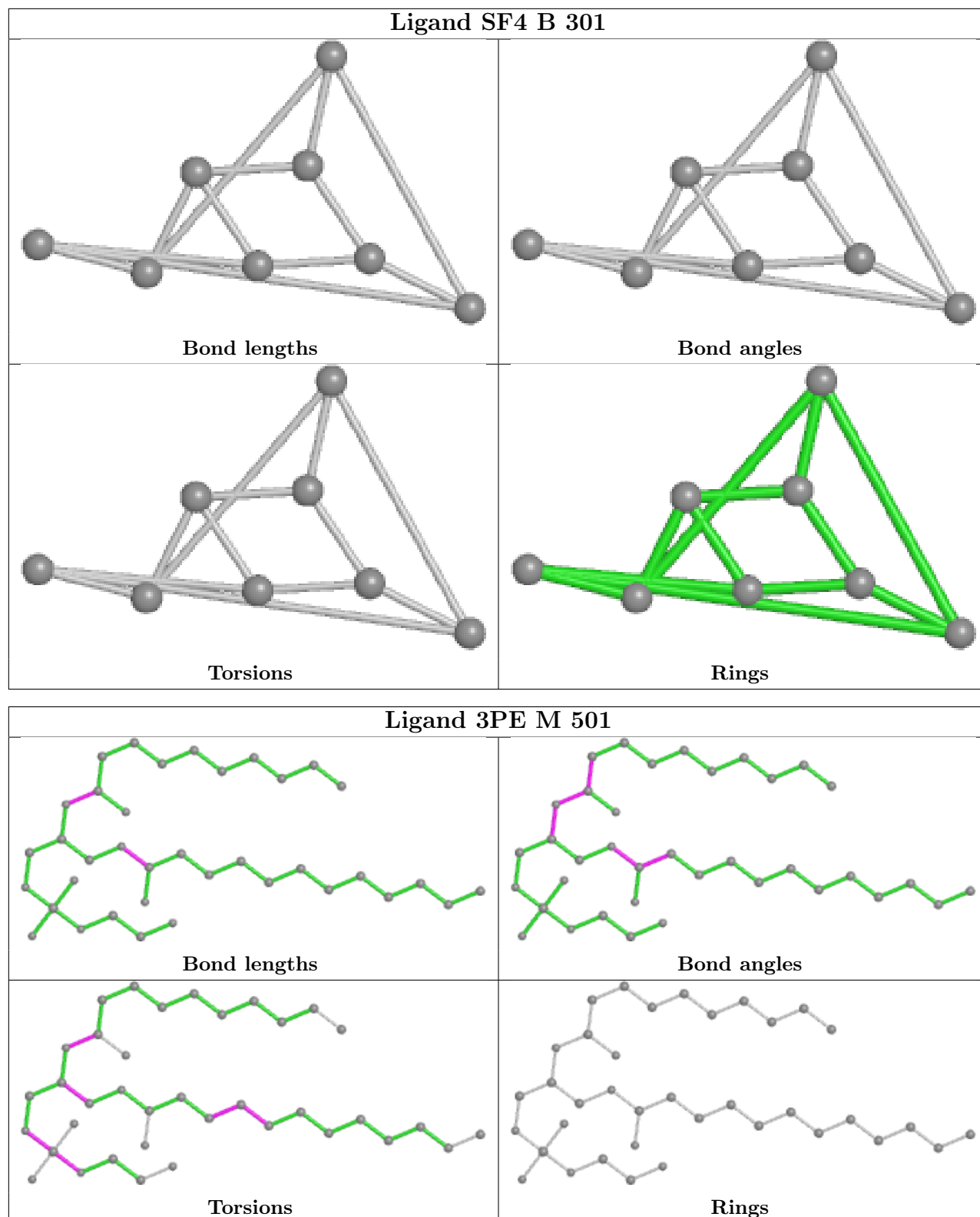


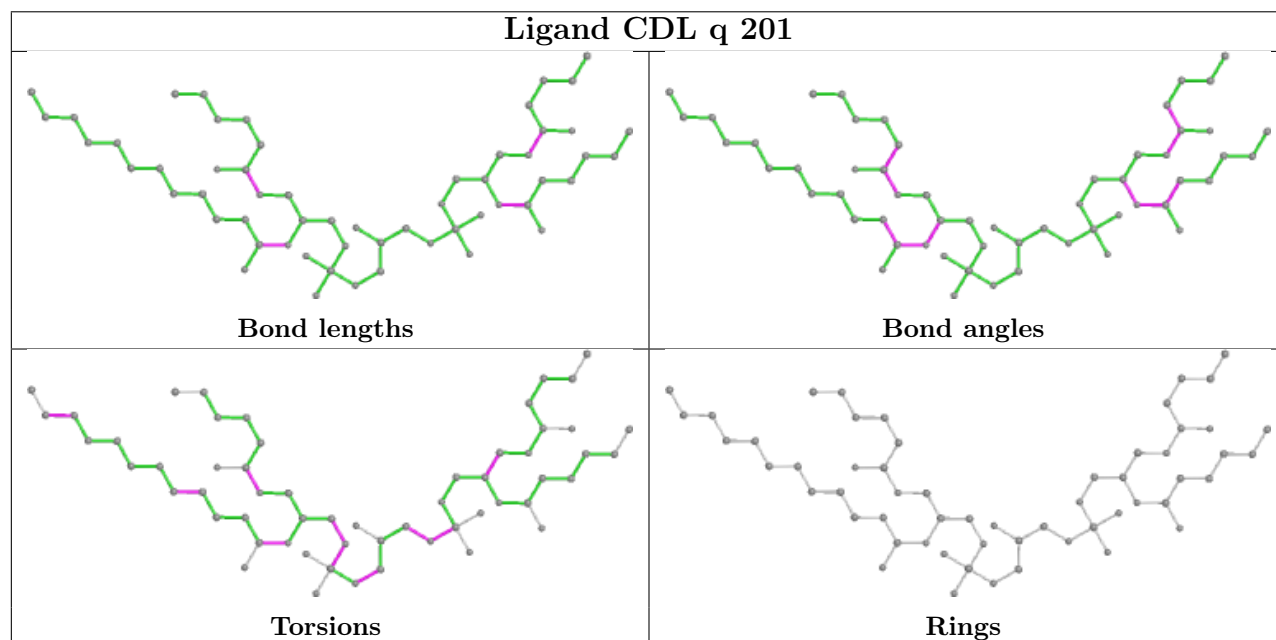
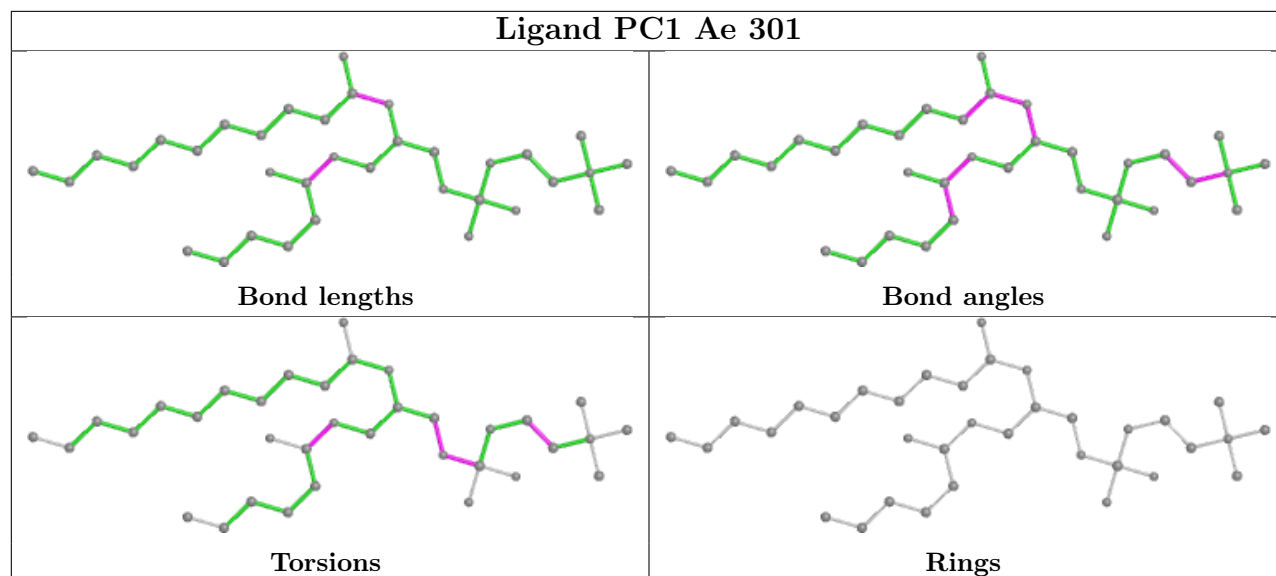


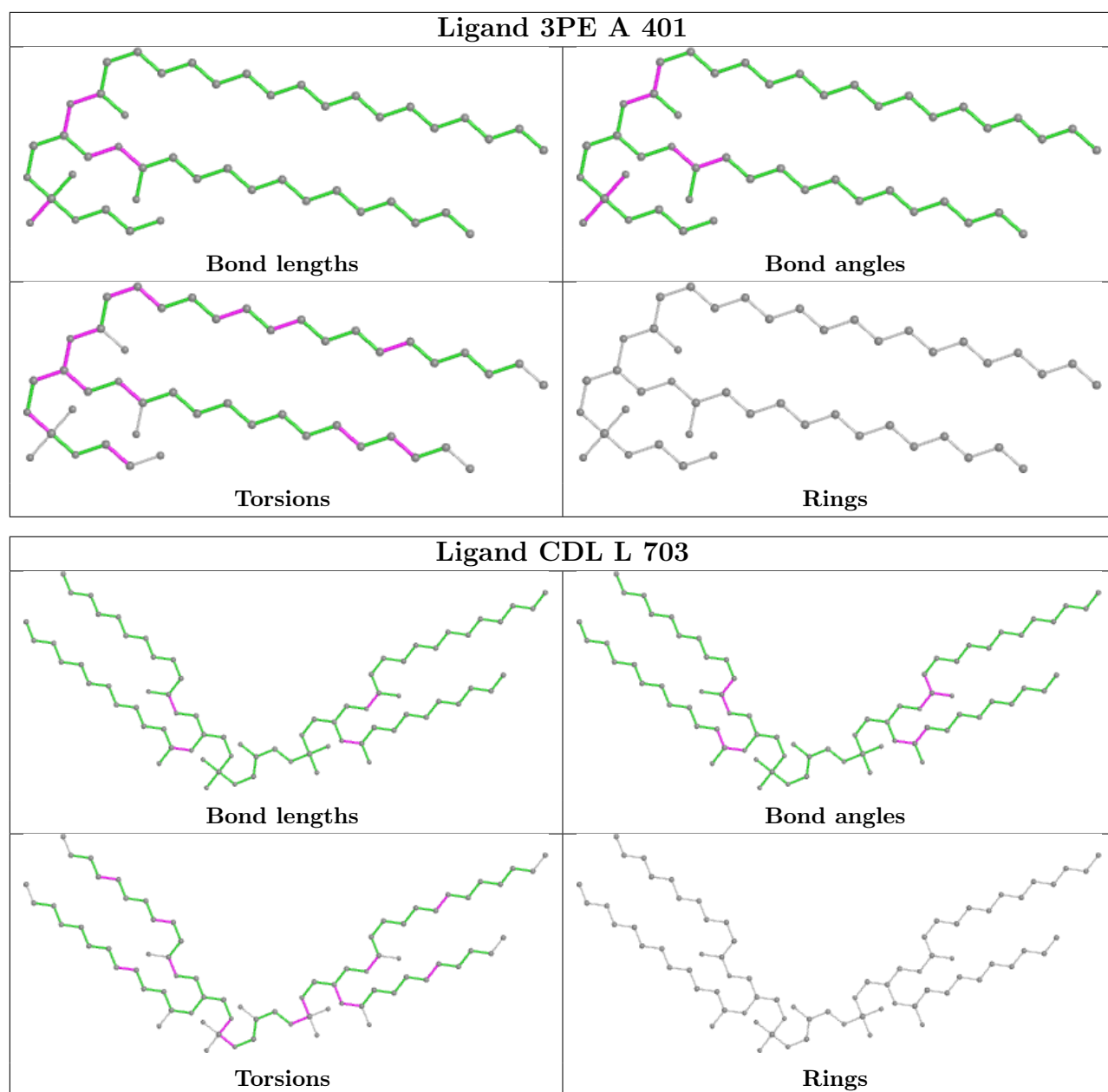


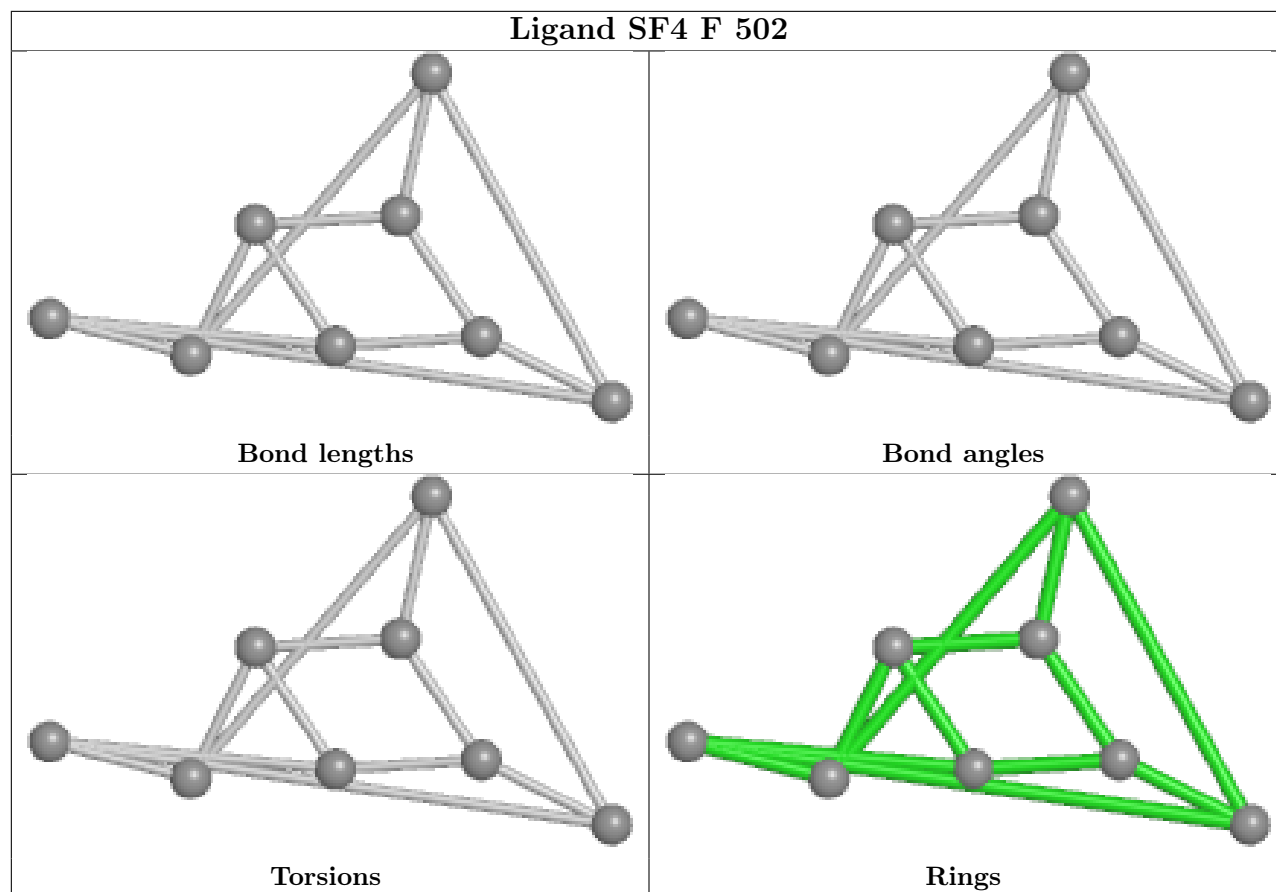












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

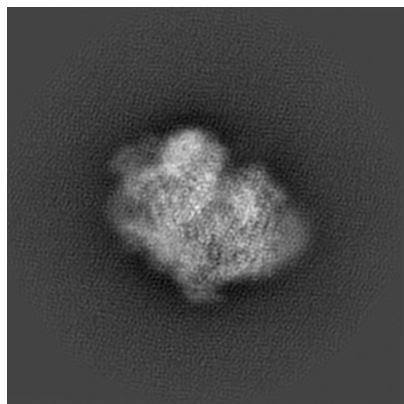
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-35313. These allow visual inspection of the internal detail of the map and identification of artifacts.

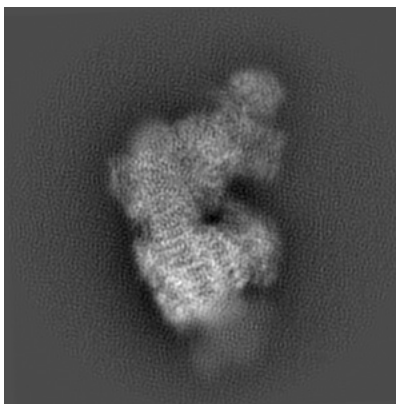
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

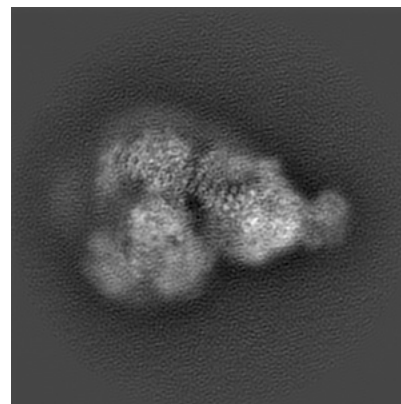
#### 6.1.1 Primary map



X

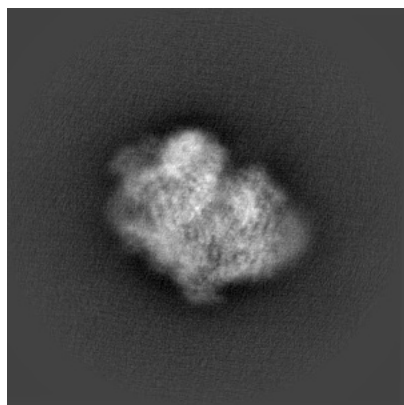


Y

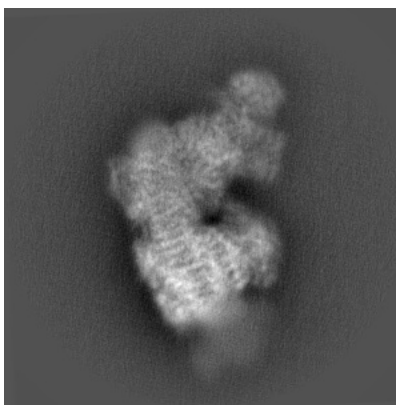


Z

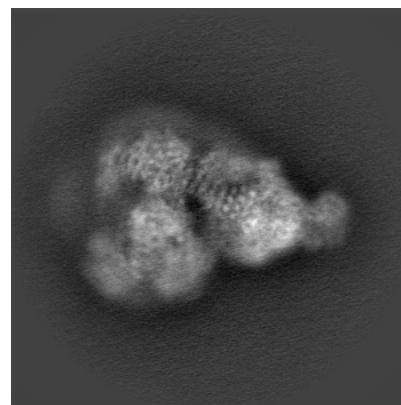
#### 6.1.2 Raw map



X



Y

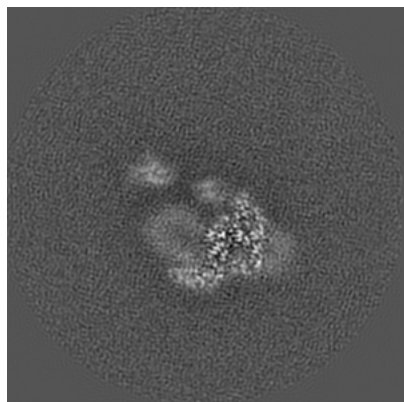


Z

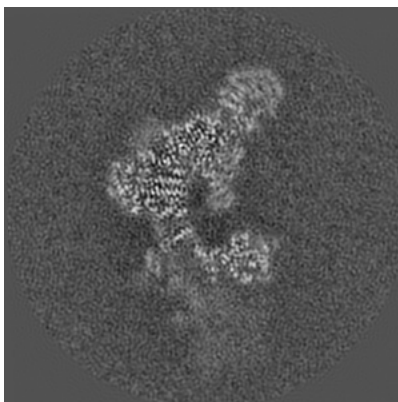
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

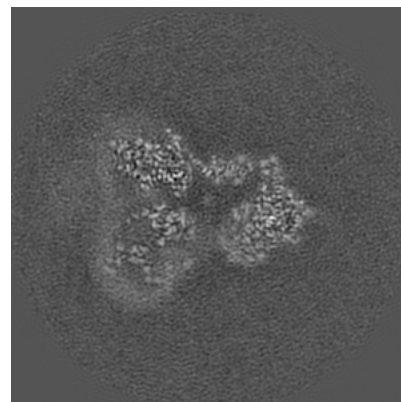
### 6.2.1 Primary map



X Index: 192

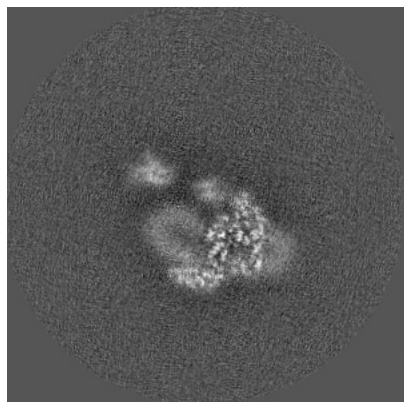


Y Index: 192

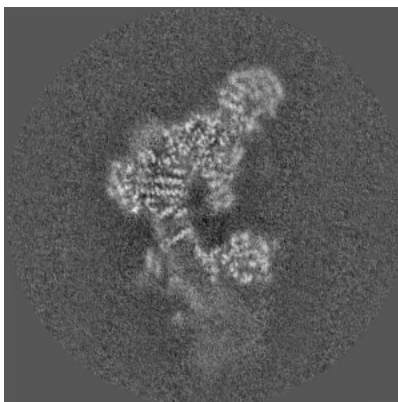


Z Index: 192

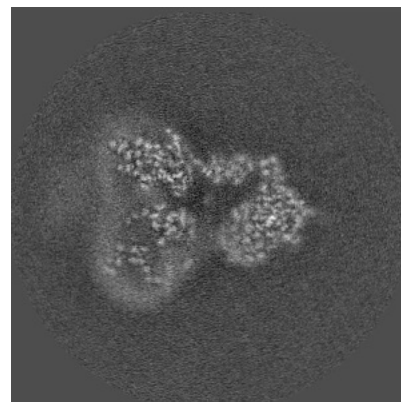
### 6.2.2 Raw map



X Index: 192



Y Index: 192

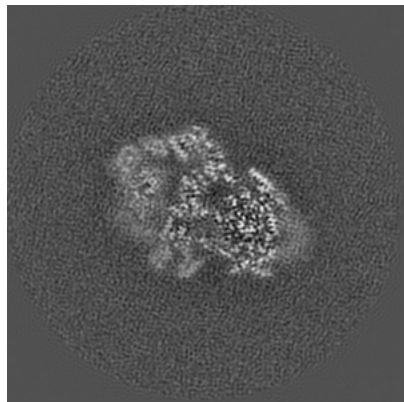


Z Index: 192

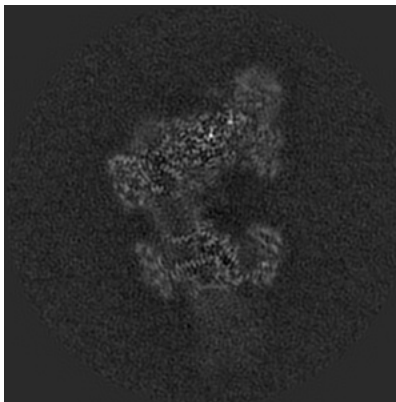
The images above show central slices of the map in three orthogonal directions.

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

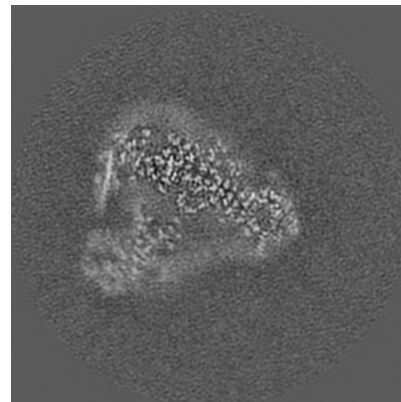
### 6.3.1 Primary map



X Index: 153

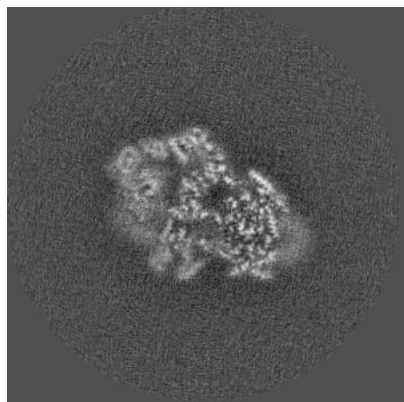


Y Index: 177

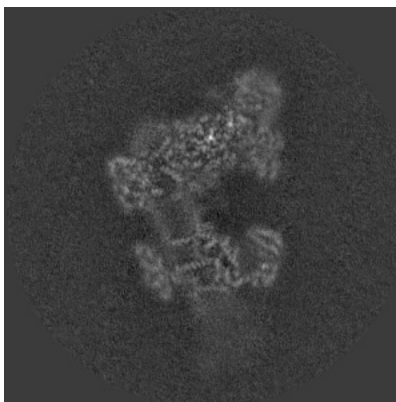


Z Index: 167

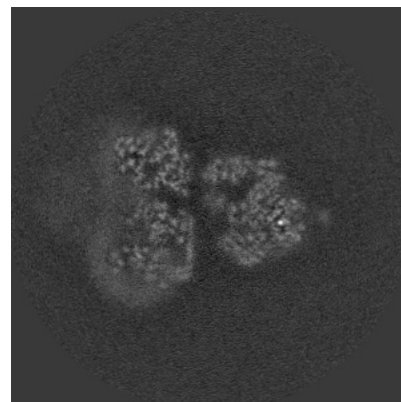
### 6.3.2 Raw map



X Index: 153



Y Index: 177



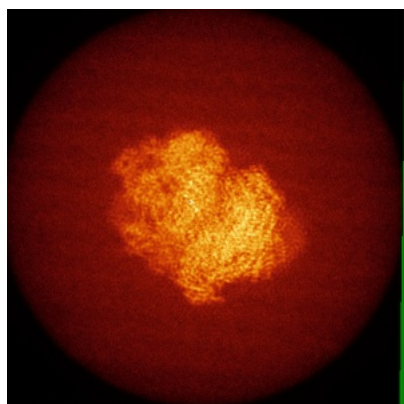
Z Index: 198

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

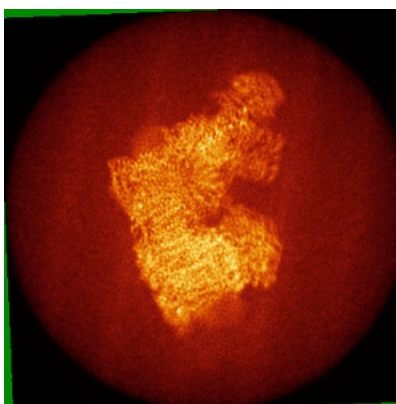


## 6.4 Orthogonal standard-deviation projections (False-color) [i](#)

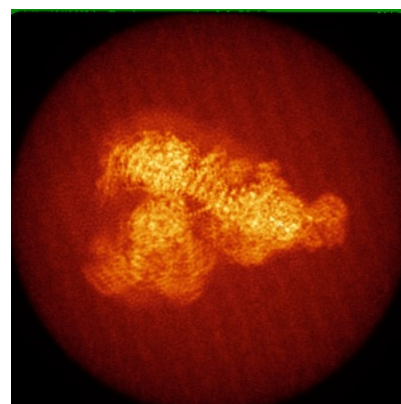
### 6.4.1 Primary map



X

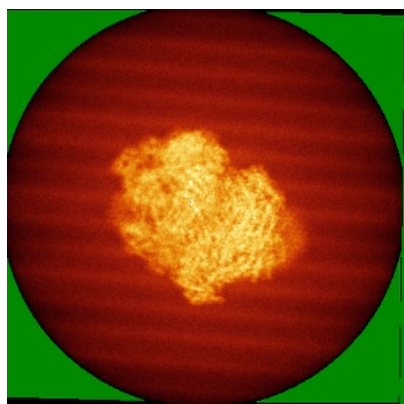


Y

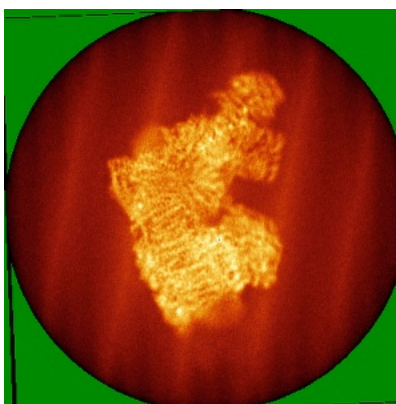


Z

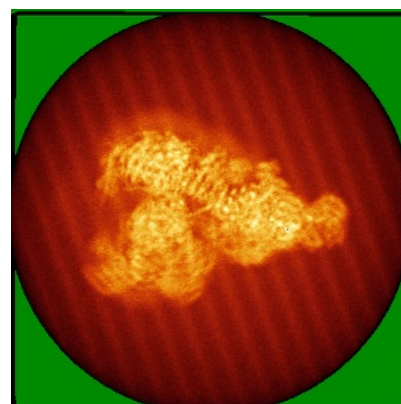
### 6.4.2 Raw map



X



Y

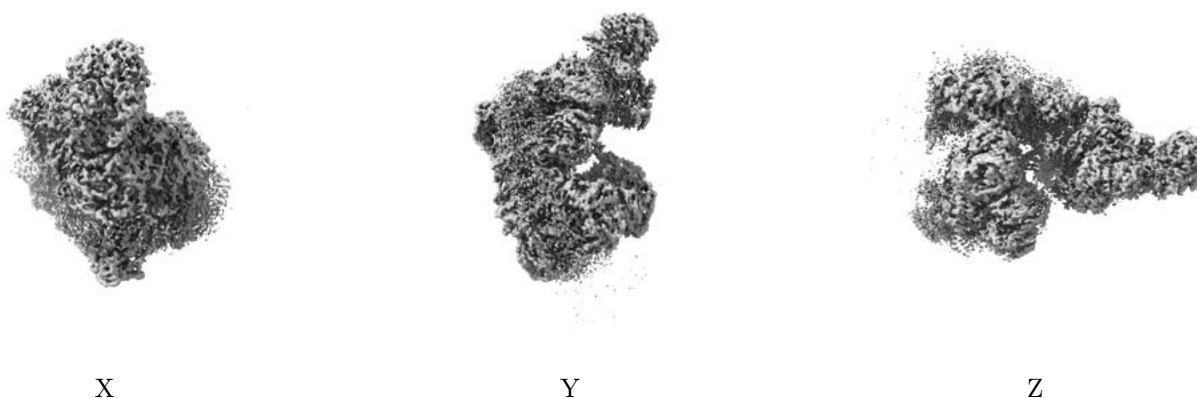


Z

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

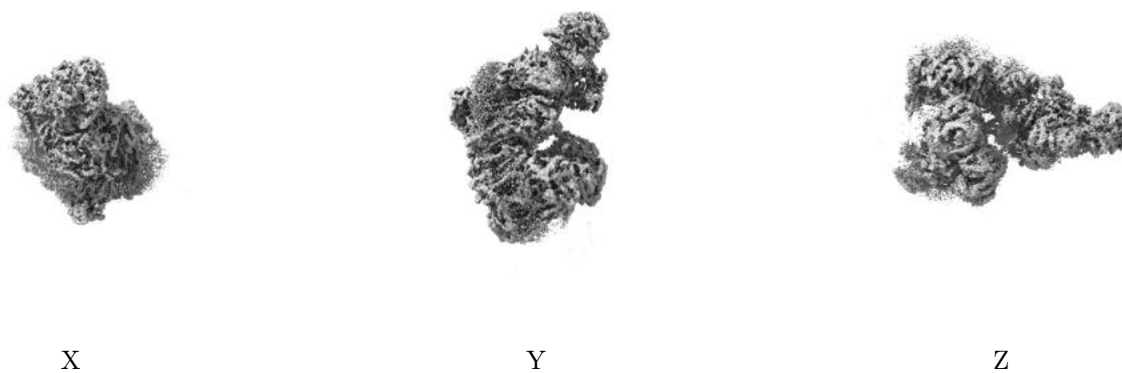
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.015. 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.

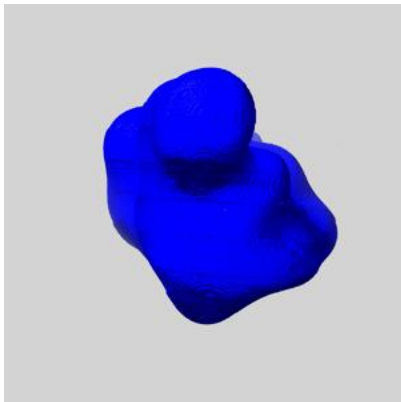
## 6.6 Mask visualisation [i](#)

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

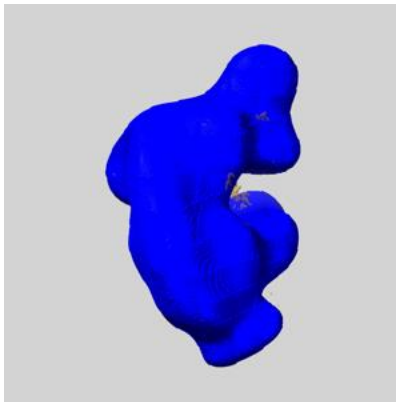
A mask typically either:

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

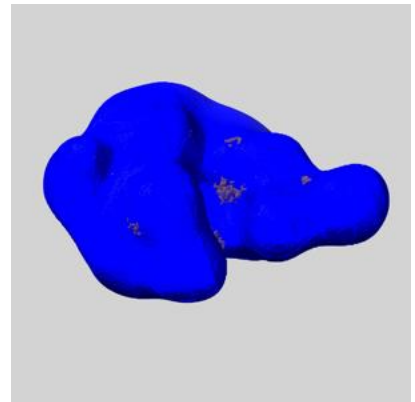
### 6.6.1 emd\_35313\_msk\_1.map [i](#)



X



Y

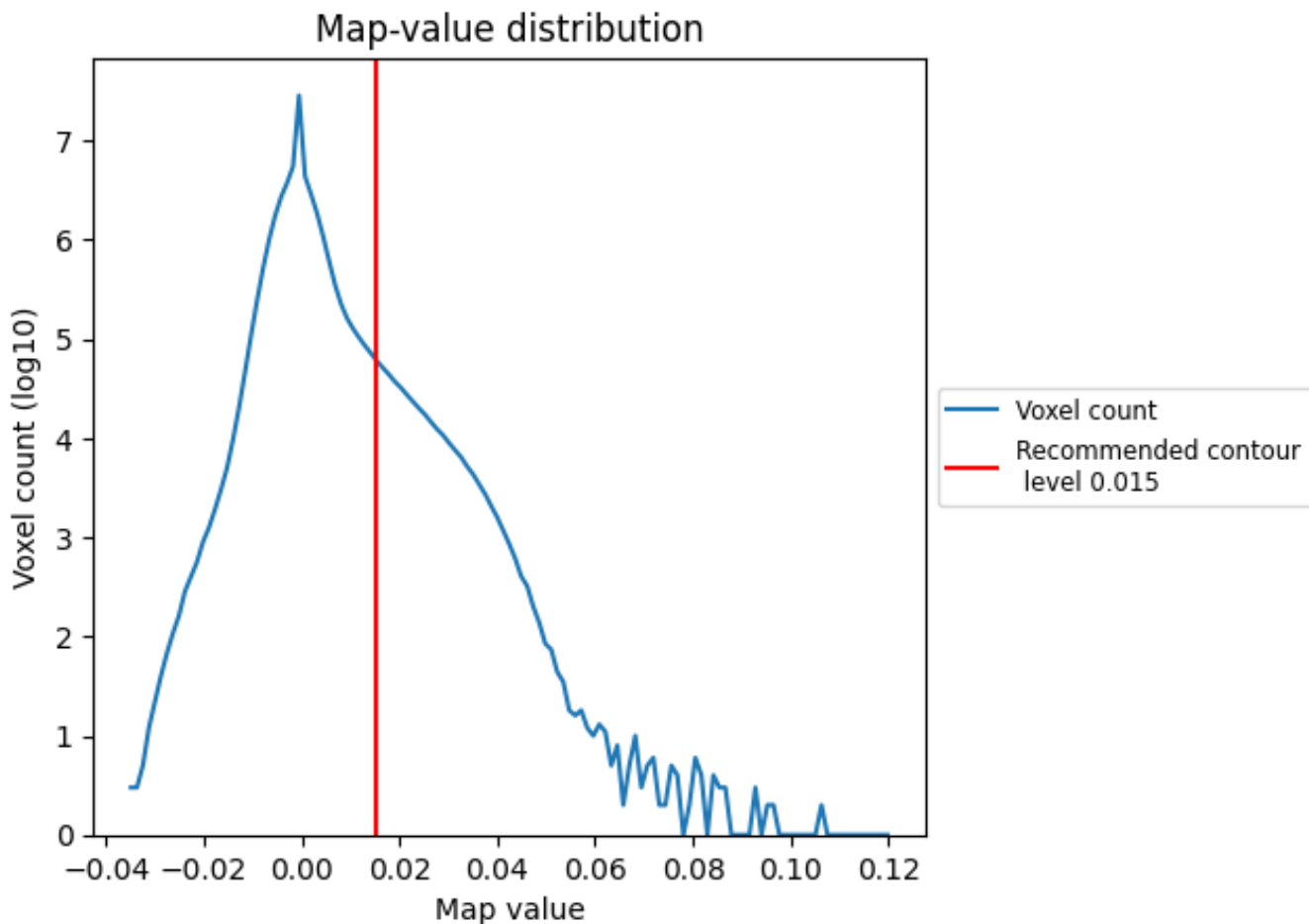


Z

## 7 Map analysis [i](#)

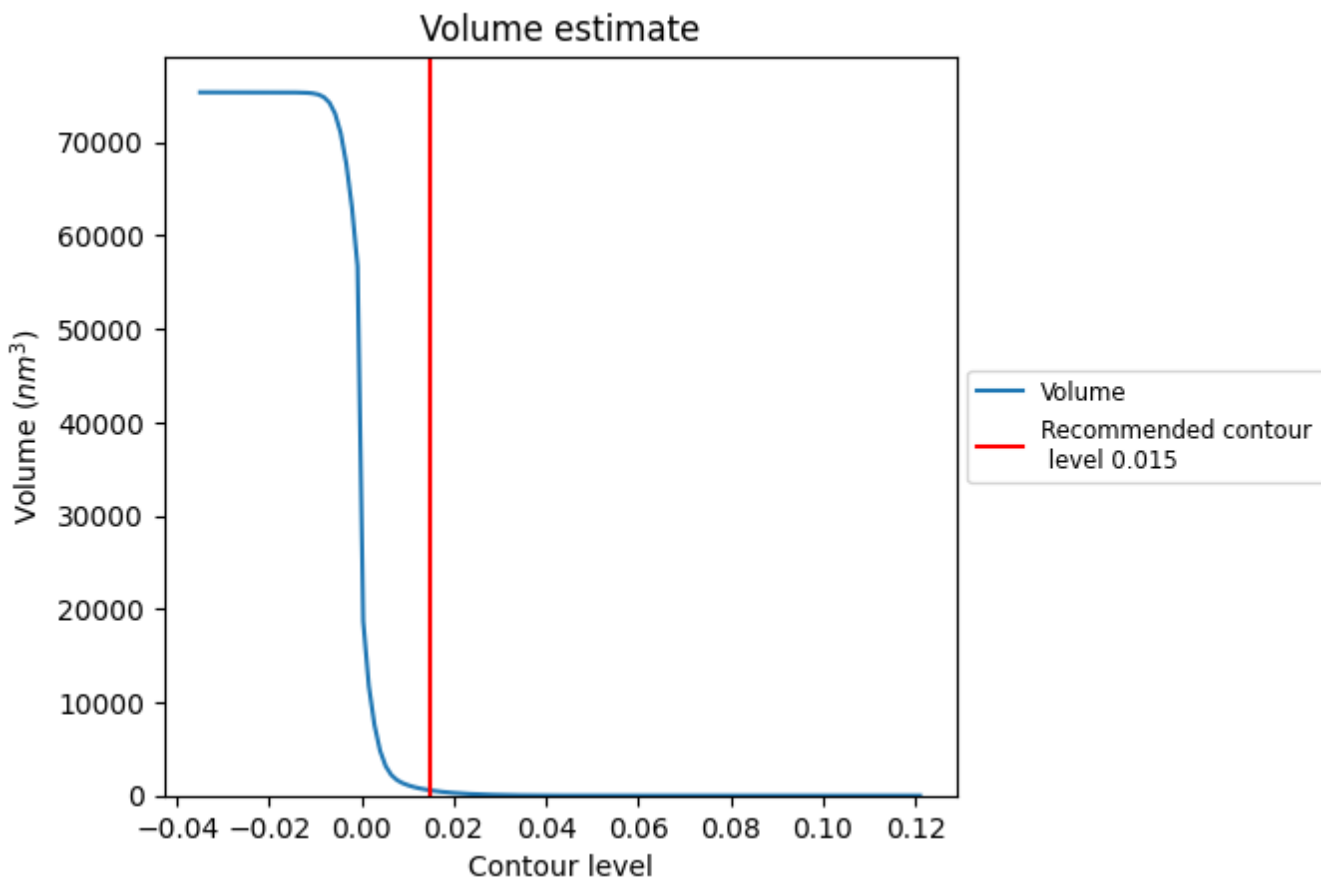
This section contains the results of statistical analysis of the map.

### 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.

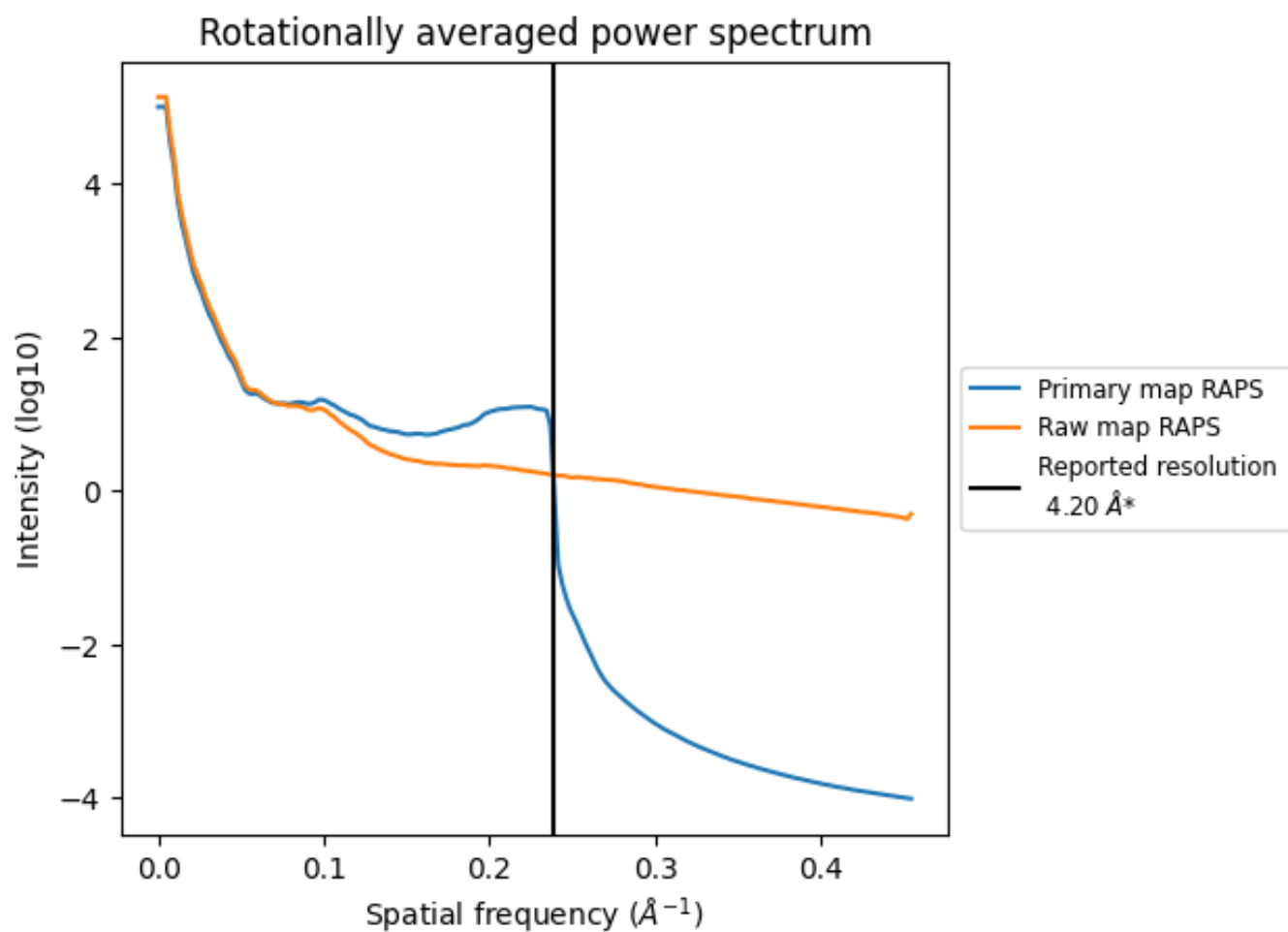
## 7.2 Volume estimate [\(i\)](#)



The volume at the recommended contour level is 556 nm<sup>3</sup>; this corresponds to an approximate mass of 502 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

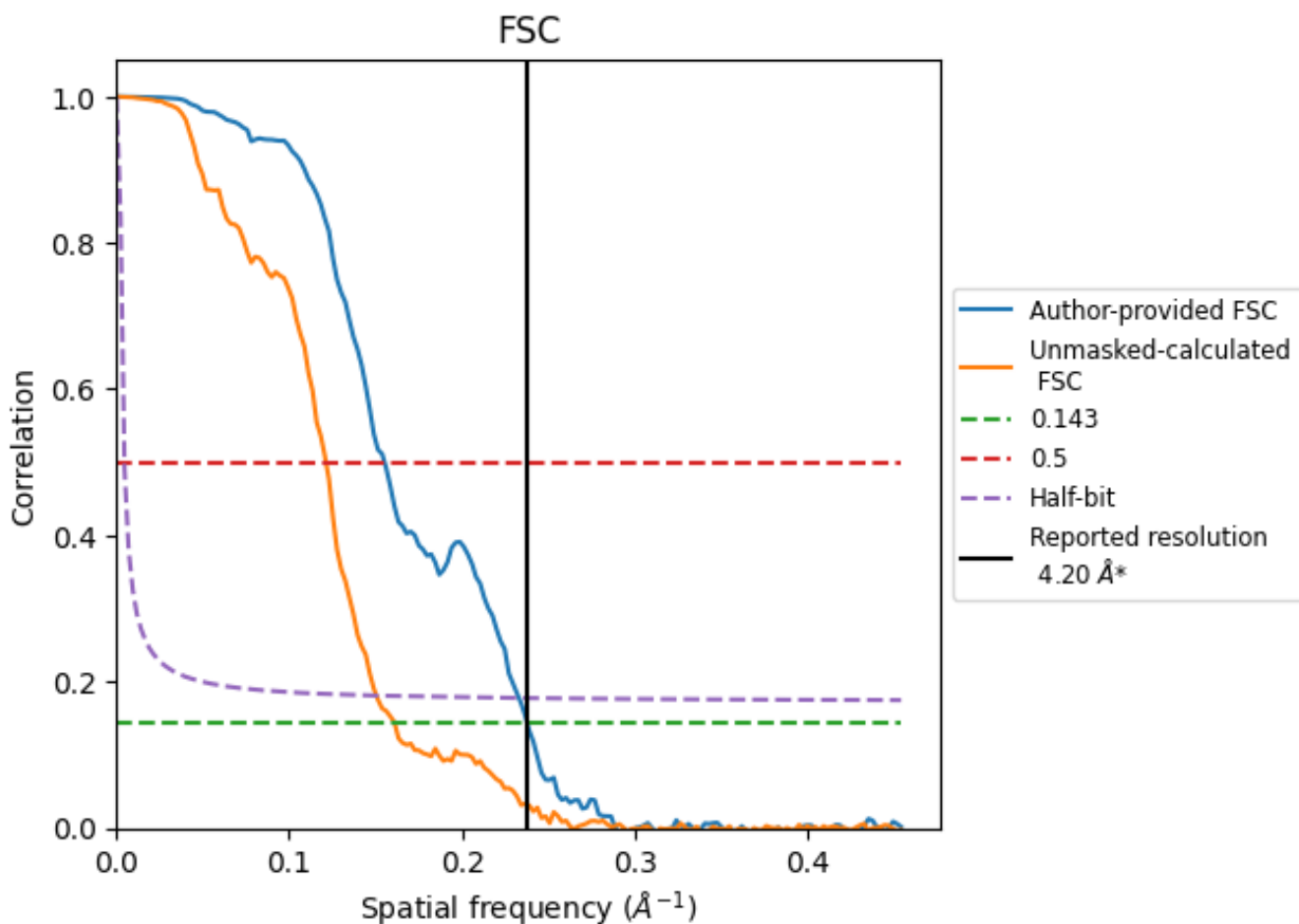


\*Reported resolution corresponds to spatial frequency of 0.238 Å<sup>-1</sup>

## 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  $0.238 \text{\AA}^{-1}$

## 8.2 Resolution estimates

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.20	-	-
Author-provided FSC curve	4.20	6.44	4.29
Unmasked-calculated*	6.21	8.24	6.64

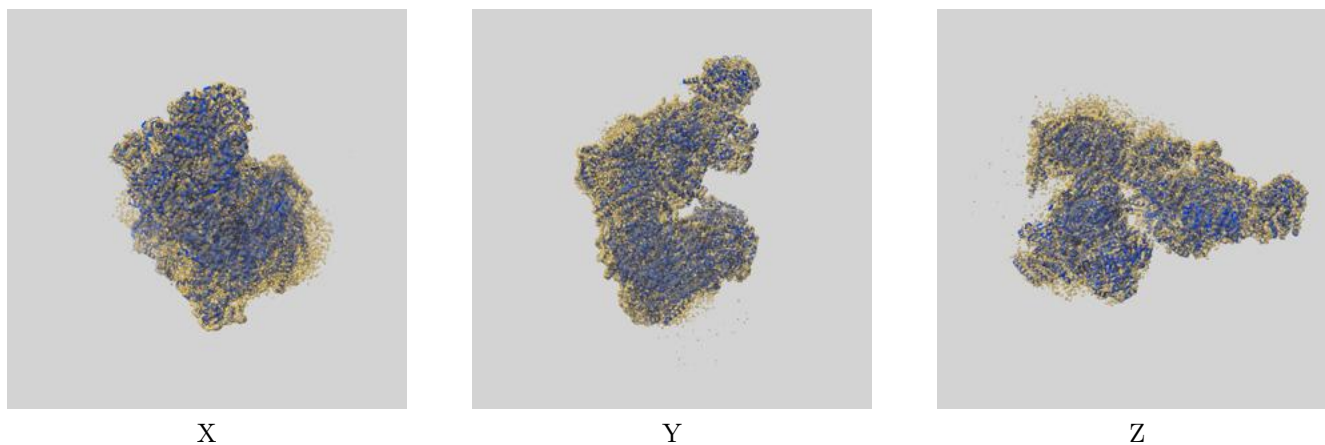
\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 6.21 differs from the reported value 4.2 by more than 10 %



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

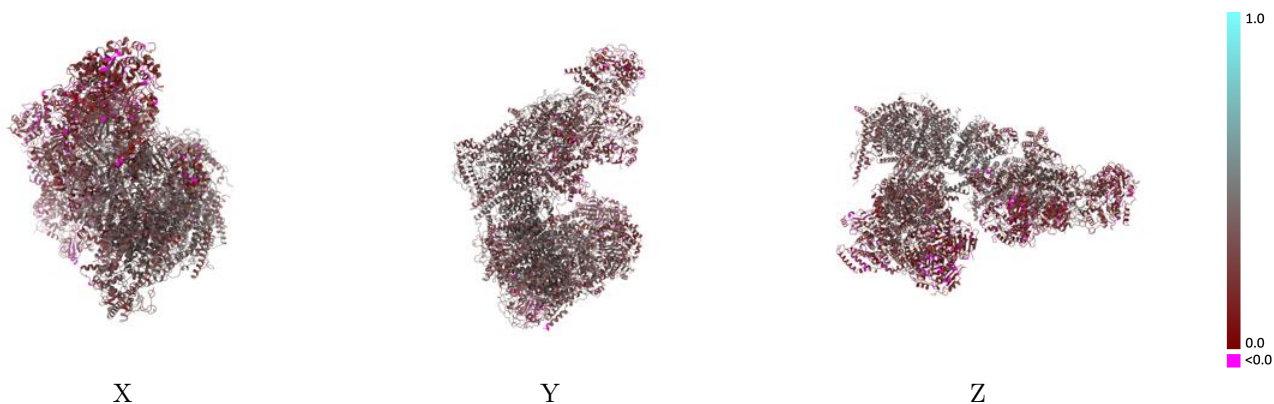
This section contains information regarding the fit between EMDB map EMD-35313 and PDB model 8IAO. Per-residue inclusion information can be found in section 3 on page 26.

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



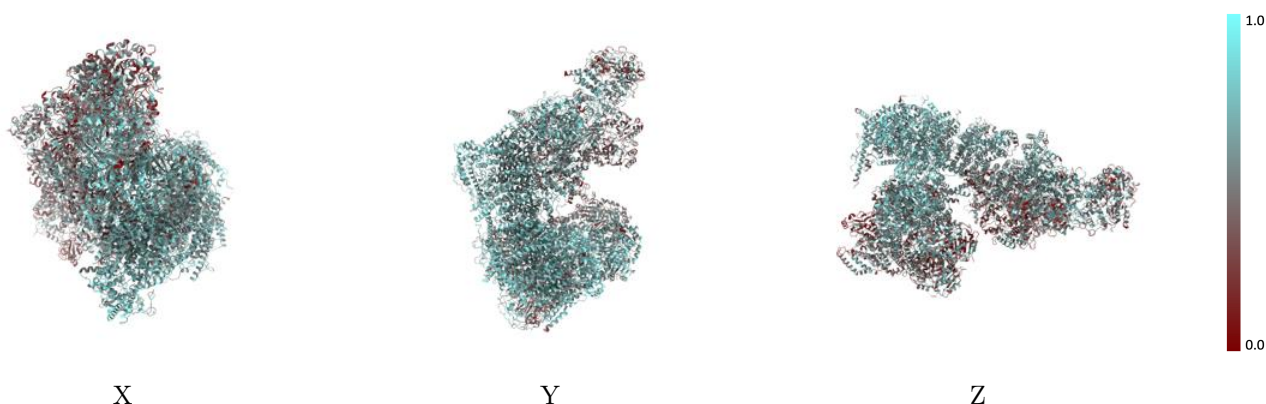
The images above show the 3D surface view of the map at the recommended contour level 0.015 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



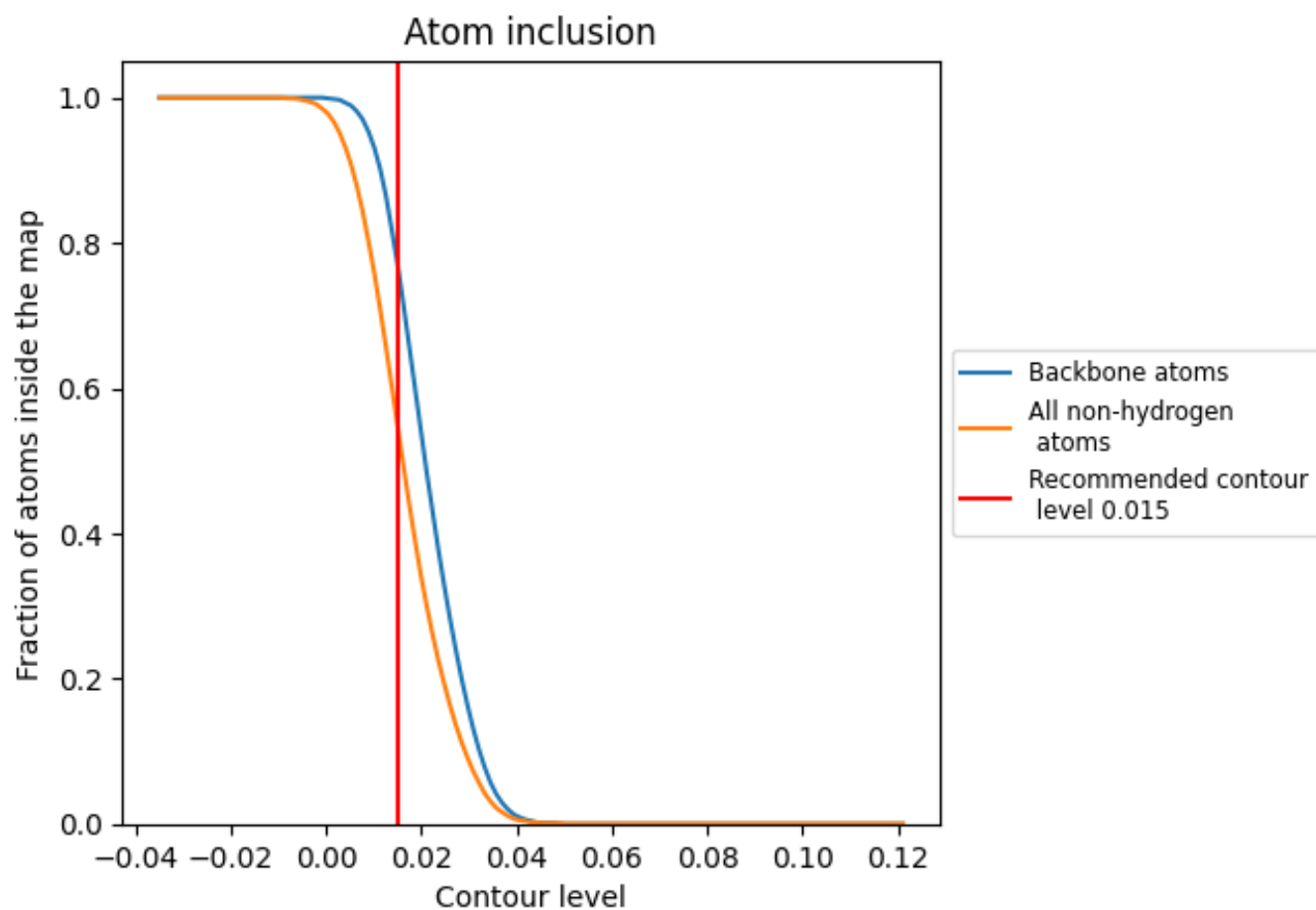
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

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



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.015).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 77% of all backbone atoms, 55% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary



































































The table lists the average atom inclusion at the recommended contour level (0.015) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.5480	 0.2950
A	 0.4860	 0.3410
AA	 0.4790	 0.1900
AB	 0.4570	 0.2030
AC	 0.4580	 0.2680
AD	 0.4900	 0.2020
AE	 0.2500	 0.1680
AF	 0.5790	 0.2560
AG	 0.3290	 0.1880
AH	 0.4340	 0.1150
AI	 0.1140	 0.1520
AJ	 0.3730	 0.2090
AK	 0.2270	 0.1820
Aa	 0.6570	 0.3410
Ab	 0.6130	 0.2800
Ac	 0.5380	 0.3210
Ad	 0.5200	 0.2490
Ae	 0.2530	 0.1840
Af	 0.5570	 0.2980
Ag	 0.4900	 0.3220
Ah	 0.4380	 0.1750
Ai	 0.2340	 0.2550
Aj	 0.3740	 0.2260
Ak	 0.2810	 0.2340
B	 0.6520	 0.3650
C	 0.6110	 0.3230
D	 0.6340	 0.3640
E	 0.4710	 0.2200
F	 0.4780	 0.2120
G	 0.4680	 0.2300
H	 0.5830	 0.3630
I	 0.6470	 0.3510
J	 0.4890	 0.3360
K	 0.6140	 0.3890
L	 0.6360	 0.3700



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Chain	Atom inclusion	Q-score
M	 0.6520	 0.4030
N	 0.6470	 0.3960
O	 0.6120	 0.3250
P	 0.3820	 0.1950
Q	 0.4740	 0.2750
R	 0.4820	 0.2780
S	 0.3800	 0.1320
T	 0.2640	 0.1360
U	 0.6950	 0.3650
V	 0.5510	 0.2390
W	 0.4310	 0.2360
X	 0.6940	 0.3350
Y	 0.5540	 0.3560
Z	 0.6820	 0.3230
a	 0.6990	 0.3640
b	 0.6520	 0.3380
c	 0.5850	 0.2880
d	 0.6340	 0.3740
e	 0.6710	 0.3650
f	 0.6220	 0.3180
g	 0.6470	 0.3470
h	 0.6460	 0.3530
i	 0.6530	 0.3580
j	 0.6570	 0.3130
k	 0.7120	 0.3440
l	 0.6680	 0.3680
m	 0.6300	 0.3620
n	 0.7200	 0.3760
o	 0.5940	 0.2710
p	 0.6840	 0.3510
q	 0.5190	 0.3170
r	 0.4450	 0.2750
s	 0.3350	 0.1910