wwPDB EM Validation Summary Report

Jul 14, 2025 – 05:28 pm BST

PDB ID	:	9FZL / pdb_00009fzl
EMDB ID	:	EMD-50491
Title	:	Perkinsus marinus respiratory supercomplex CII2CIII2CIV2 in an intermediate state
Authors	:	Wu, F.; Amunts, A.
Deposited on	:	2024-07-05
Resolution	:	2.20 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*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

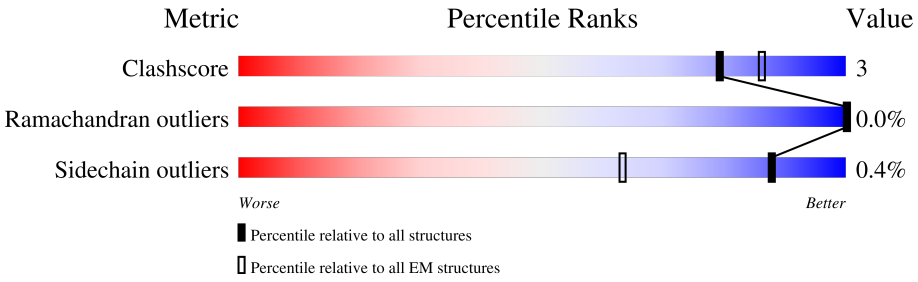
EMDB validation analysis	:	0.0.1.dev118
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.0rc1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.44

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.20 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)
Clashscore	210492	15764
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 >=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 <=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	2M	604	77% 94% 6%
1	2m	604	77% 94% 6%
2	2N	259	24% 95% 5%
2	2n	259	23% 95% 5%
3	2O	160	94% 6%
3	2o	160	95% 5%
4	2P	158	93% 7%
4	2p	158	94% 6%

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Mol	Chain	Length	Quality of chain
5	2Q	69	91% 9%
5	2q	69	91% 9%
6	2R	117	88% 12%
6	2r	117	91% 9%
7	2S	165	7% 93% 7%
7	2s	165	7% 93% 7%
8	2T	82	89% 11%
8	2t	82	89% 11%
9	2U	48	15% 88% 12%
9	2u	48	17% 88% 12%
10	2V	87	25% 97%
10	2v	87	24% 95% 5%
11	3A	454	97%
11	3a	454	97%
12	3B	496	97%
12	3b	496	98%
13	3C	241	97%
13	3c	241	98%
14	3D	95	95% 5%
14	3d	95	95% 5%
15	3E	92	95% 5%
15	3e	92	96%
16	3F	84	96%
16	3f	84	96%
17	3G	354	90% 10%

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Mol	Chain	Length	Quality of chain
17	3g	354	90% 10%
18	3H	326	30% 87% 13%
18	3h	326	30% 87% 13%
19	3I	176	95% 5%
19	3i	176	95% 5%
20	3J	92	11% 99%
20	3j	92	11% 99%
21	3K	79	97%
21	3k	79	95% 5%
22	3L	69	29% 87% 13%
22	3l	69	29% 87% 13%
23	40	230	100% 90% 10%
23	41	230	100% 90% 10%
24	4A	100	100% 91% 9%
24	4a	100	100% 91% 9%
25	4B	93	98% 91% 8%
25	4b	93	98% 91% 8%
26	4C	75	96% 88% 11%
26	4c	75	96% 88% 11%
27	4D	90	99% 92% 8%
27	4d	90	100% 93% 7%
28	4E	152	100% 95% 5%
28	4e	152	100% 95% 5%
29	4F	73	99% 96%
29	4f	73	99% 96%

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Mol	Chain	Length	Quality of chain
30	4G	100	99% 98%
30	4g	100	99% 98%
31	4H	141	100% 96%
31	4h	141	100% 95% 5%
32	4I	196	100% 95% 5%
32	4i	196	100% 94% 6%
33	4J	186	100% 92% 8%
33	4j	186	100% 91% 9%
34	4K	93	100% 95% 5%
34	4k	93	100% 95% 5%
35	4L	122	100% 96%
35	4l	122	100% 96%
36	4M	98	100% 93% 7%
36	4m	98	100% 93% 7%
37	4N	131	100% 95% 5%
37	4n	131	100% 95% 5%
38	4O	47	100% 91% 9%
38	4o	47	100% 91% 9%
39	4P	180	100% 96%
39	4p	180	100% 96%
40	4Q	459	100% 88% 12%
40	4q	459	100% 88% 12%
41	4R	103	100% 97%
41	4r	103	100% 96%
42	4S	65	100% 97%

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Mol	Chain	Length	Quality of chain
42	4s	65	100% 100%
43	4T	121	100% 93% 7%
43	4t	121	100% 93% 7%
44	4U	91	100% 88% 12%
44	4u	91	100% 89% 11%
45	4V	185	100% 93% 7%
45	4v	185	100% 93% 7%
46	4W	141	100% 96%
46	4w	141	100% 96%
47	4X	226	100% 91% 9%
47	4x	226	100% 90% 10%
48	4Y	107	100% 95% 5%
48	4y	107	100% 95% 5%
49	4Z	186	100% 98%
49	4z	186	100% 98%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
61	AJP	40	304	X	-	-	-
61	AJP	41	304	X	-	-	-

2 Entry composition (i)

There are 68 unique types of molecules in this entry. The entry contains 142424 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 Succinate dehydrogenase [ubiquinone] flavoprotein subunit, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	2M	604	Total	C	N	O	S	0	0
			4610	2880	831	873	26		
1	2m	604	Total	C	N	O	S	0	0
			4610	2880	831	873	26		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
2	2N	259	Total	C	N	O	S	0	0
			2068	1309	355	378	26		
2	2n	259	Total	C	N	O	S	0	0
			2068	1309	355	378	26		

- Molecule 3 is a protein called SDHG.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	2O	160	Total	C	N	O	S	0	0
			1254	806	229	213	6		
3	2o	160	Total	C	N	O	S	0	0
			1254	806	229	213	6		

- Molecule 4 is a protein called Transmembrane protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	2P	158	Total	C	N	O	S	0	0
			1309	846	246	211	6		
4	2p	158	Total	C	N	O	S	0	0
			1309	846	246	211	6		

- Molecule 5 is a protein called Kinesin-like protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	2Q	69	Total	C	N	O	S	0	0
			564	367	100	94	3		
5	2q	69	Total	C	N	O	S	0	0
			564	367	100	94	3		

- Molecule 6 is a protein called SDHH.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	2R	117	Total	C	N	O	S	0	0
			950	621	166	157	6		
6	2r	117	Total	C	N	O	S	0	0
			950	621	166	157	6		

- Molecule 7 is a protein called DUF6827 domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	2S	165	Total	C	N	O	S	0	0
			1323	832	223	257	11		
7	2s	165	Total	C	N	O	S	0	0
			1323	832	223	257	11		

- Molecule 8 is a protein called Rab-GAP TBC domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	2T	82	Total	C	N	O	S	0	0
			695	446	117	128	4		
8	2t	82	Total	C	N	O	S	0	0
			695	446	117	128	4		

- Molecule 9 is a protein called Syntaxin-1A.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	2U	48	Total	C	N	O	S	0	0
			390	246	68	75	1		
9	2u	48	Total	C	N	O	S	0	0
			390	246	68	75	1		

- Molecule 10 is a protein called SDHI.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	2V	87	Total	C	N	O	S	0	0
			709	457	119	126	7		

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Mol	Chain	Residues	Atoms					AltConf	Trace
10	2v	87	Total	C	N	O	S	0	0
			709	457	119	126	7		

- Molecule 11 is a protein called Mitochondrial processing peptidase beta subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	3A	454	Total	C	N	O	S	0	0
			3622	2285	621	698	18		
11	3a	454	Total	C	N	O	S	0	0
			3622	2285	621	698	18		

- Molecule 12 is a protein called Alpha-MPP.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	3B	496	Total	C	N	O	S	0	0
			3884	2459	669	734	22		
12	3b	496	Total	C	N	O	S	0	0
			3884	2459	669	734	22		

- Molecule 13 is a protein called Iso-1-cytochrome c.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	3C	241	Total	C	N	O	S	0	0
			1921	1225	334	349	13		
13	3c	241	Total	C	N	O	S	0	0
			1921	1225	334	349	13		

- Molecule 14 is a protein called QCR8.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	3D	95	Total	C	N	O	S	0	0
			836	551	146	135	4		
14	3d	95	Total	C	N	O	S	0	0
			836	551	146	135	4		

- Molecule 15 is a protein called QCR9.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	3E	92	Total	C	N	O	S	0	0
			813	545	138	127	3		
15	3e	92	Total	C	N	O	S	0	0
			813	545	138	127	3		

- Molecule 16 is a protein called QCR10.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	3F	84	Total	C	N	O	S	0	0
			734	493	123	114	4		
16	3f	84	Total	C	N	O	S	0	0
			734	493	123	114	4		

- Molecule 17 is a protein called Cytochrome b.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	3G	354	Total	C	N	O	S	0	0
			3016	2063	448	498	7		
17	3g	354	Total	C	N	O	S	0	0
			3016	2063	448	498	7		

- Molecule 18 is a protein called Ubiquinol-cytochrome c reductase, iron-sulfur subunit, putative.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	3H	326	Total	C	N	O	S	0	0
			2628	1669	478	466	15		
18	3h	326	Total	C	N	O	S	0	0
			2628	1669	478	466	15		

- Molecule 19 is a protein called Ubiquinol-cytochrome C reductase complex 14kD subunit, putative.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	3I	176	Total	C	N	O	S	0	0
			1472	946	255	259	12		
19	3i	176	Total	C	N	O	S	0	0
			1472	946	255	259	12		

- Molecule 20 is a protein called Ubiquinol-cytochrome c reductase complex 7.8 kDa protein, putative.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	3J	92	Total	C	N	O	S	0	0
			755	471	134	139	11		
20	3j	92	Total	C	N	O	S	0	0
			755	471	134	139	11		

- Molecule 21 is a protein called Cu-binding protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	3K	79	Total	C	N	O	S	0	0
			608	391	110	103	4		
21	3k	79	Total	C	N	O	S	0	0
			608	391	110	103	4		

- Molecule 22 is a protein called Aurora kinase.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	3L	69	Total	C	N	O	S	0	0
			509	327	91	89	2		
22	3l	69	Total	C	N	O	S	0	0
			509	327	91	89	2		

- Molecule 23 is a protein called Cytochrome c oxidase subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	40	230	Total	C	N	O	S	0	0
			2004	1365	289	346	4		
23	41	230	Total	C	N	O	S	0	0
			2004	1365	289	346	4		

- Molecule 24 is a protein called Cytochrome c oxidase subunit 6B.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	4A	100	Total	C	N	O	S	0	0
			841	518	157	157	9		
24	4a	100	Total	C	N	O	S	0	0
			841	518	157	157	9		

- Molecule 25 is a protein called Peptidase M14 carboxypeptidase A domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	4B	93	Total	C	N	O	S	0	0
			732	479	116	129	8		
25	4b	93	Total	C	N	O	S	0	0
			732	479	116	129	8		

- Molecule 26 is a protein called Cytochrome c oxidase subunit 40.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	4C	75	Total	C	N	O	S	0	0
			626	414	95	113	4		

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Mol	Chain	Residues	Atoms					AltConf	Trace
26	4c	75	Total	C	N	O	S	0	0
			626	414	95	113	4		

- Molecule 27 is a protein called Cytochrome c oxidase subunit 34.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	4D	90	Total	C	N	O	S	0	0
			787	525	128	131	3		
27	4d	90	Total	C	N	O	S	0	0
			787	525	128	131	3		

- Molecule 28 is a protein called Merozoite surface protein, putative.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	4E	152	Total	C	N	O	S	0	0
			1313	840	229	229	15		
28	4e	152	Total	C	N	O	S	0	0
			1313	840	229	229	15		

- Molecule 29 is a protein called Ubiquitin, putative.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	4F	73	Total	C	N	O	S	0	0
			613	406	108	97	2		
29	4f	73	Total	C	N	O	S	0	0
			613	406	108	97	2		

- Molecule 30 is a protein called Cytochrome c oxidase subunit 33.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	4G	100	Total	C	N	O	S	0	0
			854	550	156	144	4		
30	4g	100	Total	C	N	O	S	0	0
			854	550	156	144	4		

- Molecule 31 is a protein called Cytochrome c oxidase subunit 30.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	4H	141	Total	C	N	O	S	0	0
			1125	711	195	217	2		
31	4h	141	Total	C	N	O	S	0	0
			1125	711	195	217	2		

- Molecule 32 is a protein called Cytochrome c oxidase subunit 6C.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	4I	196	Total	C	N	O	S	0	0
			1695	1105	276	305	9		
32	4i	196	Total	C	N	O	S	0	0
			1695	1105	276	305	9		

- Molecule 33 is a protein called Cytochrome c oxidase subunit 24.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	4J	186	Total	C	N	O	S	0	0
			1517	990	268	253	6		
33	4j	186	Total	C	N	O	S	0	0
			1517	990	268	253	6		

- Molecule 34 is a protein called Cytochrome c oxidase subunit 37.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	4K	93	Total	C	N	O	S	0	0
			722	473	129	118	2		
34	4k	93	Total	C	N	O	S	0	0
			722	473	129	118	2		

- Molecule 35 is a protein called Cytochrome c oxidase subunit 7A.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	4L	122	Total	C	N	O	S	0	0
			1083	715	192	168	8		
35	4l	122	Total	C	N	O	S	0	0
			1083	715	192	168	8		

- Molecule 36 is a protein called Cytochrome c oxidase subunit 35.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	4M	98	Total	C	N	O	S	0	0
			773	498	147	127	1		
36	4m	98	Total	C	N	O	S	0	0
			773	498	147	127	1		

- Molecule 37 is a protein called Cytochrome c oxidase polypeptide II.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	4N	131	Total	C	N	O	S	0	0
			1025	661	173	184	7		
37	4n	131	Total	C	N	O	S	0	0
			1025	661	173	184	7		

- Molecule 38 is a protein called GINS subunit domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	4O	47	Total	C	N	O	S	0	0
			383	257	60	63	3		
38	4o	47	Total	C	N	O	S	0	0
			383	257	60	63	3		

- Molecule 39 is a protein called Cytochrome c oxidase subunit 2A.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	4P	180	Total	C	N	O	S	0	0
			1504	977	246	276	5		
39	4p	180	Total	C	N	O	S	0	0
			1504	977	246	276	5		

- Molecule 40 is a protein called Cytochrome c oxidase subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	4Q	459	Total	C	N	O	S	0	0
			3687	2519	545	612	11		
40	4q	459	Total	C	N	O	S	0	0
			3687	2519	545	612	11		

- Molecule 41 is a protein called Cytochrome c oxidase subunit 32.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	4R	103	Total	C	N	O	S	0	0
			916	609	156	145	6		
41	4r	103	Total	C	N	O	S	0	0
			916	609	156	145	6		

- Molecule 42 is a protein called Cytochrome c oxidase subunit 7C.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	4S	65	Total	C	N	O	S	0	0
			541	350	85	100	6		

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Mol	Chain	Residues	Atoms					AltConf	Trace
42	4s	65	Total	C	N	O	S	0	0
			541	350	85	100	6		

- Molecule 43 is a protein called Cytochrome c oxidase subunit 13.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	4T	121	Total	C	N	O	S	0	0
			983	634	170	167	12		
43	4t	121	Total	C	N	O	S	0	0
			983	634	170	167	12		

- Molecule 44 is a protein called Amino acid transporter transmembrane domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	4U	91	Total	C	N	O	S	0	0
			758	503	125	127	3		
44	4u	91	Total	C	N	O	S	0	0
			758	503	125	127	3		

- Molecule 45 is a protein called Cytochrome c oxidase subunit 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	4V	185	Total	C	N	O	S	0	0
			1539	1003	270	260	6		
45	4v	185	Total	C	N	O	S	0	0
			1539	1003	270	260	6		

- Molecule 46 is a protein called Cytochrome c oxidase subunit 19.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	4W	141	Total	C	N	O	S	0	0
			1193	782	206	198	7		
46	4w	141	Total	C	N	O	S	0	0
			1193	782	206	198	7		

- Molecule 47 is a protein called Cytochrome Coxidase subunit, putative.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	4X	226	Total	C	N	O	S	0	0
			1860	1186	313	344	17		

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Mol	Chain	Residues	Atoms					AltConf	Trace
47	4x	226	Total	C	N	O	S	0	0
			1860	1186	313	344	17		

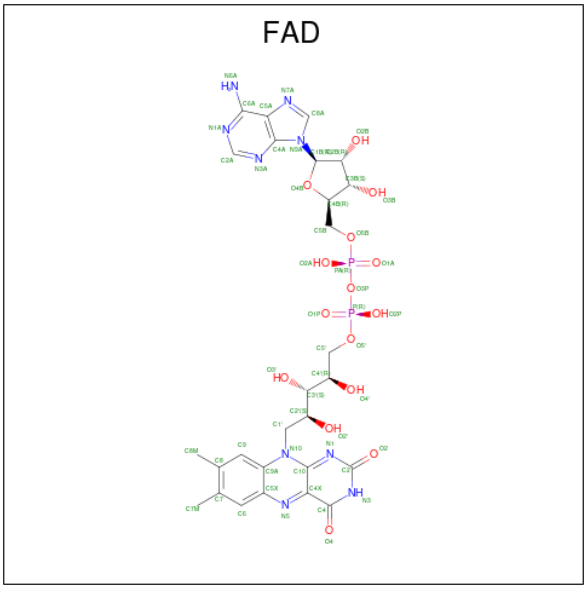
- Molecule 48 is a protein called Cytochrome c oxidase subunit 18.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	4Y	107	Total	C	N	O	S	0	0
			905	567	153	179	6		
48	4y	107	Total	C	N	O	S	0	0
			905	567	153	179	6		

- Molecule 49 is a protein called Cytochrome c oxidase subunit 31.

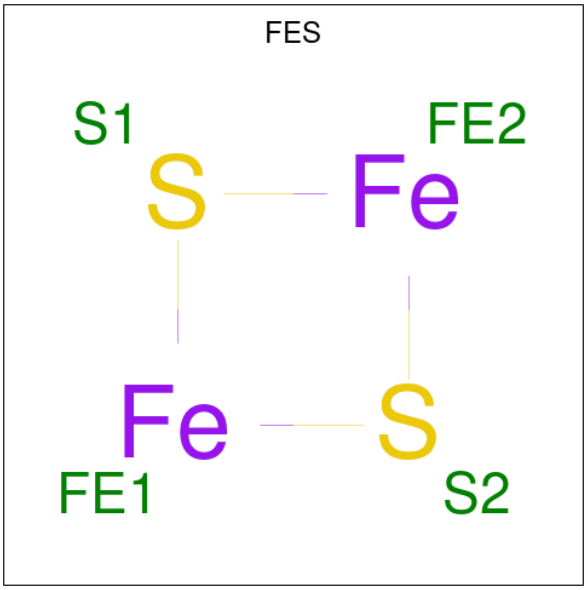
Mol	Chain	Residues	Atoms					AltConf	Trace
49	4Z	186	Total	C	N	O	S	0	0
			1582	1041	270	266	5		
49	4z	186	Total	C	N	O	S	0	0
			1582	1041	270	266	5		

- Molecule 50 is FLAVIN-ADENINE DINUCLEOTIDE (CCD ID: FAD) (formula: $C_{27}H_{33}N_9O_{15}P_2$).



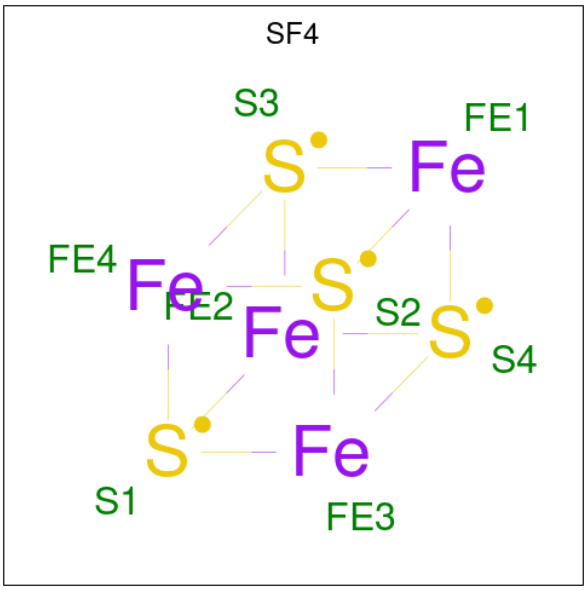
Mol	Chain	Residues	Atoms					AltConf
50	2M	1	Total	C	N	O	P	0
			53	27	9	15	2	
50	2m	1	Total	C	N	O	P	0
			53	27	9	15	2	

- Molecule 51 is FE2/S2 (INORGANIC) CLUSTER (CCD ID: FES) (formula: Fe_2S_2).



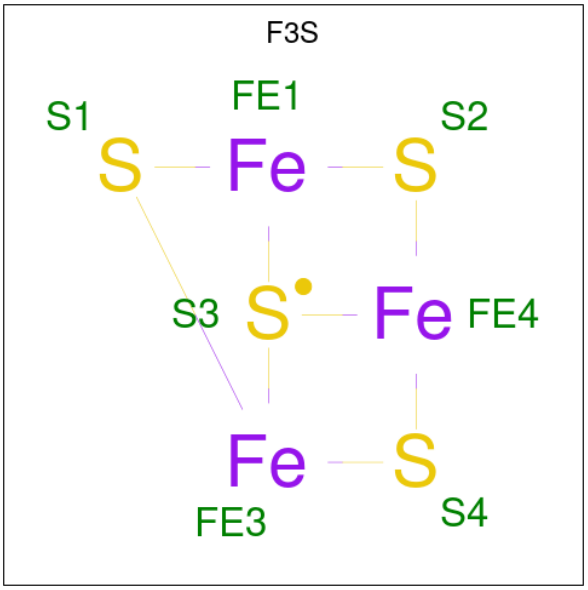
Mol	Chain	Residues	Atoms	AltConf
51	2N	1	Total Fe S 4 2 2	0
51	3H	1	Total Fe S 4 2 2	0
51	2n	1	Total Fe S 4 2 2	0
51	3h	1	Total Fe S 4 2 2	0

- Molecule 52 is IRON/SULFUR CLUSTER (CCD ID: SF4) (formula: Fe_4S_4).



Mol	Chain	Residues	Atoms	AltConf
52	2N	1	Total Fe S 8 4 4	0
52	2n	1	Total Fe S 8 4 4	0

- Molecule 53 is FE3-S4 CLUSTER (CCD ID: F3S) (formula: Fe_3S_4).

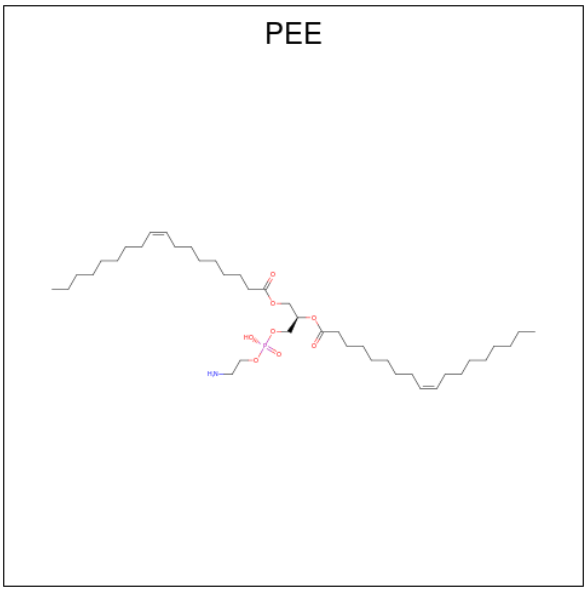


Mol	Chain	Residues	Atoms	AltConf
53	2N	1	Total Fe S 7 3 4	0
53	2n	1	Total Fe S 7 3 4	0

- Molecule 54 is POTASSIUM ION (CCD ID: K) (formula: K).

Mol	Chain	Residues	Atoms	AltConf
54	2N	1	Total K 1 1	0
54	4Q	1	Total K 1 1	0
54	2n	1	Total K 1 1	0
54	4q	1	Total K 1 1	0

- Molecule 55 is 1,2-dioleoyl-sn-glycero-3-phosphoethanolamine (CCD ID: PEE) (formula: $C_{41}H_{78}NO_8P$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
55	2O	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	2P	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	2P	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	2R	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	3C	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	3F	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	40	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	40	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	40	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	4D	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	4Q	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	4Q	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	4R	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	4S	1	Total	C	N	O	P	0
			51	41	1	8	1	

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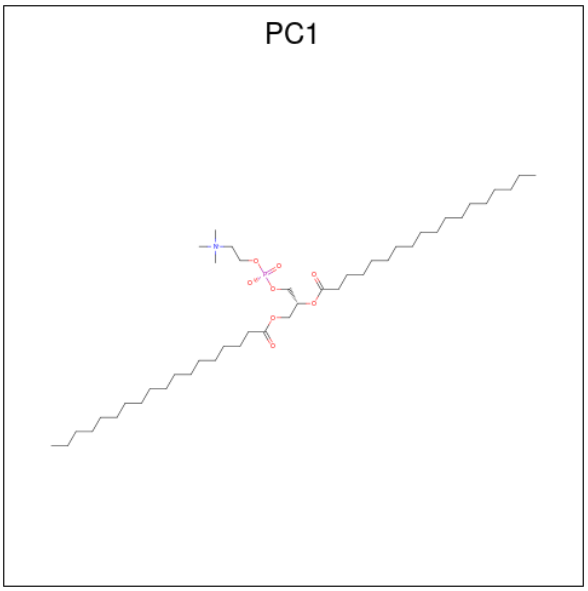
Mol	Chain	Residues	Atoms					AltConf
55	4W	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	4Z	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	2o	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	2p	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	2p	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	2r	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	3c	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	3f	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	41	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	41	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	41	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	4d	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	4q	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	4q	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	4r	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	4s	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	4w	1	Total	C	N	O	P	0
			51	41	1	8	1	
55	4z	1	Total	C	N	O	P	0
			51	41	1	8	1	

- Molecule 56 is 1,2-DIACYL-SN-GLYCERO-3-PHOSPHOCHOLINE (CCD ID: PC1) (formula: $C_{44}H_{88}NO_8P$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
56	2O	1	Total	C	N	O	P	0
			54	44	1	8	1	
56	2O	1	Total	C	N	O	P	0
			54	44	1	8	1	
56	2P	1	Total	C	N	O	P	0
			54	44	1	8	1	
56	2R	1	Total	C	N	O	P	0
			54	44	1	8	1	
56	2T	1	Total	C	N	O	P	0
			54	44	1	8	1	
56	3A	1	Total	C	N	O	P	0
			54	44	1	8	1	
56	3A	1	Total	C	N	O	P	0
			54	44	1	8	1	
56	3H	1	Total	C	N	O	P	0
			54	44	1	8	1	
56	4E	1	Total	C	N	O	P	0
			54	44	1	8	1	
56	2o	1	Total	C	N	O	P	0
			54	44	1	8	1	
56	2o	1	Total	C	N	O	P	0
			54	44	1	8	1	
56	2p	1	Total	C	N	O	P	0
			54	44	1	8	1	
56	2r	1	Total	C	N	O	P	0
			54	44	1	8	1	
56	2t	1	Total	C	N	O	P	0
			54	44	1	8	1	

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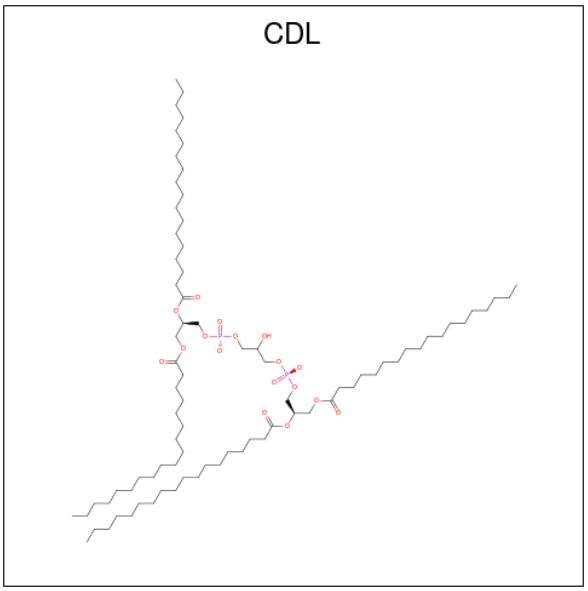
Mol	Chain	Residues	Atoms					AltConf
56	3a	1	Total	C	N	O	P	0
			54	44	1	8	1	
56	3a	1	Total	C	N	O	P	0
			54	44	1	8	1	
56	3h	1	Total	C	N	O	P	0
			54	44	1	8	1	
56	4e	1	Total	C	N	O	P	0
			54	44	1	8	1	

- Molecule 57 is CARDIOLIPIN (CCD ID: CDL) (formula: $C_{81}H_{156}O_{17}P_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf
57	2O	1	Total	C	O	P	0
			100	81	17	2	
57	2P	1	Total	C	O	P	0
			100	81	17	2	
57	2Q	1	Total	C	O	P	0
			100	81	17	2	
57	2U	1	Total	C	O	P	0
			100	81	17	2	
57	3D	1	Total	C	O	P	0
			100	81	17	2	
57	3D	1	Total	C	O	P	0
			100	81	17	2	
57	3E	1	Total	C	O	P	0
			100	81	17	2	

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Mol	Chain	Residues	Atoms				AltConf
57	3E	1	Total	C	O	P	0
			100	81	17	2	
57	3E	1	Total	C	O	P	0
			100	81	17	2	
57	3G	1	Total	C	O	P	0
			100	81	17	2	
57	3H	1	Total	C	O	P	0
			100	81	17	2	
57	3I	1	Total	C	O	P	0
			100	81	17	2	
57	3I	1	Total	C	O	P	0
			100	81	17	2	
57	3I	1	Total	C	O	P	0
			100	81	17	2	
57	3L	1	Total	C	O	P	0
			100	81	17	2	
57	3L	1	Total	C	O	P	0
			100	81	17	2	
57	4E	1	Total	C	O	P	0
			100	81	17	2	
57	4J	1	Total	C	O	P	0
			100	81	17	2	
57	4K	1	Total	C	O	P	0
			100	81	17	2	
57	4K	1	Total	C	O	P	0
			100	81	17	2	
57	4L	1	Total	C	O	P	0
			100	81	17	2	
57	4M	1	Total	C	O	P	0
			100	81	17	2	
57	4Q	1	Total	C	O	P	0
			100	81	17	2	
57	4Q	1	Total	C	O	P	0
			100	81	17	2	
57	4S	1	Total	C	O	P	0
			100	81	17	2	
57	4T	1	Total	C	O	P	0
			100	81	17	2	
57	4U	1	Total	C	O	P	0
			100	81	17	2	
57	4W	1	Total	C	O	P	0
			100	81	17	2	

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Mol	Chain	Residues	Atoms				AltConf
57	4W	1	Total	C	O	P	0
			100	81	17	2	
57	4Z	1	Total	C	O	P	0
			100	81	17	2	
57	2o	1	Total	C	O	P	0
			100	81	17	2	
57	2p	1	Total	C	O	P	0
			100	81	17	2	
57	2q	1	Total	C	O	P	0
			100	81	17	2	
57	2u	1	Total	C	O	P	0
			100	81	17	2	
57	3d	1	Total	C	O	P	0
			100	81	17	2	
57	3d	1	Total	C	O	P	0
			100	81	17	2	
57	3e	1	Total	C	O	P	0
			100	81	17	2	
57	3e	1	Total	C	O	P	0
			100	81	17	2	
57	3e	1	Total	C	O	P	0
			100	81	17	2	
57	3g	1	Total	C	O	P	0
			100	81	17	2	
57	3h	1	Total	C	O	P	0
			100	81	17	2	
57	3i	1	Total	C	O	P	0
			100	81	17	2	
57	3i	1	Total	C	O	P	0
			100	81	17	2	
57	3i	1	Total	C	O	P	0
			100	81	17	2	
57	3l	1	Total	C	O	P	0
			100	81	17	2	
57	3l	1	Total	C	O	P	0
			100	81	17	2	
57	4e	1	Total	C	O	P	0
			100	81	17	2	
57	4j	1	Total	C	O	P	0
			100	81	17	2	
57	4k	1	Total	C	O	P	0
			100	81	17	2	

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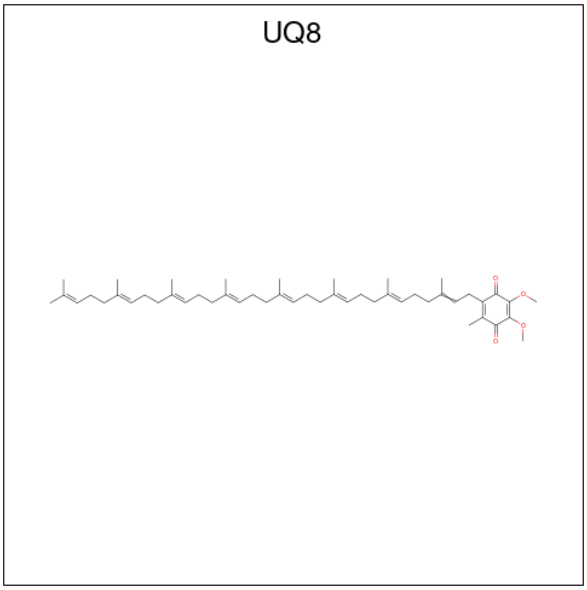
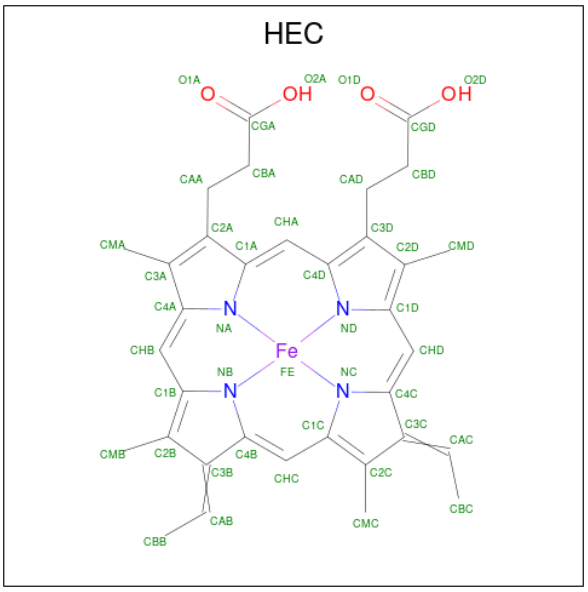
Mol	Chain	Residues	Atoms				AltConf
57	4k	1	Total	C	O	P	0
			100	81	17	2	
57	4l	1	Total	C	O	P	0
			100	81	17	2	
57	4m	1	Total	C	O	P	0
			100	81	17	2	
57	4q	1	Total	C	O	P	0
			100	81	17	2	
57	4q	1	Total	C	O	P	0
			100	81	17	2	
57	4s	1	Total	C	O	P	0
			100	81	17	2	
57	4t	1	Total	C	O	P	0
			100	81	17	2	
57	4u	1	Total	C	O	P	0
			100	81	17	2	
57	4w	1	Total	C	O	P	0
			100	81	17	2	
57	4w	1	Total	C	O	P	0
			100	81	17	2	
57	4z	1	Total	C	O	P	0
			100	81	17	2	

- Molecule 58 is Ubiquinone-8 (CCD ID: UQ8) (formula: $C_{49}H_{74}O_4$).



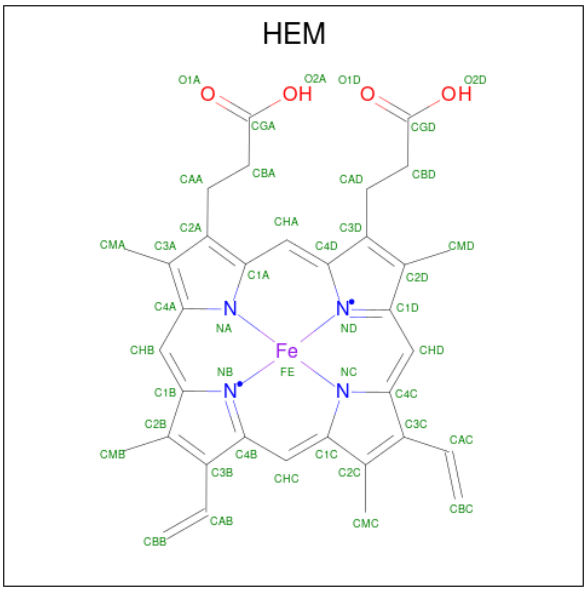
Mol	Chain	Residues	Atoms	AltConf
58	2S	1	Total C O 53 49 4	0
58	3D	1	Total C O 53 49 4	0
58	3G	1	Total C O 53 49 4	0
58	3G	1	Total C O 53 49 4	0
58	2s	1	Total C O 53 49 4	0
58	3d	1	Total C O 53 49 4	0
58	3g	1	Total C O 53 49 4	0
58	3g	1	Total C O 53 49 4	0

- Molecule 59 is HEME C (CCD ID: HEC) (formula: $C_{34}H_{34}FeN_4O_4$).



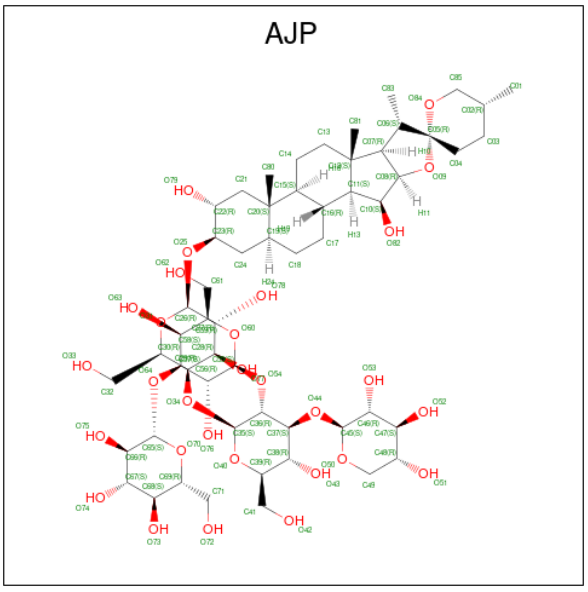
Mol	Chain	Residues	Atoms	AltConf
59	3C	1	Total C Fe N O 43 34 1 4 4	0
59	3c	1	Total C Fe N O 43 34 1 4 4	0

- Molecule 60 is PROTOPORPHYRIN IX CONTAINING FE (CCD ID: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).



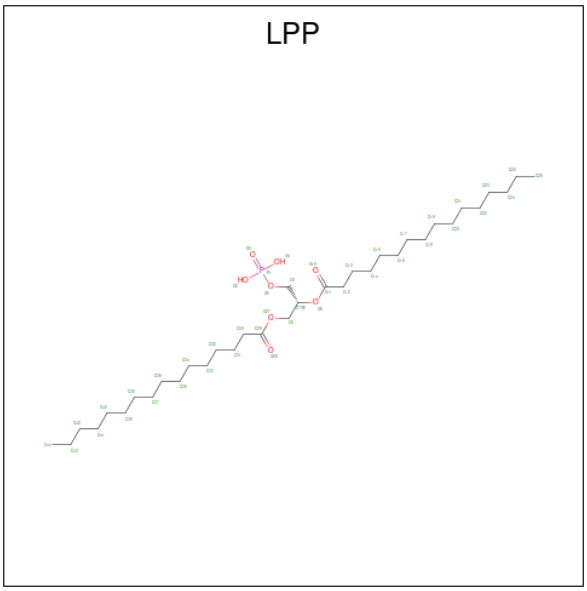
Mol	Chain	Residues	Atoms					AltConf
60	3G	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
60	3G	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
60	3g	1	Total	C	Fe	N	O	0
			43	34	1	4	4	
60	3g	1	Total	C	Fe	N	O	0
			43	34	1	4	4	

- Molecule 61 is Digitonin (CCD ID: AJP) (formula: $C_{56}H_{92}O_{29}$).



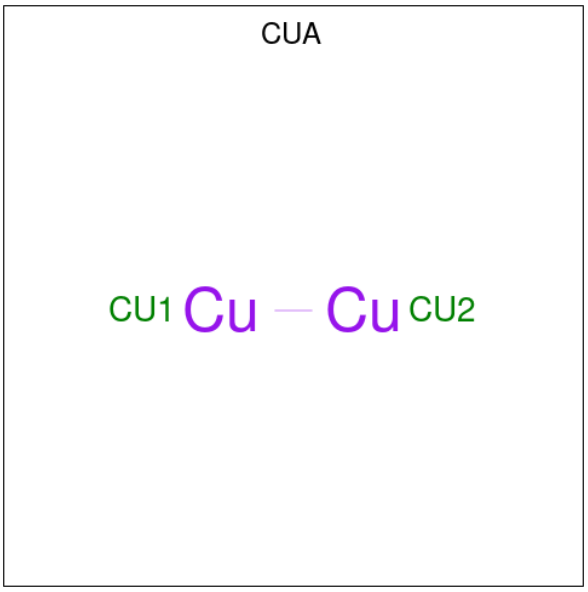
Mol	Chain	Residues	Atoms			AltConf
61	40	1	Total 43	C 33	O 10	0
61	41	1	Total 43	C 33	O 10	0

- Molecule 62 is 2-(HEXADECANOYLOXY)-1-[(PHOSPHONOOXY)METHYL]ETHYL HEXADECANOATE (CCD ID: LPP) (formula: $C_{35}H_{69}O_8P$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf
62	4C	1	Total 44	C 35	O 8	P 1	0
62	4D	1	Total 44	C 35	O 8	P 1	0
62	4c	1	Total 44	C 35	O 8	P 1	0
62	4d	1	Total 44	C 35	O 8	P 1	0

- Molecule 63 is DINUCLEAR COPPER ION (CCD ID: CUA) (formula: Cu_2).



Mol	Chain	Residues	Atoms	AltConf
63	4N	1	Total Cu 2 2	0
63	4n	1	Total Cu 2 2	0

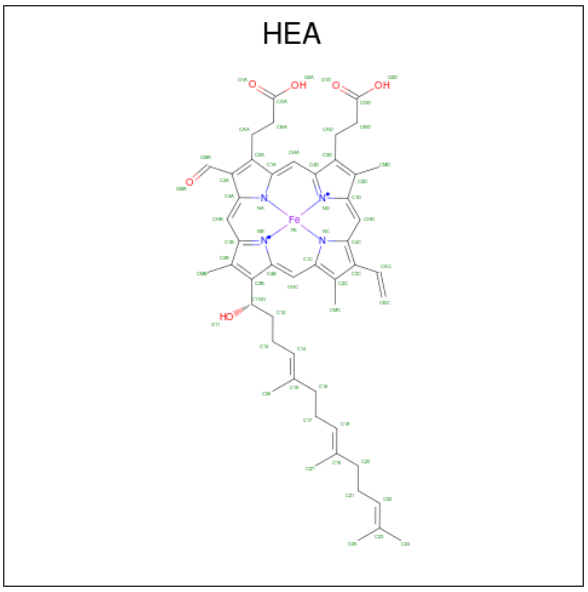
- Molecule 64 is COPPER (II) ION (CCD ID: CU) (formula: Cu).

Mol	Chain	Residues	Atoms	AltConf
64	4Q	1	Total Cu 1 1	0
64	4q	1	Total Cu 1 1	0

- Molecule 65 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

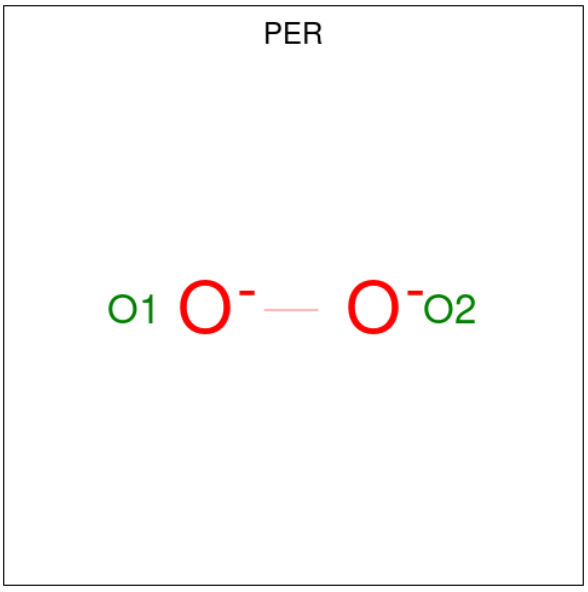
Mol	Chain	Residues	Atoms	AltConf
65	4Q	1	Total Mg 1 1	0
65	4q	1	Total Mg 1 1	0

- Molecule 66 is HEME-A (CCD ID: HEA) (formula: $C_{49}H_{56}FeN_4O_6$).



Mol	Chain	Residues	Atoms					AltConf
66	4Q	1	Total	C	Fe	N	O	0
			60	49	1	4	6	
66	4Q	1	Total	C	Fe	N	O	0
			60	49	1	4	6	
66	4q	1	Total	C	Fe	N	O	0
			60	49	1	4	6	
66	4q	1	Total	C	Fe	N	O	0
			60	49	1	4	6	

- Molecule 67 is PEROXIDE ION (CCD ID: PER) (formula: O_2).



Mol	Chain	Residues	Atoms	AltConf
67	4Q	1	Total O 2 2	0
67	4q	1	Total O 2 2	0

- Molecule 68 is ZINC ION (CCD ID: ZN) (formula: Zn).

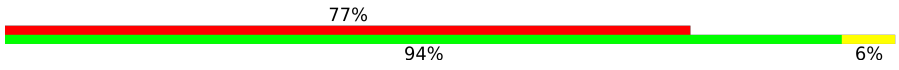
Mol	Chain	Residues	Atoms	AltConf
68	4T	2	Total Zn 2 2	0
68	4X	1	Total Zn 1 1	0
68	4t	2	Total Zn 2 2	0
68	4x	1	Total Zn 1 1	0

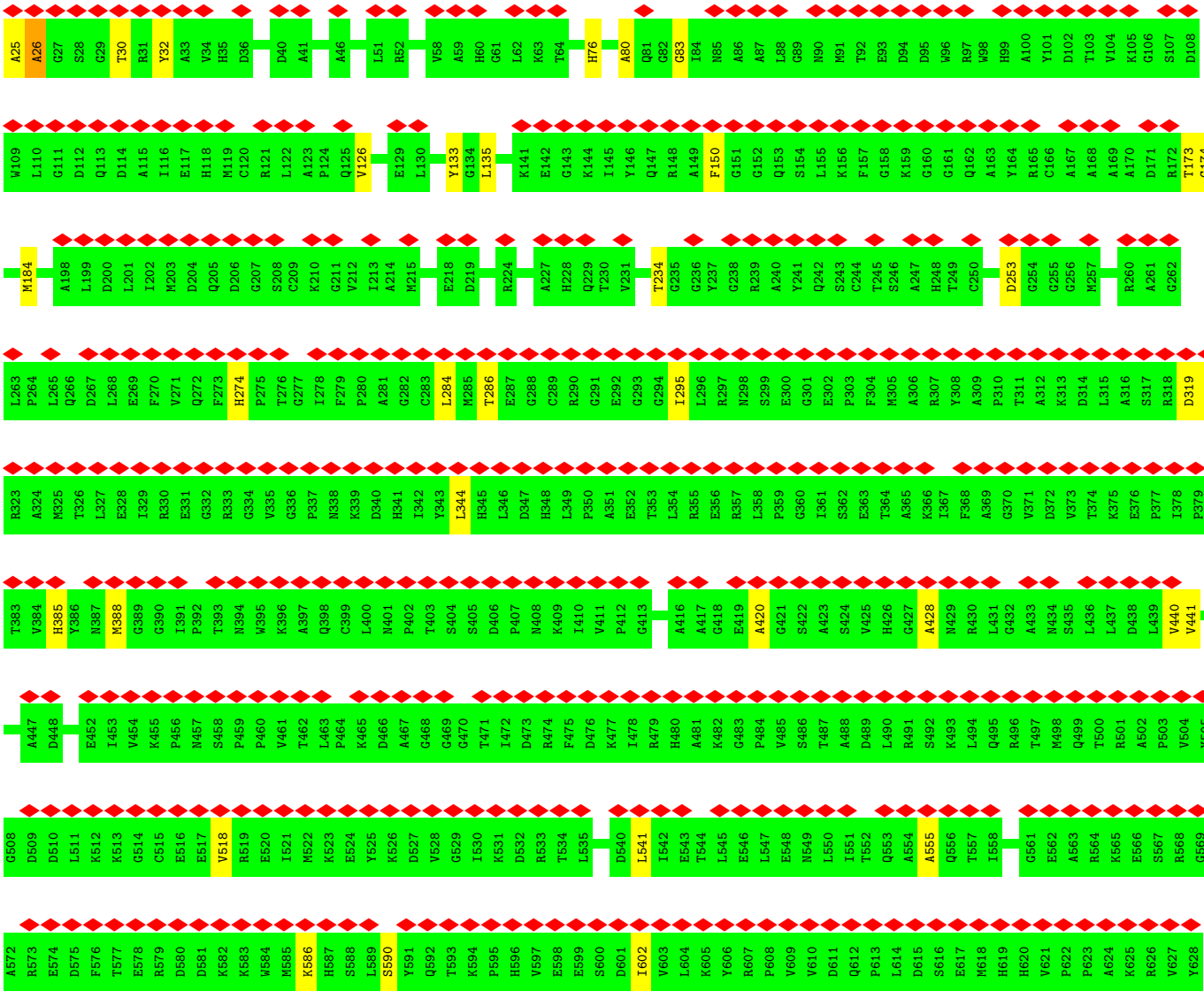
3 Residue-property plots (i)

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

• Molecule 1: Succinate dehydrogenase [ubiquinone] flavoprotein subunit, mitochondrial

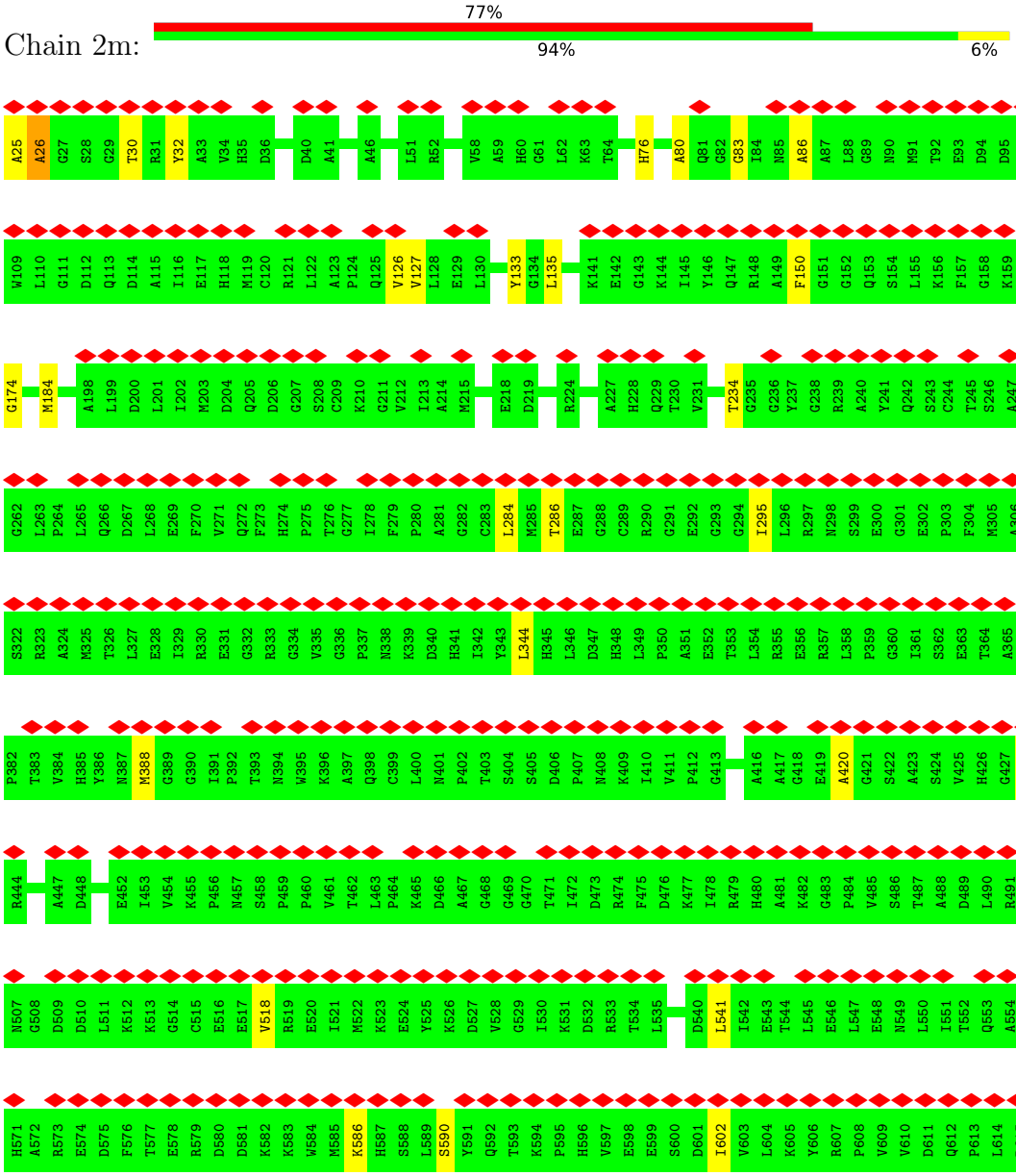
Chain 2M:





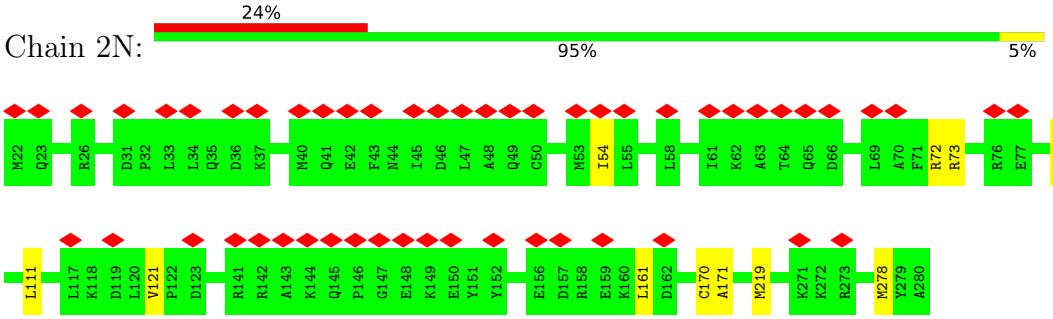
• Molecule 1: Succinate dehydrogenase [ubiquinone] flavoprotein subunit, mitochondrial

Chain 2m:



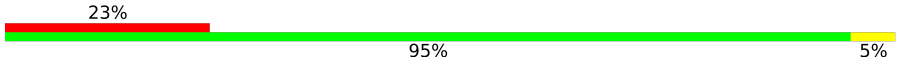
• Molecule 2: Succinate dehydrogenase [ubiquinone] iron-sulfur subunit, mitochondrial

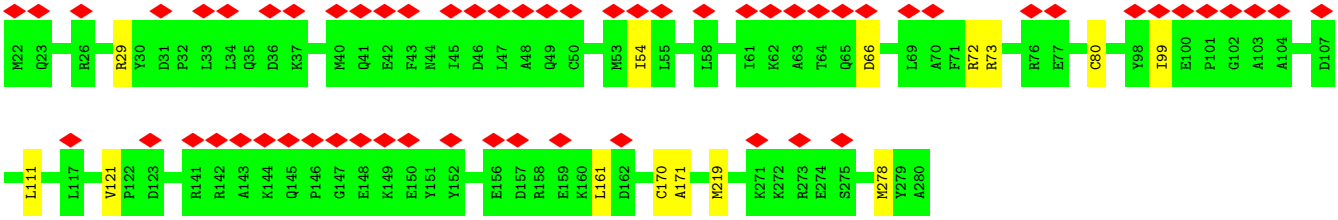
Chain 2N:



• Molecule 2: Succinate dehydrogenase [ubiquinone] iron-sulfur subunit, mitochondrial

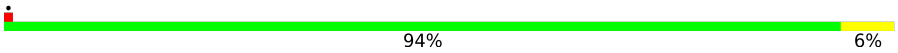
Chain 2n:

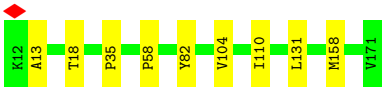




• Molecule 3: SDHG

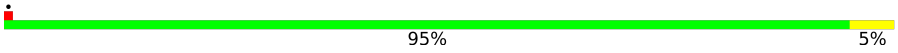
Chain 2O:

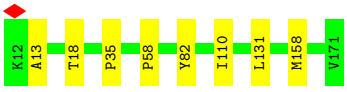




• Molecule 3: SDHG

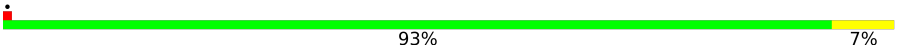
Chain 2o:





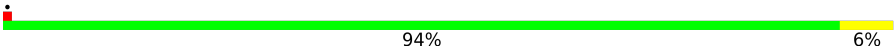
• Molecule 4: Transmembrane protein

Chain 2P:



• Molecule 4: Transmembrane protein

Chain 2p:



• Molecule 5: Kinesin-like protein

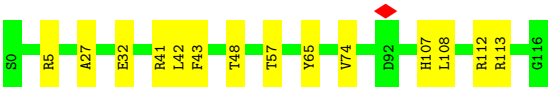
Chain 2Q:

• Molecule 5: Kinesin-like protein

Chain 2q:

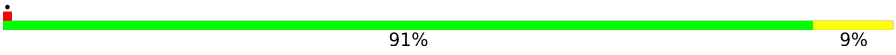
• Molecule 6: SDHH

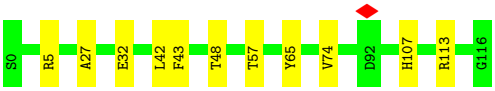
Chain 2R:



• Molecule 6: SDHH

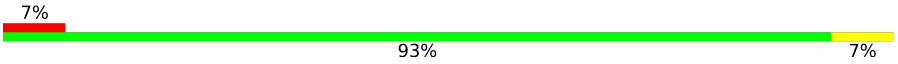
Chain 2r:





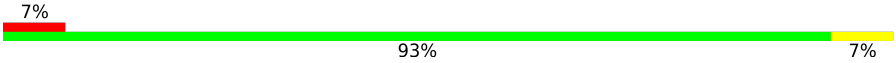
• Molecule 7: DUF6827 domain-containing protein

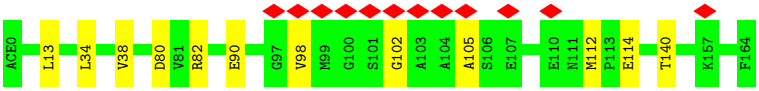
Chain 2S:



• Molecule 7: DUF6827 domain-containing protein

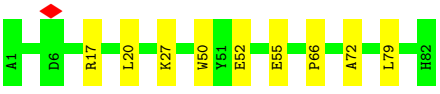
Chain 2s:





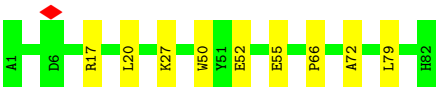
• Molecule 8: Rab-GAP TBC domain-containing protein

Chain 2T:



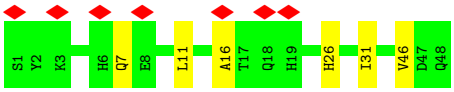
• Molecule 8: Rab-GAP TBC domain-containing protein

Chain 2t:



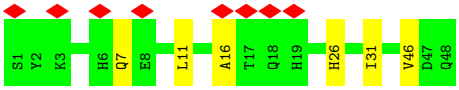
• Molecule 9: Syntaxin-1A

Chain 2U:



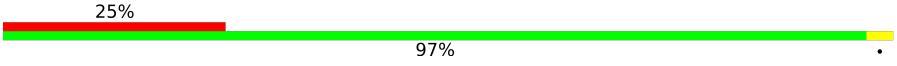
• Molecule 9: Syntaxin-1A

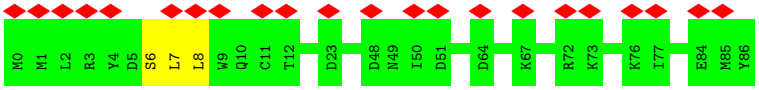
Chain 2u:



• Molecule 10: SDHI

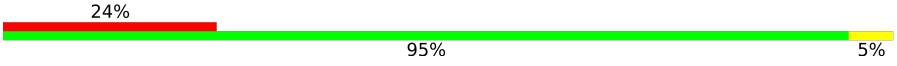
Chain 2V:

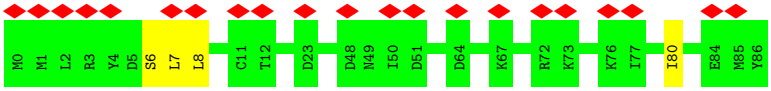




• Molecule 10: SDHI

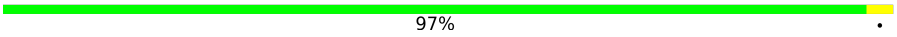
Chain 2v:





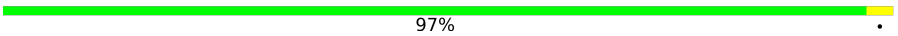
• Molecule 11: Mitochondrial processing peptidase beta subunit

Chain 3A:



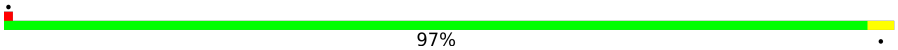
• Molecule 11: Mitochondrial processing peptidase beta subunit

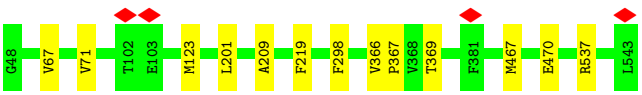
Chain 3a:



• Molecule 12: Alpha-MPP

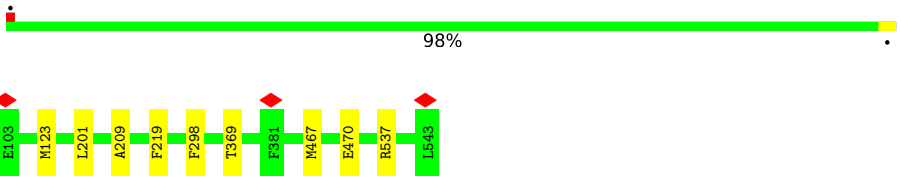
Chain 3B:





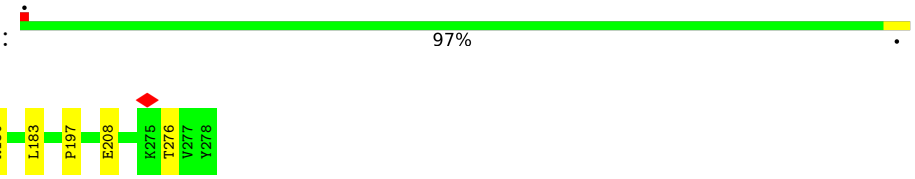
• Molecule 12: Alpha-MPP

Chain 3b:



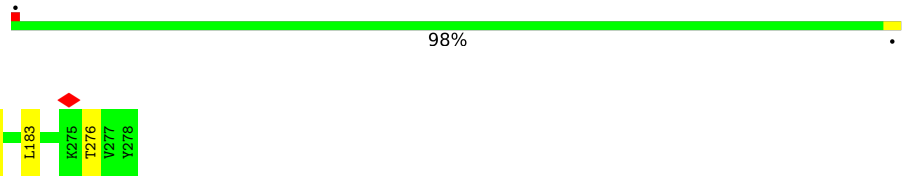
• Molecule 13: Iso-1-cytochrome c

Chain 3C:



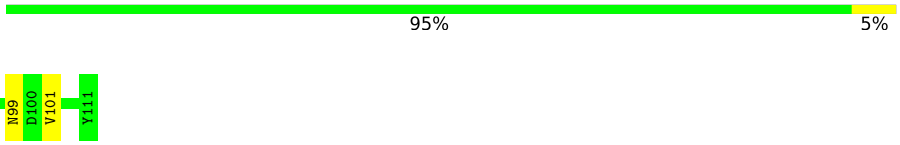
• Molecule 13: Iso-1-cytochrome c

Chain 3c:



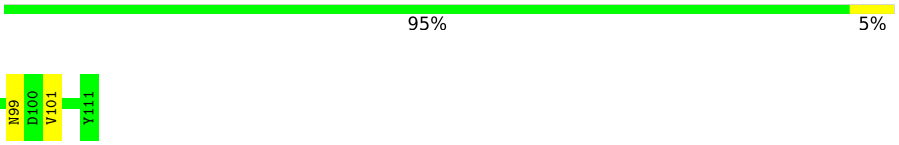
• Molecule 14: QCR8

Chain 3D:



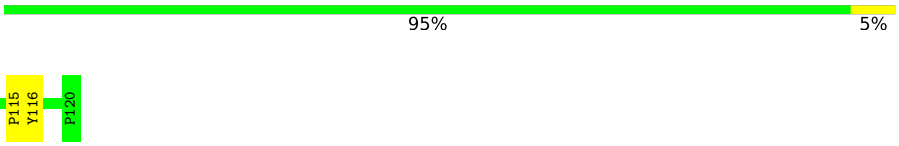
• Molecule 14: QCR8

Chain 3d:



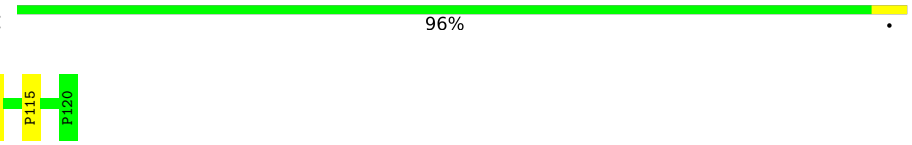
• Molecule 15: QCR9

Chain 3E:



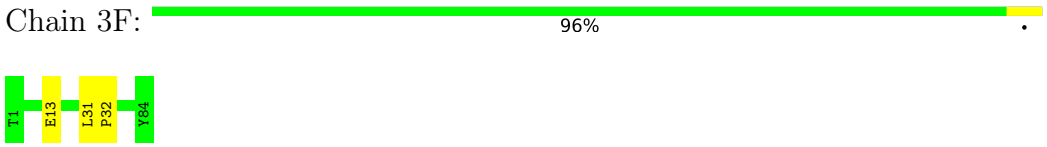
• Molecule 15: QCR9

Chain 3e:



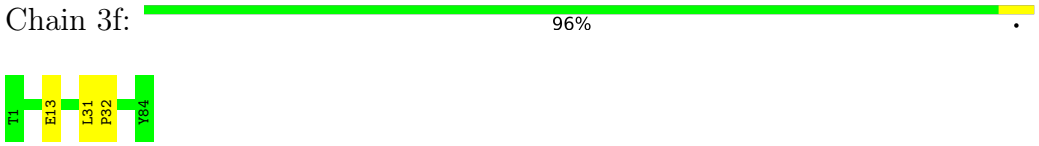
• Molecule 16: QCR10

Chain 3F:



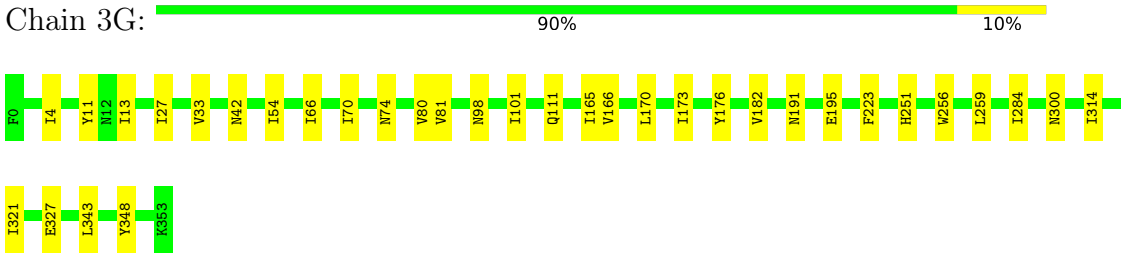
• Molecule 16: QCR10

Chain 3f:



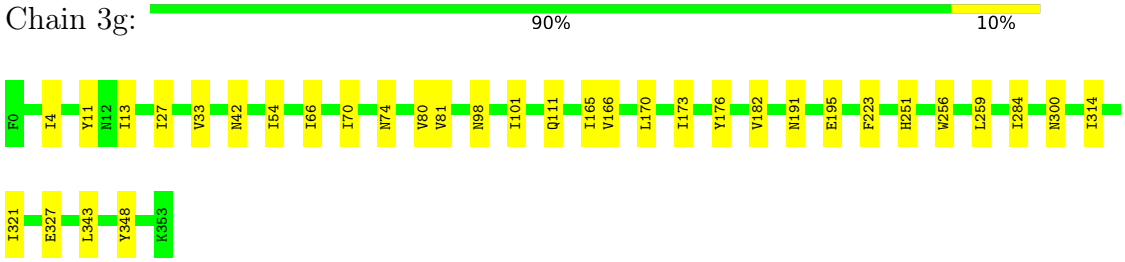
• Molecule 17: Cytochrome b

Chain 3G:



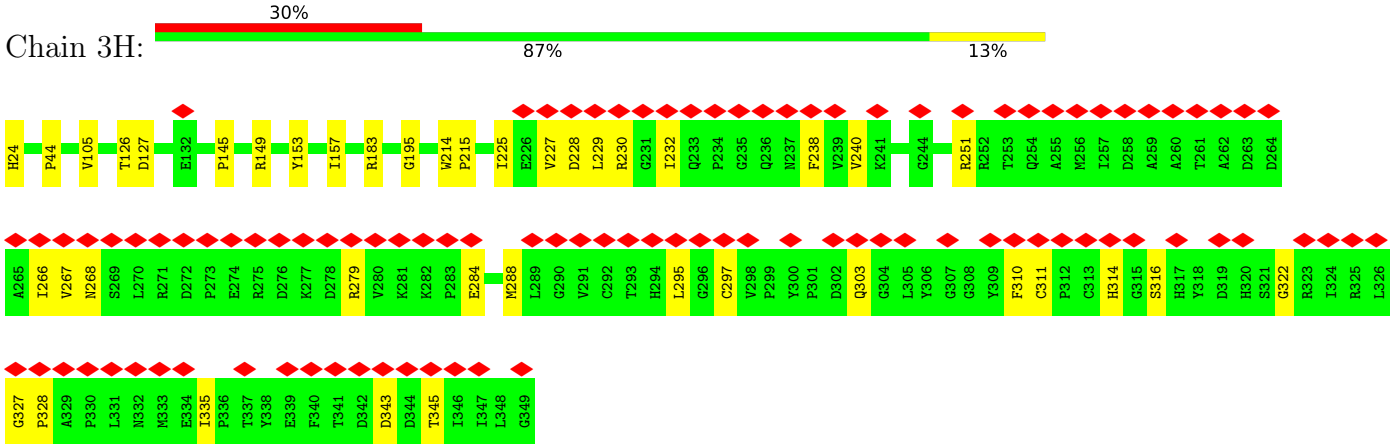
• Molecule 17: Cytochrome b

Chain 3g:



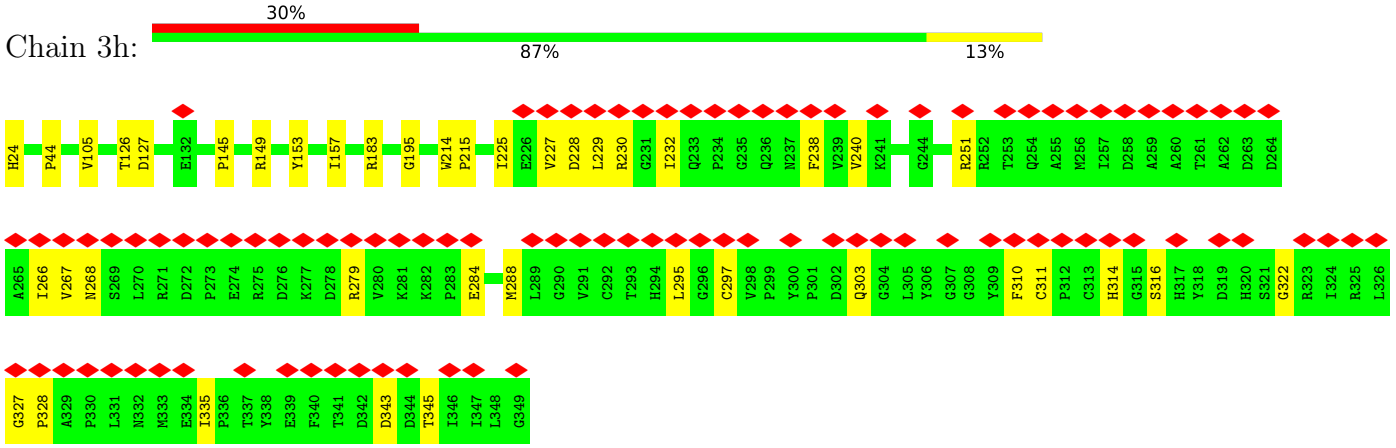
• Molecule 18: Ubiquinol-cytochrome c reductase, iron-sulfur subunit, putative

Chain 3H:



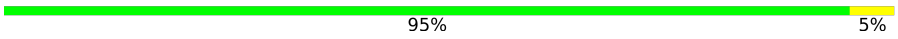
• Molecule 18: Ubiquinol-cytochrome c reductase, iron-sulfur subunit, putative

Chain 3h:



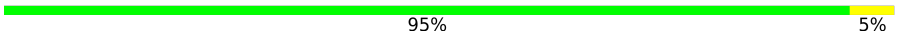
• Molecule 19: Ubiquinol-cytochrome C reductase complex 14kD subunit, putative

Chain 3I:



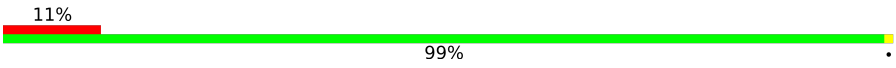
• Molecule 19: Ubiquinol-cytochrome C reductase complex 14kD subunit, putative

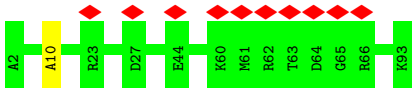
Chain 3i:



• Molecule 20: Ubiquinol-cytochrome c reductase complex 7.8 kDa protein, putative

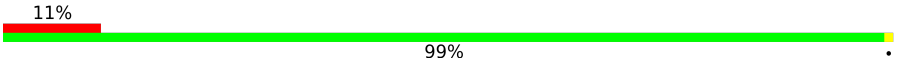
Chain 3J:

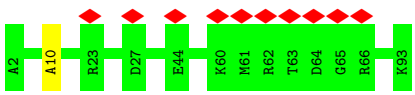




• Molecule 20: Ubiquinol-cytochrome c reductase complex 7.8 kDa protein, putative

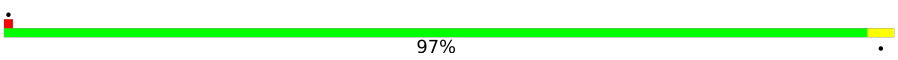
Chain 3j:

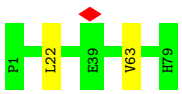




• Molecule 21: Cu-binding protein

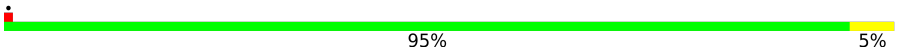
Chain 3K:

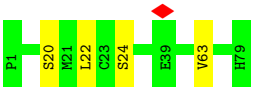




• Molecule 21: Cu-binding protein

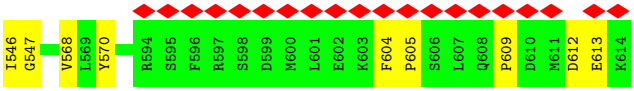
Chain 3k:





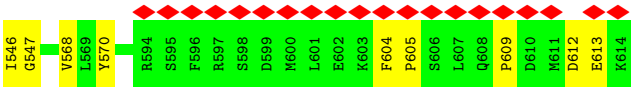
• Molecule 22: Aurora kinase

Chain 3L:



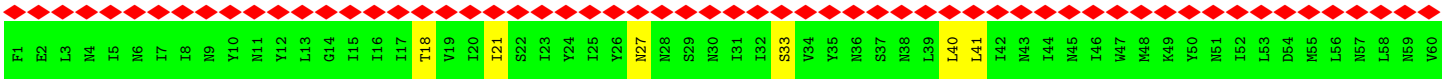
• Molecule 22: Aurora kinase

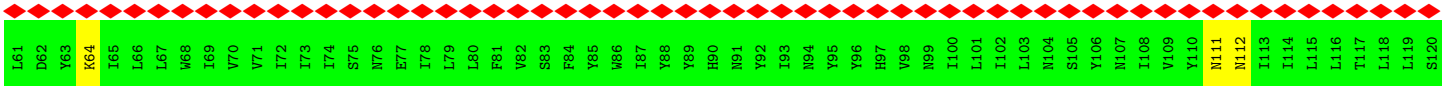
Chain 3l:

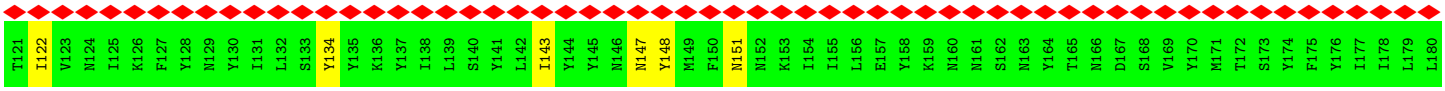


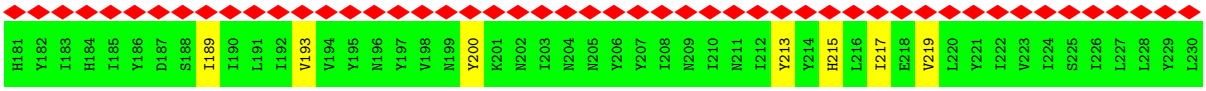
• Molecule 23: Cytochrome c oxidase subunit 3

Chain 40:



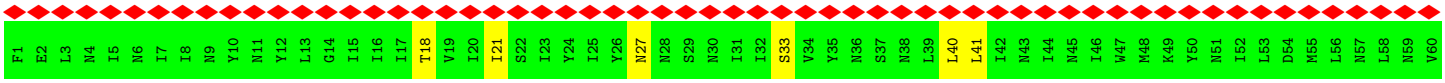


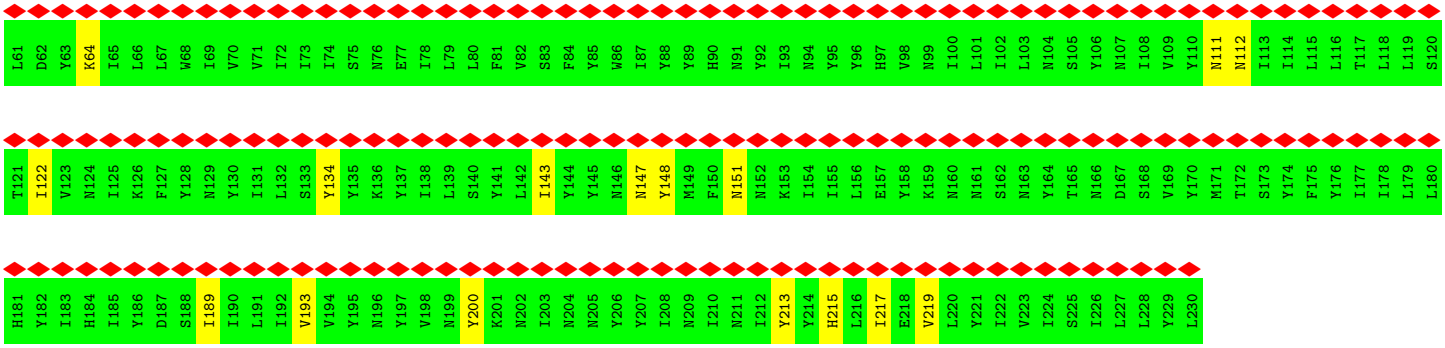




• Molecule 23: Cytochrome c oxidase subunit 3

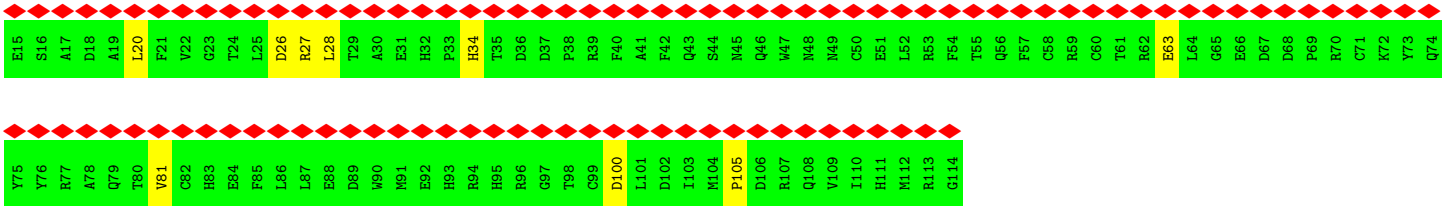
Chain 41:





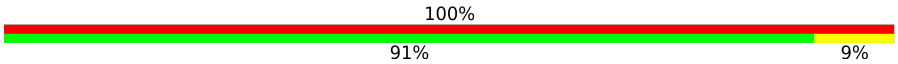
• Molecule 24: Cytochrome c oxidase subunit 6B

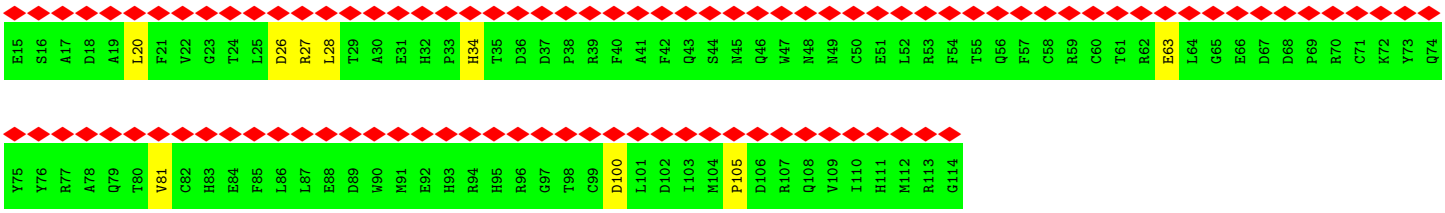
Chain 4A:



• Molecule 24: Cytochrome c oxidase subunit 6B

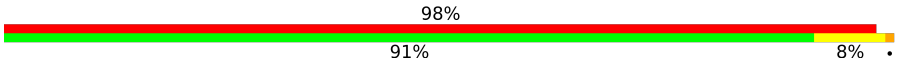
Chain 4a:

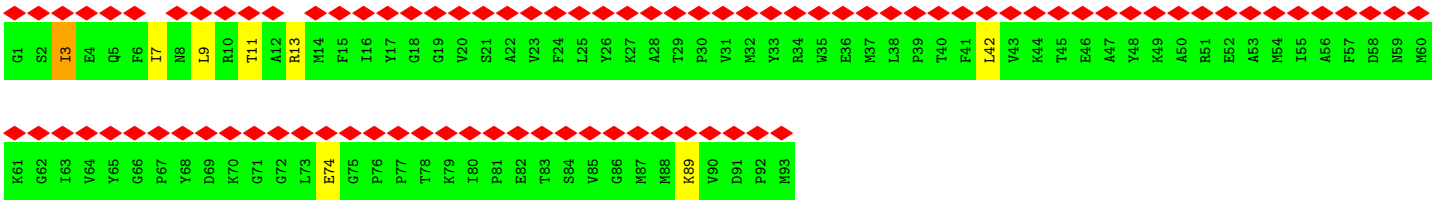




• Molecule 25: Peptidase M14 carboxypeptidase A domain-containing protein

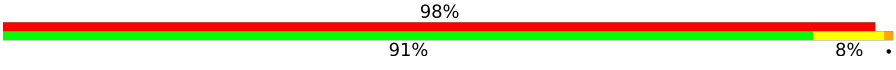
Chain 4B:

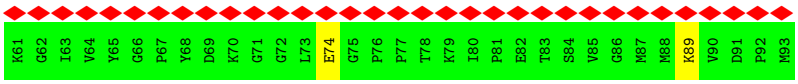




• Molecule 25: Peptidase M14 carboxypeptidase A domain-containing protein

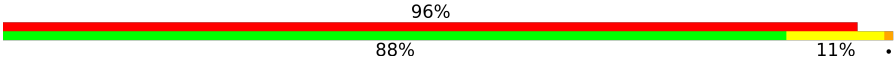
Chain 4b:

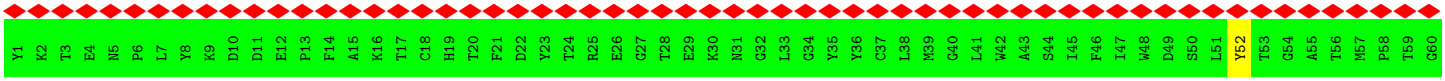


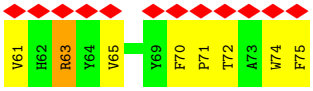


• Molecule 26: Cytochrome c oxidase subunit 40

Chain 4C:

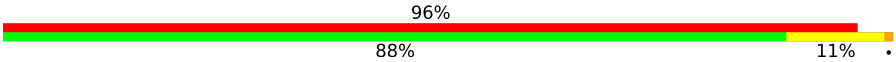


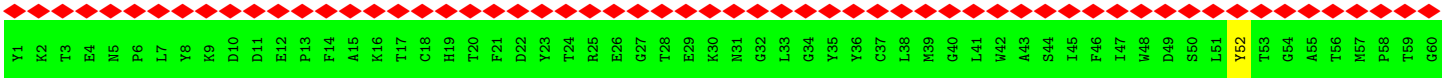


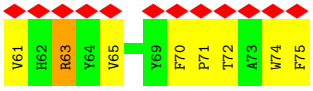


• Molecule 26: Cytochrome c oxidase subunit 40

Chain 4c:

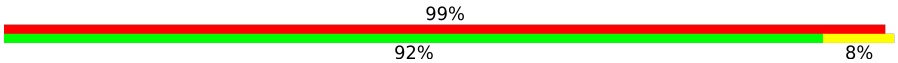


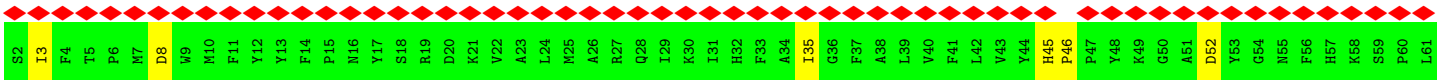


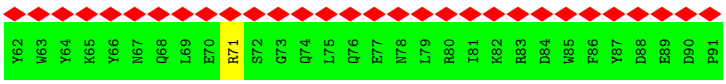


• Molecule 27: Cytochrome c oxidase subunit 34

Chain 4D:

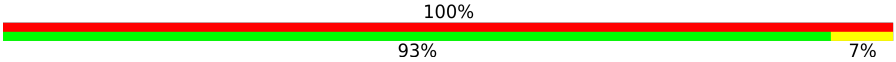


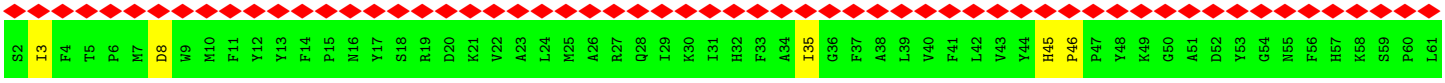


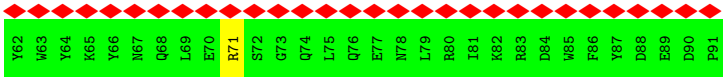


• Molecule 27: Cytochrome c oxidase subunit 34

Chain 4d:

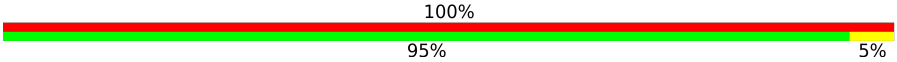


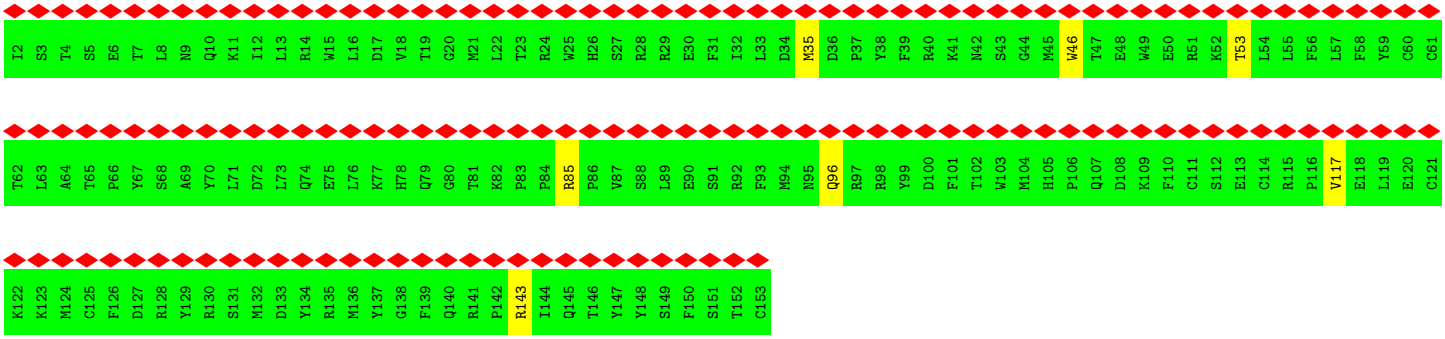




• Molecule 28: Merozoite surface protein, putative

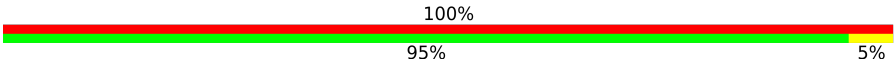
Chain 4E:

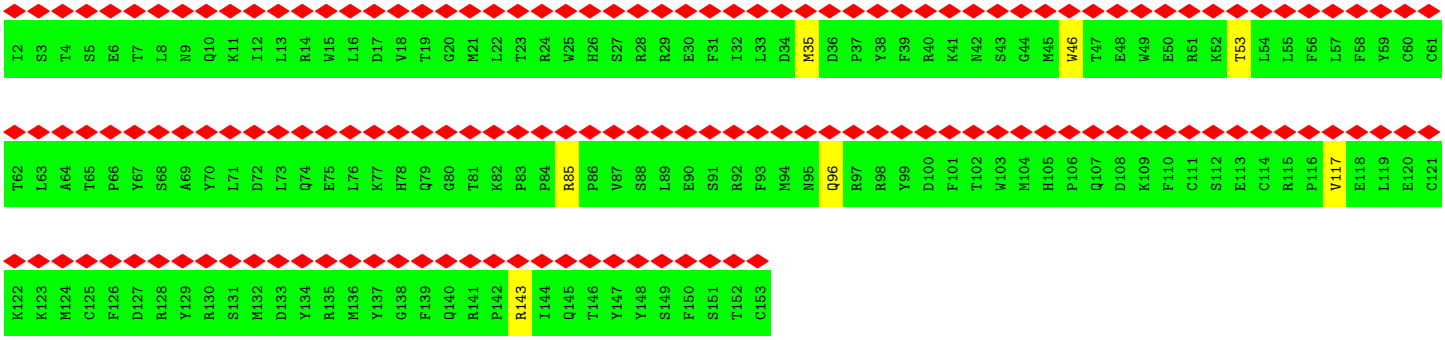




• Molecule 28: Merozoite surface protein, putative

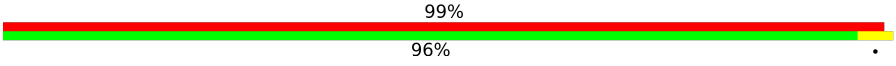
Chain 4e:

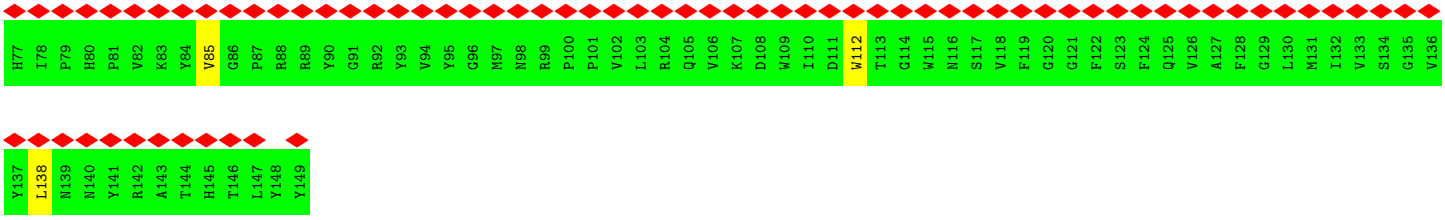




• Molecule 29: Ubiquitin, putative

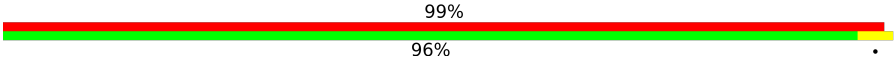
Chain 4F:

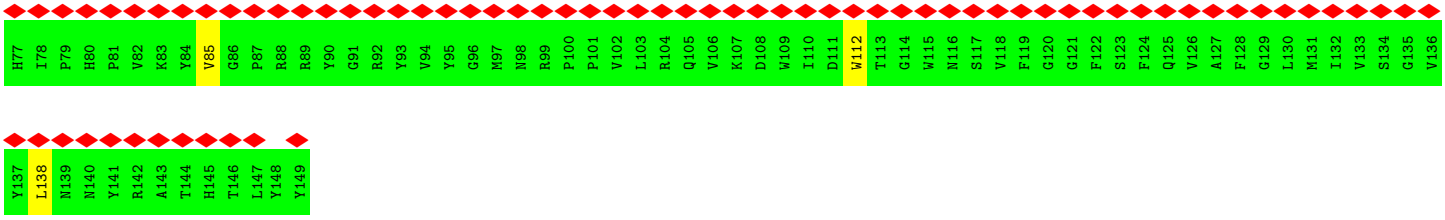




• Molecule 29: Ubiquitin, putative

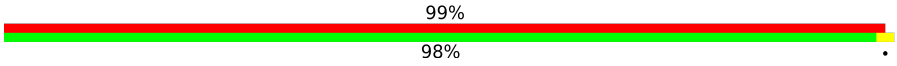
Chain 4f:

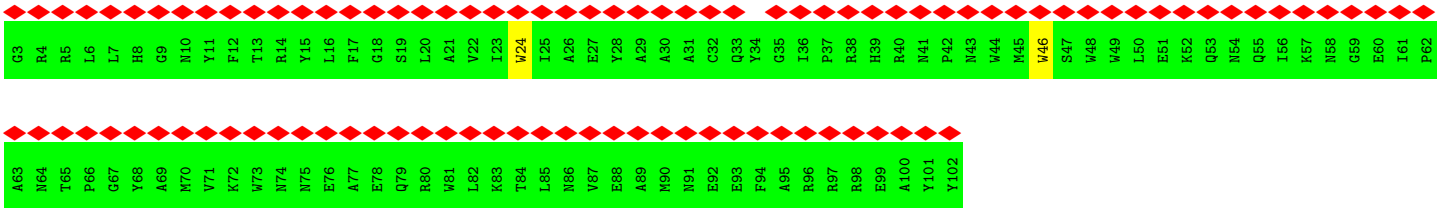




• Molecule 30: Cytochrome c oxidase subunit 33

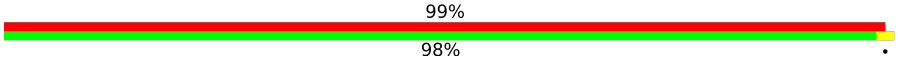
Chain 4G:





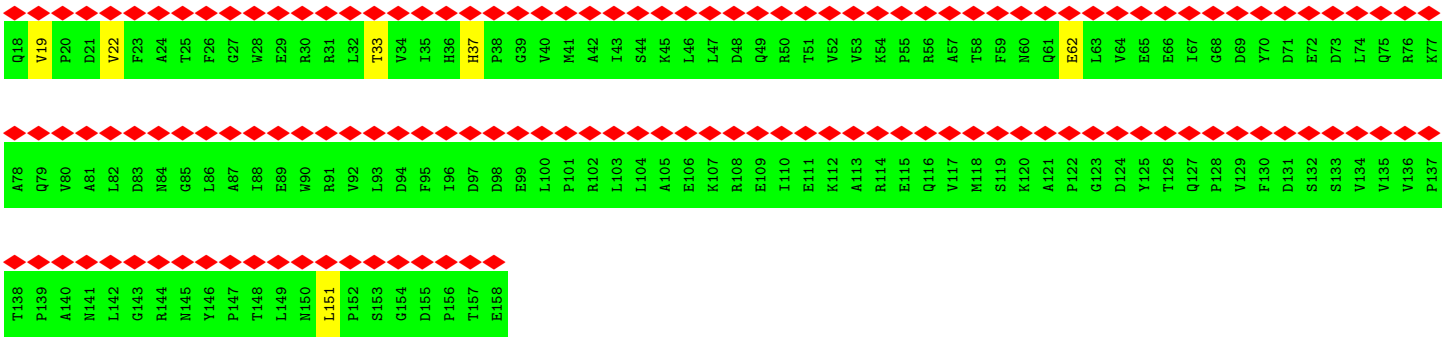
• Molecule 30: Cytochrome c oxidase subunit 33

Chain 4g:



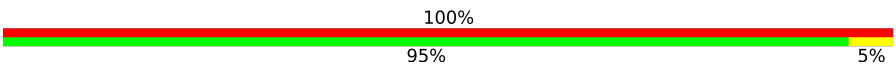
• Molecule 31: Cytochrome c oxidase subunit 30

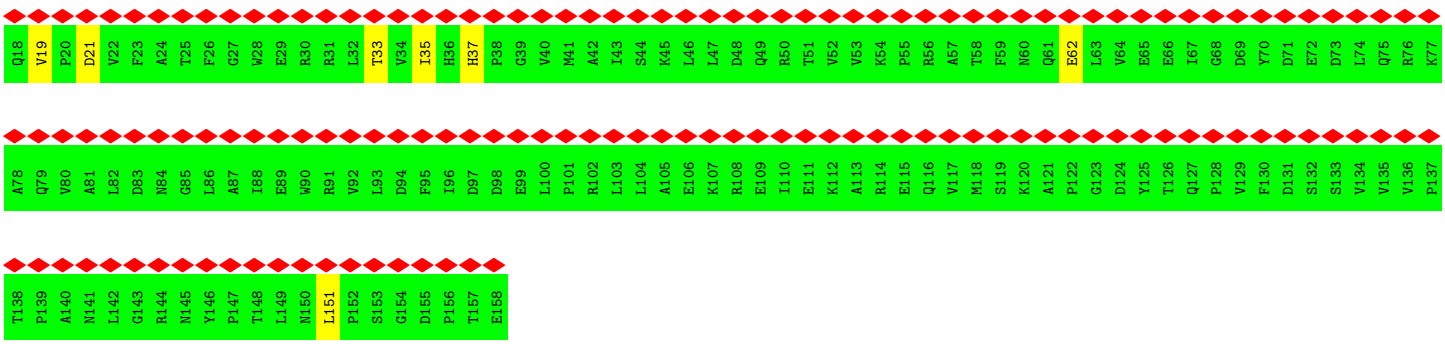
Chain 4H:



• Molecule 31: Cytochrome c oxidase subunit 30

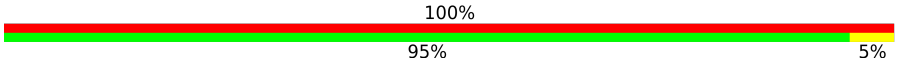
Chain 4h:

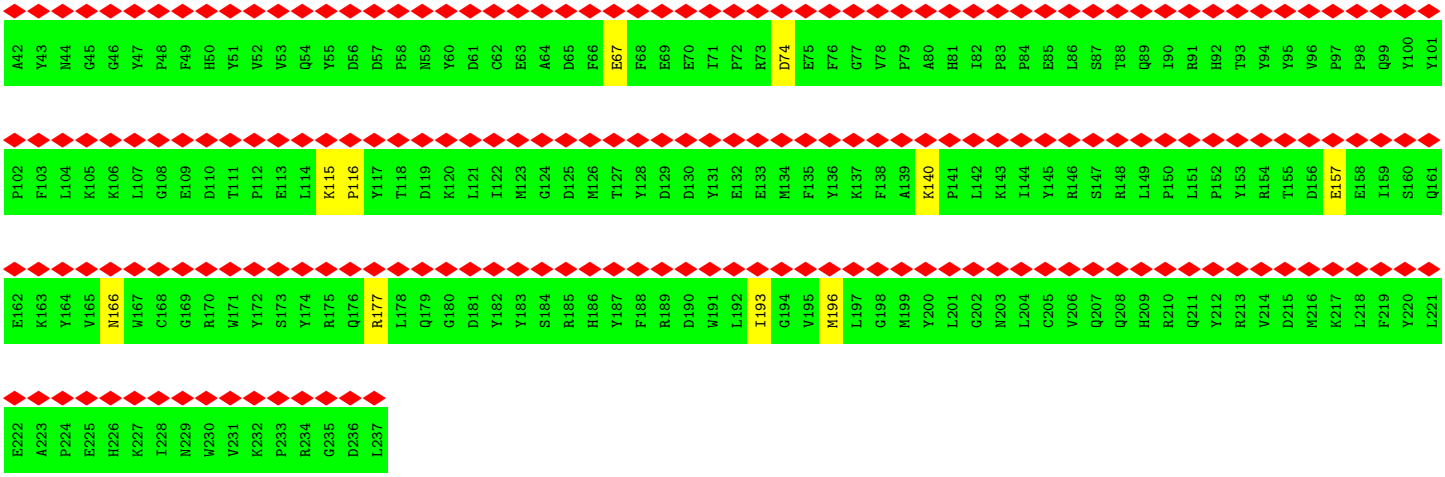




• Molecule 32: Cytochrome c oxidase subunit 6C

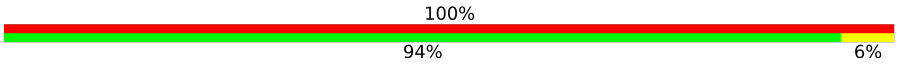
Chain 4I:

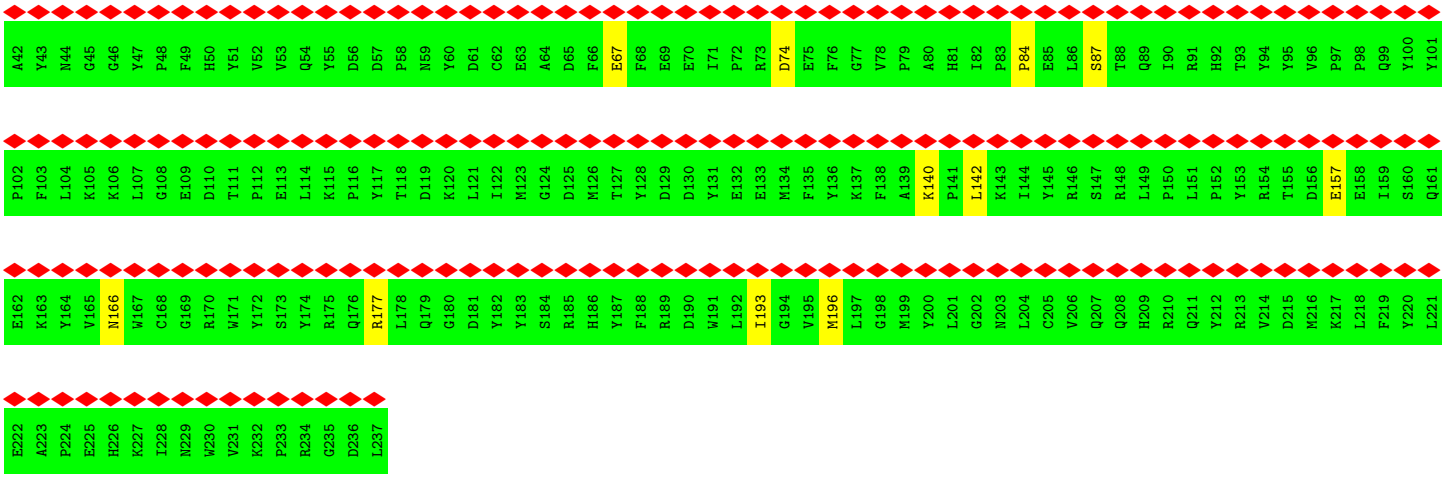




• Molecule 32: Cytochrome c oxidase subunit 6C

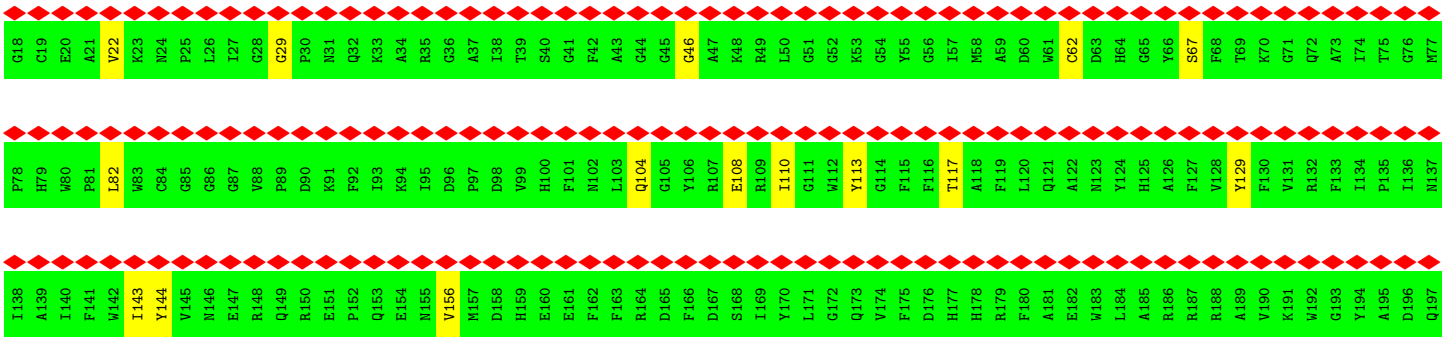
Chain 4i:





• Molecule 33: Cytochrome c oxidase subunit 24

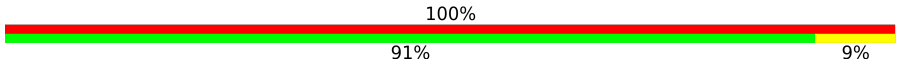
Chain 4J:



I198 H199 I200 P201 P202 V203

• Molecule 33: Cytochrome c oxidase subunit 24

Chain 4j:



G18 C19 E20 A21 V22 K23 N24 P25 L26 I27 G28 G29 P30 N31 Q32 K33 A34 R35 G36 A37 I38 T39 S40 G41 F42 A43 G44 G45 G46 A47 K48 R49 L50 G51 G52 K53 G54 Y55 G56 I57 M58 A59 D60 W61 C62 D63 H64 G65 Y66 S67 F68 T69 K70 G71 Q72 A73 I74 T75 G76 M77

P78 H79 W80 P81 L82 W83 C84 G85 G86 G87 V88 P89 D90 K91 F92 I93 K94 I95 D96 P97 D98 V99 H100 F101 N102 L103 Q104 G105 Y106 R107 E108 R109 I110 G111 W112 Y113 G114 F115 F116 T117 A118 F119 L120 Q121 A122 N123 Y124 H125 A126 F127 V128 Y129 F130 V131 R132 F133 I134 P135 I136 N137

I138 A139 I140 F141 W142 I143 Y144 V145 N146 E147 R148 Q149 R150 E151 P152 Q153 E154 N155 V156 M157 D158 H159 E160 E161 F162 F163 R164 D165 F166 D167 S168 I169 Y170 L171 G172 Q173 V174 F175 D176 H177 H178 R179 F180 A181 E182 W183 L184 A185 R186 R187 R188 A189 V190 K191 W192 G193 Y194 A195 D196 Q197

I198 H199 I200 P201 P202 V203

• Molecule 34: Cytochrome c oxidase subunit 37

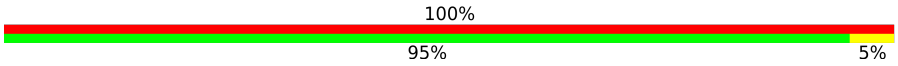
Chain 4K:

R10 G11 S12 V13 F14 Q15 M16 P17 S18 T19 P20 V21 Y22 P23 L24 T25 T26 T27 K28 K29 V30 A31 P32 P33 T34 A35 L36 A37 K38 R39 T40 P41 E42 Q43 P44 F45 G46 W47 G48 S49 P50 V51 R52 E53 D54 R55 A56 W57 R58 V59 V60 P61 R62 I63 F64 I65 I66 L67 V68 I69

V70 Y71 L72 S73 G74 W75 A76 A77 I78 K79 T80 M81 L82 P83 R84 G85 G86 S87 I88 L89 G90 Q91 I92 Y93 G94 G95 P96 P97 K98 G99 R100 L101 I102

• Molecule 34: Cytochrome c oxidase subunit 37

Chain 4k:

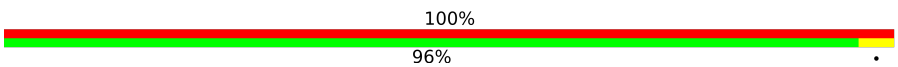


R10 G11 S12 V13 F14 Q15 M16 P17 S18 T19 P20 V21 Y22 P23 L24 T25 T26 T27 K28 K29 V30 A31 P32 P33 T34 A35 L36 A37 K38 R39 T40 P41 E42 Q43 P44 F45 G46 W47 G48 S49 P50 V51 R52 E53 D54 R55 A56 W57 R58 V59 V60 P61 R62 N63 F64 I65 I66 L67 V68 I69

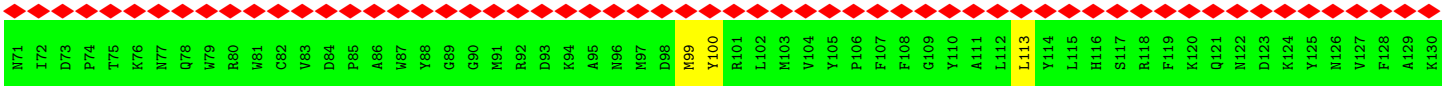
V70 Y71 L72 S73 G74 W75 A76 A77 I78 K79 T80 M81 L82 P83 R84 G85 G86 S87 I88 L89 G90 Q91 I92 Y93 G94 G95 P96 P97 K98 G99 R100 L101 I102

• Molecule 35: Cytochrome c oxidase subunit 7A

Chain 4L:

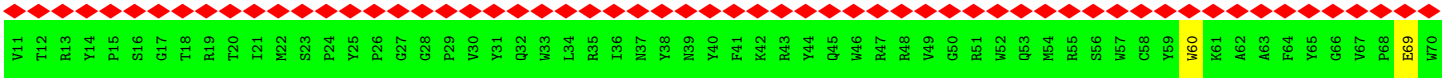


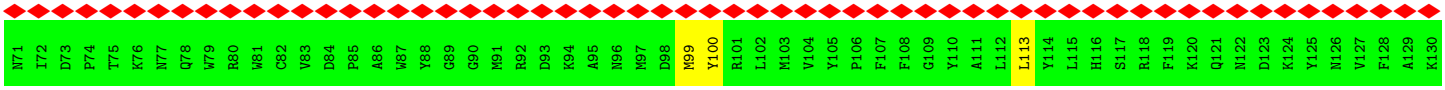
V11 T12 R13 Y14 P15 S16 G17 T18 R19 T20 I21 M22 S23 P24 Y25 P26 G27 G28 P29 V30 Y31 Q32 W33 L34 R35 I36 N37 Y38 N39 Y40 F41 K42 R43 Y44 Q45 W46 R47 R48 V49 G50 R51 W52 Q53 M54 R55 S56 W57 C58 Y59 W60 K61 A62 A63 F64 Y65 G66 V67 P68 E69 W70



• Molecule 35: Cytochrome c oxidase subunit 7A

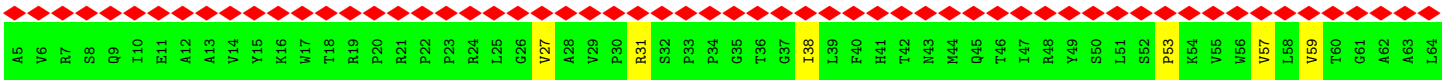
Chain 4l:

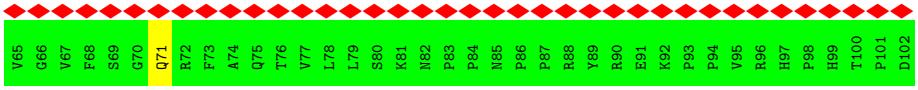




• Molecule 36: Cytochrome c oxidase subunit 35

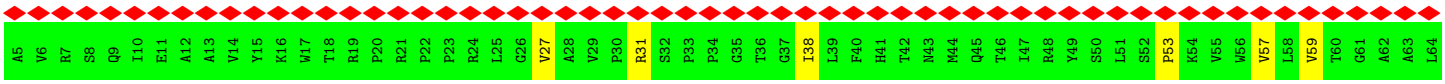
Chain 4M:

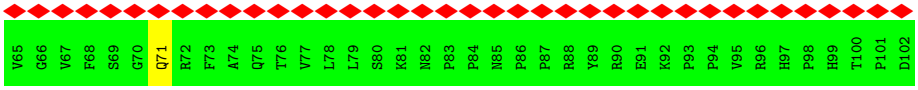




• Molecule 36: Cytochrome c oxidase subunit 35

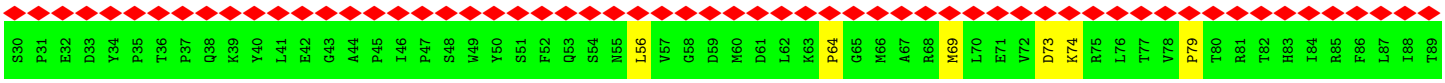
Chain 4m:





• Molecule 37: Cytochrome c oxidase polypeptide II

Chain 4N:

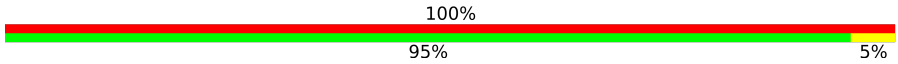


G90 A91 D92 V93 I94 H95 S96 W97 S98 V99 P100 S101 L102 G103 I104 K105 C106 D107 A108 T109 P110 G111 R112 L113 V114 K115 I116 N117 T118 F119 I120 Q121 R122 E123 G124 V125 F126 Y127 G128 Q129 C130 S131 E132 L133 C134 G135 T136 L137 H138 A139 F140 M141 P142 I143 V144 V145 E146 A147 V148 S149

P150 E151 A152 F153 A154 A155 H156 A157 K158 K159 W160

• Molecule 37: Cytochrome c oxidase polypeptide II

Chain 4n:



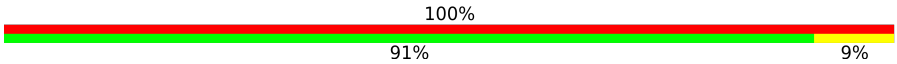
S30 P31 E32 D33 Y34 P35 T36 P37 Q38 K39 Y40 L41 E42 G43 A44 P45 I46 P47 S48 W49 Y50 S51 F52 Q53 S54 N55 L56 V57 G58 D59 M60 D61 L62 K63 P64 G65 M66 A67 R68 M69 L70 E71 V72 D73 K74 R75 L76 T77 V78 P79 T80 R81 T82 H83 I84 R85 F86 L87 I88 T89

G90 A91 D92 V93 I94 H95 S96 W97 S98 V99 P100 S101 L102 G103 I104 K105 C106 D107 A108 T109 P110 G111 R112 L113 V114 K115 I116 N117 T118 F119 I120 Q121 R122 E123 G124 V125 F126 Y127 G128 Q129 C130 S131 E132 L133 C134 G135 T136 L137 H138 A139 F140 M141 P142 I143 V144 V145 E146 A147 V148 S149

P150 E151 A152 F153 A154 A155 H156 A157 K158 K159 W160

• Molecule 38: GINS subunit domain-containing protein

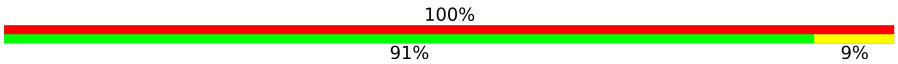
Chain 4O:



D355 I356 P357 W358 P359 A360 R361 T362 D363 W364 G365 G366 H367 D368 P369 A370 T371 P372 F373 A374 E375 L376 M377 I378 N379 T380 H381 S382 M383 F384 W385 P386 V387 A388 I389 F390 I391 Y392 V393 S394 A395 I396 Y397 M398 V399 K400 K401

• Molecule 38: GINS subunit domain-containing protein

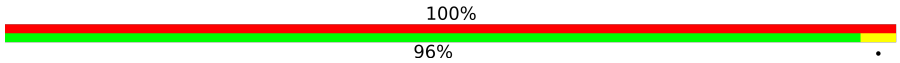
Chain 4o:



D355 I356 P357 W358 P359 A360 R361 T362 D363 W364 G365 G366 H367 D368 P369 A370 T371 P372 F373 A374 E375 L376 M377 I378 N379 T380 H381 S382 M383 F384 W385 P386 V387 A388 I389 F390 I391 Y392 V393 S394 A395 I396 Y397 M398 V399 K400 K401

• Molecule 39: Cytochrome c oxidase subunit 2A

Chain 4P:



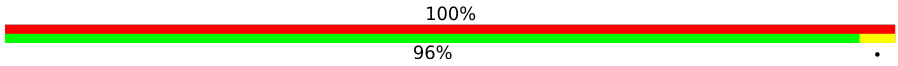
K26 S27 Y28 Y29 D30 D31 F32 K33 D34 R35 L36 K37 P38 G39 K40 Y41 T42 Q43 G44 R45 C46 P47 Q48 S49 E50 G51 D52 Y53 R54 Q55 E56 S57 K58 T59 I60 G61 R62 E63 H64 L65 N66 D67 D68 G69 T70 R71 S72 K73 R74 Y75 T76 V77 K78 E79 A80 D81 A82 L83 G84 Y85

H86 Y87 H88 P89 P90 I91 D92 K93 K94 G95 Q96 V97 Y98 V99 K100 G101 P102 N103 T104 V105 I106 E107 R108 G109 Q110 T111 W112 I113 K114 G115 Y116 E117 L118 P119 S120 M121 E122 Y123 T124 Y125 G126 P127 K128 Q129 E130 D131 I132 P133 F134 Y135 P136 R137 V138 K139 L140 N141 V142 W143 G144 N145

Y146 N147 L148 V149 M150 K151 V152 E153 F154 L155 F156 F157 Y158 L159 P160 T161 I162 I163 V164 F165 G166 I167 C168 I169 P170 V171 Y172 T173 I174 N175 F176 A177 Q178 E179 E180 V181 I182 Y183 T184 T185 M186 T187 V188 K189 V190 T191 G192 R193 Q194 W195 Y196 W197 V198 Y199 E200 V201 E202 S203 P204 T205

• Molecule 39: Cytochrome c oxidase subunit 2A

Chain 4p:



K26 S27 Y28 Y29 D30 D31 F32 K33 D34 R35 L36 K37 P38 G39 K40 Y41 T42 Q43 G44 R45 C46 P47 Q48 S49 E50 G51 D52 Y53 R54 Q55 E56 S57 K58 T59 I60 G61 R62 E63 H64 L65 N66 D67 D68 G69 T70 R71 S72 K73 R74 Y75 T76 V77 K78 E79 A80 D81 A82 L83 G84 Y85

H86 Y87 H88 P89 P90 I91 D92 K93 K94 G95 Q96 V97 Y98 V99 K100 G101 P102 N103 T104 V105 I106 E107 R108 G109 Q110 T111 W112 I113 K114 G115 Y116 E117 L118 P119 S120 M121 E122 Y123 T124 Y125 G126 P127 K128 Q129 E130 D131 I132 P133 F134 Y135 P136 R137 V138 K139 L140 N141 V142 W143 G144 N145

Y146 N147 L148 V149 M150 K151 V152 E153 F154 L155 F156 F157 Y158 L159 P160 T161 I162 I163 V164 F165 G166 I167 C168 I169 P170 V171 Y172 T173 I174 N175 F176 A177 Q178 E179 E180 V181 I182 Y183 T184 T185 M186 T187 V188 K189 V190 T191 G192 R193 Q194 W195 Y196 W197 V198 Y199 E200 V201 E202 S203 P204 T205

• Molecule 40: Cytochrome c oxidase subunit 1

Chain 4Q:

F405 Y406 I407 L408 V409 N410 N411 N412 K413 R414 I415 G416 I417 Y418 Y419 I420 K421 L422 S423 I424 I425 I426 G427 I428 L429 G430 I431 V432 L433 S434 Y435 I436 I437 R438 V439 E440 L441 Y442 N443 S444 G445 N446 R447 I448 I449 K450 Y451 D452 N453 V454 N455 Y456 Y457 N458 M459 V460 I461 T462 L463 H464

G465 L466 L467 M468 I469 F470 Y471 I472 I473 M474 P475 G476 L477 Y478 G479 G480 I481 P482 L483 Y484 I485 L486 P487 I488 L489 S490 V491 I492 T493 D494 I495 V496 L497 P498 R499 I500 N501 N502 I503 S504 I505 I506 I507 V508 L509 I510 S511 Y512 I513 V514 V515 I516 N517 S518 I519 V520 I521 E522 Y523 N524

I525 G526 T527 G528 W529 T530 L531 Y532 P533 P534 L535 S536 I537 I538 G539 T540 V541 I542 V543 N544 M545 I546 L547 Y548 G549 L550 I551 I552 I553 G554 I555 S556 S557 I558 I559 S560 A561 I562 N563 F564 M565 N566 I567 L568 I569 V570 I571 D572 G573 I574 I575 Y576 V577 Y578 I579 W580 S581 I582 I583 I584

T585 S586 V587 I588 L589 I590 I591 S592 L593 P594 I595 L596 N597 G598 I599 L600 L601 M602 I603 L604 S605 D606 I607 Y608 F609 N610 S611 I612 Y613 F614 I615 L616 N617 G618 D619 V620 V621 L622 Y623 Q624 H625 L626 F627 W628 Y629 F630 G631 H632 P633 E634 V635 Y636 I637 L638 I639 L640 P641 A642 F643 G644

I645 I646 S647 I648 I649 L650 S651 V652 L653 N654 N655 K656 I657 I658 F659 G660 M661 K662 S663 M664 I665 L666 A667 I668 I669 M670 I671 S672 I673 L674 G675 S676 I677 V678 W679 A680 H681 H682 I683 Y684 T685 V686 G687 L688 E689 L690 D691 T692 K693 I694 Y695 F696 N697 N698 L699 T700 L701 I702 I703 S704

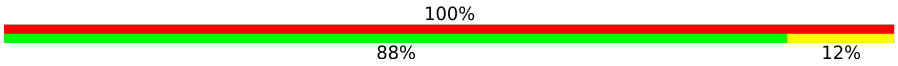
I705 P706 I707 G708 N709 K710 I711 Y712 N713 W714 I715 I716 L717 Y718 I719 G720 S721 Y722 N723 I724 L725 Y726 N727 G728 Y729 Q730 S731 L732 I733 F734 S735 I736 M737 F738 I739 I740 I741 F742 I743 I744 G745 G746 I747 T748 G749 I750 I751 I752 S753 I754 D755 I756 I757 D758 I759 G760 L761 H762 D763 T764

Y765 Y766 I767 V768 S769 H770 F771 H772 Y773 I774 L775 S776 I777 G778 A779 V780 I781 S782 L783 L784 A785 G786 I787 L788 L789 L790 K791 D792 I793 I794 G795 Y796 Y797 N798 V799 I800 I801 K802 I803 N804 K805 Y806 F807 Q808 L809 L810 L811 F812 I813 N814 I815 N816 I817 I818 F819 T820 P821 Q822 F823 I824

I825 G826 F827 N828 V829 M830 P831 R832 R833 I834 L835 E836 Y837 S838 D839 N840 I841 I842 V843 W844 N845 L846 I847 S848 S849 I850 G851 S852 I853 S854 T855 I856 L857 I858 L859 L860 S861 I862 F863

• Molecule 40: Cytochrome c oxidase subunit 1

Chain 4q:



F405 Y406 I407 L408 V409 N410 N411 N412 K413 R414 I415 G416 I417 Y418 Y419 I420 K421 L422 S423 I424 I425 I426 G427 I428 L429 G430 I431 V432 L433 S434 Y435 I436 I437 R438 V439 E440 L441 Y442 N443 S444 G445 N446 R447 I448 I449 K450 Y451 D452 N453 V454 N455 Y456 Y457 N458 M459 V460 I461 T462 L463 H464

G465 L466 L467 M468 I469 F470 Y471 I472 I473 M474 P475 G476 L477 Y478 G479 G480 I481 P482 L483 Y484 I485 L486 P487 I488 L489 S490 V491 I492 T493 D494 I495 V496 L497 P498 R499 I500 N501 N502 I503 S504 I505 I506 I507 V508 L509 I510 S511 Y512 I513 V514 V515 I516 N517 S518 I519 V520 I521 E522 Y523 N524

I525 G526 T527 G528 W529 T530 L531 Y532 P533 P534 L535 S536 I537 I538 G539 T540 V541 I542 V543 N544 M545 I546 L547 Y548 G549 L550 I551 I552 I553 G554 I555 S556 S557 I558 I559 S560 A561 I562 N563 F564 M565 N566 I567 L568 I569 V570 I571 D572 G573 I574 I575 Y576 V577 Y578 I579 W580 S581 I582 I583 I584

T585 S586 V587 L588 L589 I590 I591 S592 L593 P594 I595 L596 N597 G598 I599 L600 L601 M602 I603 L604 S605 D606 I607 Y608 F609 N610 S611 I612 Y613 F614 I615 L616 N617 G618 D619 V620 V621 L622 Y623 Q624 H625 L626 F627 W628 Y629 F630 G631 H632 P633 E634 V635 Y636 I637 L638 I639 L640 P641 A642 F643 G644

I645 I646 S647 I648 I649 L650 S651 V652 L653 N654 N655 K656 I657 I658 F659 G660 M661 K662 S663 M664 I665 L666 A667 I668 I669 M670 I671 S672 I673 L674 G675 S676 I677 V678 W679 A680 H681 H682 I683 Y684 T685 V686 G687 L688 E689 L690 D691 T692 K693 I694 Y695 F696 N697 N698 L699 T700 L701 I702 I703 S704

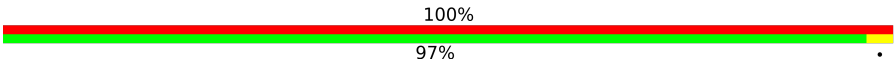
I705 P706 T707 G708 N709 K710 I711 Y712 N713 W714 I715 I716 L717 Y718 I719 G720 S721 Y722 N723 I724 L725 Y726 N727 G728 Y729 Q730 S731 L732 I733 F734 S735 I736 M737 F738 I739 I740 I741 F742 I743 I744 G745 G746 I747 T748 G749 I750 I751 I752 S753 I754 D755 I756 I757 D758 I759 G760 L761 H762 D763 T764

Y765 Y766 I767 V768 S769 H770 F771 H772 Y773 I774 L775 S776 I777 G778 A779 V780 I781 S782 L783 L784 A785 G786 I787 L788 L789 L790 K791 D792 I793 I794 G795 Y796 Y797 N798 V799 I800 I801 K802 I803 N804 K805 Y806 F807 G808 L809 L810 L811 F812 I813 N814 I815 N816 I817 I818 F819 T820 P821 Q822 F823 I824

I825 G826 F827 N828 V829 M830 P831 R832 R833 I834 L835 E836 Y837 S838 D839 N840 I841 I842 V843 W844 N845 L846 I847 S848 S849 I850 G851 S852 I853 S854 T855 I856 L857 I858 L859 L860 S861 I862 F863

• Molecule 41: Cytochrome c oxidase subunit 32

Chain 4R:

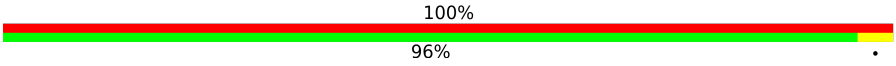


G17 R18 E19 L20 P21 E22 Y23 V24 V25 L26 P27 H28 N29 Q30 Q31 R32 Y33 G34 R35 D36 K37 S38 Y39 S40 Y41 F42 T43 C44 L45 W46 H47 F48 P49 K50 M51 V52 F53 T54 E55 K56 W57 C58 Y59 T60 N61 I62 M63 W64 F65 V66 F67 W68 T69 G70 F71 W72 F73 I74 P75 N76

Y77 I78 W79 W80 E81 R82 R83 Y84 A85 Y86 Q87 K88 A89 G90 F91 H92 W93 E94 H95 T96 N97 R98 K99 L100 Q101 A102 R103 K104 E105 A106 L107 G108 M109 D110 K111 V112 P113 A114 S115 G116 M117 D118 W119

• Molecule 41: Cytochrome c oxidase subunit 32

Chain 4r:



• Molecule 42: Cytochrome c oxidase subunit 7C

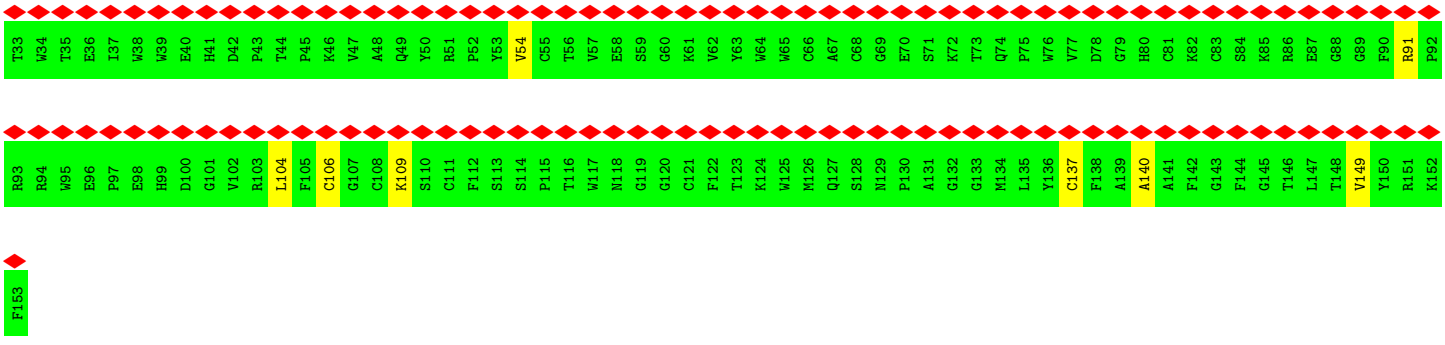
Chain 4S:

• Molecule 42: Cytochrome c oxidase subunit 7C

Chain 4s:

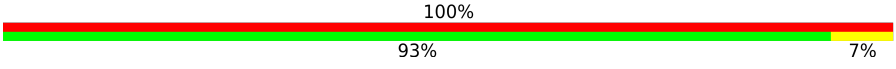
• Molecule 43: Cytochrome c oxidase subunit 13

Chain 4T:



• Molecule 43: Cytochrome c oxidase subunit 13

Chain 4t:



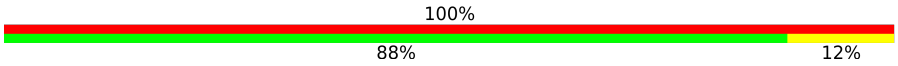
T33 W34 T35 E36 I37 W38 W39 E40 H41 D42 P43 T44 P45 K46 V47 A48 Q49 Y50 R51 P52 Y53 V54 C55 T56 V57 E58 S59 C60 K61 V62 Y63 W64 W65 C66 A67 C68 G69 E70 S71 K72 T73 Q74 P75 W76 V77 D78 G79 H80 C81 K82 C83 S84 K85 R86 E87 G88 G89 F90 R91 P92

R93 R94 W95 E96 P97 E98 H99 D100 G101 V102 R103 L104 F105 C106 G107 C108 K109 S110 C111 F112 S113 S114 P115 T116 W117 N118 G119 G120 C121 F122 T123 K124 W125 M126 Q127 S128 N129 P130 A131 G132 G133 M134 L135 Y136 C137 F138 A139 A140 A141 F142 G143 F144 G145 T146 L147 T148 V149 Y150 R151 K152

F153

• Molecule 44: Amino acid transporter transmembrane domain-containing protein

Chain 4U:

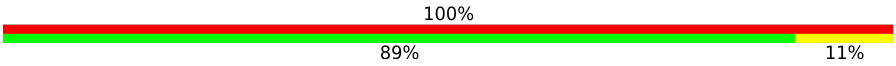


Y354 T355 P356 S357 F358 E359 R360 G361 L362 N363 P364 E365 L366 T367 S368 G369 D370 Y371 G372 D373 M374 P375 K376 P377 Q378 P379 L380 I381 D382 F383 F384 T385 Q386 N387 R388 N389 P390 W391 F392 G393 F394 A395 M396 F397 C398 G399 F400 N401 F402 L403 W404 W405 A406 F407 F408 G409 A410 W411 Q412 I413

R414 P415 L416 W417 A418 S419 Q420 R421 K422 S423 L424 A425 E426 A427 D428 R429 L430 Y431 G432 P433 T434 K435 Y436 G437 V438 G439 K440 K441 Y442 I443 N444

• Molecule 44: Amino acid transporter transmembrane domain-containing protein

Chain 4u:



Y354 T355 P356 S357 F358 E359 R360 G361 L362 N363 P364 E365 L366 T367 S368 G369 D370 Y371 G372 D373 M374 P375 K376 P377 Q378 P379 L380 I381 D382 F383 F384 T385 Q386 N387 R388 N389 P390 W391 F392 G393 F394 A395 M396 F397 C398 G399 F400 N401 F402 L403 W404 W405 A406 F407 F408 G409 A410 W411 Q412 I413

R414 P415 L416 W417 A418 S419 Q420 R421 K422 S423 L424 A425 E426 A427 D428 R429 L430 Y431 G432 P433 T434 K435 Y436 G437 V438 G439 K440 K441 Y442 I443 N444

• Molecule 45: Cytochrome c oxidase subunit 4

Chain 4V:

R-7 I-6 G-5 G-4 P-3 P-2 V-1 F0 M1 Q2 F3 P4 P5 P6 P7 P8 K9 E10 Y11 L12 A13 D14 G15 T16 P17 K18 T19 Y20 P21 L22 H23 Q24 P25 V26 F27 D28 H29 G30 Y31 T32 W33 E34 H35 W36 Y37 M38 T39 N40 A41 G42 V43 F44 H45 T46 V47 Y48 Y49 G50 E51 F52

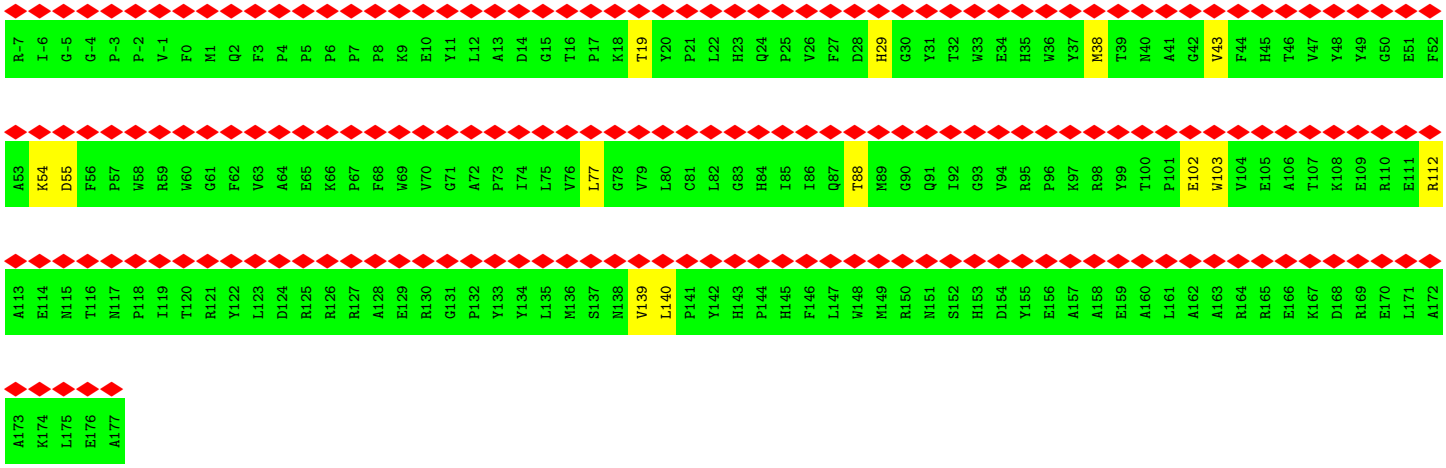
A53 K54 D55 F56 P57 W58 R59 W60 G61 F62 V63 A64 E65 K66 P67 F68 W69 V70 G71 A72 P73 I74 L75 V76 L77 G78 V79 L80 C81 L82 G83 H84 I85 I86 Q87 T88 M89 G90 Q91 I92 G93 Y94 R95 P96 K97 R98 Y99 T100 P101 E102 W103 Y104 E105 A106 T107 K108 E109 R110 E111 R112

A113 E114 N115 T116 N117 P118 I119 T120 R121 Y122 L123 D124 R125 R126 R127 A128 E129 R130 G131 P132 Y133 Y134 L135 M136 S137 N138 V139 L140 P141 Y142 H143 P144 H145 F146 L147 W148 M149 R150 N151 S152 H153 D164 Y155 E156 A157 A158 E159 A160 L161 A162 A163 R164 R165 E166 K167 D168 R169 E170 L171 A172

A173 K174 L175 E176 A177

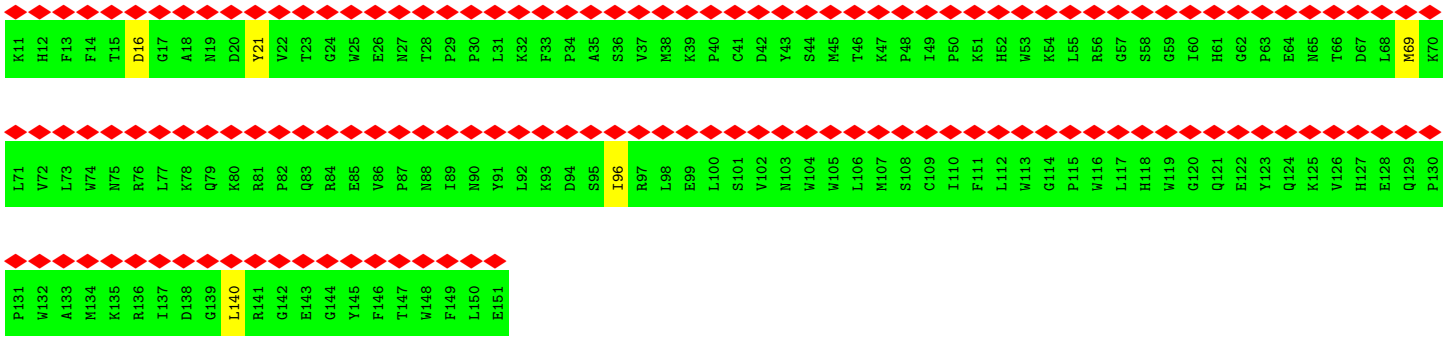
• Molecule 45: Cytochrome c oxidase subunit 4

Chain 4v:



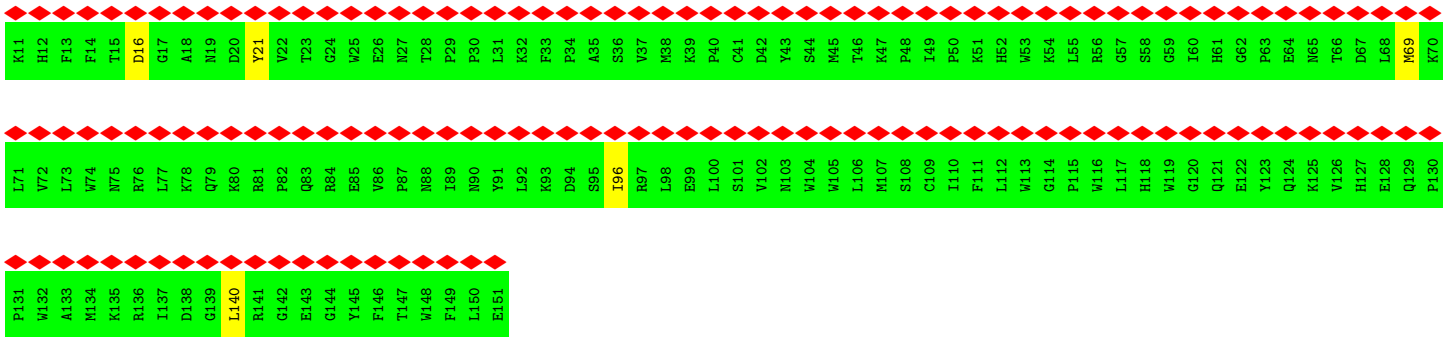
• Molecule 46: Cytochrome c oxidase subunit 19

Chain 4W:



• Molecule 46: Cytochrome c oxidase subunit 19

Chain 4w:



• Molecule 47: Cytochrome Coxidase subunit, putative

Chain 4X:

Y33 R34 H35 W36 H37 R38 M39 S40 E41 D42 D43 W44 A45 L46 P47 L48 D49 S50 M51 P52 E53 D54 V55 K56 T57 L58 M59 A60 T61 P62 Q63 T64 E65 R66 G67 F68 V69 E70 D71 Y72 W73 Y74 N75 R76 I77 R78 G79 E80 A81 T82 L83 L84 D85 P86 E87 A88 L89 P90 S91 K92

S93 Y94 I95 A96 L97 A98 R99 D100 M101 G102 L103 Q104 I105 V106 D107 E108 P109 S110 S111 H112 M113 M114 G115 L116 I117 E118 L119 Y120 E121 Y122 L123 R124 G125 A126 S127 F128 V129 G130 P131 F132 G133 T134 I135 E136 N137 P138 V139 L140 V141 P142 A143 V144 G145 Q146 E147 R148 V149 V150 A151 C152

T153 G154 G155 V156 G157 D158 E159 E160 H161 F162 T163 L164 W165 F166 R167 C168 R169 E170 G171 F172 M173 Y174 R175 C176 G177 E178 C179 D180 Q181 I182 F183 M184 L185 V186 R187 L188 Y189 Y190 E191 D192 R193 Y194 W195 T196 Q197 T198 L199 V200 R201 D202 T203 F204 M205 S206 D207 G208 D209 M210 F211 D212

L213 K214 T215 L216 E217 R218 V219 H220 K221 M222 W223 N224 K225 D226 E227 M228 V229 R230 W231 E232 V233 G234 Y235 W236 A237 Q238 D239 Y240 V241 L242 G243 K244 G245 V246 L247 P248 G249 M250 V251 E252 E253 H254 T255 R256 V257 N258

• Molecule 47: Cytochrome Coxidase subunit, putative

Chain 4x:

Y33 R34 H35 W36 H37 R38 M39 S40 E41 D42 D43 W44 A45 L46 P47 L48 D49 S50 M51 P52 E53 D54 V55 K56 T57 L58 M59 A60 T61 P62 Q63 T64 E65 R66 G67 F68 V69 E70 D71 Y72 W73 Y74 N75 R76 I77 R78 G79 E80 A81 T82 L83 L84 D85 P86 E87 A88 L89 P90 S91 K92

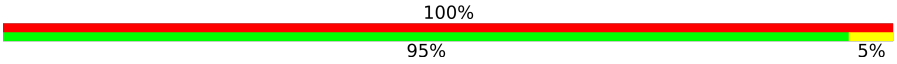
S93 Y94 I95 A96 L97 A98 R99 D100 M101 G102 L103 Q104 I105 V106 D107 E108 P109 S110 S111 H112 M113 M114 G115 L116 I117 E118 L119 Y120 E121 Y122 L123 R124 G125 A126 S127 F128 V129 G130 P131 F132 G133 T134 I135 E136 N137 P138 V139 L140 V141 P142 A143 V144 G145 Q146 E147 R148 V149 V150 A151 C152

T153 G154 G155 V156 G157 D158 E159 E160 H161 F162 T163 L164 W165 F166 R167 C168 R169 E170 G171 F172 M173 Y174 R175 C176 G177 E178 C179 D180 Q181 I182 F183 M184 L185 V186 R187 L188 Y189 Y190 E191 D192 R193 Y194 W195 T196 Q197 T198 L199 V200 R201 D202 T203 F204 M205 S206 D207 G208 D209 M210 F211 D212

L213 K214 T215 L216 E217 R218 V219 H220 K221 M222 W223 N224 K225 D226 E227 M228 V229 R230 W231 E232 V233 G234 Y235 W236 A237 Q238 D239 Y240 V241 L242 G243 K244 G245 V246 L247 P248 G249 M250 V251 E252 E253 H254 T255 R256 V257 N258

• Molecule 48: Cytochrome c oxidase subunit 18

Chain 4Y:

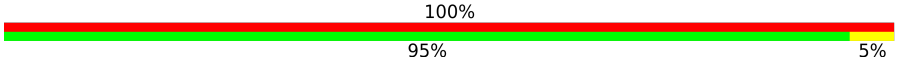


I24 Y25 E26 G27 Q28 T29 V30 Q31 E32 S33 E34 L35 I36 P37 Q38 E39 D40 D41 W42 V43 I44 E45 E46 T47 N48 F49 C50 L51 G52 R53 N54 C55 Y56 V57 R58 F59 R60 E61 E62 D63 D64 L65 A66 R67 R68 A69 L70 H71 Q72 M73 D74 S75 Q76 L77 N78 K79 M80 H81 T82 R83

L84 R85 D86 G87 T88 V89 I90 P91 Y92 M93 S94 F95 H96 P97 D98 E99 M100 V101 D102 R103 P104 A105 P106 I107 H108 T109 F110 S111 E112 K113 P114 L115 L116 K117 W118 T119 W120 D121 E122 T123 Y124 E125 E126 A127 Y128 D129 D130

• Molecule 48: Cytochrome c oxidase subunit 18

Chain 4y:

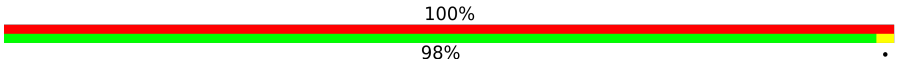


I24 Y25 E26 G27 Q28 T29 V30 Q31 E32 S33 E34 L35 I36 P37 Q38 E39 D40 D41 W42 V43 I44 E45 E46 T47 N48 F49 C50 L51 G52 R53 N54 C55 Y56 V57 R58 F59 R60 E61 E62 D63 D64 L65 A66 R67 R68 A69 L70 H71 Q72 M73 D74 S75 Q76 L77 N78 K79 M80 H81 T82 R83

L84 R85 D86 G87 T88 V89 I90 P91 Y92 M93 S94 F95 H96 P97 D98 E99 M100 V101 D102 R103 P104 A105 P106 I107 H108 T109 F110 S111 E112 K113 P114 L115 L116 K117 W118 T119 W120 D121 E122 T123 Y124 E125 E126 A127 Y128 D129 D130

• Molecule 49: Cytochrome c oxidase subunit 31

Chain 4Z:



P15 P16 T17 R18 L19 S20 T21 P22 L23 Y24 S25 E26 G27 G28 A29 F30 T31 V32 N33 W34 W35 R36 N37 R38 Y39 G40 L41 Y42 S43 R44 R45 Q46 T47 D48 P49 M50 L51 A52 E53 F54 L55 F56 R57 Q58 Q59 V60 K61 E62 W63 F64 Y65 D66 V67 P68 S69 Y70 N71 Y72 A73 A74

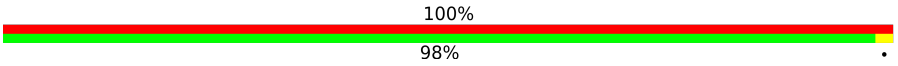
L75 V76 G77 L78 A79 L80 G81 I82 L83 V84 A85 V86 I87 W88 R89 H90 F91 L92 F93 N94 P95 D96 V97 Y98 V99 R100 R101 Q102 E103 L104 R105 K106 M107 W108 P109 D110 R111 H112 R113 Q114 F115 A116 Y117 A118 V119 P120 Y121 L122 N123 P124 Q125 L126 K127 N128 L129 L130 L131 P132 Y133 K134

N135 S136 F137 I138 D139 N140 E141 P142 D143 Y144 A145 D146 Y147 N148 P149 V150 G151 L152 R153 P154 Q155 R156 V157 M158 A159 I160 R161 R162 I163 P164 G165 F166 F167 W168 A169 I170 P171 Q172 Y173 F174 F175 E176 D177 P178 L179 Y180 T181 S182 C183 S184 T185 K186 N187 M188 Q189 T190 I191 Y192 K193 K194

L195 G196 Y197 S198 E199 L200

• Molecule 49: Cytochrome c oxidase subunit 31

Chain 4z:



P15 P16 T17 R18 L19 S20 T21 P22 L23 Y24 S25 E26 G27 G28 A29 F30 T31 V32 N33 W34 W35 R36 N37 R38 Y39 G40 L41 Y42 S43 R44 R45 Q46 T47 D48 P49 M50 L51 A52 E53 F54 L55 F56 R57 Q58 Q59 V60 K61 E62 W63 F64 Y65 D66 V67 P68 S69 Y70 N71 Y72 A73 A74

L75 V76 G77 L78 A79 L80 G81 I82 L83 V84 A85 V86 I87 W88 R89 H90 F91 L92 F93 N94 P95 D96 V97 Y98 V99 R100 R101 Q102 E103 L104 R105 K106 M107 W108 P109 D110 R111 H112 R113 Q114 F115 A116 Y117 A118 V119 P120 Y121 L122 N123 P124 Q125 L126 K127 N128 L129 L130 L131 P132 Y133 K134

N135 S136 F137 I138 D139 N140 E141 P142 D143 Y144 A145 D146 Y147 N148 P149 V150 G151 L152 R153 P154 Q155 R156 V157 M158 A159 I160 R161 R162 I163 P164 G165 F166 F167 W168 A169 I170 P171 Q172 Y173 F174 F175 E176 D177 P178 L179 Y180 T181 S182 C183 S184 T185 K186 N187 M188 Q189 T190 I191 Y192 K193 K194

L195 G196 Y197 S198 E199 L200

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	296890	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	44	Depositor
Minimum defocus (nm)	300	Depositor
Maximum defocus (nm)	1500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.214	Depositor
Minimum map value	-0.083	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.003	Depositor
Recommended contour level	0.0203	Depositor
Map size (Å)	423.2, 423.2, 423.2	wwPDB
Map dimensions	500, 500, 500	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.8464, 0.8464, 0.8464	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: FAD, PER, UQ8, HEC, CDL, F3S, FES, SF4, CUA, ACE, PEE, AJP, LPP, ZN, PC1, CU, MG, HEM, HEA, K

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	2M	0.16	0/4709	0.29	0/6372
1	2m	0.16	0/4709	0.29	0/6372
2	2N	0.20	0/2118	0.27	0/2863
2	2n	0.20	0/2118	0.27	0/2863
3	2O	0.24	0/1292	0.25	0/1759
3	2o	0.24	0/1292	0.25	0/1759
4	2P	0.23	0/1342	0.25	0/1812
4	2p	0.23	0/1342	0.25	0/1812
5	2Q	0.22	0/580	0.31	0/788
5	2q	0.22	0/580	0.31	0/788
6	2R	0.25	0/985	0.26	0/1336
6	2r	0.25	0/985	0.26	0/1336
7	2S	0.24	0/1350	0.23	0/1828
7	2s	0.24	0/1350	0.23	0/1828
8	2T	0.27	0/714	0.24	0/971
8	2t	0.27	0/714	0.24	0/971
9	2U	0.23	0/400	0.22	0/547
9	2u	0.23	0/400	0.22	0/547
10	2V	0.19	0/724	0.21	0/975
10	2v	0.19	0/724	0.21	0/975
11	3A	0.25	0/3701	0.32	0/5025
11	3a	0.25	0/3701	0.32	0/5025
12	3B	0.26	0/3967	0.26	0/5371
12	3b	0.26	0/3967	0.26	0/5371
13	3C	0.39	0/1988	0.44	0/2712
13	3c	0.39	0/1988	0.44	0/2712
14	3D	0.30	0/872	0.28	0/1182
14	3d	0.30	0/872	0.28	0/1182
15	3E	0.31	0/848	0.25	0/1148
15	3e	0.31	0/848	0.25	0/1148
16	3F	0.31	0/767	0.30	0/1042

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
16	3f	0.31	0/767	0.30	0/1042
17	3G	0.31	0/3098	0.30	0/4231
17	3g	0.31	0/3098	0.30	0/4231
18	3H	0.22	0/2713	0.32	0/3693
18	3h	0.22	0/2713	0.32	0/3693
19	3I	0.28	0/1514	0.33	0/2045
19	3i	0.28	0/1514	0.33	0/2045
20	3J	0.20	0/776	0.29	0/1045
20	3j	0.20	0/776	0.29	0/1045
21	3K	0.23	0/627	0.28	0/847
21	3k	0.23	0/627	0.28	0/847
22	3L	0.26	0/521	0.50	2/713 (0.3%)
22	3l	0.26	0/521	0.50	2/713 (0.3%)
23	40	0.20	0/2060	0.27	0/2822
23	41	0.20	0/2060	0.27	0/2822
24	4A	0.18	0/863	0.25	0/1166
24	4a	0.18	0/863	0.25	0/1166
25	4B	0.20	0/751	0.31	0/1013
25	4b	0.20	0/751	0.31	0/1013
26	4C	0.18	0/653	0.31	0/891
26	4c	0.18	0/653	0.31	0/891
27	4D	0.19	0/819	0.24	0/1110
27	4d	0.19	0/819	0.23	0/1110
28	4E	0.20	0/1353	0.27	0/1824
28	4e	0.20	0/1353	0.27	0/1824
29	4F	0.18	0/638	0.26	0/870
29	4f	0.18	0/638	0.26	0/870
30	4G	0.18	0/883	0.22	0/1199
30	4g	0.18	0/883	0.22	0/1199
31	4H	0.18	0/1149	0.22	0/1565
31	4h	0.18	0/1149	0.22	0/1565
32	4I	0.21	0/1757	0.24	0/2386
32	4i	0.21	0/1757	0.24	0/2386
33	4J	0.20	0/1573	0.24	0/2131
33	4j	0.20	0/1573	0.24	0/2131
34	4K	0.17	0/745	0.22	0/1017
34	4k	0.17	0/745	0.22	0/1017
35	4L	0.21	0/1131	0.26	0/1537
35	4l	0.21	0/1131	0.26	0/1537
36	4M	0.18	0/800	0.22	0/1097
36	4m	0.18	0/800	0.22	0/1097
37	4N	0.19	0/1055	0.27	0/1436
37	4n	0.19	0/1055	0.27	0/1436

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
38	4O	0.20	0/400	0.24	0/549
38	4o	0.20	0/400	0.24	0/549
39	4P	0.19	0/1551	0.25	0/2106
39	4p	0.19	0/1551	0.25	0/2106
40	4Q	0.19	0/3774	0.30	0/5155
40	4q	0.19	0/3774	0.30	0/5155
41	4R	0.18	0/958	0.20	0/1301
41	4r	0.18	0/958	0.20	0/1301
42	4S	0.18	0/560	0.23	0/760
42	4s	0.18	0/560	0.23	0/760
43	4T	0.20	0/1024	0.27	0/1391
43	4t	0.20	0/1024	0.27	0/1391
44	4U	0.16	0/790	0.31	0/1073
44	4u	0.16	0/790	0.31	0/1073
45	4V	0.19	0/1600	0.24	0/2183
45	4v	0.19	0/1600	0.24	0/2183
46	4W	0.19	0/1240	0.29	0/1686
46	4w	0.19	0/1240	0.29	0/1686
47	4X	0.19	0/1912	0.23	0/2592
47	4x	0.19	0/1912	0.23	0/2592
48	4Y	0.19	0/929	0.24	0/1261
48	4y	0.19	0/929	0.24	0/1261
49	4Z	0.22	0/1639	0.24	0/2233
49	4z	0.22	0/1639	0.24	0/2233
All	All	0.23	0/136426	0.28	4/185318 (0.0%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
2	2N	0	1
2	2n	0	1
4	2P	0	1
4	2p	0	1
6	2R	0	1
6	2r	0	1
11	3A	0	1
11	3a	0	1
13	3C	0	1
13	3c	0	1

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Mol	Chain	#Chirality outliers	#Planarity outliers
18	3H	0	2
18	3h	0	2
26	4C	0	1
26	4c	0	1
28	4E	0	1
28	4e	0	1
All	All	0	18

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
22	3L	609	PRO	N-CA-CB	7.75	110.20	103.31
22	3l	609	PRO	N-CA-CB	7.74	110.19	103.31
22	3L	605	PRO	N-CA-CB	6.97	109.94	103.46
22	3l	605	PRO	N-CA-CB	6.95	109.92	103.46

There are no chirality outliers.

5 of 18 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	2N	73	ARG	Sidechain
4	2P	41	ARG	Sidechain
6	2R	5	ARG	Sidechain
11	3A	71	ARG	Sidechain
13	3C	180	ARG	Sidechain

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	2M	4610	0	4538	28	0
1	2m	4610	0	4538	29	0
2	2N	2068	0	2025	6	0
2	2n	2068	0	2025	7	0
3	2O	1254	0	1263	8	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	2o	1254	0	1263	7	0
4	2P	1309	0	1367	11	0
4	2p	1309	0	1367	11	0
5	2Q	564	0	567	6	0
5	2q	564	0	567	6	0
6	2R	950	0	935	12	0
6	2r	950	0	935	10	0
7	2S	1323	0	1261	9	0
7	2s	1323	0	1261	9	0
8	2T	695	0	672	9	0
8	2t	695	0	672	9	0
9	2U	390	0	369	7	0
9	2u	390	0	369	6	0
10	2V	709	0	723	3	0
10	2v	709	0	723	4	0
11	3A	3622	0	3508	8	0
11	3a	3622	0	3508	8	0
12	3B	3884	0	3842	10	0
12	3b	3884	0	3842	9	0
13	3C	1921	0	1816	8	0
13	3c	1921	0	1816	6	0
14	3D	836	0	798	5	0
14	3d	836	0	798	5	0
15	3E	813	0	776	5	0
15	3e	813	0	776	4	0
16	3F	734	0	704	2	0
16	3f	734	0	704	2	0
17	3G	3016	0	3162	28	0
17	3g	3016	0	3162	28	0
18	3H	2628	0	2541	26	0
18	3h	2628	0	2541	26	0
19	3I	1472	0	1436	7	0
19	3i	1472	0	1436	7	0
20	3J	755	0	693	1	0
20	3j	755	0	693	1	0
21	3K	608	0	617	2	0
21	3k	608	0	617	3	0
22	3L	509	0	475	5	0
22	3l	509	0	475	5	0
23	40	2004	0	2032	17	0
23	41	2004	0	2032	17	0
24	4A	841	0	766	9	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
24	4a	841	0	766	9	0
25	4B	732	0	746	6	0
25	4b	732	0	746	6	0
26	4C	626	0	575	10	0
26	4c	626	0	575	10	0
27	4D	787	0	745	6	0
27	4d	787	0	745	5	0
28	4E	1313	0	1269	7	0
28	4e	1313	0	1269	7	0
29	4F	613	0	591	3	0
29	4f	613	0	591	3	0
30	4G	854	0	811	1	0
30	4g	854	0	811	1	0
31	4H	1125	0	1112	6	0
31	4h	1125	0	1112	7	0
32	4I	1695	0	1593	7	0
32	4i	1695	0	1593	8	0
33	4J	1517	0	1435	10	0
33	4j	1517	0	1435	11	0
34	4K	722	0	760	5	0
34	4k	722	0	760	5	0
35	4L	1083	0	1027	5	0
35	4l	1083	0	1027	5	0
36	4M	773	0	797	7	0
36	4m	773	0	797	7	0
37	4N	1025	0	1018	6	0
37	4n	1025	0	1018	6	0
38	4O	383	0	368	3	0
38	4o	383	0	368	3	0
39	4P	1504	0	1461	8	0
39	4p	1504	0	1461	9	0
40	4Q	3687	0	3955	41	0
40	4q	3687	0	3955	42	0
41	4R	916	0	854	2	0
41	4r	916	0	854	3	0
42	4S	541	0	489	1	0
42	4s	541	0	489	0	0
43	4T	983	0	902	9	0
43	4t	983	0	902	9	0
44	4U	758	0	713	10	0
44	4u	758	0	713	9	0
45	4V	1539	0	1482	11	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
45	4v	1539	0	1482	11	0
46	4W	1193	0	1164	6	0
46	4w	1193	0	1164	6	0
47	4X	1860	0	1764	16	0
47	4x	1860	0	1764	17	0
48	4Y	905	0	835	5	0
48	4y	905	0	835	5	0
49	4Z	1582	0	1548	4	0
49	4z	1582	0	1548	4	0
50	2M	53	0	31	11	0
50	2m	53	0	31	11	0
51	2N	4	0	0	0	0
51	2n	4	0	0	0	0
51	3H	4	0	0	1	0
51	3h	4	0	0	1	0
52	2N	8	0	0	0	0
52	2n	8	0	0	0	0
53	2N	7	0	0	0	0
53	2n	7	0	0	0	0
54	2N	1	0	0	0	0
54	2n	1	0	0	0	0
54	4Q	1	0	0	0	0
54	4q	1	0	0	0	0
55	2O	51	0	82	0	0
55	2P	102	0	164	0	0
55	2R	51	0	82	0	0
55	2o	51	0	82	0	0
55	2p	102	0	164	0	0
55	2r	51	0	82	0	0
55	3C	51	0	82	1	0
55	3F	51	0	82	1	0
55	3c	51	0	82	1	0
55	3f	51	0	82	1	0
55	40	153	0	246	1	0
55	41	153	0	246	1	0
55	4D	51	0	82	0	0
55	4Q	102	0	164	2	0
55	4R	51	0	82	0	0
55	4S	51	0	82	0	0
55	4W	51	0	82	0	0
55	4Z	51	0	82	0	0
55	4d	51	0	82	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
55	4q	102	0	164	2	0
55	4r	51	0	82	0	0
55	4s	51	0	82	0	0
55	4w	51	0	82	0	0
55	4z	51	0	82	0	0
56	2O	108	0	176	5	0
56	2P	54	0	88	2	0
56	2R	54	0	88	1	0
56	2T	54	0	88	1	0
56	2o	108	0	176	5	0
56	2p	54	0	88	2	0
56	2r	54	0	88	1	0
56	2t	54	0	88	1	0
56	3A	108	0	176	2	0
56	3H	54	0	88	0	0
56	3a	108	0	176	2	0
56	3h	54	0	88	0	0
56	4E	54	0	88	2	0
56	4e	54	0	88	2	0
57	2O	100	0	156	1	0
57	2P	100	0	156	3	0
57	2Q	100	0	156	2	0
57	2U	100	0	156	2	0
57	2o	100	0	156	1	0
57	2p	100	0	156	3	0
57	2q	100	0	156	2	0
57	2u	100	0	156	2	0
57	3D	200	0	312	0	0
57	3E	300	0	468	0	0
57	3G	100	0	156	5	0
57	3H	100	0	156	1	0
57	3I	300	0	468	3	0
57	3L	200	0	312	1	0
57	3d	200	0	312	0	0
57	3e	300	0	468	0	0
57	3g	100	0	156	4	0
57	3h	100	0	156	1	0
57	3i	300	0	468	3	0
57	3l	200	0	312	1	0
57	4E	100	0	156	0	0
57	4J	100	0	156	1	0
57	4K	200	0	312	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
57	4L	100	0	156	0	0
57	4M	100	0	156	0	0
57	4Q	200	0	312	3	0
57	4S	100	0	156	0	0
57	4T	100	0	156	3	0
57	4U	100	0	156	2	0
57	4W	200	0	312	1	0
57	4Z	100	0	156	0	0
57	4e	100	0	156	0	0
57	4j	100	0	156	1	0
57	4k	200	0	312	3	0
57	4l	100	0	156	0	0
57	4m	100	0	156	0	0
57	4q	200	0	312	3	0
57	4s	100	0	156	1	0
57	4t	100	0	156	3	0
57	4u	100	0	156	2	0
57	4w	200	0	312	1	0
57	4z	100	0	156	0	0
58	2S	53	0	74	2	0
58	2s	53	0	74	2	0
58	3D	53	0	74	12	0
58	3G	106	0	148	15	0
58	3d	53	0	74	12	0
58	3g	106	0	148	15	0
59	3C	43	0	31	6	0
59	3c	43	0	31	5	0
60	3G	86	0	60	5	0
60	3g	86	0	60	5	0
61	40	43	0	0	1	0
61	41	43	0	0	1	0
62	4C	44	0	67	0	0
62	4D	44	0	67	1	0
62	4c	44	0	67	0	0
62	4d	44	0	67	1	0
63	4N	2	0	0	0	0
63	4n	2	0	0	0	0
64	4Q	1	0	0	0	0
64	4q	1	0	0	0	0
65	4Q	1	0	0	0	0
65	4q	1	0	0	0	0
66	4Q	120	0	108	6	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
66	4q	120	0	108	6	0
67	4Q	2	0	0	0	0
67	4q	2	0	0	0	0
68	4T	2	0	0	0	0
68	4X	1	0	0	0	0
68	4t	2	0	0	0	0
68	4x	1	0	0	0	0
All	All	142424	0	144688	735	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

The worst 5 of 735 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:2M:76:HIS:CE1	50:2M:701:FAD:HM82	1.21	1.70
1:2m:76:HIS:CE1	50:2m:701:FAD:HM82	1.21	1.65
1:2m:76:HIS:NE2	50:2m:701:FAD:C8M	1.75	1.46
1:2M:76:HIS:NE2	50:2M:701:FAD:C8M	1.75	1.45
13:3C:76:CYS:SG	59:3C:301:HEC:HAC	1.67	1.34

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	2M	602/604 (100%)	586 (97%)	15 (2%)	1 (0%)	44 52
1	2m	602/604 (100%)	586 (97%)	15 (2%)	1 (0%)	44 52
2	2N	257/259 (99%)	250 (97%)	7 (3%)	0	100 100
2	2n	257/259 (99%)	250 (97%)	7 (3%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	2O	158/160 (99%)	156 (99%)	2 (1%)	0	100	100
3	2o	158/160 (99%)	157 (99%)	1 (1%)	0	100	100
4	2P	156/158 (99%)	155 (99%)	1 (1%)	0	100	100
4	2p	156/158 (99%)	155 (99%)	1 (1%)	0	100	100
5	2Q	67/69 (97%)	63 (94%)	4 (6%)	0	100	100
5	2q	67/69 (97%)	63 (94%)	4 (6%)	0	100	100
6	2R	115/117 (98%)	115 (100%)	0	0	100	100
6	2r	115/117 (98%)	115 (100%)	0	0	100	100
7	2S	163/165 (99%)	162 (99%)	1 (1%)	0	100	100
7	2s	163/165 (99%)	162 (99%)	1 (1%)	0	100	100
8	2T	80/82 (98%)	77 (96%)	3 (4%)	0	100	100
8	2t	80/82 (98%)	77 (96%)	3 (4%)	0	100	100
9	2U	46/48 (96%)	46 (100%)	0	0	100	100
9	2u	46/48 (96%)	46 (100%)	0	0	100	100
10	2V	85/87 (98%)	84 (99%)	1 (1%)	0	100	100
10	2v	85/87 (98%)	84 (99%)	1 (1%)	0	100	100
11	3A	452/454 (100%)	447 (99%)	5 (1%)	0	100	100
11	3a	452/454 (100%)	447 (99%)	5 (1%)	0	100	100
12	3B	494/496 (100%)	489 (99%)	5 (1%)	0	100	100
12	3b	494/496 (100%)	489 (99%)	5 (1%)	0	100	100
13	3C	239/241 (99%)	235 (98%)	4 (2%)	0	100	100
13	3c	239/241 (99%)	235 (98%)	4 (2%)	0	100	100
14	3D	93/95 (98%)	92 (99%)	1 (1%)	0	100	100
14	3d	93/95 (98%)	92 (99%)	1 (1%)	0	100	100
15	3E	90/92 (98%)	90 (100%)	0	0	100	100
15	3e	90/92 (98%)	90 (100%)	0	0	100	100
16	3F	82/84 (98%)	81 (99%)	1 (1%)	0	100	100
16	3f	82/84 (98%)	81 (99%)	1 (1%)	0	100	100
17	3G	352/354 (99%)	340 (97%)	12 (3%)	0	100	100
17	3g	352/354 (99%)	340 (97%)	12 (3%)	0	100	100
18	3H	324/326 (99%)	314 (97%)	10 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
18	3h	324/326 (99%)	314 (97%)	10 (3%)	0	100	100
19	3I	174/176 (99%)	169 (97%)	5 (3%)	0	100	100
19	3i	174/176 (99%)	169 (97%)	5 (3%)	0	100	100
20	3J	90/92 (98%)	90 (100%)	0	0	100	100
20	3j	90/92 (98%)	90 (100%)	0	0	100	100
21	3K	77/79 (98%)	77 (100%)	0	0	100	100
21	3k	77/79 (98%)	77 (100%)	0	0	100	100
22	3L	67/69 (97%)	64 (96%)	2 (3%)	1 (2%)	8	6
22	3l	67/69 (97%)	64 (96%)	2 (3%)	1 (2%)	8	6
23	40	228/230 (99%)	226 (99%)	2 (1%)	0	100	100
23	41	228/230 (99%)	226 (99%)	2 (1%)	0	100	100
24	4A	98/100 (98%)	98 (100%)	0	0	100	100
24	4a	98/100 (98%)	98 (100%)	0	0	100	100
25	4B	91/93 (98%)	90 (99%)	1 (1%)	0	100	100
25	4b	91/93 (98%)	90 (99%)	1 (1%)	0	100	100
26	4C	73/75 (97%)	72 (99%)	1 (1%)	0	100	100
26	4c	73/75 (97%)	72 (99%)	1 (1%)	0	100	100
27	4D	88/90 (98%)	88 (100%)	0	0	100	100
27	4d	88/90 (98%)	88 (100%)	0	0	100	100
28	4E	150/152 (99%)	146 (97%)	4 (3%)	0	100	100
28	4e	150/152 (99%)	146 (97%)	4 (3%)	0	100	100
29	4F	71/73 (97%)	69 (97%)	2 (3%)	0	100	100
29	4f	71/73 (97%)	69 (97%)	2 (3%)	0	100	100
30	4G	98/100 (98%)	97 (99%)	1 (1%)	0	100	100
30	4g	98/100 (98%)	97 (99%)	1 (1%)	0	100	100
31	4H	139/141 (99%)	138 (99%)	1 (1%)	0	100	100
31	4h	139/141 (99%)	138 (99%)	1 (1%)	0	100	100
32	4I	194/196 (99%)	193 (100%)	1 (0%)	0	100	100
32	4i	194/196 (99%)	193 (100%)	1 (0%)	0	100	100
33	4J	184/186 (99%)	178 (97%)	6 (3%)	0	100	100
33	4j	184/186 (99%)	178 (97%)	6 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
34	4K	91/93 (98%)	89 (98%)	2 (2%)	0	100	100
34	4k	91/93 (98%)	90 (99%)	1 (1%)	0	100	100
35	4L	120/122 (98%)	120 (100%)	0	0	100	100
35	4l	120/122 (98%)	120 (100%)	0	0	100	100
36	4M	96/98 (98%)	96 (100%)	0	0	100	100
36	4m	96/98 (98%)	96 (100%)	0	0	100	100
37	4N	129/131 (98%)	128 (99%)	1 (1%)	0	100	100
37	4n	129/131 (98%)	128 (99%)	1 (1%)	0	100	100
38	4O	45/47 (96%)	45 (100%)	0	0	100	100
38	4o	45/47 (96%)	45 (100%)	0	0	100	100
39	4P	178/180 (99%)	174 (98%)	4 (2%)	0	100	100
39	4p	178/180 (99%)	174 (98%)	4 (2%)	0	100	100
40	4Q	457/459 (100%)	443 (97%)	14 (3%)	0	100	100
40	4q	457/459 (100%)	442 (97%)	15 (3%)	0	100	100
41	4R	101/103 (98%)	101 (100%)	0	0	100	100
41	4r	101/103 (98%)	101 (100%)	0	0	100	100
42	4S	63/65 (97%)	61 (97%)	2 (3%)	0	100	100
42	4s	63/65 (97%)	61 (97%)	2 (3%)	0	100	100
43	4T	119/121 (98%)	116 (98%)	3 (2%)	0	100	100
43	4t	119/121 (98%)	116 (98%)	3 (2%)	0	100	100
44	4U	89/91 (98%)	88 (99%)	1 (1%)	0	100	100
44	4u	89/91 (98%)	88 (99%)	1 (1%)	0	100	100
45	4V	183/185 (99%)	182 (100%)	1 (0%)	0	100	100
45	4v	183/185 (99%)	182 (100%)	1 (0%)	0	100	100
46	4W	139/141 (99%)	136 (98%)	3 (2%)	0	100	100
46	4w	139/141 (99%)	136 (98%)	3 (2%)	0	100	100
47	4X	224/226 (99%)	221 (99%)	3 (1%)	0	100	100
47	4x	224/226 (99%)	221 (99%)	3 (1%)	0	100	100
48	4Y	105/107 (98%)	101 (96%)	4 (4%)	0	100	100
48	4y	105/107 (98%)	101 (96%)	4 (4%)	0	100	100
49	4Z	184/186 (99%)	181 (98%)	3 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
49	4z	184/186 (99%)	181 (98%)	3 (2%)	0	100	100
All	All	16000/16196 (99%)	15719 (98%)	277 (2%)	4 (0%)	100	100

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
22	3L	604	PHE
22	3l	604	PHE
1	2M	26	ALA
1	2m	26	ALA

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	2M	481/481 (100%)	478 (99%)	3 (1%)	84	91
1	2m	481/481 (100%)	478 (99%)	3 (1%)	84	91
2	2N	221/221 (100%)	219 (99%)	2 (1%)	75	86
2	2n	221/221 (100%)	219 (99%)	2 (1%)	75	86
3	2O	130/130 (100%)	130 (100%)	0	100	100
3	2o	130/130 (100%)	130 (100%)	0	100	100
4	2P	139/139 (100%)	139 (100%)	0	100	100
4	2p	139/139 (100%)	139 (100%)	0	100	100
5	2Q	60/60 (100%)	60 (100%)	0	100	100
5	2q	60/60 (100%)	60 (100%)	0	100	100
6	2R	100/100 (100%)	100 (100%)	0	100	100
6	2r	100/100 (100%)	100 (100%)	0	100	100
7	2S	144/144 (100%)	144 (100%)	0	100	100
7	2s	144/144 (100%)	144 (100%)	0	100	100
8	2T	73/73 (100%)	73 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
8	2t	73/73 (100%)	73 (100%)	0	100	100
9	2U	43/43 (100%)	43 (100%)	0	100	100
9	2u	43/43 (100%)	43 (100%)	0	100	100
10	2V	76/76 (100%)	76 (100%)	0	100	100
10	2v	76/76 (100%)	76 (100%)	0	100	100
11	3A	386/386 (100%)	386 (100%)	0	100	100
11	3a	386/386 (100%)	386 (100%)	0	100	100
12	3B	423/423 (100%)	422 (100%)	1 (0%)	92	96
12	3b	423/423 (100%)	422 (100%)	1 (0%)	92	96
13	3C	204/204 (100%)	203 (100%)	1 (0%)	86	93
13	3c	204/204 (100%)	203 (100%)	1 (0%)	86	93
14	3D	88/88 (100%)	88 (100%)	0	100	100
14	3d	88/88 (100%)	88 (100%)	0	100	100
15	3E	81/81 (100%)	81 (100%)	0	100	100
15	3e	81/81 (100%)	81 (100%)	0	100	100
16	3F	72/72 (100%)	72 (100%)	0	100	100
16	3f	72/72 (100%)	72 (100%)	0	100	100
17	3G	336/336 (100%)	334 (99%)	2 (1%)	84	91
17	3g	336/336 (100%)	334 (99%)	2 (1%)	84	91
18	3H	280/280 (100%)	280 (100%)	0	100	100
18	3h	280/280 (100%)	280 (100%)	0	100	100
19	3I	154/154 (100%)	153 (99%)	1 (1%)	84	91
19	3i	154/154 (100%)	153 (99%)	1 (1%)	84	91
20	3J	79/79 (100%)	79 (100%)	0	100	100
20	3j	79/79 (100%)	79 (100%)	0	100	100
21	3K	67/67 (100%)	67 (100%)	0	100	100
21	3k	67/67 (100%)	67 (100%)	0	100	100
22	3L	48/60 (80%)	48 (100%)	0	100	100
22	3l	48/60 (80%)	48 (100%)	0	100	100
23	40	229/229 (100%)	229 (100%)	0	100	100
23	41	229/229 (100%)	229 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
24	4A	91/91 (100%)	90 (99%)	1 (1%)	70 82
24	4a	91/91 (100%)	90 (99%)	1 (1%)	70 82
25	4B	77/77 (100%)	75 (97%)	2 (3%)	41 54
25	4b	77/77 (100%)	75 (97%)	2 (3%)	41 54
26	4C	64/64 (100%)	64 (100%)	0	100 100
26	4c	64/64 (100%)	64 (100%)	0	100 100
27	4D	81/81 (100%)	81 (100%)	0	100 100
27	4d	81/81 (100%)	81 (100%)	0	100 100
28	4E	146/146 (100%)	146 (100%)	0	100 100
28	4e	146/146 (100%)	146 (100%)	0	100 100
29	4F	63/63 (100%)	63 (100%)	0	100 100
29	4f	63/63 (100%)	63 (100%)	0	100 100
30	4G	83/83 (100%)	82 (99%)	1 (1%)	67 80
30	4g	83/83 (100%)	82 (99%)	1 (1%)	67 80
31	4H	124/124 (100%)	124 (100%)	0	100 100
31	4h	124/124 (100%)	124 (100%)	0	100 100
32	4I	180/180 (100%)	178 (99%)	2 (1%)	70 82
32	4i	180/180 (100%)	178 (99%)	2 (1%)	70 82
33	4J	148/148 (100%)	145 (98%)	3 (2%)	50 65
33	4j	148/148 (100%)	145 (98%)	3 (2%)	50 65
34	4K	77/77 (100%)	77 (100%)	0	100 100
34	4k	77/77 (100%)	77 (100%)	0	100 100
35	4L	108/108 (100%)	108 (100%)	0	100 100
35	4l	108/108 (100%)	108 (100%)	0	100 100
36	4M	85/85 (100%)	85 (100%)	0	100 100
36	4m	85/85 (100%)	85 (100%)	0	100 100
37	4N	112/112 (100%)	112 (100%)	0	100 100
37	4n	112/112 (100%)	112 (100%)	0	100 100
38	4O	40/40 (100%)	40 (100%)	0	100 100
38	4o	40/40 (100%)	40 (100%)	0	100 100
39	4P	163/163 (100%)	163 (100%)	0	100 100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
39	4p	163/163 (100%)	163 (100%)	0	100	100
40	4Q	419/419 (100%)	417 (100%)	2 (0%)	86	93
40	4q	419/419 (100%)	417 (100%)	2 (0%)	86	93
41	4R	92/92 (100%)	92 (100%)	0	100	100
41	4r	92/92 (100%)	92 (100%)	0	100	100
42	4S	59/59 (100%)	59 (100%)	0	100	100
42	4s	59/59 (100%)	59 (100%)	0	100	100
43	4T	102/102 (100%)	102 (100%)	0	100	100
43	4t	102/102 (100%)	102 (100%)	0	100	100
44	4U	76/76 (100%)	75 (99%)	1 (1%)	65	78
44	4u	76/76 (100%)	75 (99%)	1 (1%)	65	78
45	4V	156/156 (100%)	154 (99%)	2 (1%)	65	78
45	4v	156/156 (100%)	154 (99%)	2 (1%)	65	78
46	4W	128/128 (100%)	128 (100%)	0	100	100
46	4w	128/128 (100%)	128 (100%)	0	100	100
47	4X	198/198 (100%)	197 (100%)	1 (0%)	86	93
47	4x	198/198 (100%)	197 (100%)	1 (0%)	86	93
48	4Y	100/100 (100%)	100 (100%)	0	100	100
48	4y	100/100 (100%)	100 (100%)	0	100	100
49	4Z	167/167 (100%)	167 (100%)	0	100	100
49	4z	167/167 (100%)	167 (100%)	0	100	100
All	All	14106/14130 (100%)	14056 (100%)	50 (0%)	88	95

5 of 50 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	2n	80	CYS
24	4a	26	ASP
47	4x	37	HIS
2	2n	278	MET
17	3g	251	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 135 such sidechains are listed below:

Mol	Chain	Res	Type
33	4j	64	HIS
35	4l	96	ASN
46	4w	61	HIS
33	4J	64	HIS
32	4I	89	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 162 ligands modelled in this entry, 14 are monoatomic - leaving 148 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	PEE	2o	202	-	50,50,50	0.77	2 (4%)	53,55,55	0.65	0
57	CDL	4Q	907	-	99,99,99	0.29	0	105,111,111	0.48	1 (0%)
55	PEE	4Q	910	-	50,50,50	0.77	2 (4%)	53,55,55	0.60	1 (1%)
57	CDL	3I	201	-	99,99,99	0.30	0	105,111,111	0.47	1 (0%)
61	AJP	41	304	-	49,49,95	1.06	2 (4%)	74,80,149	1.48	9 (12%)
50	FAD	2M	701	-	53,58,58	0.82	2 (3%)	68,89,89	1.07	4 (5%)
55	PEE	4S	102	-	50,50,50	0.76	2 (4%)	53,55,55	0.54	0
57	CDL	3l	702	-	99,99,99	0.30	0	105,111,111	0.32	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
57	CDL	4q	907	-	99,99,99	0.29	0	105,111,111	0.48	1 (0%)
60	HEM	3G	401	17	41,50,50	1.33	3 (7%)	45,82,82	1.43	6 (13%)
57	CDL	4M	201	-	99,99,99	0.28	0	105,111,111	0.30	0
57	CDL	3d	202	-	99,99,99	0.31	0	105,111,111	0.47	0
57	CDL	3e	203	-	99,99,99	0.29	0	105,111,111	0.40	1 (0%)
60	HEM	3G	402	17	41,50,50	1.30	2 (4%)	45,82,82	1.43	7 (15%)
57	CDL	4S	101	-	99,99,99	0.29	0	105,111,111	0.39	0
55	PEE	4W	203	-	50,50,50	0.75	2 (4%)	53,55,55	0.54	0
57	CDL	3I	203	-	99,99,99	0.30	0	105,111,111	0.39	0
67	PER	4Q	906	66,64	0,1,1	-	-	-		
63	CUA	4n	201	37	0,1,1	-	-	-		
55	PEE	4Z	302	-	50,50,50	0.77	2 (4%)	53,55,55	0.53	0
57	CDL	4W	201	-	99,99,99	0.29	0	105,111,111	0.34	0
57	CDL	4Z	301	-	99,99,99	0.29	0	105,111,111	0.43	1 (0%)
57	CDL	4L	201	-	99,99,99	0.29	0	105,111,111	0.34	0
55	PEE	2R	201	-	50,50,50	0.75	2 (4%)	53,55,55	0.49	0
57	CDL	3e	201	-	99,99,99	0.30	0	105,111,111	0.44	0
57	CDL	4W	202	-	99,99,99	0.29	0	105,111,111	0.33	0
62	LPP	4d	102	-	43,43,43	0.21	0	47,48,48	0.31	0
56	PC1	2O	202	-	53,53,53	0.28	0	59,61,61	0.41	0
55	PEE	4z	302	-	50,50,50	0.78	2 (4%)	53,55,55	0.53	0
57	CDL	4k	202	-	99,99,99	0.28	0	105,111,111	0.41	0
57	CDL	2q	101	-	99,99,99	0.29	0	105,111,111	0.37	1 (0%)
57	CDL	3i	203	-	99,99,99	0.30	0	105,111,111	0.46	1 (0%)
52	SF4	2n	302	2	0,12,12	-	-	-		
55	PEE	3C	302	-	50,50,50	0.77	2 (4%)	53,55,55	0.67	1 (1%)
57	CDL	4j	301	-	99,99,99	0.29	0	105,111,111	0.43	0
57	CDL	2o	201	-	99,99,99	0.29	0	105,111,111	0.32	0
57	CDL	4K	201	-	99,99,99	0.28	0	105,111,111	0.33	0
56	PC1	3H	403	-	53,53,53	0.30	0	59,61,61	0.41	0
56	PC1	2O	203	-	53,53,53	0.28	0	59,61,61	0.56	1 (1%)
57	CDL	4q	908	-	99,99,99	0.29	0	105,111,111	0.33	0
62	LPP	4C	101	-	43,43,43	0.26	0	47,48,48	0.40	0
57	CDL	3i	202	-	99,99,99	0.30	0	105,111,111	0.47	1 (0%)
58	UQ8	2S	201	-	53,53,53	1.78	7 (13%)	64,67,67	1.60	14 (21%)
57	CDL	3D	201	-	99,99,99	0.29	0	105,111,111	0.43	1 (0%)
66	HEA	4q	905	67,40	57,67,67	1.41	9 (15%)	61,103,103	2.10	18 (29%)
57	CDL	3L	702	-	99,99,99	0.31	0	105,111,111	0.32	0
55	PEE	3F	101	-	50,50,50	0.76	2 (4%)	53,55,55	0.57	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
57	CDL	3G	403	-	99,99,99	0.30	0	105,111,111	0.40	1 (0%)
56	PC1	3a	502	-	53,53,53	0.30	0	59,61,61	0.40	0
57	CDL	3i	201	-	99,99,99	0.30	0	105,111,111	0.39	0
55	PEE	4R	201	-	50,50,50	0.76	2 (4%)	53,55,55	0.57	0
56	PC1	3A	501	-	53,53,53	0.29	0	59,61,61	0.55	1 (1%)
56	PC1	3a	501	-	53,53,53	0.29	0	59,61,61	0.55	1 (1%)
57	CDL	4K	202	-	99,99,99	0.28	0	105,111,111	0.41	0
51	FES	2N	301	2	0,4,4	-	-	-		
57	CDL	3H	402	-	99,99,99	0.30	0	105,111,111	0.41	0
58	UQ8	3d	203	-	53,53,53	1.85	7 (13%)	64,67,67	1.71	16 (25%)
59	HEC	3c	301	13	32,50,50	1.72	4 (12%)	24,82,82	1.51	4 (16%)
55	PEE	2P	203	-	50,50,50	0.75	2 (4%)	53,55,55	0.56	0
55	PEE	40	302	-	50,50,50	0.74	2 (4%)	53,55,55	0.50	0
55	PEE	2p	203	-	50,50,50	0.75	2 (4%)	53,55,55	0.56	0
57	CDL	2O	204	-	99,99,99	0.29	0	105,111,111	0.32	0
57	CDL	3L	701	-	99,99,99	0.30	0	105,111,111	0.37	0
57	CDL	3e	202	-	99,99,99	0.29	0	105,111,111	0.37	0
66	HEA	4Q	904	40	57,67,67	1.39	7 (12%)	61,103,103	2.09	19 (31%)
56	PC1	2P	204	-	53,53,53	0.28	0	59,61,61	0.35	0
50	FAD	2m	701	-	53,58,58	0.82	2 (3%)	68,89,89	1.07	4 (5%)
55	PEE	4q	910	-	50,50,50	0.77	2 (4%)	53,55,55	0.60	1 (1%)
55	PEE	3f	101	-	50,50,50	0.76	2 (4%)	53,55,55	0.57	0
55	PEE	40	303	-	50,50,50	0.77	2 (4%)	53,55,55	0.52	0
66	HEA	4Q	905	67,40	57,67,67	1.41	9 (15%)	61,103,103	2.10	18 (29%)
57	CDL	4J	301	-	99,99,99	0.29	0	105,111,111	0.43	0
56	PC1	3A	502	-	53,53,53	0.30	0	59,61,61	0.40	0
60	HEM	3g	401	17	41,50,50	1.33	3 (7%)	45,82,82	1.43	7 (15%)
57	CDL	3h	402	-	99,99,99	0.29	0	105,111,111	0.40	0
57	CDL	3E	202	-	99,99,99	0.29	0	105,111,111	0.37	0
57	CDL	4Q	908	-	99,99,99	0.29	0	105,111,111	0.33	0
57	CDL	4u	501	-	99,99,99	0.29	0	105,111,111	0.43	1 (0%)
57	CDL	3E	203	-	99,99,99	0.29	0	105,111,111	0.39	1 (0%)
57	CDL	3g	403	-	99,99,99	0.30	0	105,111,111	0.40	1 (0%)
55	PEE	4r	201	-	50,50,50	0.75	2 (4%)	53,55,55	0.57	0
56	PC1	2t	101	-	53,53,53	0.29	0	59,61,61	0.34	0
58	UQ8	2s	201	-	53,53,53	1.79	7 (13%)	64,67,67	1.60	14 (21%)
57	CDL	4m	201	-	99,99,99	0.29	0	105,111,111	0.30	0
60	HEM	3g	402	17	41,50,50	1.30	2 (4%)	45,82,82	1.43	7 (15%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
57	CDL	4s	101	-	99,99,99	0.29	0	105,111,111	0.39	0
57	CDL	2P	201	-	99,99,99	0.30	0	105,111,111	0.33	0
55	PEE	4s	102	-	50,50,50	0.76	2 (4%)	53,55,55	0.54	0
63	CUA	4N	201	37	0,1,1	-	-	-		
51	FES	3h	401	18	0,4,4	-	-	-		
56	PC1	4E	202	-	53,53,53	0.29	0	59,61,61	0.44	0
58	UQ8	3G	405	-	53,53,53	1.81	5 (9%)	64,67,67	1.55	14 (21%)
67	PER	4q	906	66,64	0,1,1	-	-	-		
55	PEE	41	303	-	50,50,50	0.77	2 (4%)	53,55,55	0.52	0
55	PEE	41	301	-	50,50,50	0.75	2 (4%)	53,55,55	0.54	0
56	PC1	2r	202	-	53,53,53	0.29	0	59,61,61	0.45	0
57	CDL	4e	201	-	99,99,99	0.28	0	105,111,111	0.40	0
57	CDL	2u	101	-	99,99,99	0.29	0	105,111,111	0.31	0
53	F3S	2n	303	2	0,9,9	-	-	-		
57	CDL	4w	202	-	99,99,99	0.29	0	105,111,111	0.33	0
55	PEE	4q	909	-	50,50,50	0.75	2 (4%)	53,55,55	0.64	1 (1%)
57	CDL	3E	201	-	99,99,99	0.30	0	105,111,111	0.44	0
57	CDL	2U	101	-	99,99,99	0.29	0	105,111,111	0.31	0
62	LPP	4c	101	-	43,43,43	0.27	0	47,48,48	0.40	0
53	F3S	2N	303	2	0,9,9	-	-	-		
51	FES	2n	301	2	0,4,4	-	-	-		
57	CDL	2p	201	-	99,99,99	0.30	0	105,111,111	0.33	0
56	PC1	2o	204	-	53,53,53	0.28	0	59,61,61	0.56	1 (1%)
66	HEA	4q	904	40	57,67,67	1.39	7 (12%)	61,103,103	2.09	19 (31%)
55	PEE	2P	202	-	50,50,50	0.76	2 (4%)	53,55,55	0.51	0
51	FES	3H	401	18	0,4,4	-	-	-		
55	PEE	2r	201	-	50,50,50	0.75	2 (4%)	53,55,55	0.49	0
55	PEE	41	302	-	50,50,50	0.74	2 (4%)	53,55,55	0.50	0
56	PC1	3h	403	-	53,53,53	0.30	0	59,61,61	0.41	0
55	PEE	4d	101	-	50,50,50	0.75	2 (4%)	53,55,55	0.47	0
57	CDL	2Q	101	-	99,99,99	0.29	0	105,111,111	0.37	1 (0%)
62	LPP	4D	102	-	43,43,43	0.21	0	47,48,48	0.31	0
55	PEE	4D	101	-	50,50,50	0.75	2 (4%)	53,55,55	0.47	0
55	PEE	3c	302	-	50,50,50	0.77	2 (4%)	53,55,55	0.67	1 (1%)
57	CDL	4k	201	-	99,99,99	0.28	0	105,111,111	0.33	0
55	PEE	2p	202	-	50,50,50	0.76	2 (4%)	53,55,55	0.52	0
61	AJP	40	304	-	49,49,95	1.06	2 (4%)	74,80,149	1.48	9 (12%)
57	CDL	3l	701	-	99,99,99	0.30	0	105,111,111	0.37	0
56	PC1	4e	202	-	53,53,53	0.29	0	59,61,61	0.45	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
57	CDL	3I	202	-	99,99,99	0.30	0	105,111,111	0.46	1 (0%)
59	HEC	3C	301	13	32,50,50	1.71	4 (12%)	24,82,82	1.51	4 (16%)
55	PEE	2O	201	-	50,50,50	0.77	2 (4%)	53,55,55	0.65	0
56	PC1	2R	202	-	53,53,53	0.29	0	59,61,61	0.45	0
57	CDL	4w	201	-	99,99,99	0.28	0	105,111,111	0.34	0
57	CDL	4z	301	-	99,99,99	0.29	0	105,111,111	0.43	1 (0%)
52	SF4	2N	302	2	0,12,12	-	-	-		
55	PEE	4Q	909	-	50,50,50	0.75	2 (4%)	53,55,55	0.64	1 (1%)
57	CDL	4l	201	-	99,99,99	0.29	0	105,111,111	0.34	0
57	CDL	4T	203	-	99,99,99	0.29	0	105,111,111	0.29	0
56	PC1	2p	204	-	53,53,53	0.29	0	59,61,61	0.35	0
55	PEE	4w	203	-	50,50,50	0.75	2 (4%)	53,55,55	0.54	0
56	PC1	2T	101	-	53,53,53	0.29	0	59,61,61	0.34	0
58	UQ8	3G	404	-	53,53,53	1.78	7 (13%)	64,67,67	1.75	16 (25%)
58	UQ8	3g	404	-	53,53,53	1.78	7 (13%)	64,67,67	1.75	16 (25%)
55	PEE	40	301	-	50,50,50	0.75	2 (4%)	53,55,55	0.54	0
56	PC1	2o	203	-	53,53,53	0.28	0	59,61,61	0.41	0
57	CDL	3D	202	-	99,99,99	0.31	0	105,111,111	0.47	0
58	UQ8	3D	203	-	53,53,53	1.85	7 (13%)	64,67,67	1.71	16 (25%)
57	CDL	3d	201	-	99,99,99	0.29	0	105,111,111	0.43	1 (0%)
57	CDL	4U	501	-	99,99,99	0.29	0	105,111,111	0.43	1 (0%)
58	UQ8	3g	405	-	53,53,53	1.81	7 (13%)	64,67,67	1.55	14 (21%)
57	CDL	4t	203	-	99,99,99	0.29	0	105,111,111	0.29	0
57	CDL	4E	201	-	99,99,99	0.28	0	105,111,111	0.40	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
55	PEE	2o	202	-	-	19/54/54/54	-
57	CDL	4Q	907	-	-	40/110/110/110	-
55	PEE	4Q	910	-	-	14/54/54/54	-
57	CDL	3I	201	-	-	27/110/110/110	-
61	AJP	41	304	-	3/3/19/38	3/6/121/220	0/7/7/11
50	FAD	2M	701	-	-	5/30/50/50	0/6/6/6
55	PEE	4S	102	-	-	10/54/54/54	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
57	CDL	3l	702	-	-	22/110/110/110	-
57	CDL	4q	907	-	-	40/110/110/110	-
60	HEM	3G	401	17	-	6/12/54/54	-
57	CDL	4M	201	-	-	17/110/110/110	-
57	CDL	3d	202	-	-	55/110/110/110	-
57	CDL	3e	203	-	-	37/110/110/110	-
60	HEM	3G	402	17	-	5/12/54/54	-
57	CDL	4S	101	-	-	20/110/110/110	-
55	PEE	4W	203	-	-	12/54/54/54	-
57	CDL	3I	203	-	-	23/110/110/110	-
55	PEE	4Z	302	-	-	26/54/54/54	-
57	CDL	4W	201	-	-	19/110/110/110	-
57	CDL	4Z	301	-	-	16/110/110/110	-
57	CDL	4L	201	-	-	16/110/110/110	-
55	PEE	2R	201	-	-	19/54/54/54	-
57	CDL	3e	201	-	-	31/110/110/110	-
57	CDL	4W	202	-	-	28/110/110/110	-
62	LPP	4d	102	-	-	5/45/45/45	-
56	PC1	2O	202	-	-	9/57/57/57	-
55	PEE	4z	302	-	-	26/54/54/54	-
57	CDL	4k	202	-	-	30/110/110/110	-
57	CDL	2q	101	-	-	32/110/110/110	-
57	CDL	3i	203	-	-	40/110/110/110	-
52	SF4	2n	302	2	-	-	0/6/5/5
55	PEE	3C	302	-	-	14/54/54/54	-
57	CDL	4j	301	-	-	33/110/110/110	-
57	CDL	2o	201	-	-	23/110/110/110	-
57	CDL	4K	201	-	-	29/110/110/110	-
56	PC1	3H	403	-	-	16/57/57/57	-
56	PC1	2O	203	-	-	14/57/57/57	-
57	CDL	4q	908	-	-	19/110/110/110	-
62	LPP	4C	101	-	-	13/45/45/45	-
57	CDL	3i	202	-	-	27/110/110/110	-
58	UQ8	2S	201	-	-	8/51/75/75	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
57	CDL	3D	201	-	-	40/110/110/110	-
66	HEA	4q	905	67,40	-	8/32/76/76	-
57	CDL	3L	702	-	-	22/110/110/110	-
55	PEE	3F	101	-	-	16/54/54/54	-
57	CDL	3G	403	-	-	23/110/110/110	-
56	PC1	3a	502	-	-	16/57/57/57	-
57	CDL	3i	201	-	-	23/110/110/110	-
55	PEE	4R	201	-	-	16/54/54/54	-
56	PC1	3A	501	-	-	19/57/57/57	-
56	PC1	3a	501	-	-	19/57/57/57	-
57	CDL	4K	202	-	-	30/110/110/110	-
57	CDL	3H	402	-	-	15/110/110/110	-
51	FES	2N	301	2	-	-	0/1/1/1
58	UQ8	3d	203	-	-	12/51/75/75	0/1/1/1
59	HEC	3c	301	13	-	4/10/54/54	-
55	PEE	2P	203	-	-	17/54/54/54	-
55	PEE	40	302	-	-	5/54/54/54	-
55	PEE	2p	203	-	-	17/54/54/54	-
57	CDL	2O	204	-	-	23/110/110/110	-
57	CDL	3L	701	-	-	30/110/110/110	-
57	CDL	3e	202	-	-	27/110/110/110	-
66	HEA	4Q	904	40	-	7/32/76/76	-
56	PC1	2P	204	-	-	4/57/57/57	-
50	FAD	2m	701	-	-	5/30/50/50	0/6/6/6
55	PEE	4q	910	-	-	14/54/54/54	-
55	PEE	3f	101	-	-	16/54/54/54	-
55	PEE	40	303	-	-	21/54/54/54	-
66	HEA	4Q	905	67,40	-	8/32/76/76	-
57	CDL	4J	301	-	-	33/110/110/110	-
56	PC1	3A	502	-	-	16/57/57/57	-
60	HEM	3g	401	17	-	6/12/54/54	-
57	CDL	3h	402	-	-	15/110/110/110	-
57	CDL	3E	202	-	-	27/110/110/110	-
57	CDL	4Q	908	-	-	19/110/110/110	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
57	CDL	4u	501	-	-	35/110/110/110	-
57	CDL	3E	203	-	-	37/110/110/110	-
57	CDL	3g	403	-	-	23/110/110/110	-
55	PEE	4r	201	-	-	16/54/54/54	-
56	PC1	2t	101	-	-	14/57/57/57	-
58	UQ8	2s	201	-	-	8/51/75/75	0/1/1/1
57	CDL	4m	201	-	-	17/110/110/110	-
60	HEM	3g	402	17	-	5/12/54/54	-
57	CDL	4s	101	-	-	20/110/110/110	-
57	CDL	2P	201	-	-	23/110/110/110	-
55	PEE	4s	102	-	-	10/54/54/54	-
51	FES	3h	401	18	-	-	0/1/1/1
56	PC1	4E	202	-	-	11/57/57/57	-
58	UQ8	3G	405	-	-	6/51/75/75	0/1/1/1
55	PEE	41	303	-	-	21/54/54/54	-
55	PEE	41	301	-	-	16/54/54/54	-
56	PC1	2r	202	-	-	17/57/57/57	-
57	CDL	4e	201	-	-	29/110/110/110	-
57	CDL	2u	101	-	-	19/110/110/110	-
53	F3S	2n	303	2	-	-	0/3/3/3
57	CDL	4w	202	-	-	28/110/110/110	-
55	PEE	4q	909	-	-	21/54/54/54	-
57	CDL	3E	201	-	-	31/110/110/110	-
57	CDL	2U	101	-	-	19/110/110/110	-
62	LPP	4c	101	-	-	13/45/45/45	-
53	F3S	2N	303	2	-	-	0/3/3/3
51	FES	2n	301	2	-	-	0/1/1/1
57	CDL	2p	201	-	-	22/110/110/110	-
56	PC1	2o	204	-	-	14/57/57/57	-
66	HEA	4q	904	40	-	7/32/76/76	-
55	PEE	2P	202	-	-	18/54/54/54	-
51	FES	3H	401	18	-	-	0/1/1/1
55	PEE	2r	201	-	-	19/54/54/54	-
55	PEE	41	302	-	-	5/54/54/54	-
56	PC1	3h	403	-	-	16/57/57/57	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
55	PEE	4d	101	-	-	16/54/54/54	-
57	CDL	2Q	101	-	-	32/110/110/110	-
62	LPP	4D	102	-	-	5/45/45/45	-
55	PEE	4D	101	-	-	16/54/54/54	-
55	PEE	3c	302	-	-	14/54/54/54	-
57	CDL	4k	201	-	-	29/110/110/110	-
55	PEE	2p	202	-	-	18/54/54/54	-
61	AJP	40	304	-	3/3/19/38	3/6/121/220	0/7/7/11
57	CDL	3l	701	-	-	30/110/110/110	-
56	PC1	4e	202	-	-	11/57/57/57	-
57	CDL	3I	202	-	-	40/110/110/110	-
59	HEC	3C	301	13	-	4/10/54/54	-
55	PEE	2O	201	-	-	19/54/54/54	-
56	PC1	2R	202	-	-	17/57/57/57	-
57	CDL	4w	201	-	-	19/110/110/110	-
57	CDL	4z	301	-	-	16/110/110/110	-
52	SF4	2N	302	2	-	-	0/6/5/5
55	PEE	4Q	909	-	-	21/54/54/54	-
57	CDL	4l	201	-	-	16/110/110/110	-
57	CDL	4T	203	-	-	23/110/110/110	-
56	PC1	2p	204	-	-	4/57/57/57	-
55	PEE	4w	203	-	-	12/54/54/54	-
56	PC1	2T	101	-	-	14/57/57/57	-
58	UQ8	3G	404	-	-	15/51/75/75	0/1/1/1
58	UQ8	3g	404	-	-	15/51/75/75	0/1/1/1
55	PEE	40	301	-	-	16/54/54/54	-
56	PC1	2o	203	-	-	9/57/57/57	-
57	CDL	3D	202	-	-	55/110/110/110	-
58	UQ8	3D	203	-	-	12/51/75/75	0/1/1/1
57	CDL	3d	201	-	-	40/110/110/110	-
57	CDL	4U	501	-	-	35/110/110/110	-
58	UQ8	3g	405	-	-	6/51/75/75	0/1/1/1
57	CDL	4t	203	-	-	23/110/110/110	-
57	CDL	4E	201	-	-	29/110/110/110	-

The worst 5 of 176 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
58	3D	203	UQ8	C6-C1	10.23	1.53	1.35
58	3d	203	UQ8	C6-C1	10.21	1.53	1.35
58	3G	405	UQ8	C6-C1	9.76	1.53	1.35
58	3g	405	UQ8	C6-C1	9.76	1.53	1.35
58	2s	201	UQ8	C6-C1	9.74	1.53	1.35

The worst 5 of 283 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
66	4q	905	HEA	CMC-C2C-C3C	7.03	137.83	124.68
66	4Q	905	HEA	CMC-C2C-C3C	7.02	137.81	124.68
66	4q	904	HEA	CMC-C2C-C3C	6.88	137.55	124.68
66	4Q	904	HEA	CMC-C2C-C3C	6.88	137.54	124.68
66	4q	905	HEA	CMC-C2C-C1C	-6.36	118.69	128.46

5 of 6 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
61	40	304	AJP	C28
61	40	304	AJP	C29
61	40	304	AJP	C30
61	41	304	AJP	C28
61	41	304	AJP	C29

5 of 2595 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
50	2M	701	FAD	C5B-O5B-PA-O3P
50	2M	701	FAD	N10-C1'-C2'-O2'
50	2m	701	FAD	C5B-O5B-PA-O3P
50	2m	701	FAD	N10-C1'-C2'-O2'
55	2O	201	PEE	C11-C10-O2-C2

There are no ring outliers.

83 monomers are involved in 209 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
57	4Q	907	CDL	1	0
55	4Q	910	PEE	1	0
57	3I	201	CDL	3	0
61	41	304	AJP	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
50	2M	701	FAD	11	0
57	4q	907	CDL	1	0
60	3G	401	HEM	4	0
60	3G	402	HEM	1	0
57	4W	202	CDL	1	0
62	4d	102	LPP	1	0
56	2O	202	PC1	2	0
57	4k	202	CDL	2	0
57	2q	101	CDL	2	0
55	3C	302	PEE	1	0
57	4j	301	CDL	1	0
57	2o	201	CDL	1	0
57	4K	201	CDL	1	0
56	2O	203	PC1	3	0
57	4q	908	CDL	2	0
57	3i	202	CDL	3	0
58	2S	201	UQ8	2	0
66	4q	905	HEA	2	0
55	3F	101	PEE	1	0
57	3G	403	CDL	5	0
56	3A	501	PC1	2	0
56	3a	501	PC1	2	0
57	4K	202	CDL	1	0
57	3H	402	CDL	1	0
58	3d	203	UQ8	12	0
59	3c	301	HEC	5	0
55	40	302	PEE	1	0
57	2O	204	CDL	1	0
57	3L	701	CDL	1	0
66	4Q	904	HEA	4	0
56	2P	204	PC1	2	0
50	2m	701	FAD	11	0
55	4q	910	PEE	1	0
55	3f	101	PEE	1	0
66	4Q	905	HEA	2	0
57	4J	301	CDL	1	0
60	3g	401	HEM	4	0
57	3h	402	CDL	1	0
57	4Q	908	CDL	2	0
57	4u	501	CDL	2	0
57	3g	403	CDL	4	0
56	2t	101	PC1	1	0

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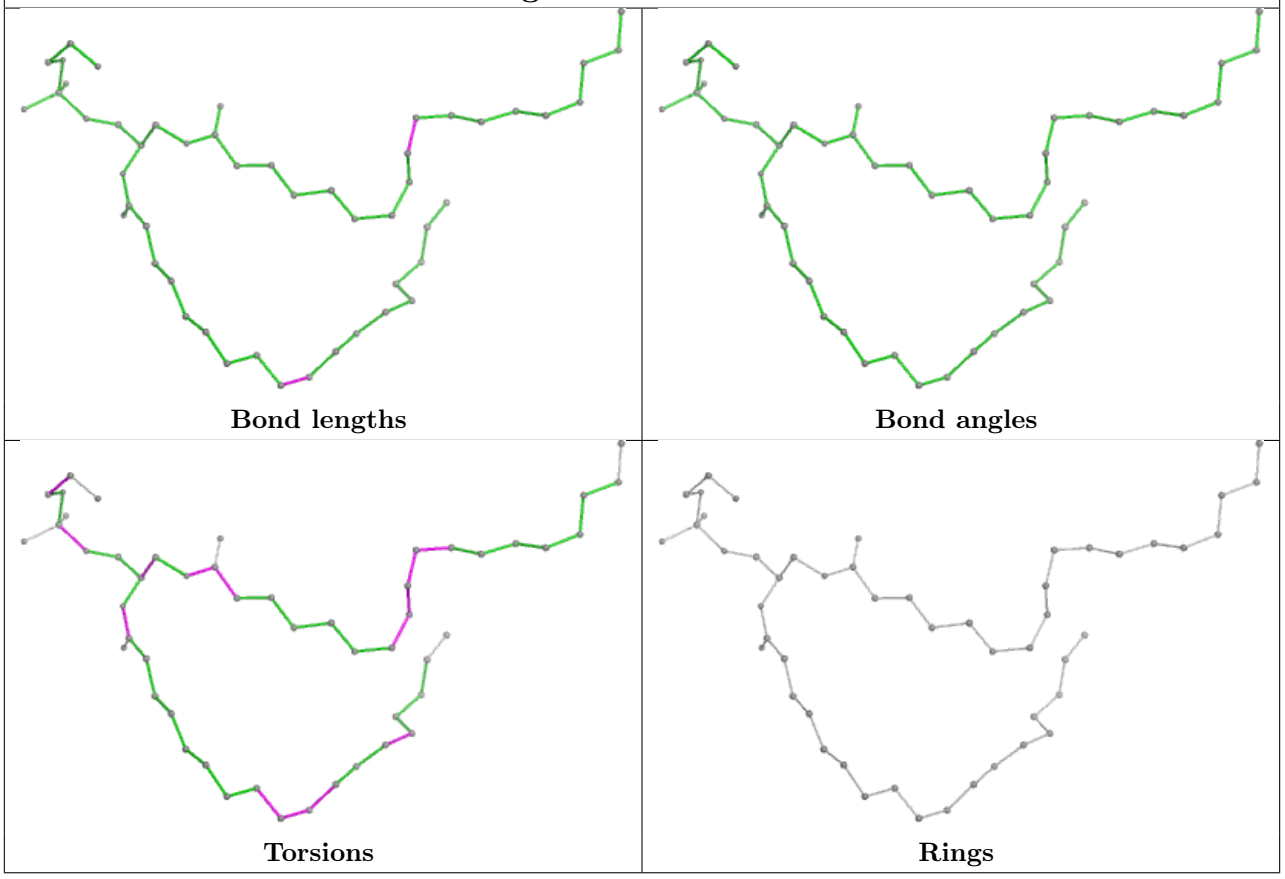
Mol	Chain	Res	Type	Clashes	Symm-Clashes
58	2s	201	UQ8	2	0
60	3g	402	HEM	1	0
57	4s	101	CDL	1	0
57	2P	201	CDL	3	0
51	3h	401	FES	1	0
56	4E	202	PC1	2	0
58	3G	405	UQ8	5	0
56	2r	202	PC1	1	0
57	2u	101	CDL	2	0
57	4w	202	CDL	1	0
55	4q	909	PEE	1	0
57	2U	101	CDL	2	0
57	2p	201	CDL	3	0
56	2o	204	PC1	3	0
66	4q	904	HEA	4	0
51	3H	401	FES	1	0
55	41	302	PEE	1	0
57	2Q	101	CDL	2	0
62	4D	102	LPP	1	0
55	3c	302	PEE	1	0
57	4k	201	CDL	1	0
61	40	304	AJP	1	0
57	3l	701	CDL	1	0
56	4e	202	PC1	2	0
59	3C	301	HEC	6	0
56	2R	202	PC1	1	0
55	4Q	909	PEE	1	0
57	4T	203	CDL	3	0
56	2p	204	PC1	2	0
56	2T	101	PC1	1	0
58	3G	404	UQ8	10	0
58	3g	404	UQ8	11	0
56	2o	203	PC1	2	0
58	3D	203	UQ8	12	0
57	4U	501	CDL	2	0
58	3g	405	UQ8	4	0
57	4t	203	CDL	3	0

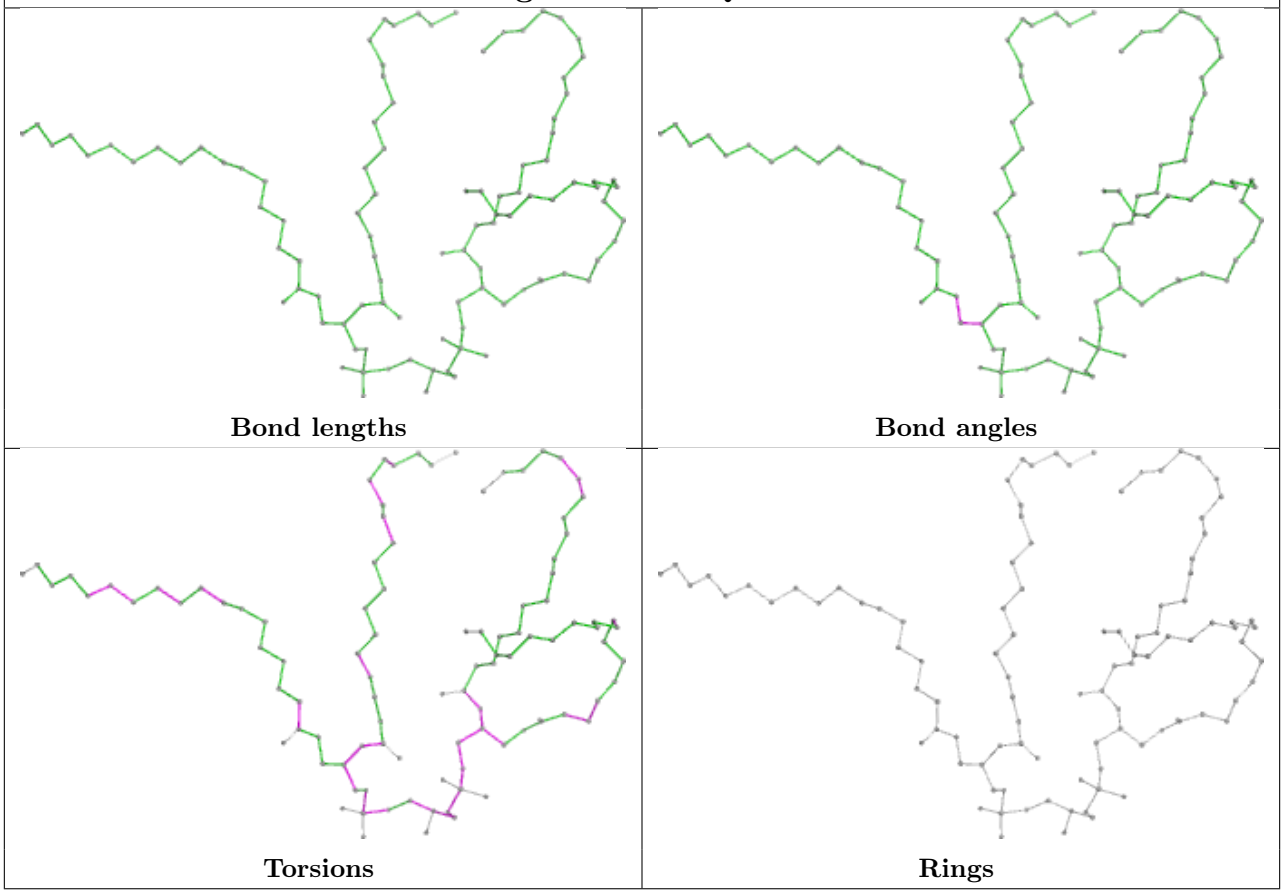
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

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

Ligand PEE 2o 202



Ligand CDL 4Q 907



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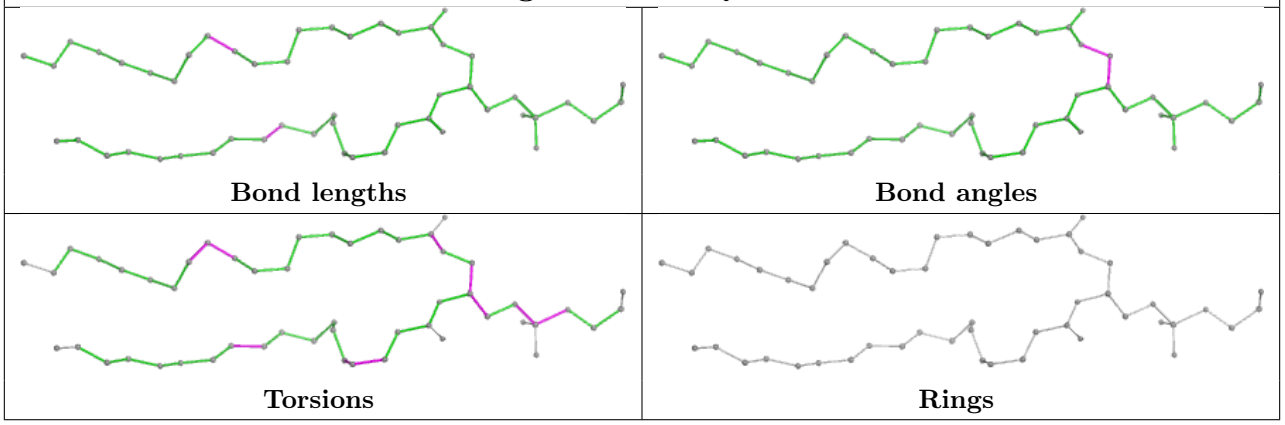
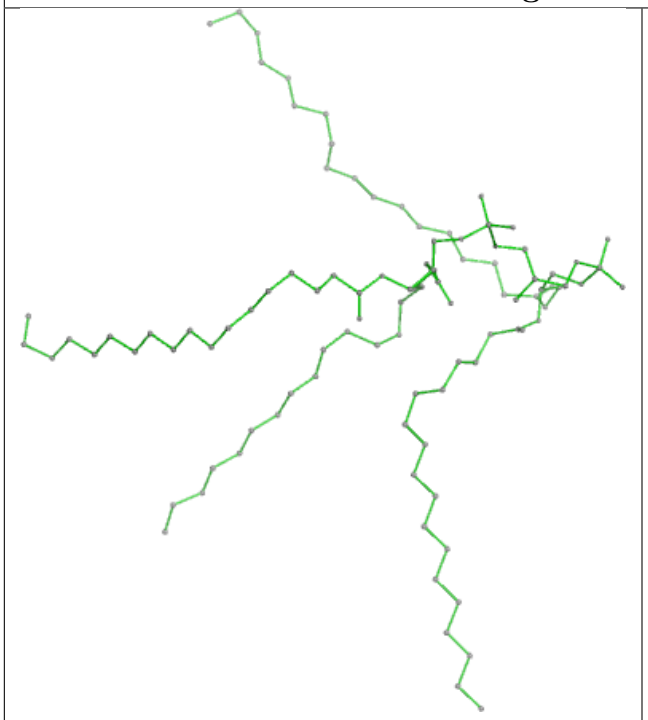
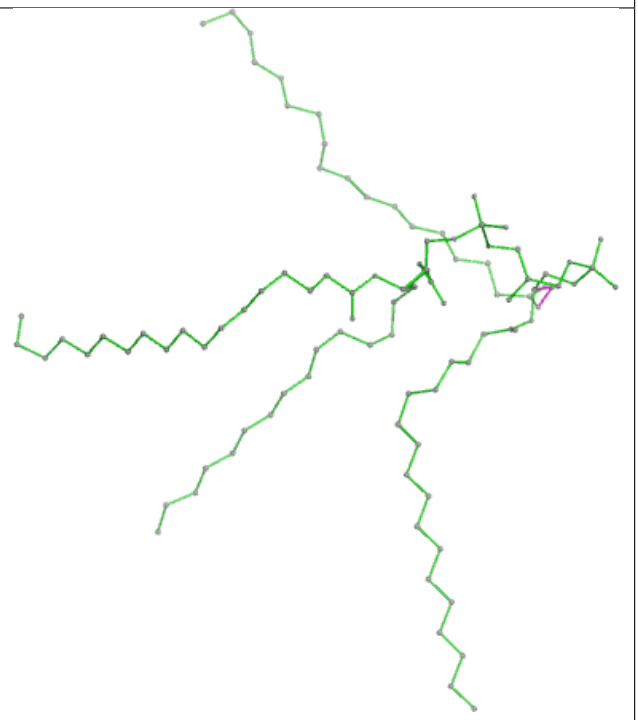


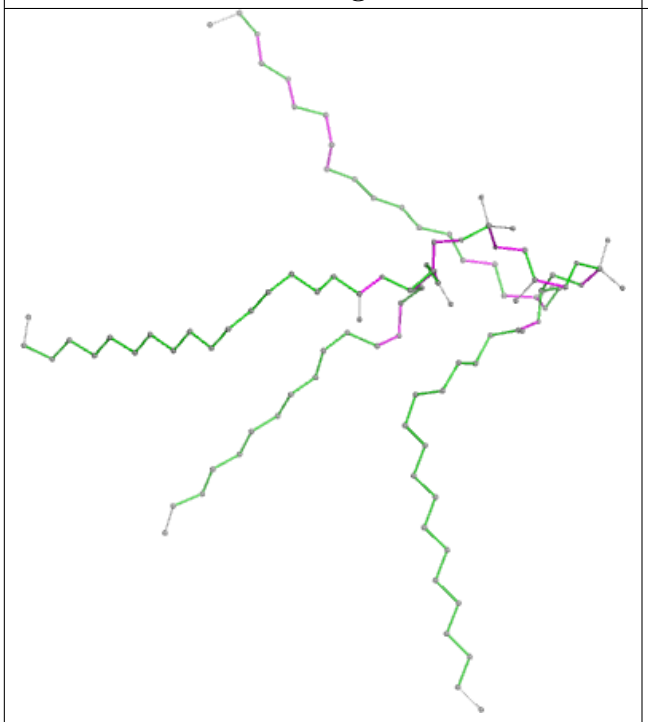
Ligand CDL 3I 201



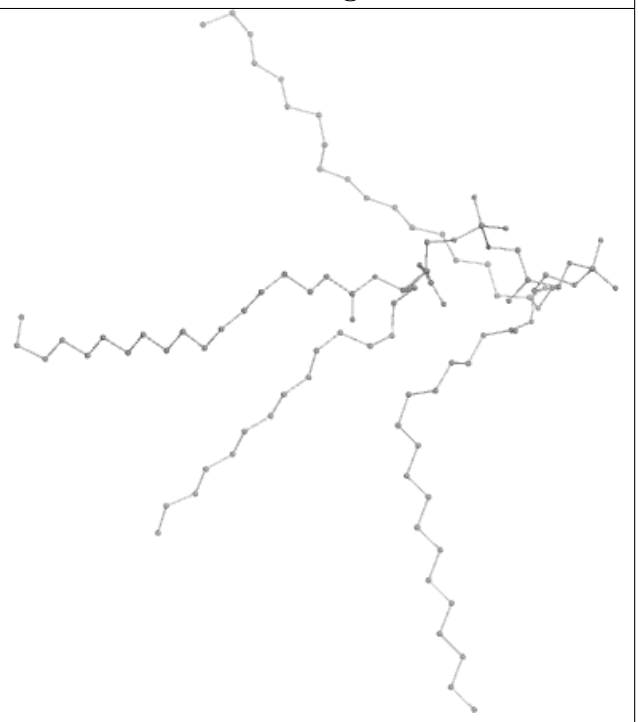
Bond lengths



Bond angles

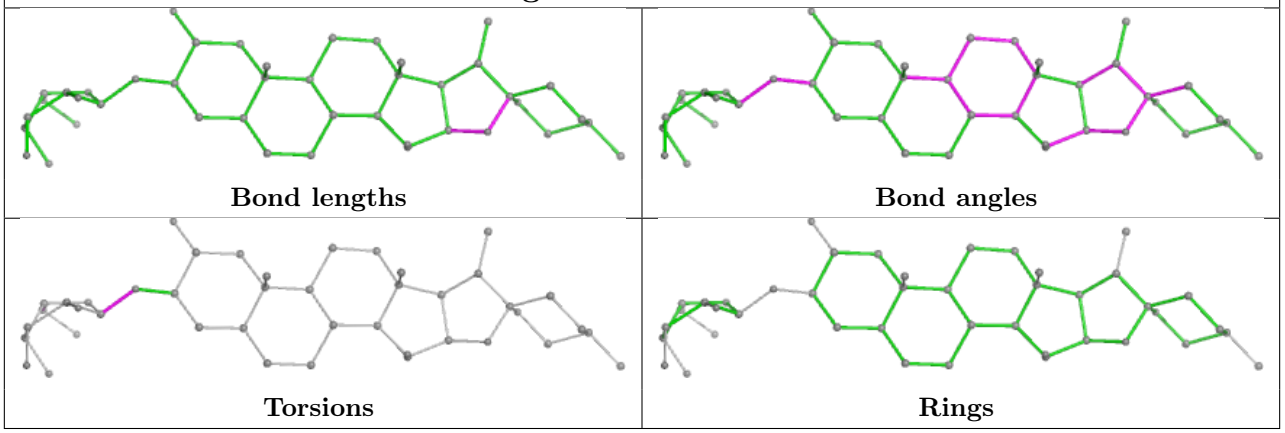


Torsions

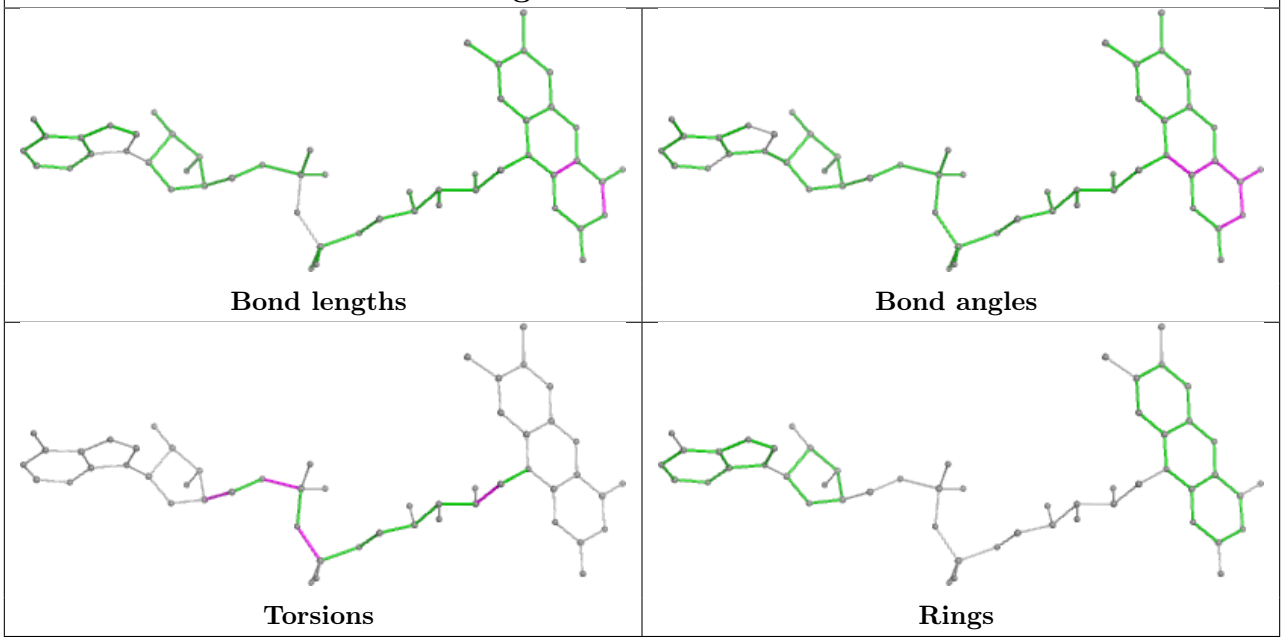


Rings

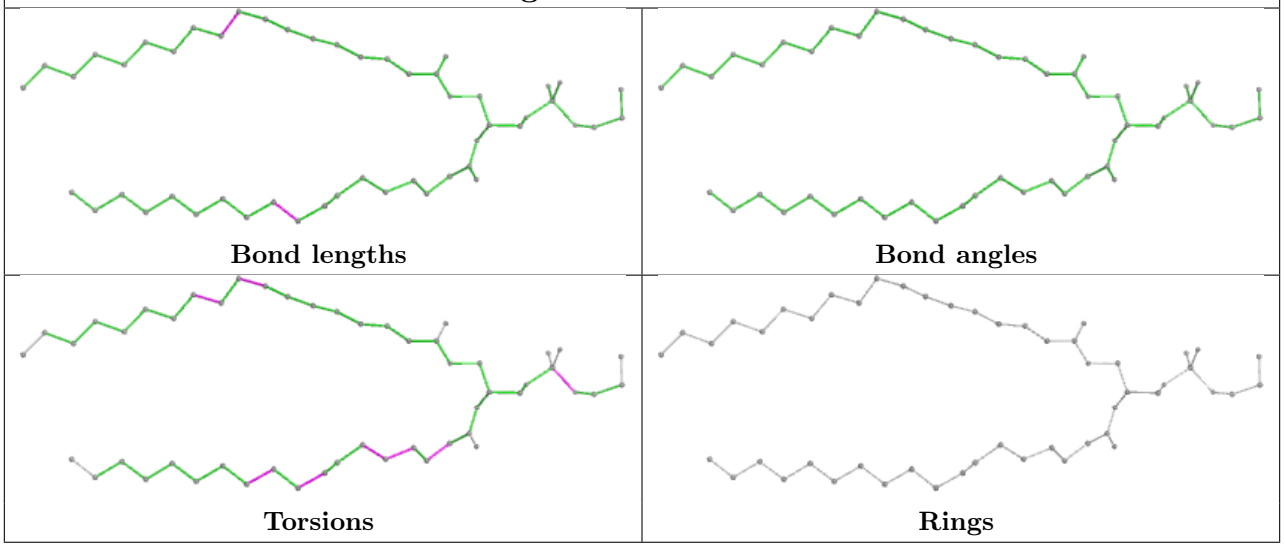
Ligand AJP 41 304



Ligand FAD 2M 701



Ligand PEE 4S 102



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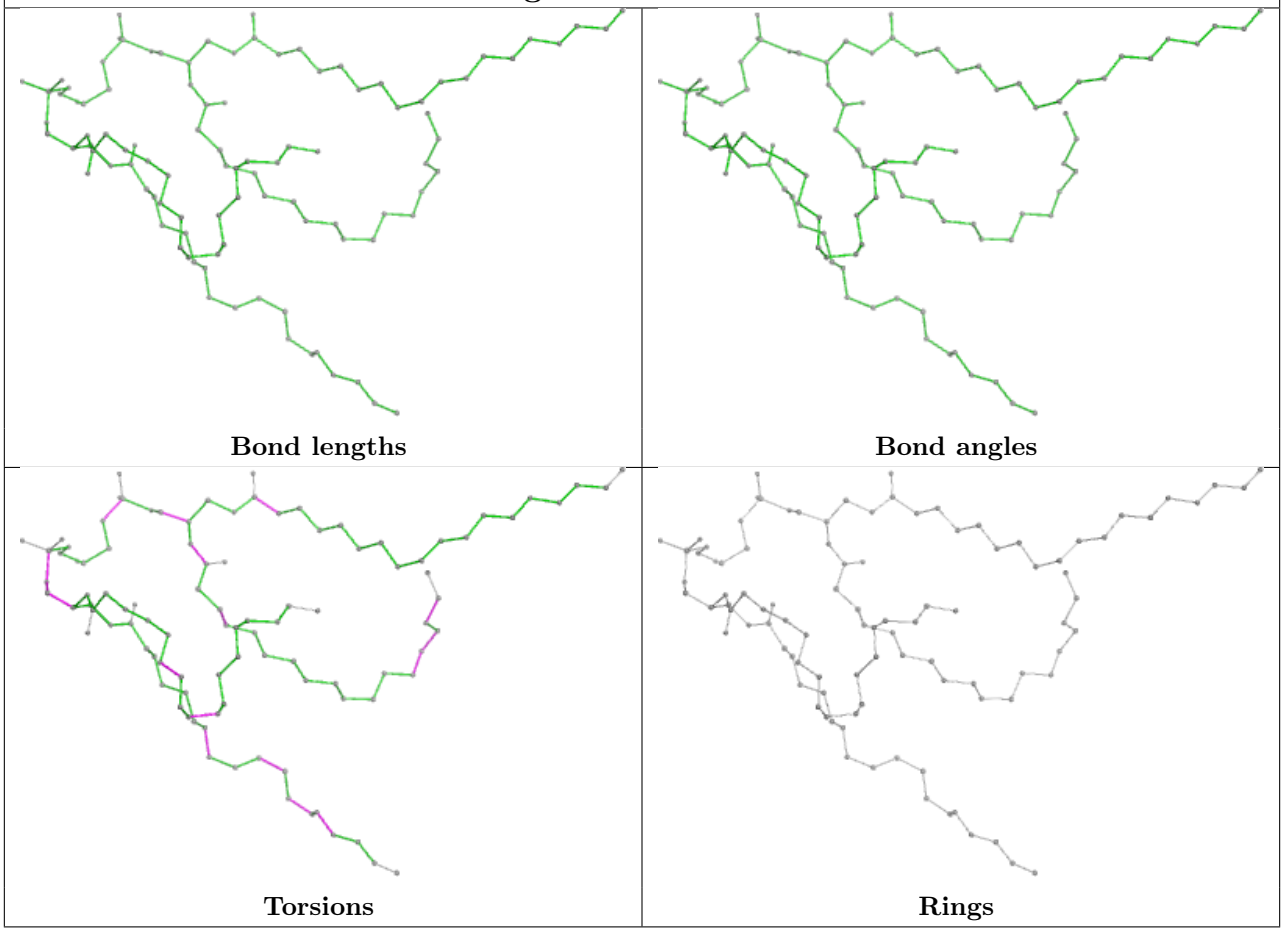
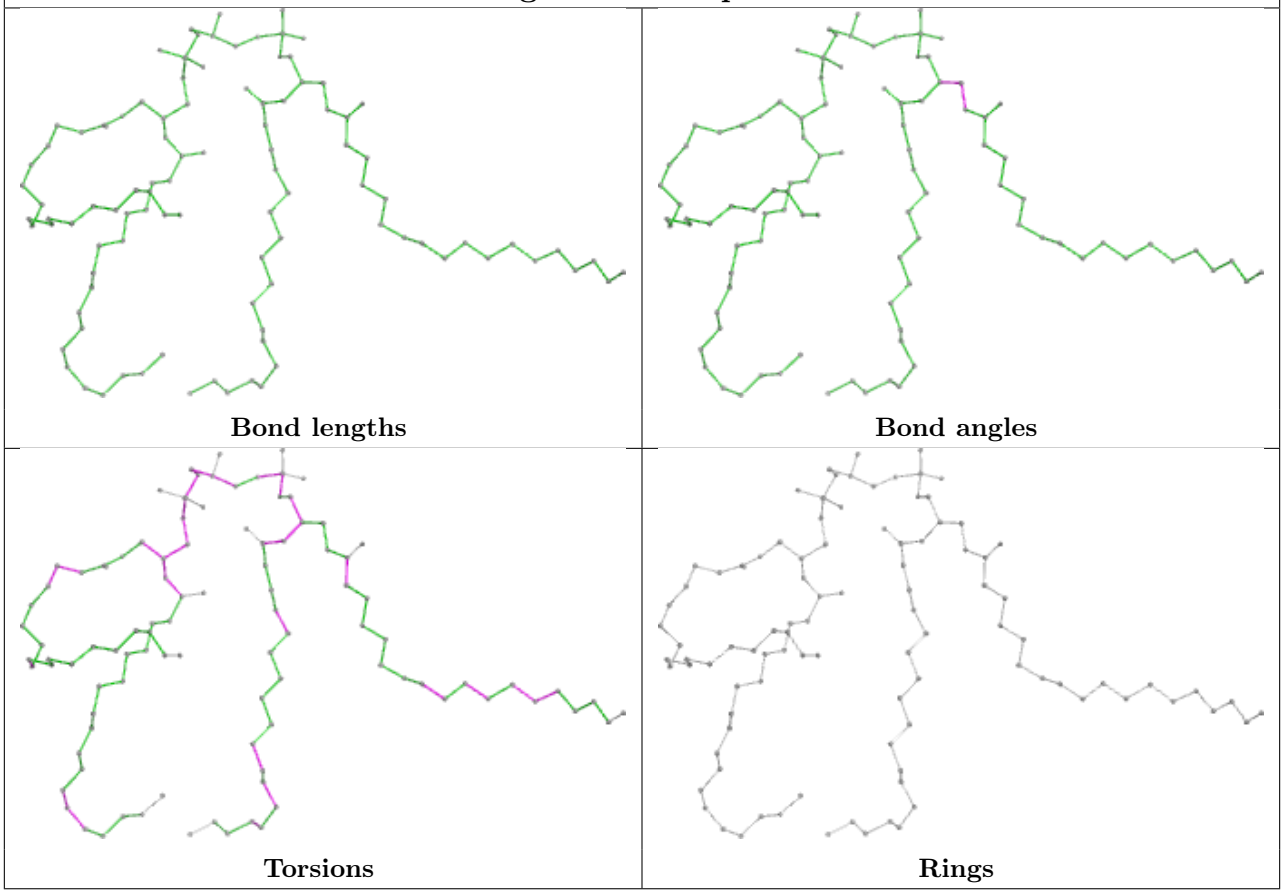
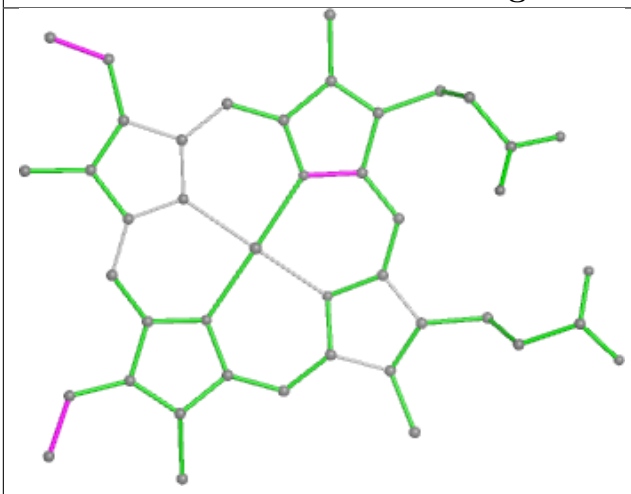


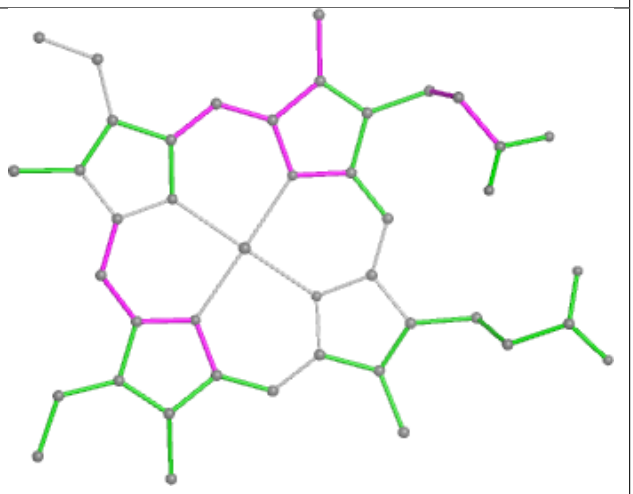
Ligand CDL 4q 907



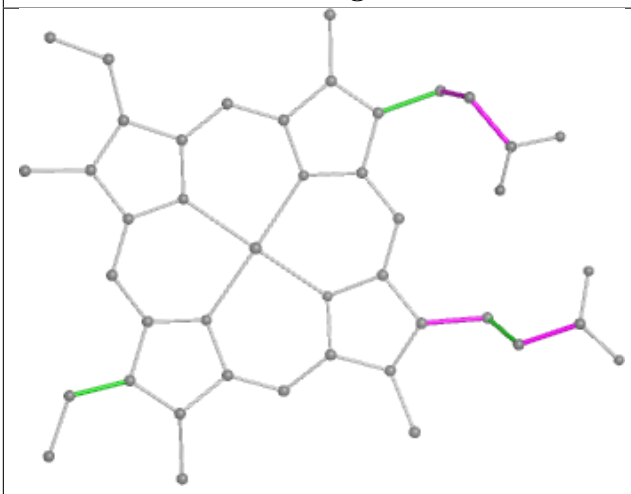
Ligand HEM 3G 401



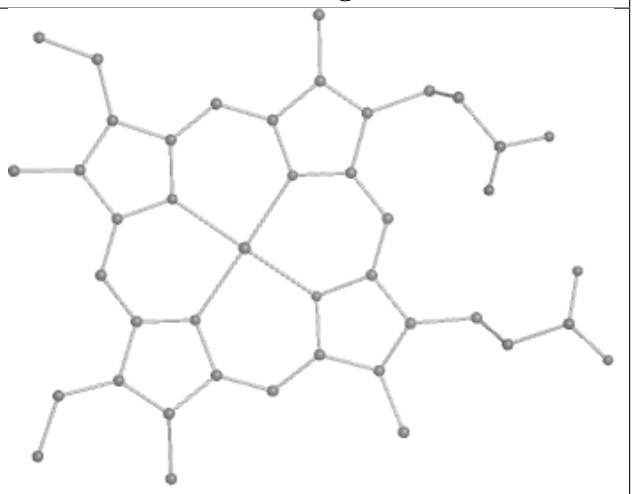
Bond lengths



Bond angles

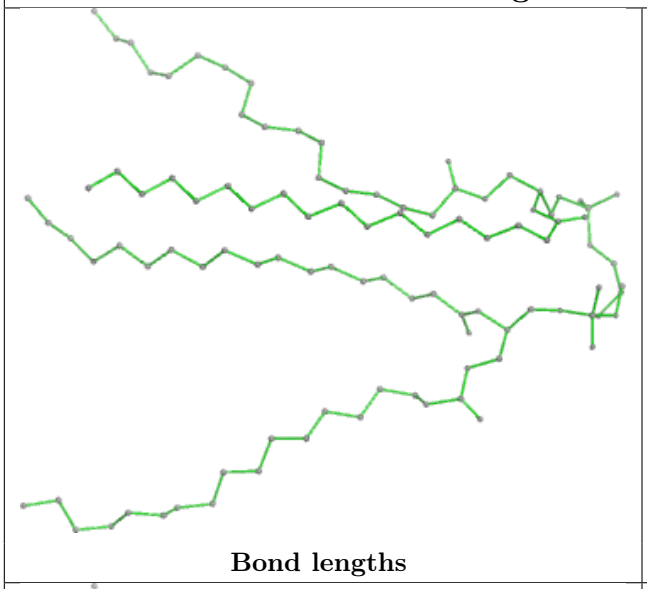


Torsions

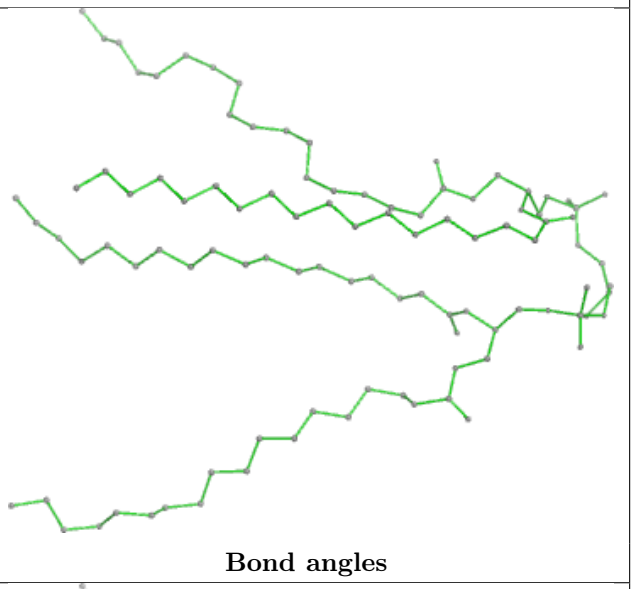


Rings

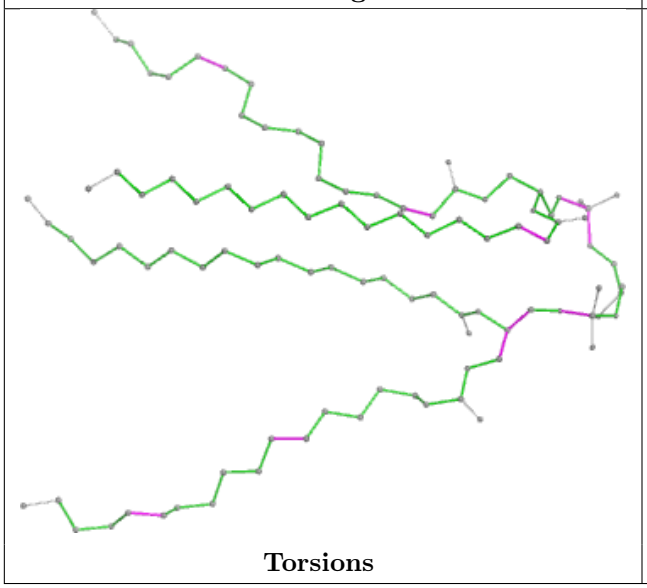
Ligand CDL 4M 201



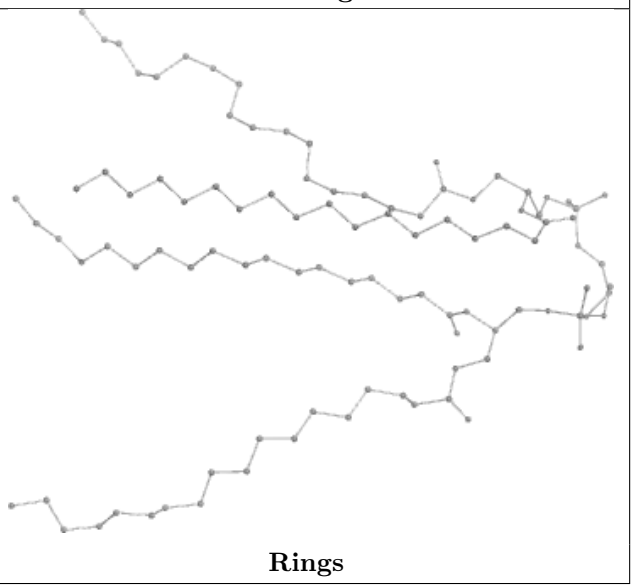
Bond lengths



Bond angles

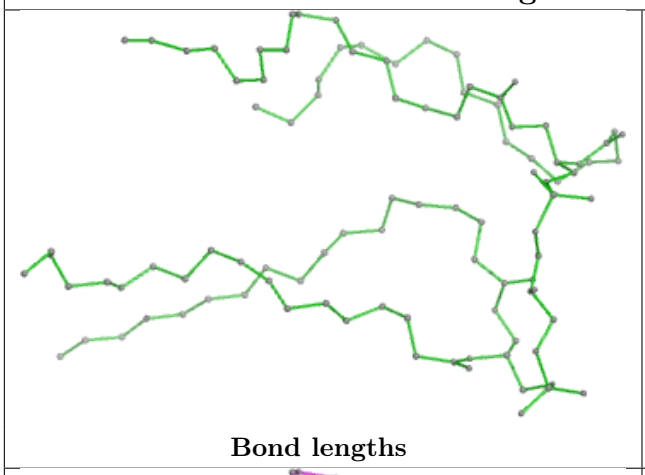


Torsions

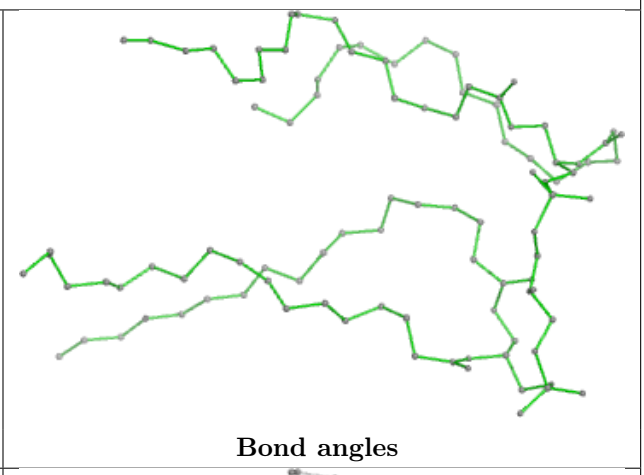


Rings

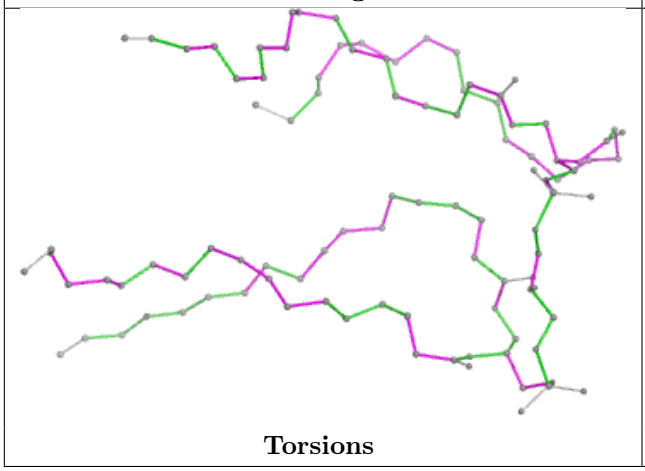
Ligand CDL 3d 202



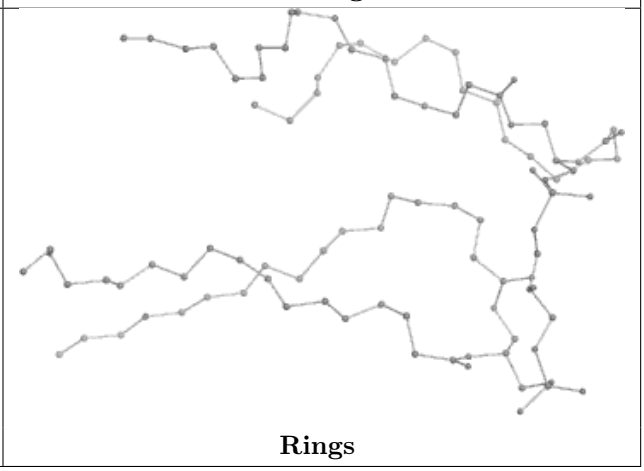
Bond lengths



Bond angles

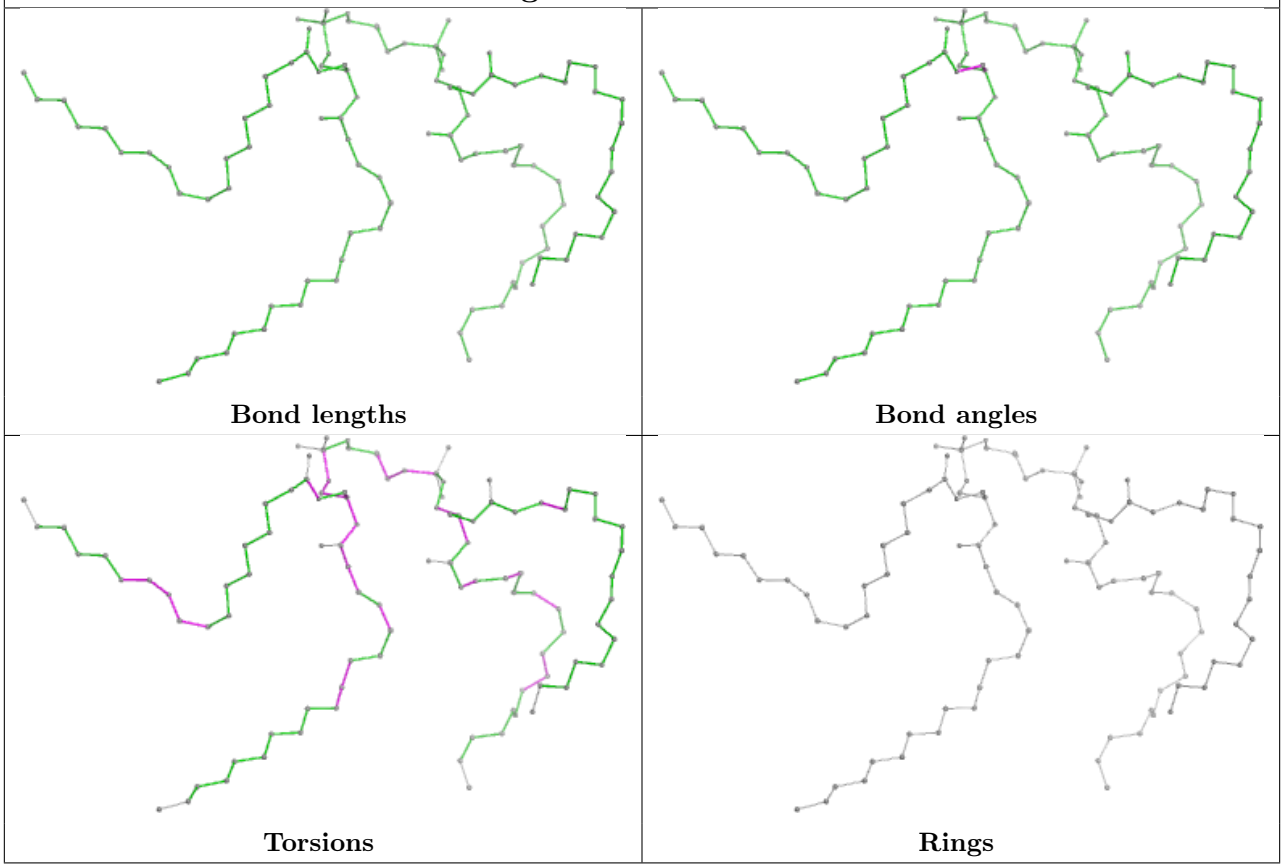


Torsions

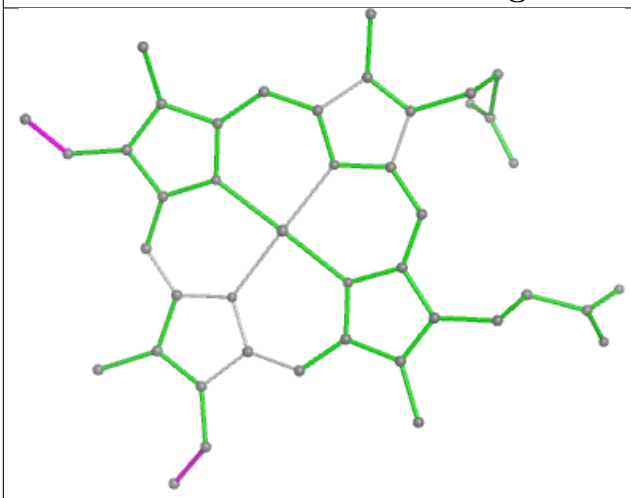


Rings

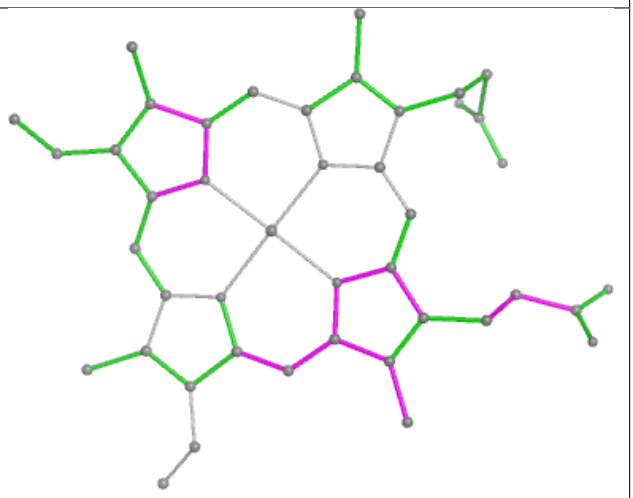
Ligand CDL 3e 203



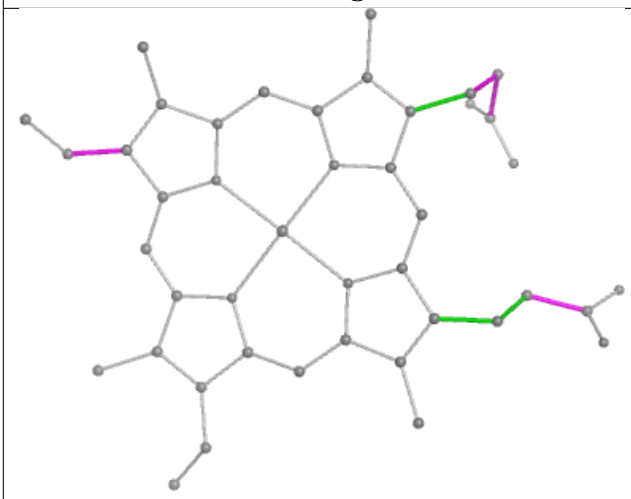
Ligand HEM 3G 402



Bond lengths



Bond angles



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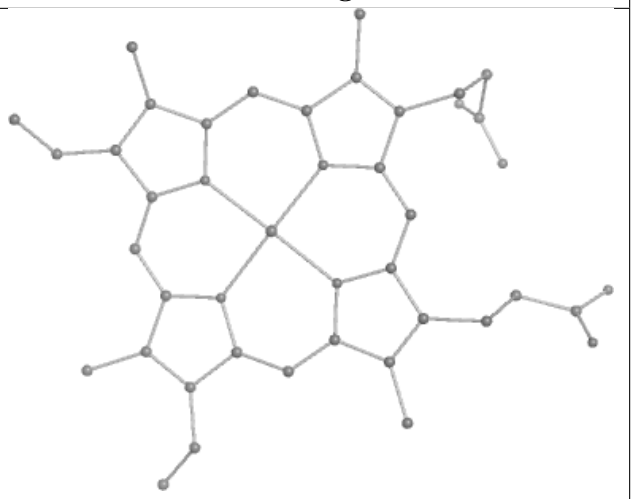
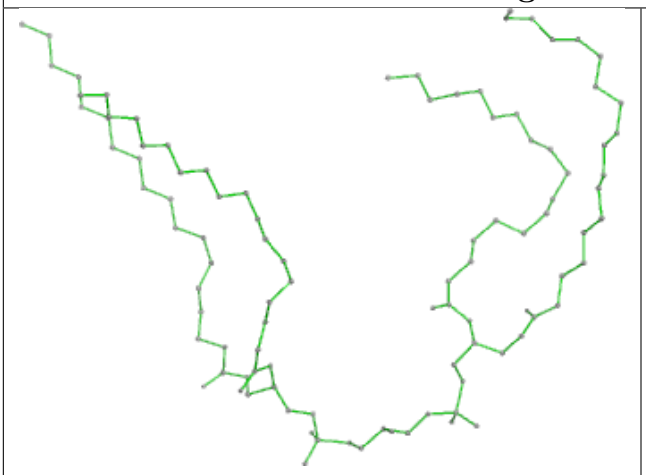
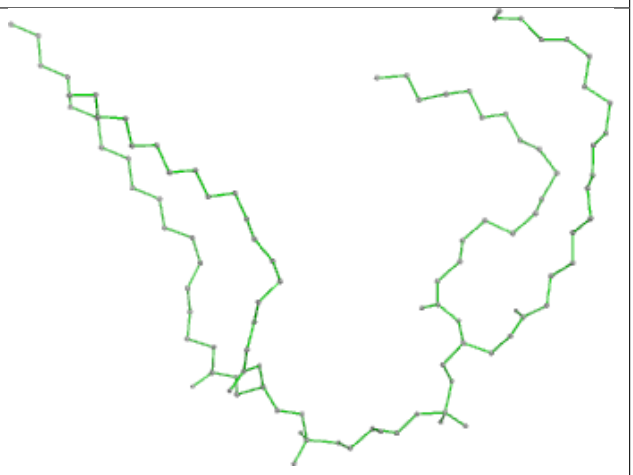


Rings

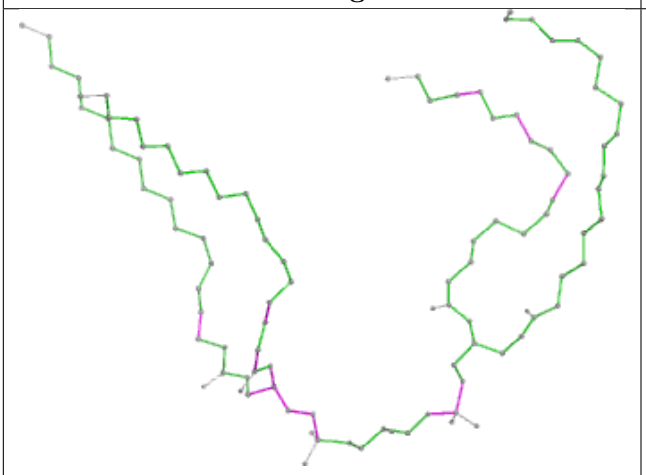
Ligand CDL 4S 101



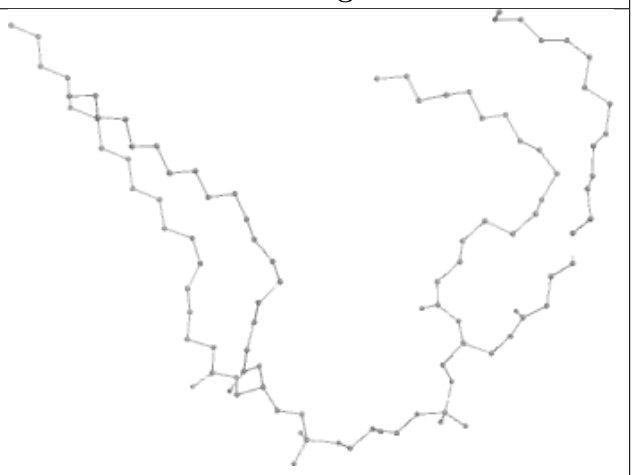
Bond lengths



Bond angles

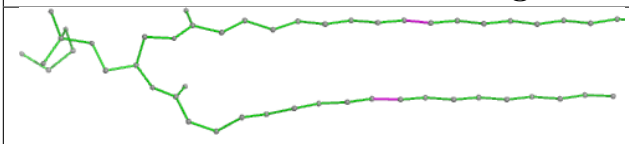


Torsions

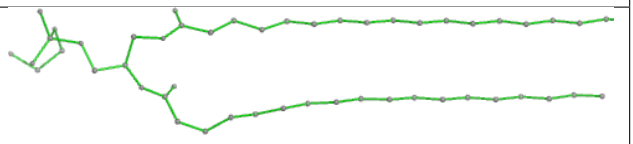


Rings

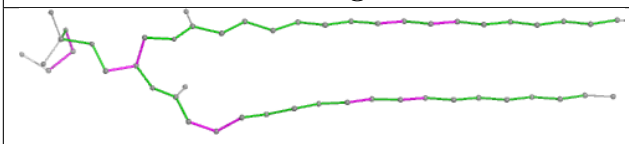
Ligand PEE 4W 203



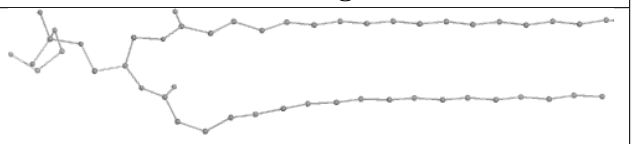
Bond lengths



Bond angles

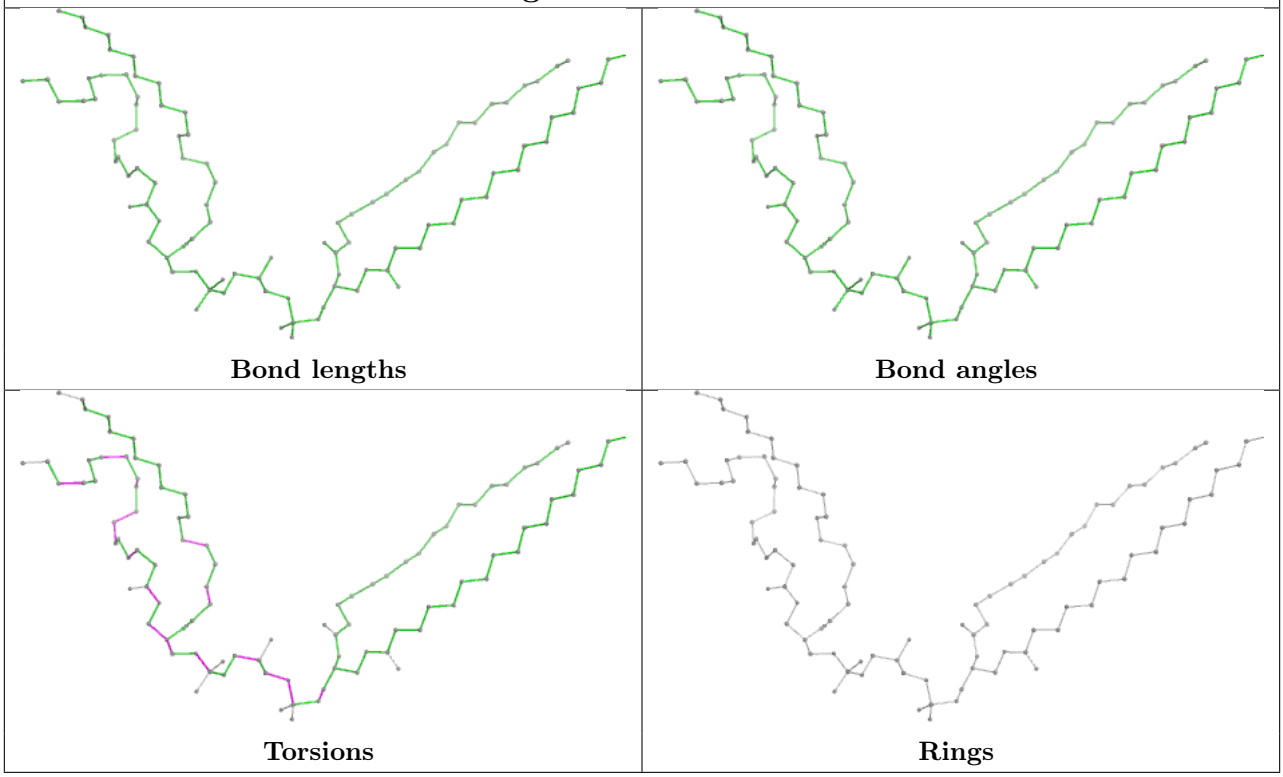


Torsions

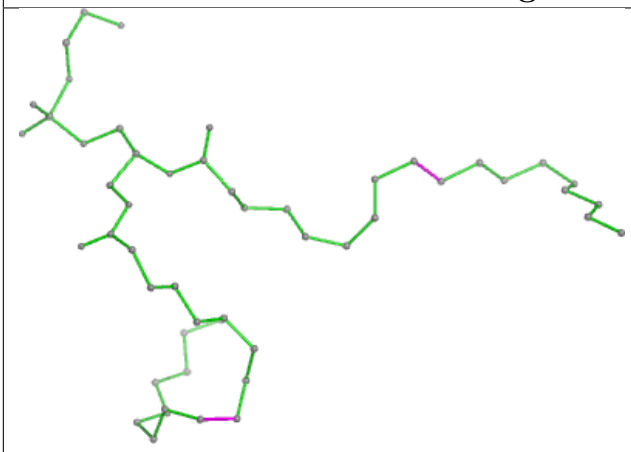


Rings

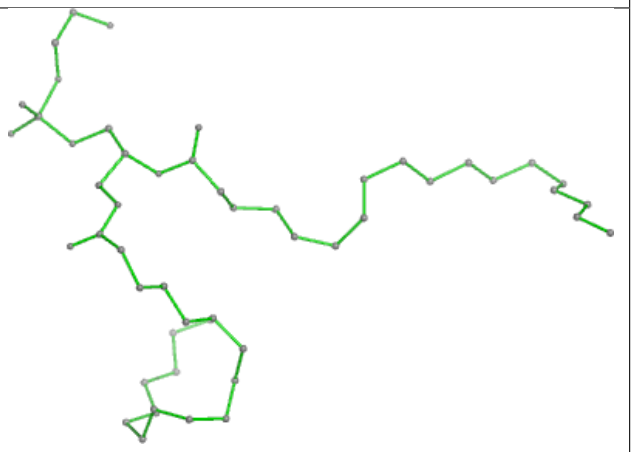
Ligand CDL 3I 203



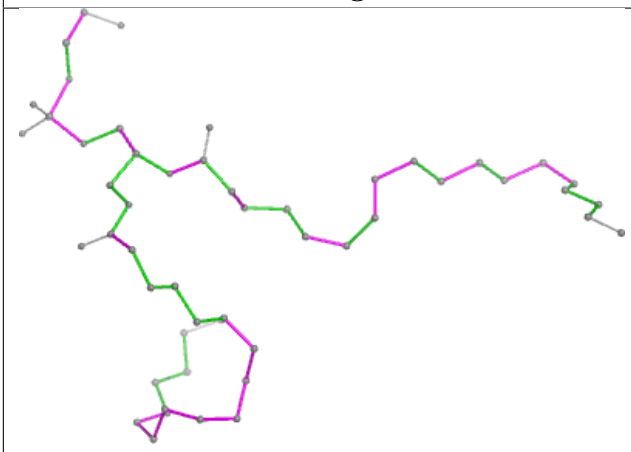
Ligand PEE 4Z 302



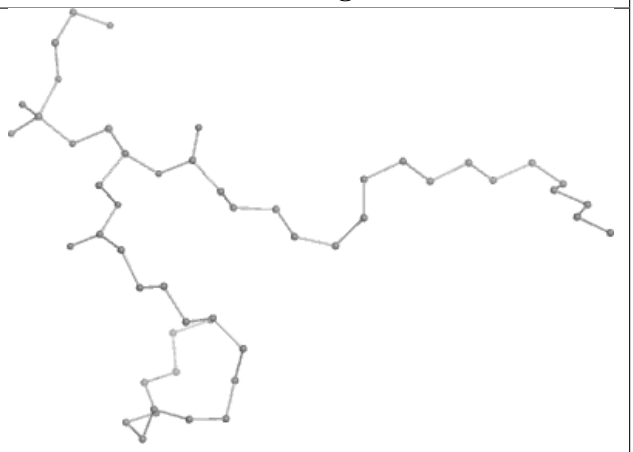
Bond lengths



Bond angles

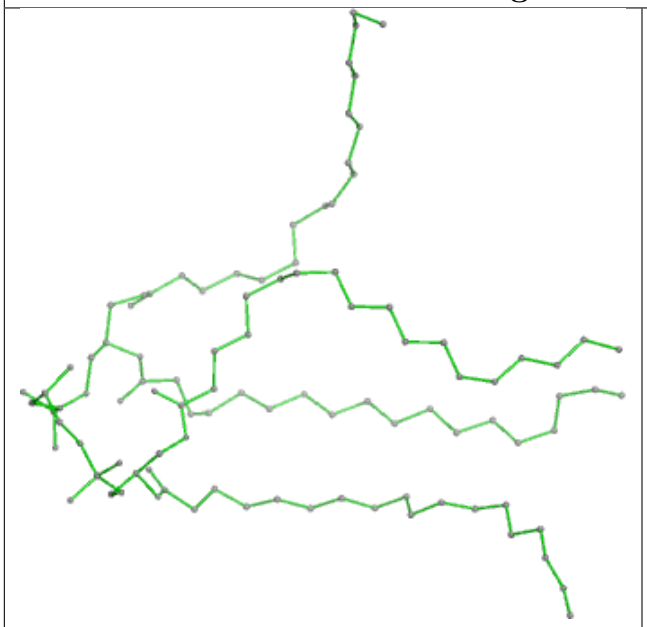


Torsions

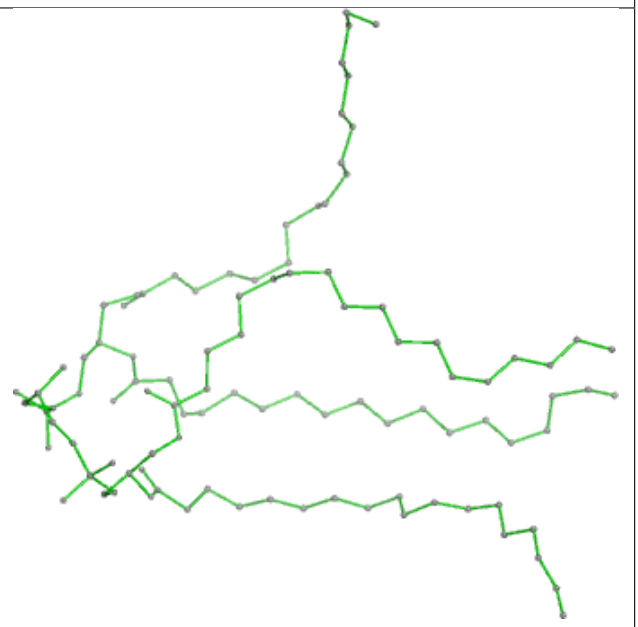


Rings

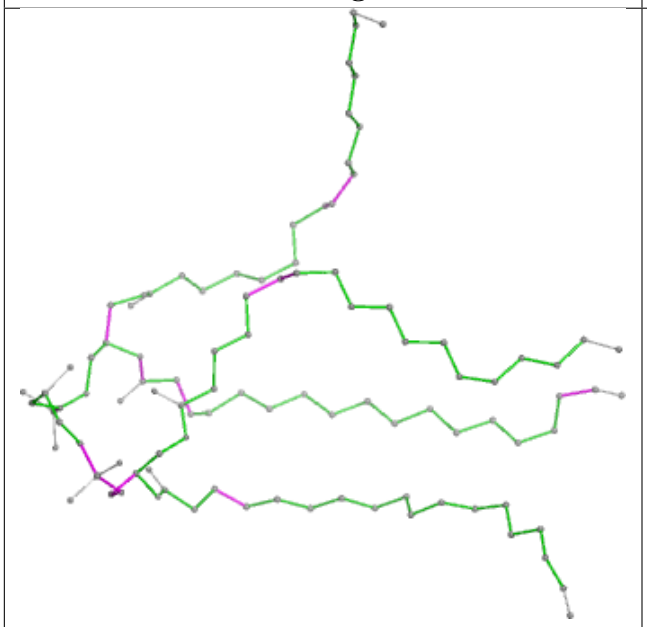
Ligand CDL 4W 201



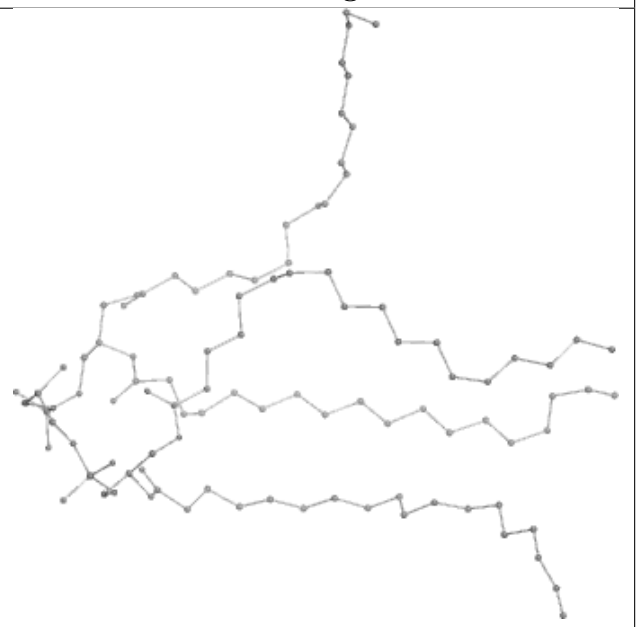
Bond lengths



Bond angles

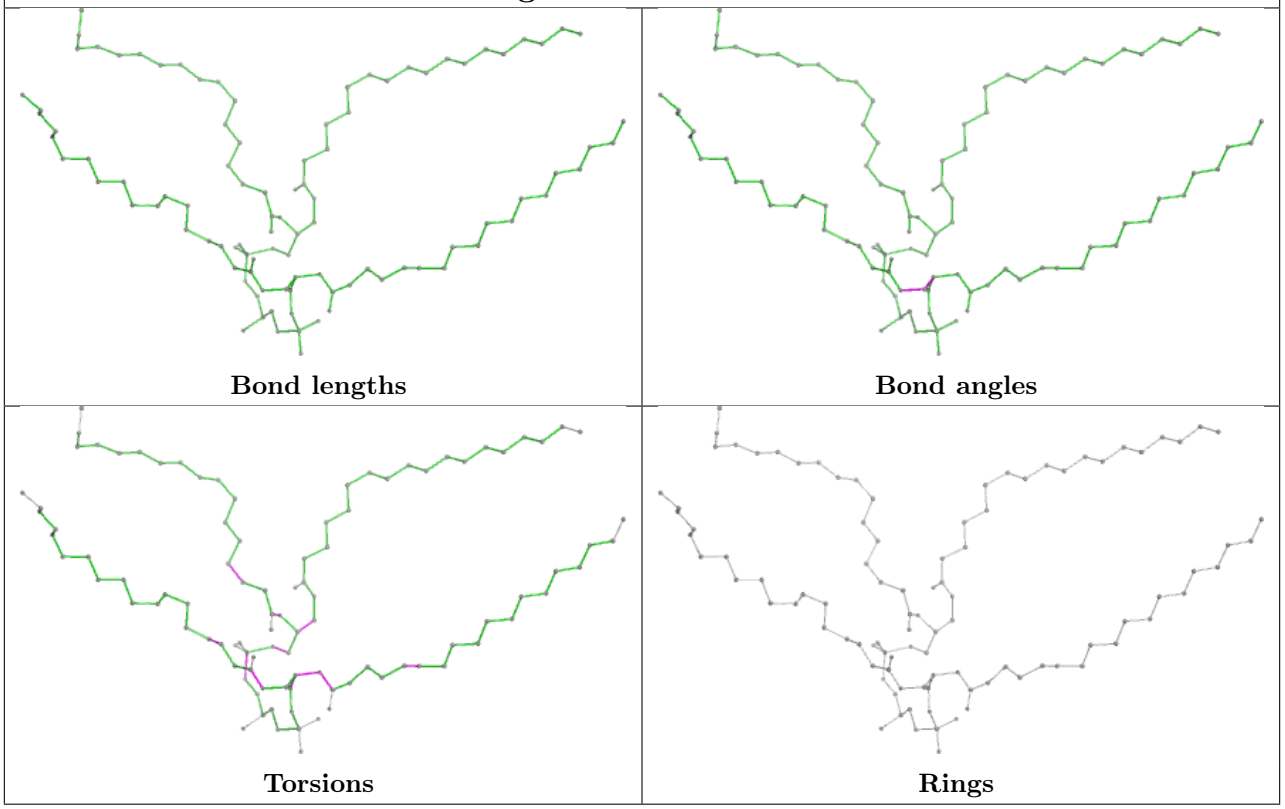


Torsions

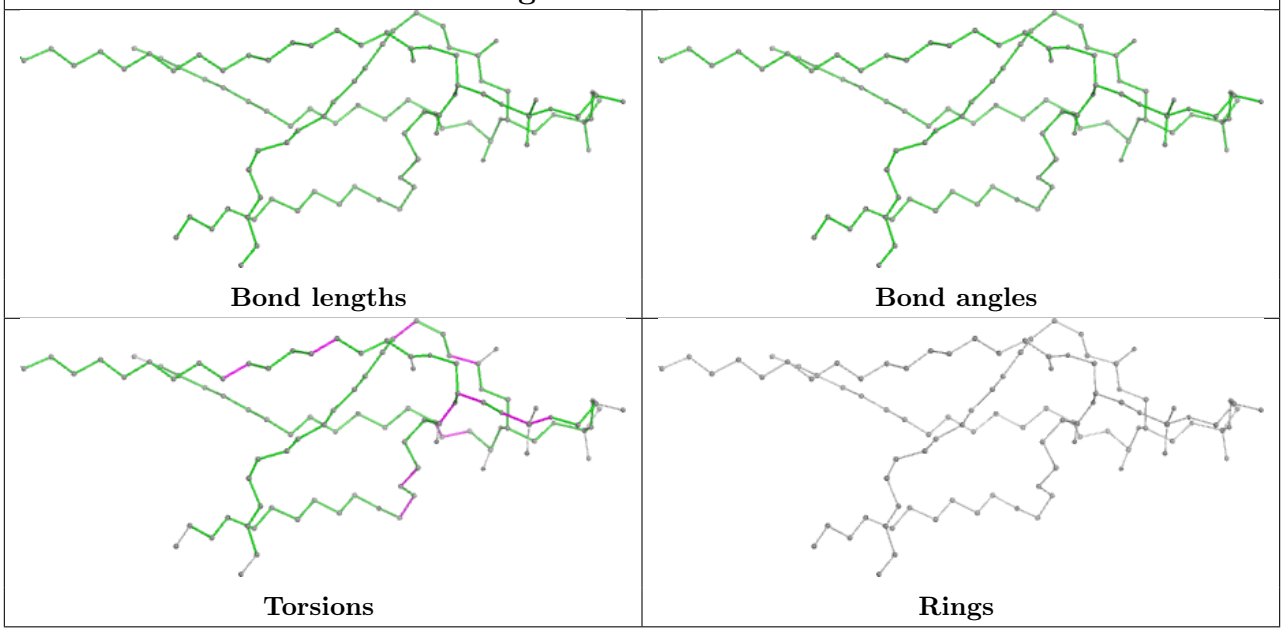


Rings

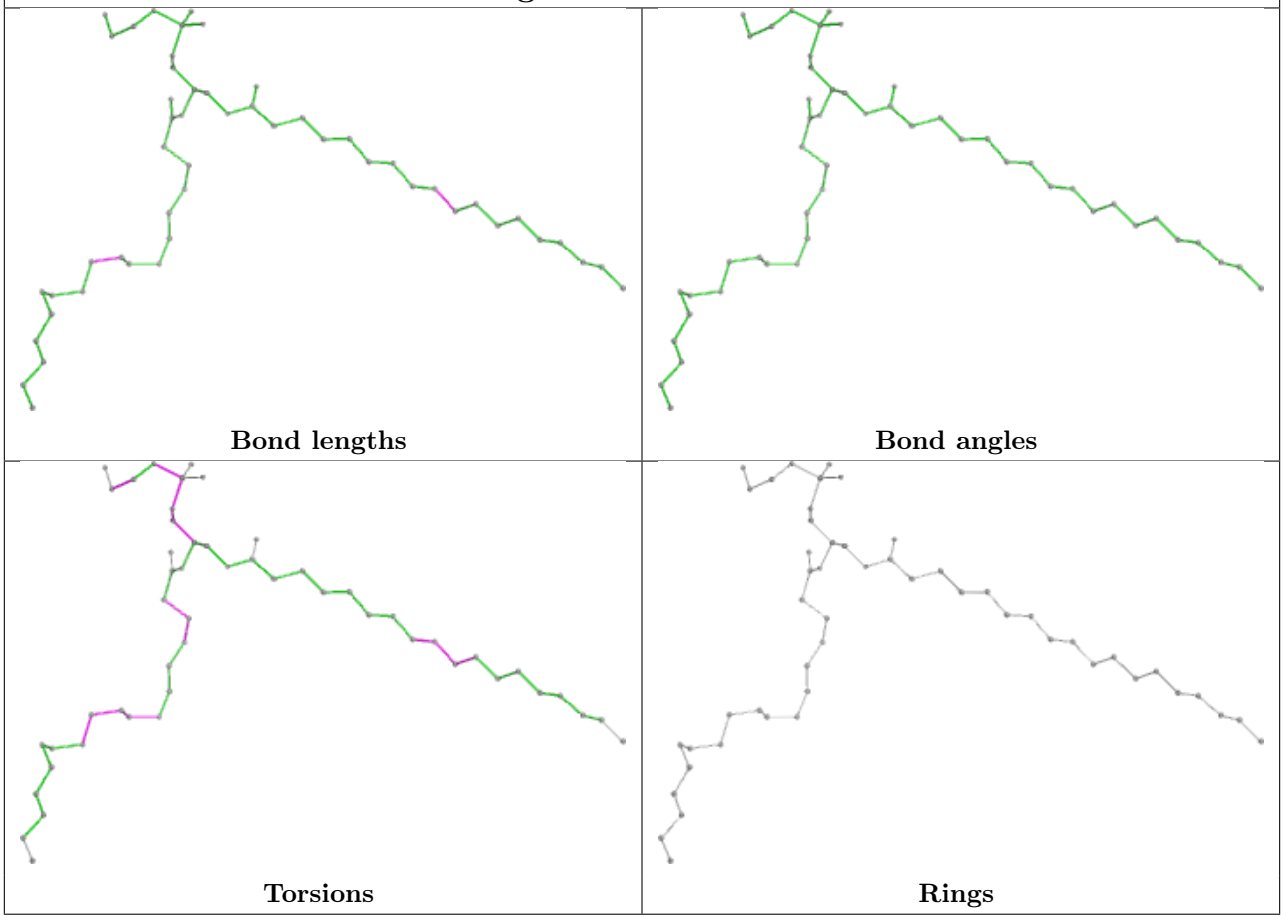
Ligand CDL 4Z 301



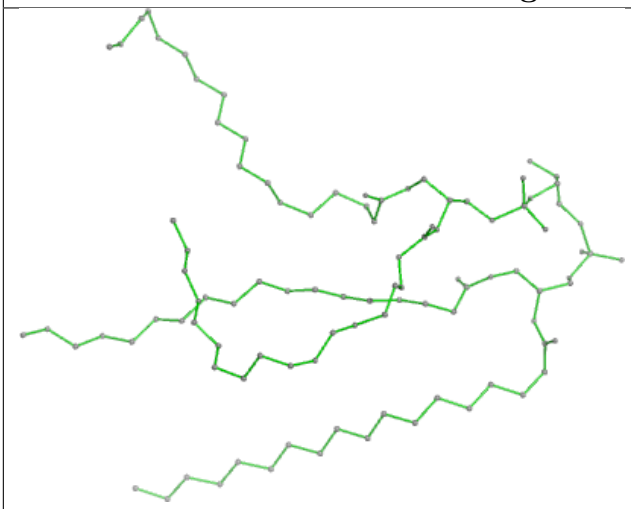
Ligand CDL 4L 201



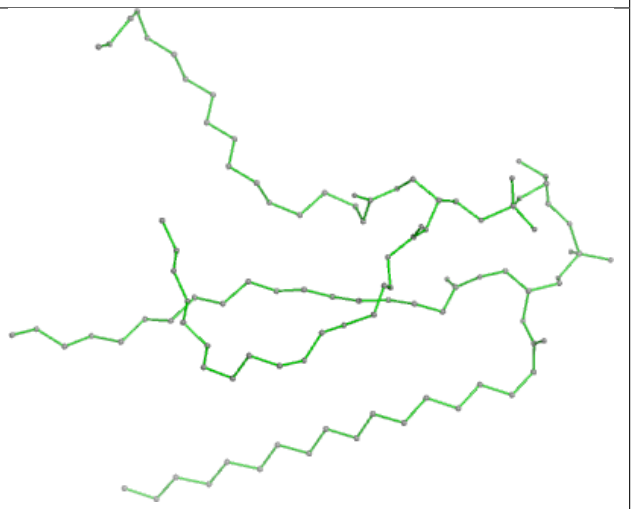
Ligand PEE 2R 201



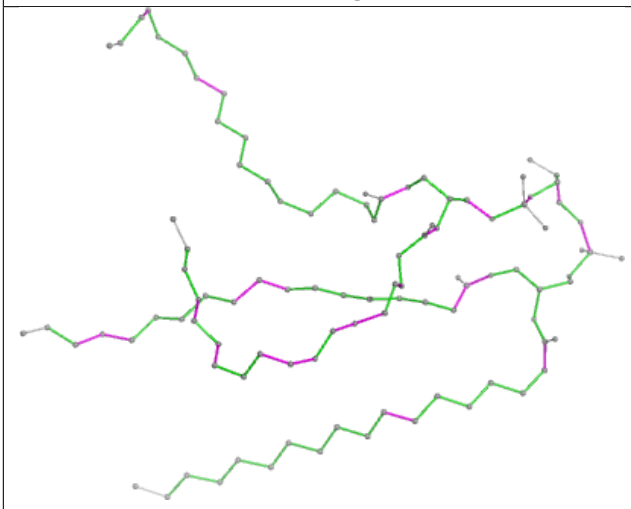
Ligand CDL 3e 201



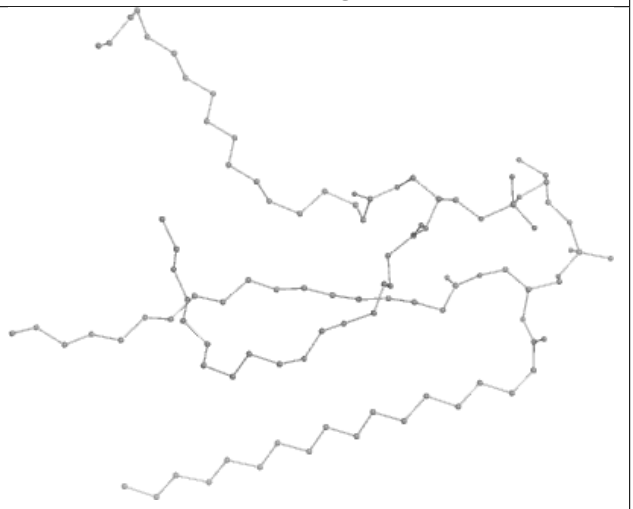
Bond lengths



Bond angles

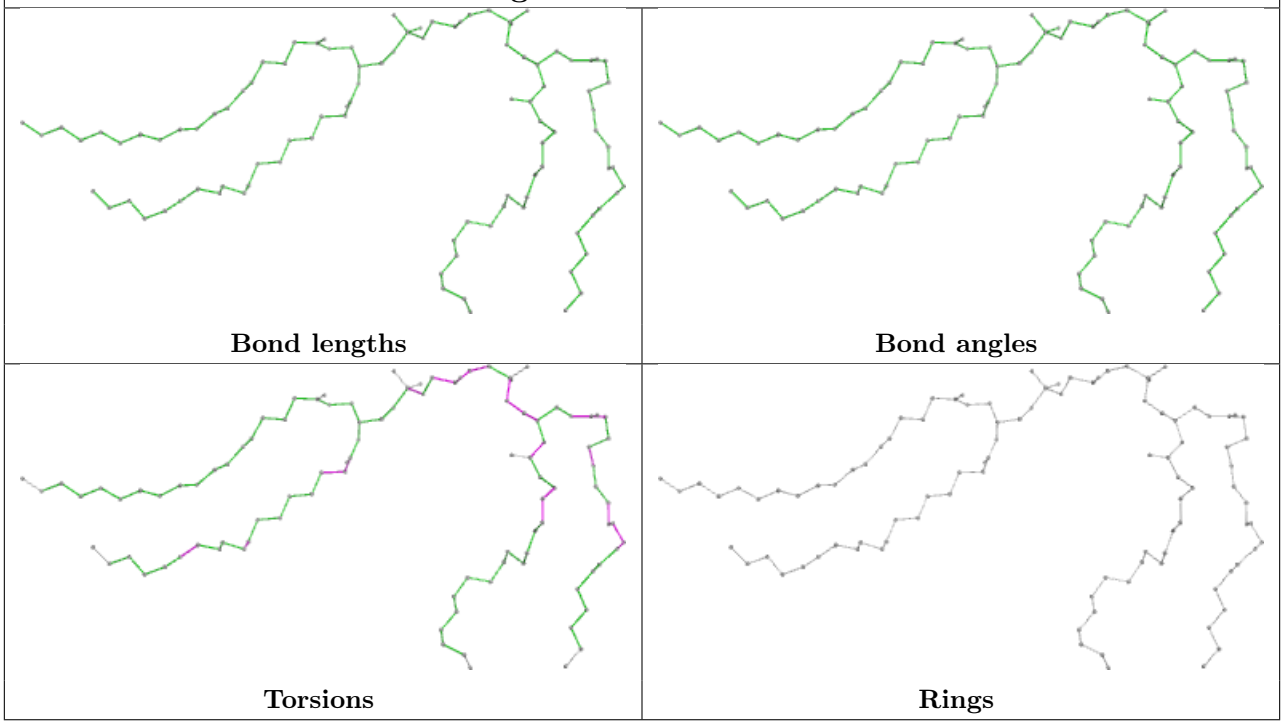


Torsions

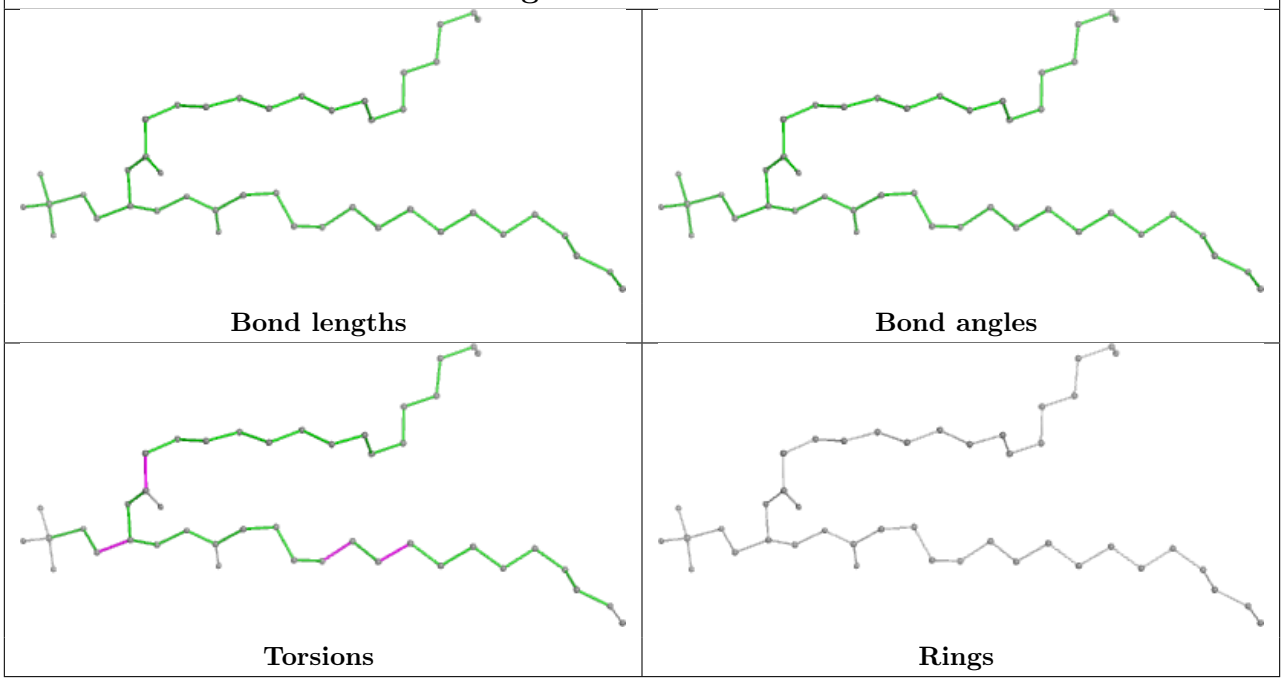


Rings

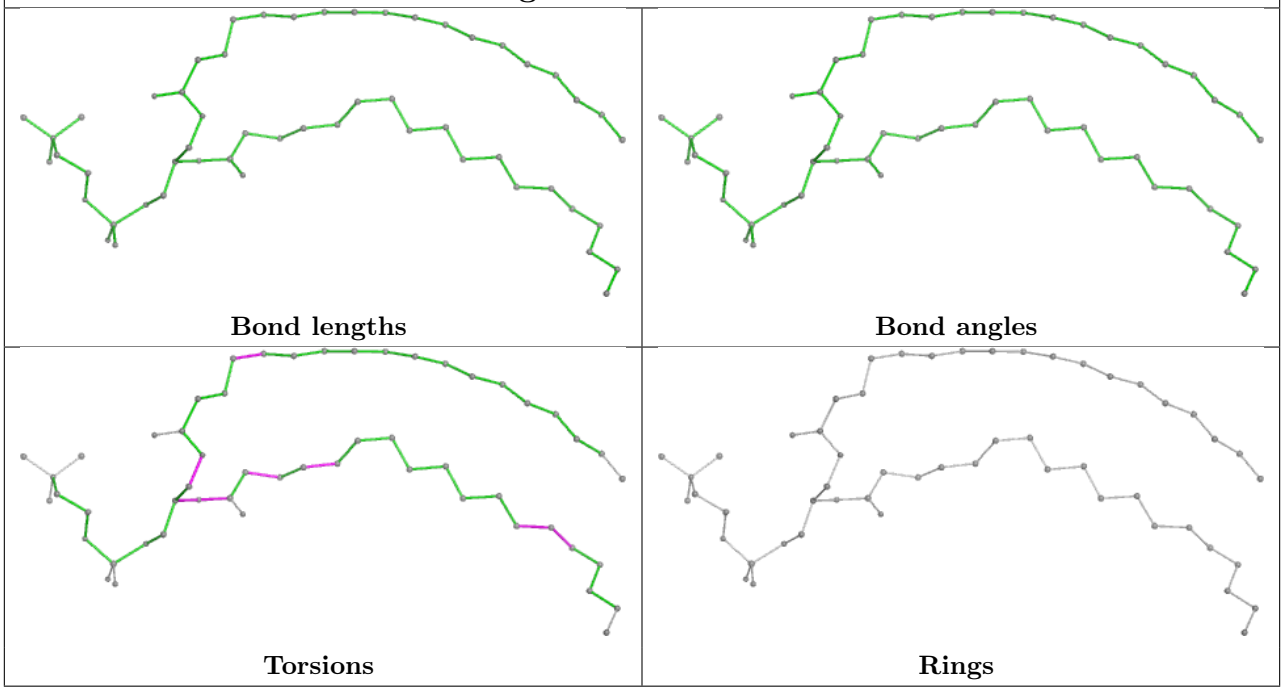
Ligand CDL 4W 202



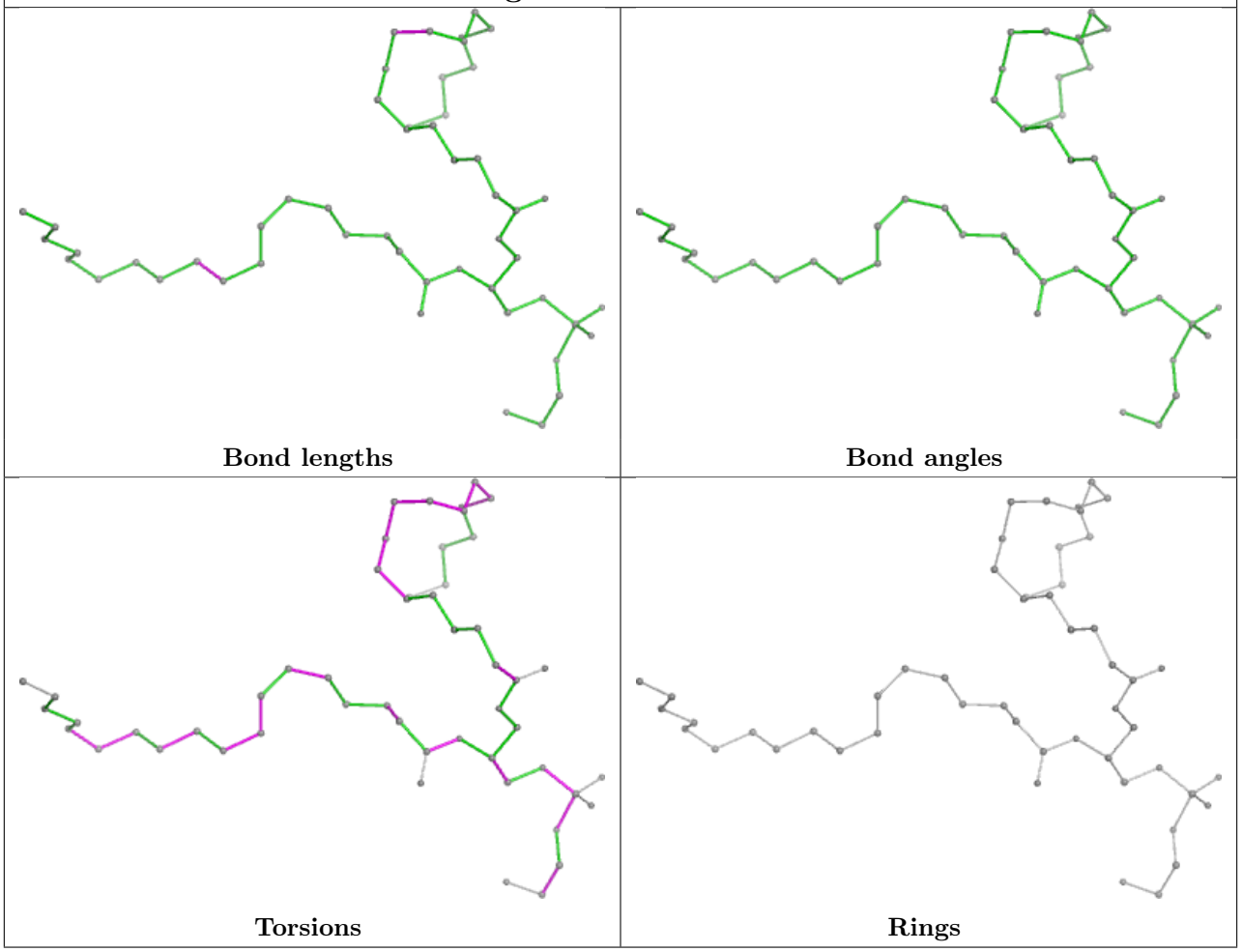
Ligand LPP 4d 102



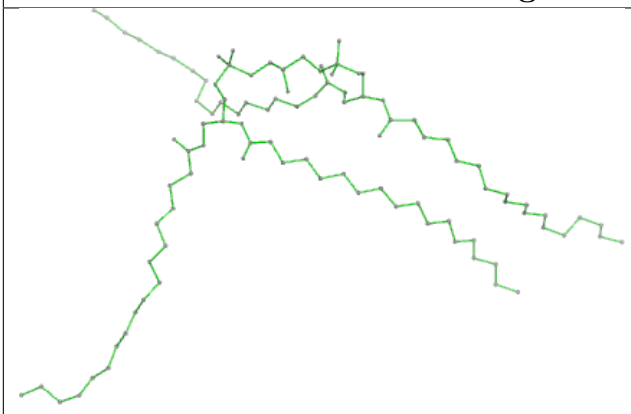
Ligand PC1 2O 202



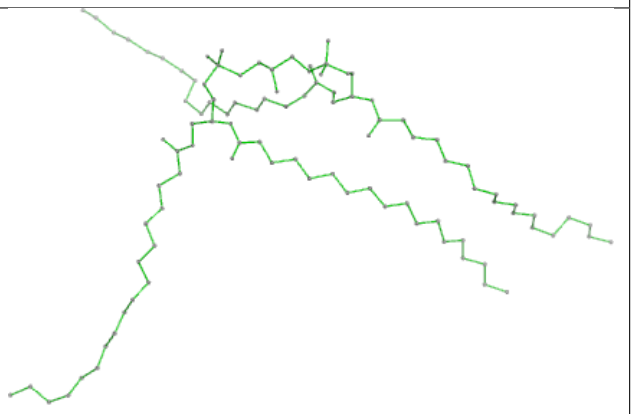
Ligand PEE 4z 302



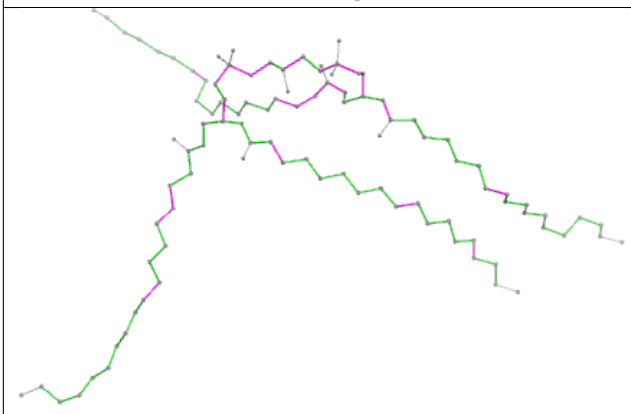
Ligand CDL 4k 202



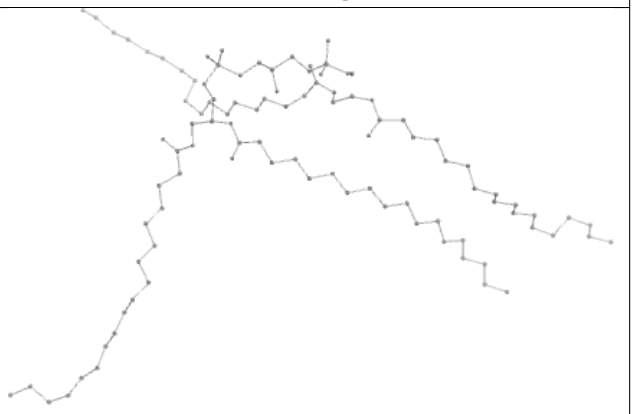
Bond lengths



Bond angles

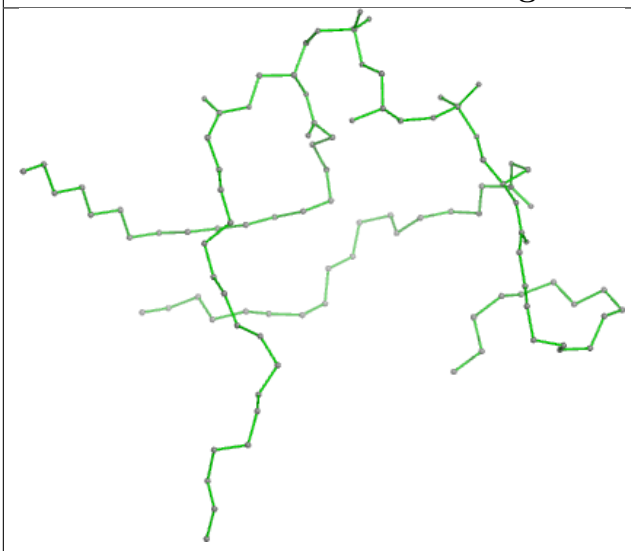


Torsions

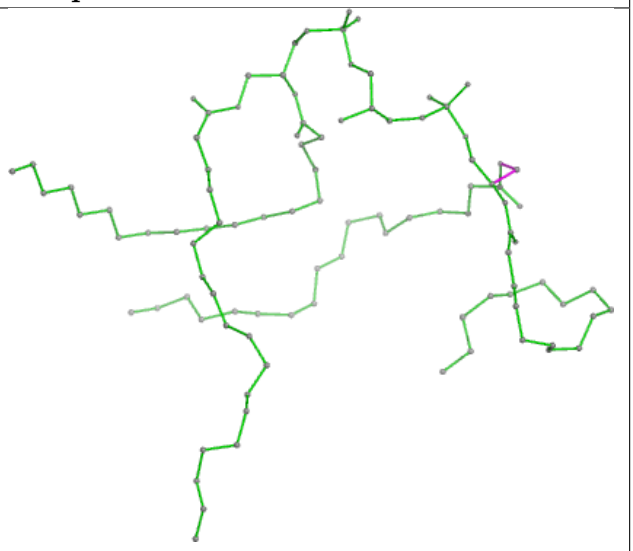


Rings

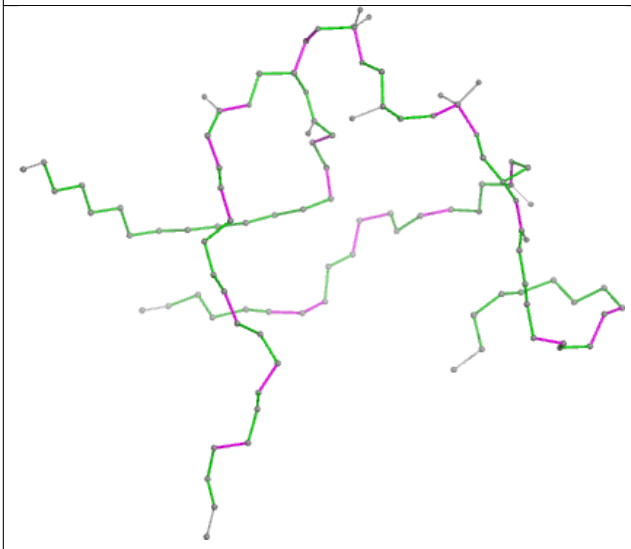
Ligand CDL 2q 101



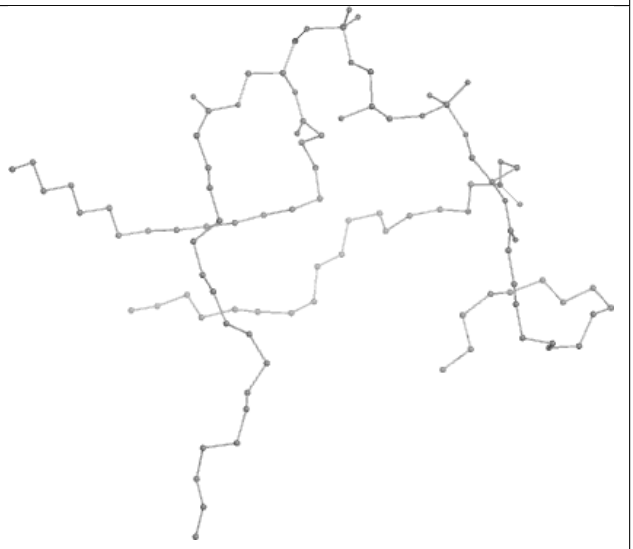
Bond lengths



Bond angles



Torsions

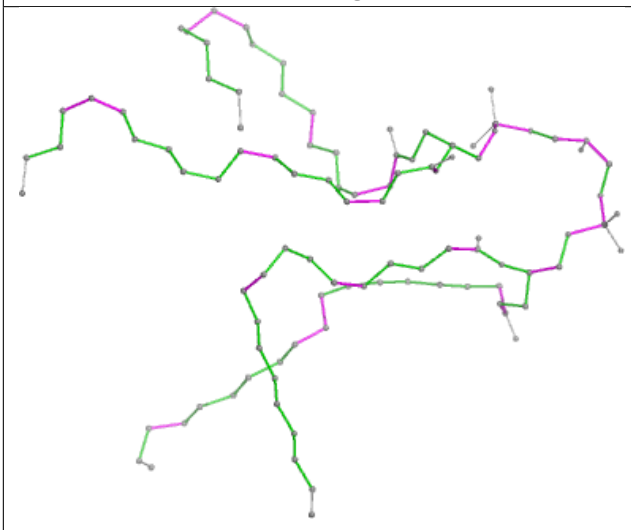


Rings

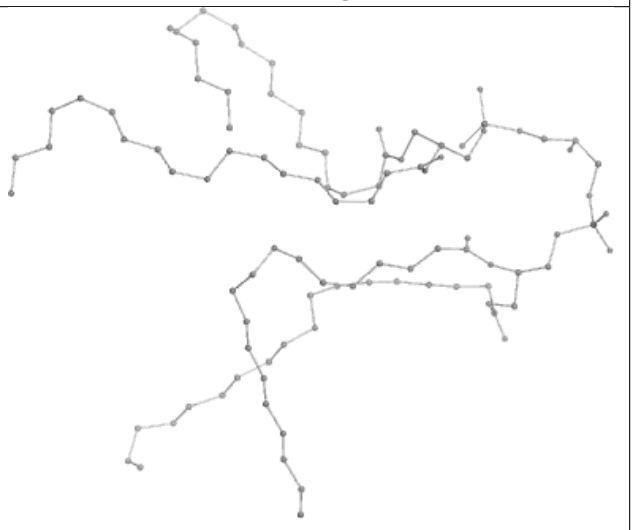
Ligand CDL 3i 203

Bond lengths

Bond angles



Torsions

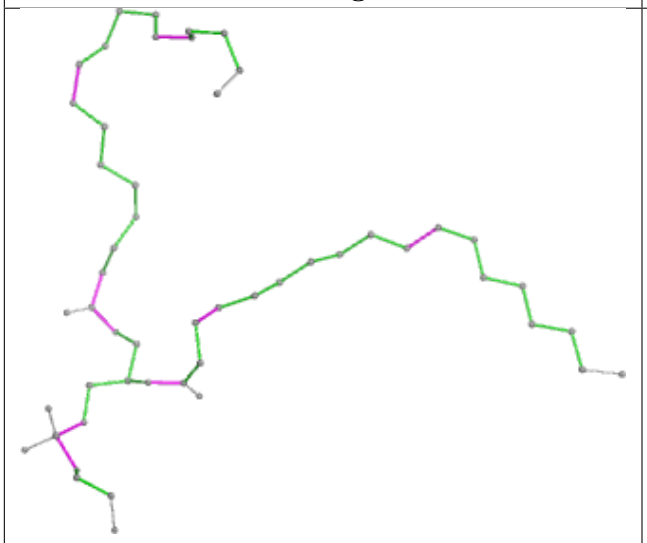


Rings

Ligand PEE 3C 302

Bond lengths

Bond angles

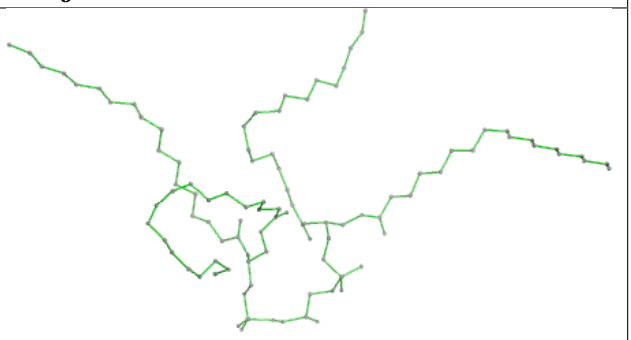


Torsions

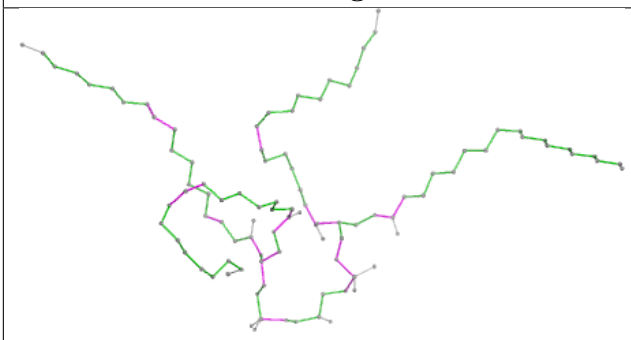
Rings

Ligand CDL 4j 301

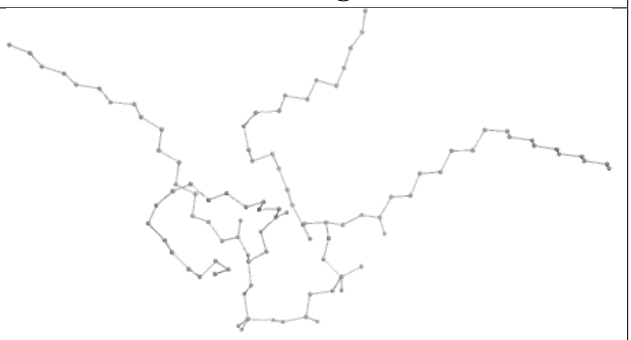
Bond lengths



Bond angles

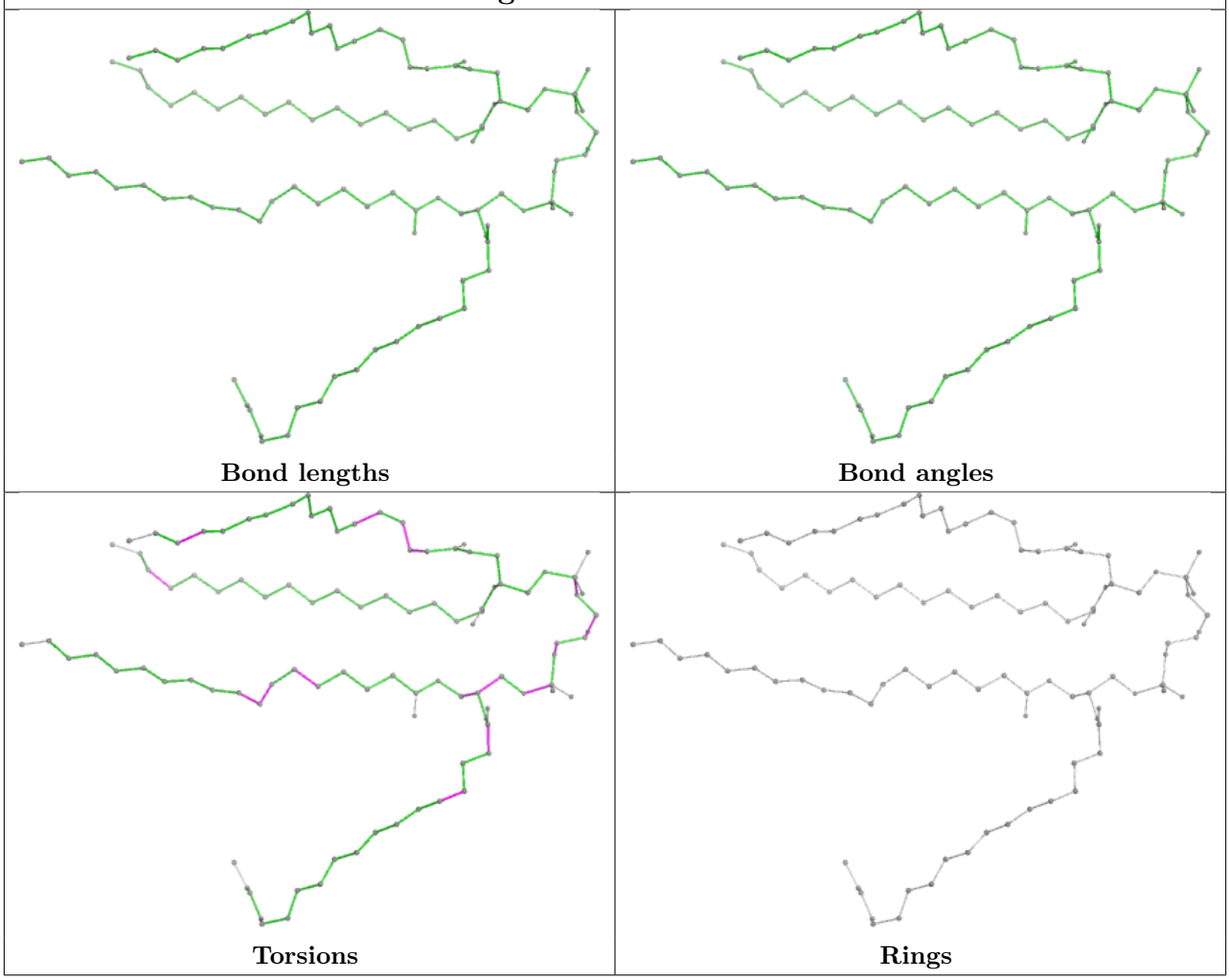


Torsions

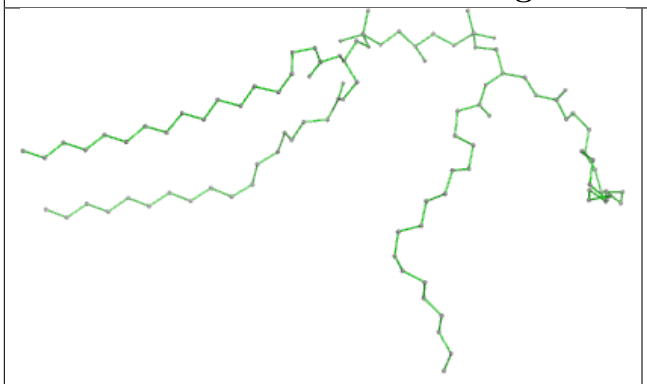


Rings

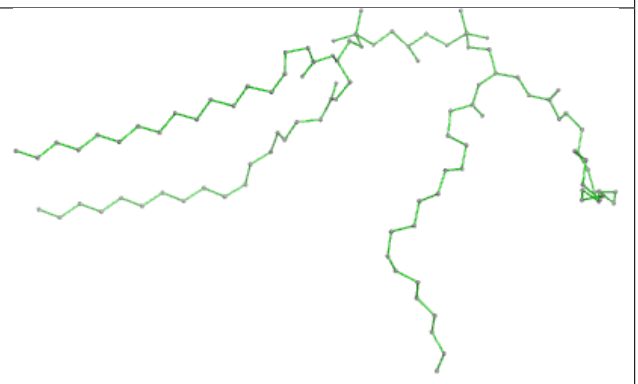
Ligand CDL 2o 201



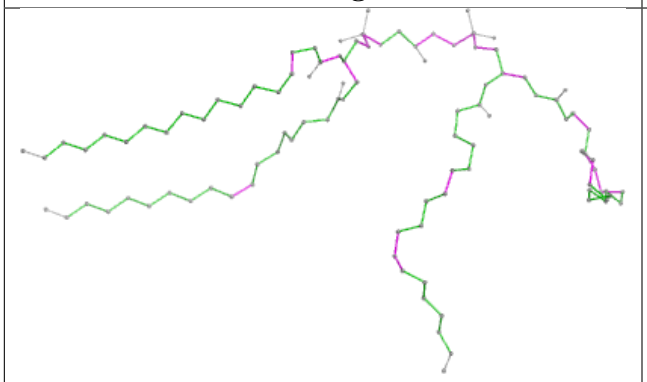
Ligand CDL 4K 201



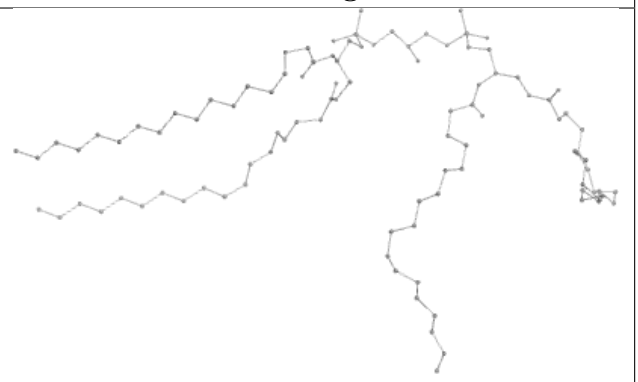
Bond lengths



Bond angles

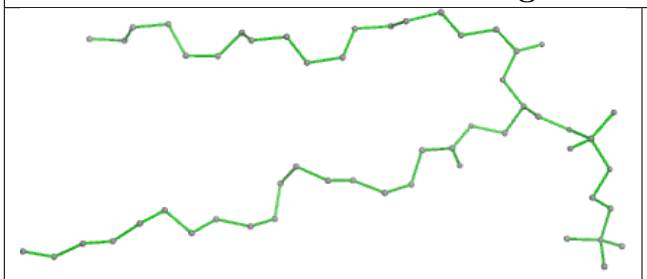


Torsions

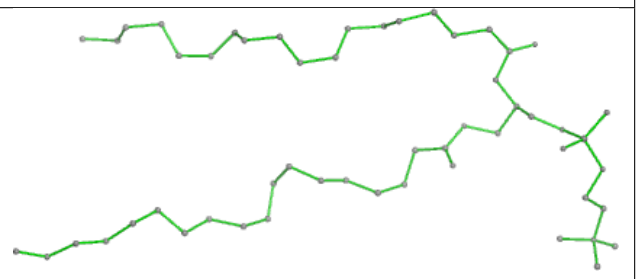


Rings

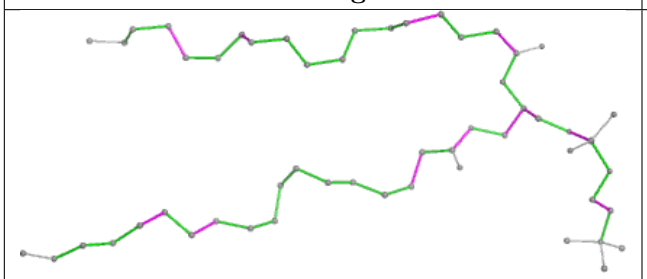
Ligand PC1 3H 403



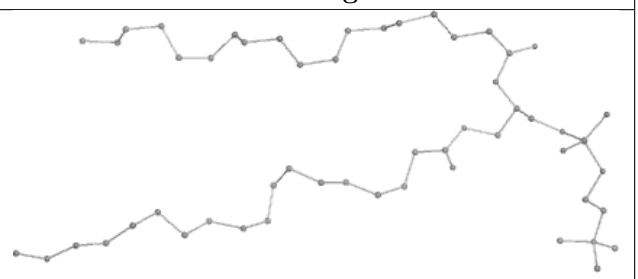
Bond lengths



Bond angles

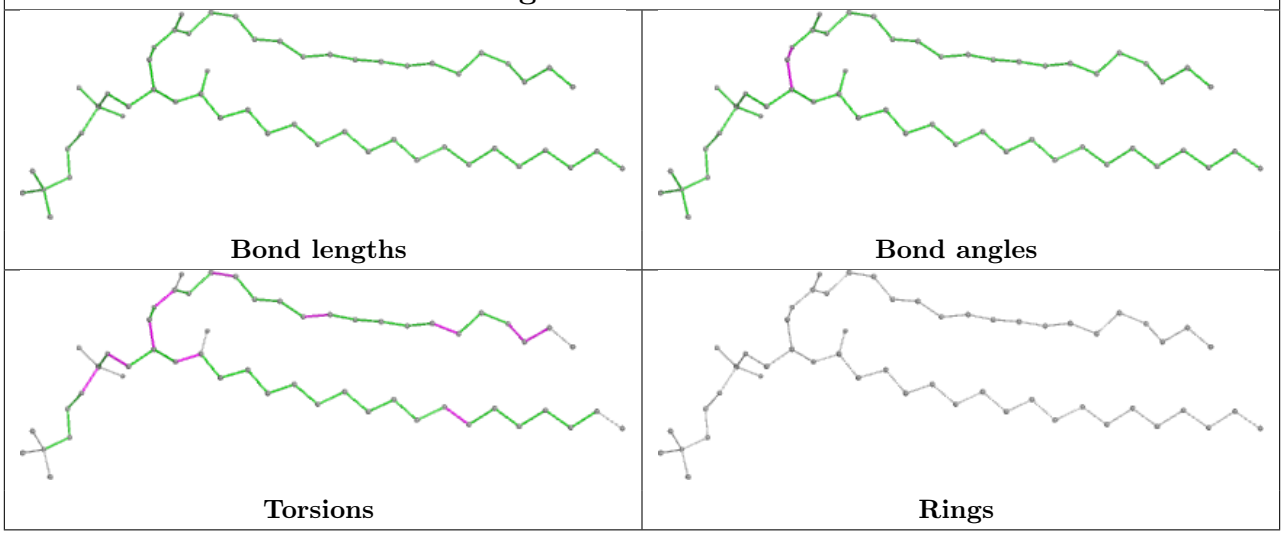


Torsions

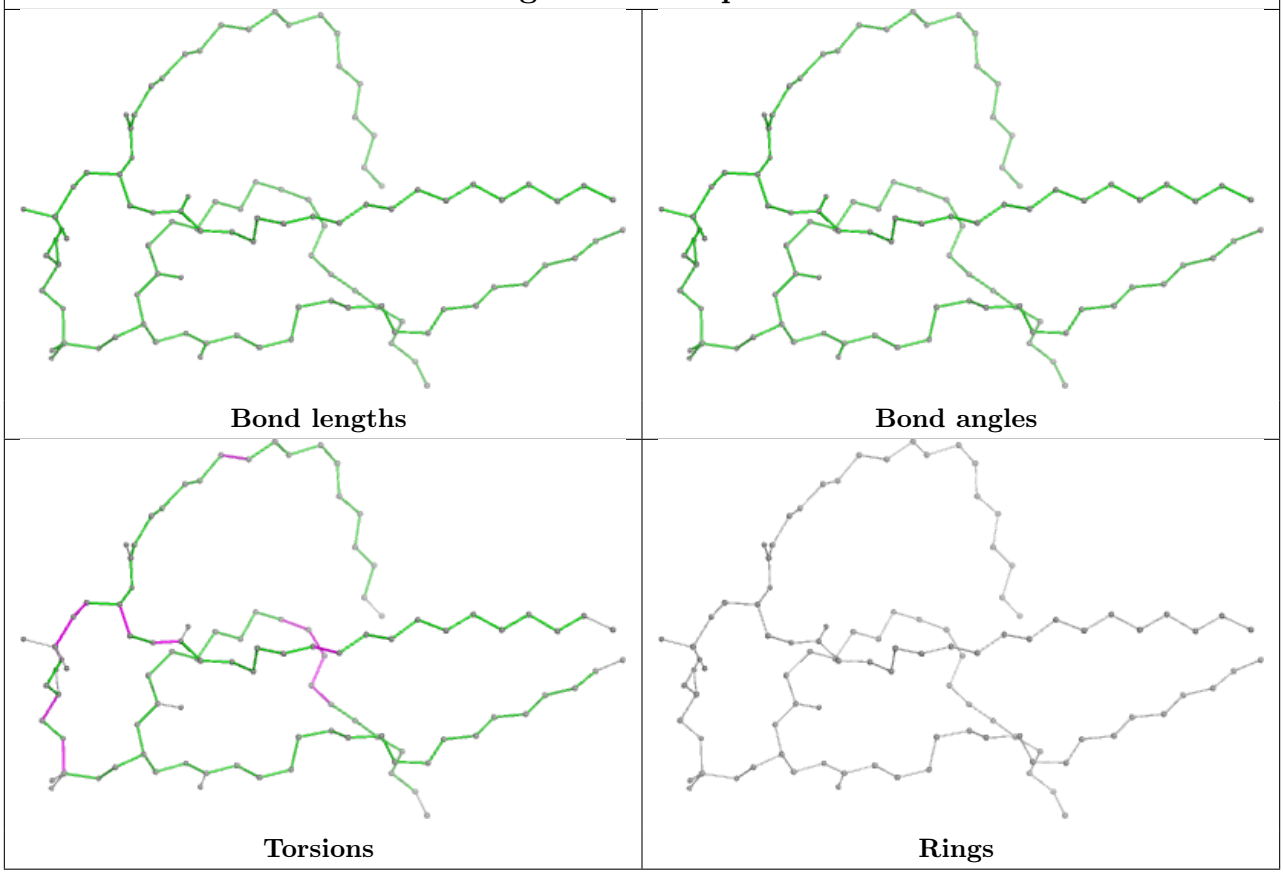


Rings

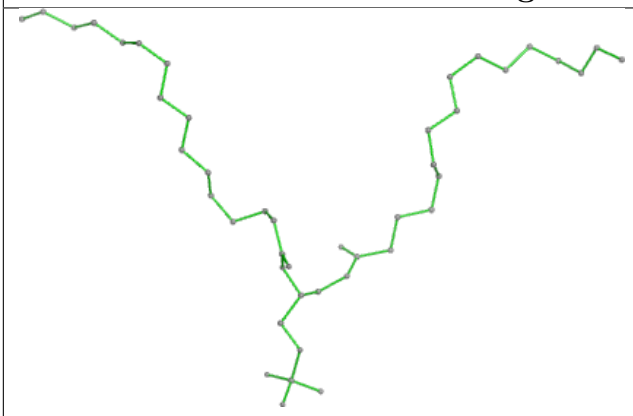
Ligand PC1 2O 203



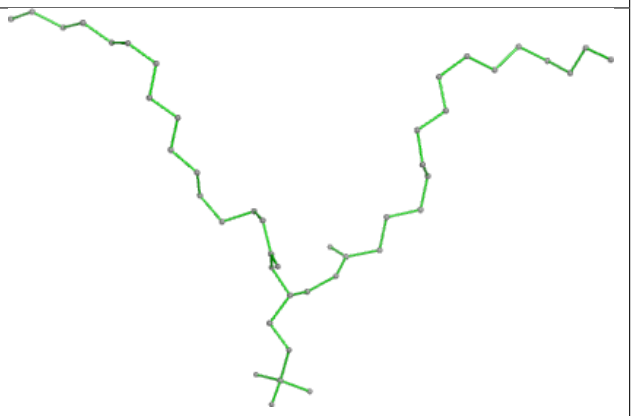
Ligand CDL 4q 908



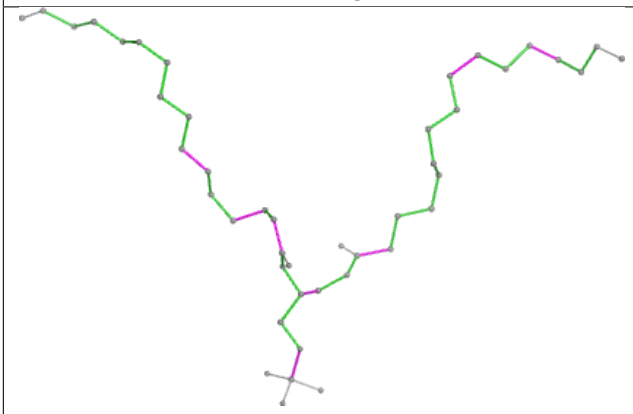
Ligand LPP 4C 101



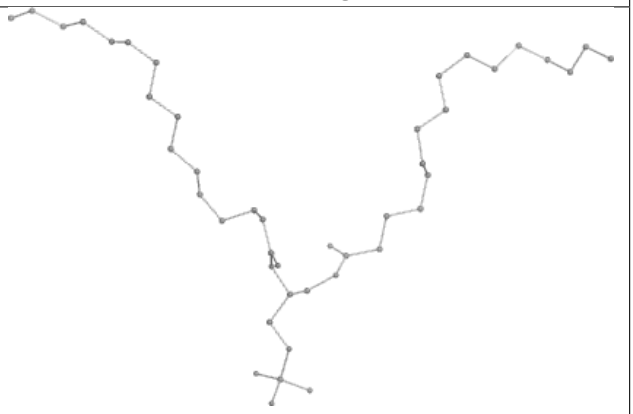
Bond lengths



Bond angles

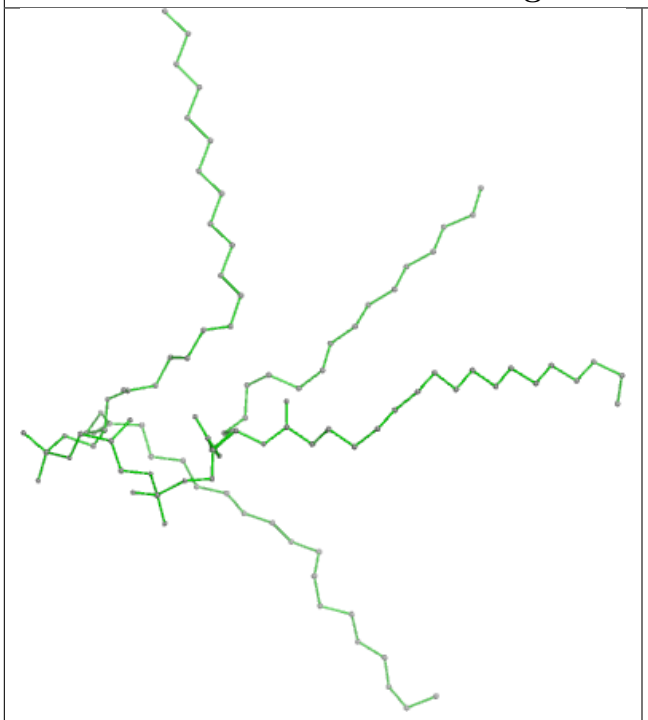


Torsions

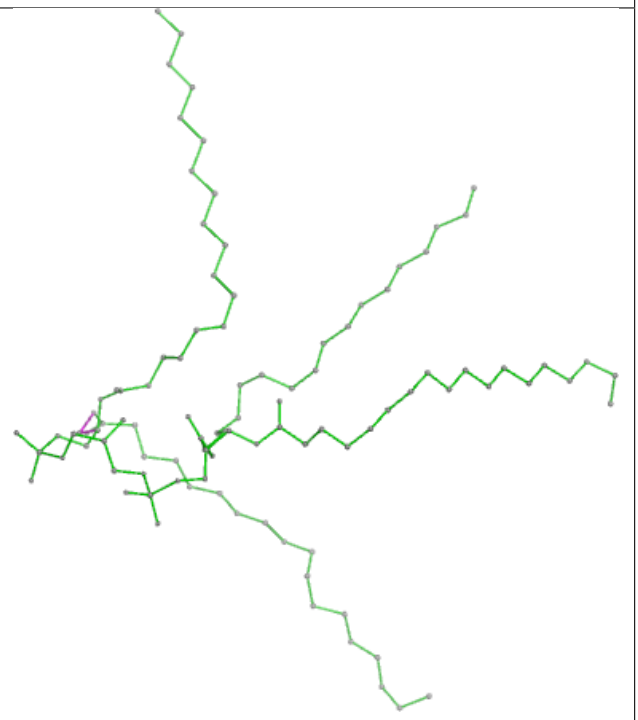


Rings

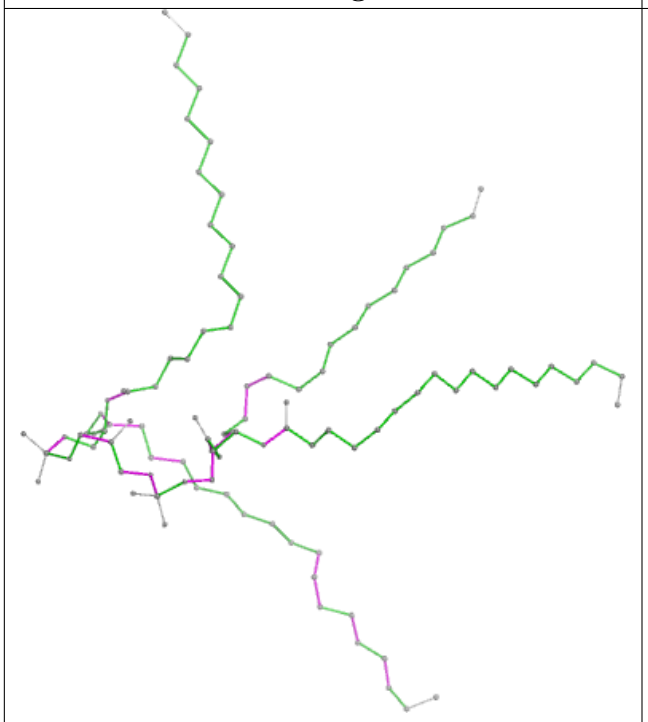
Ligand CDL 3i 202



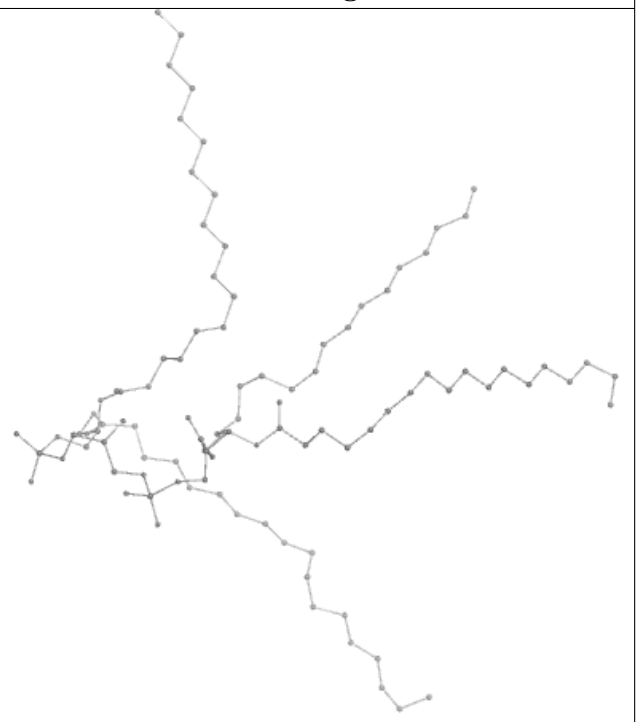
Bond lengths



Bond angles

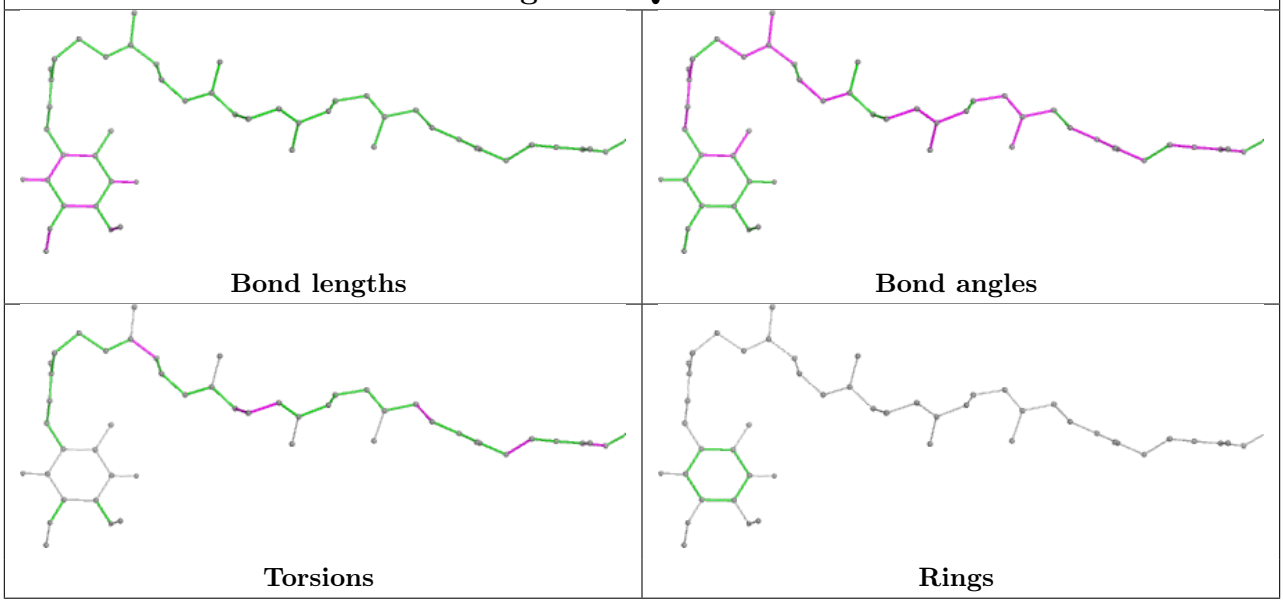


Torsions

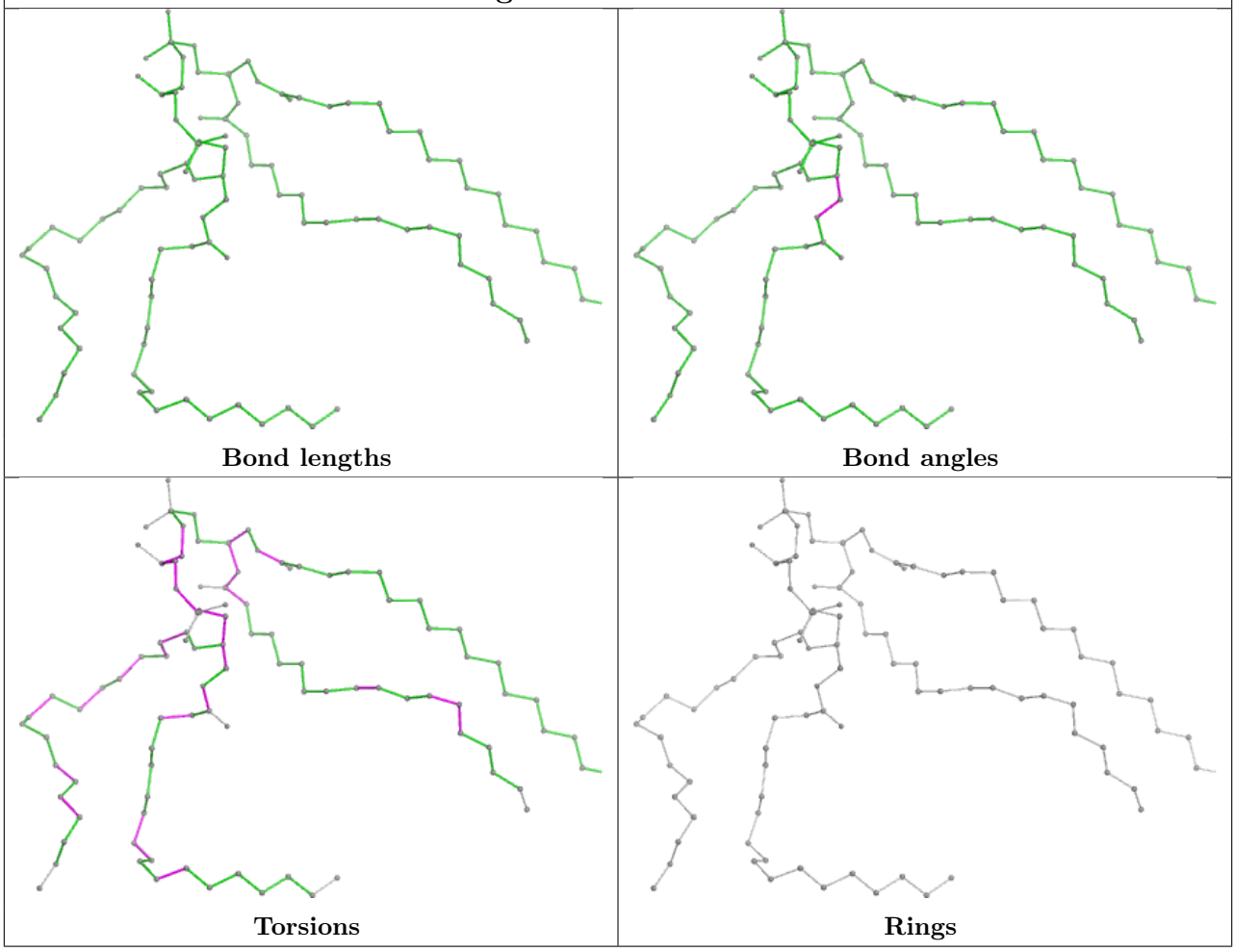


Rings

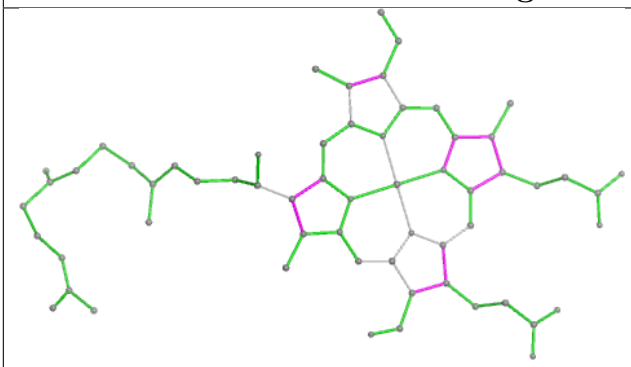
Ligand UQ8 2S 201



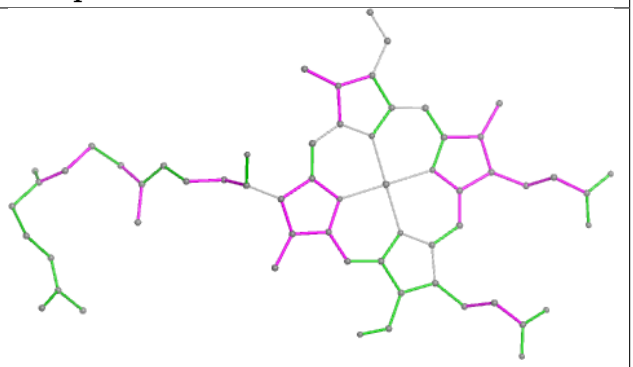
Ligand CDL 3D 201



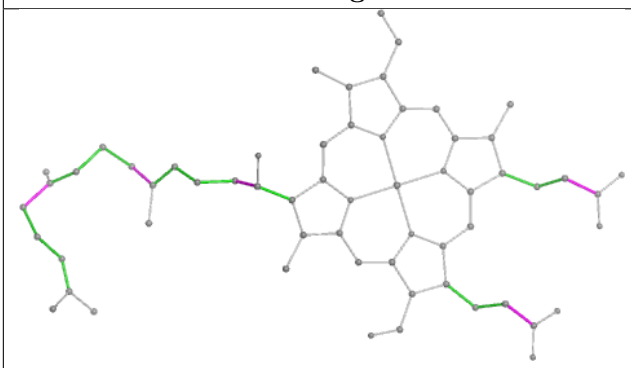
Ligand HEA 4q 905



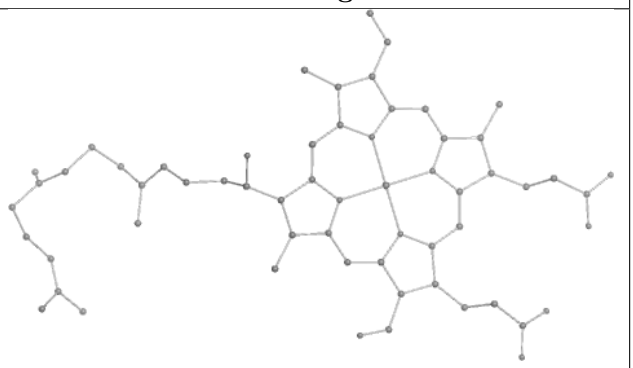
Bond lengths



Bond angles

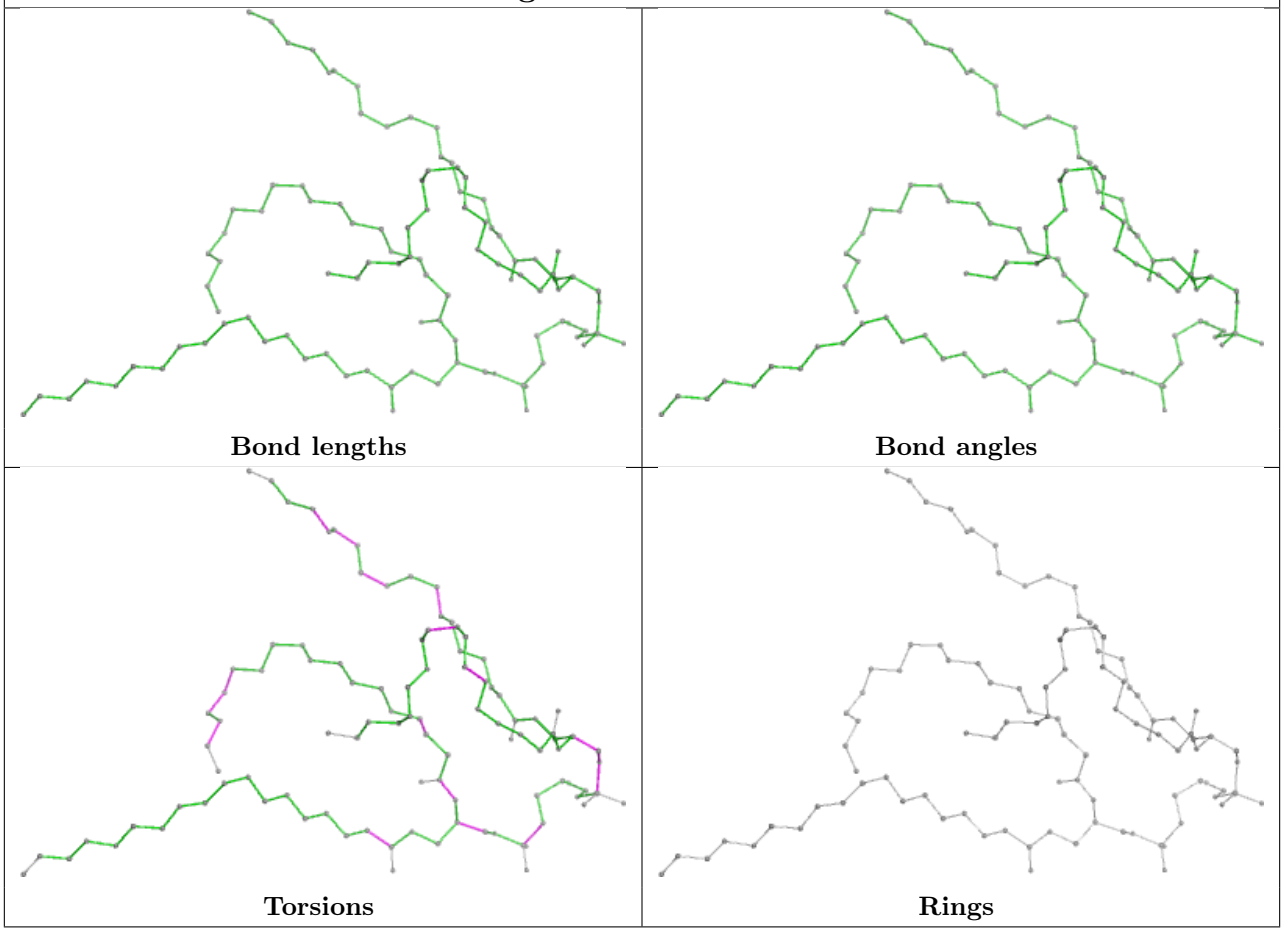


Torsions

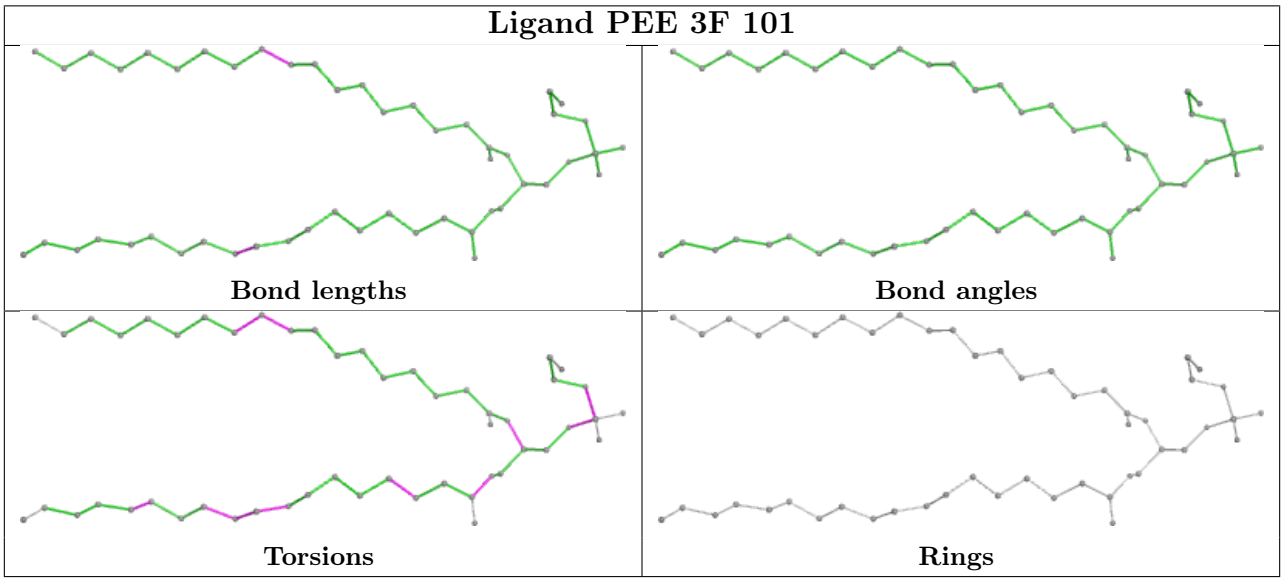


Rings

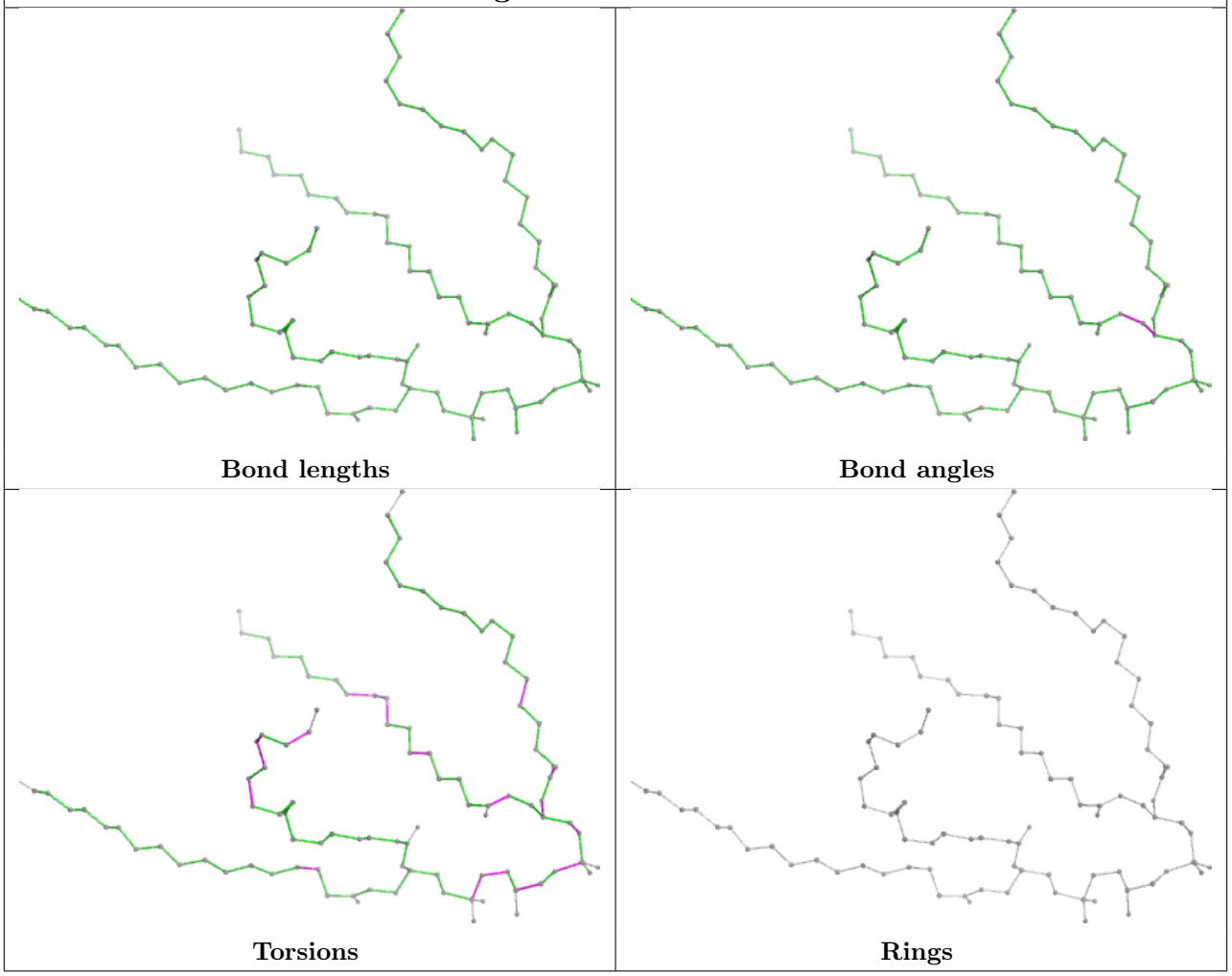
Ligand CDL 3L 702



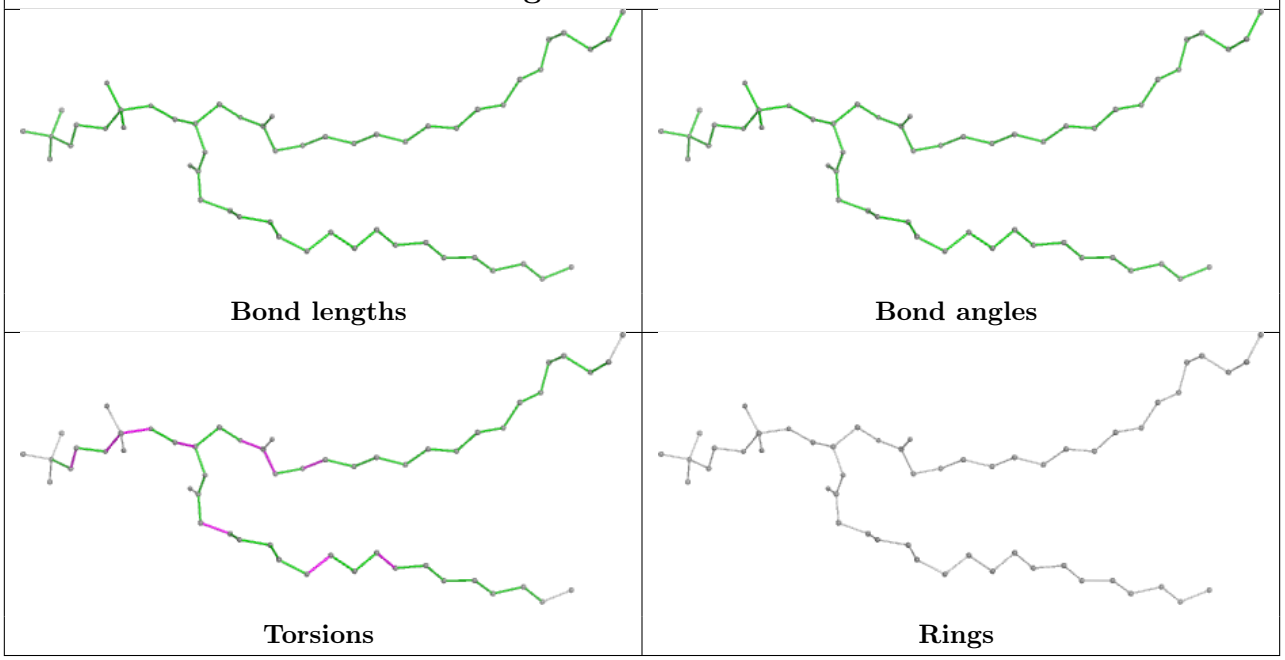
Ligand PEE 3F 101



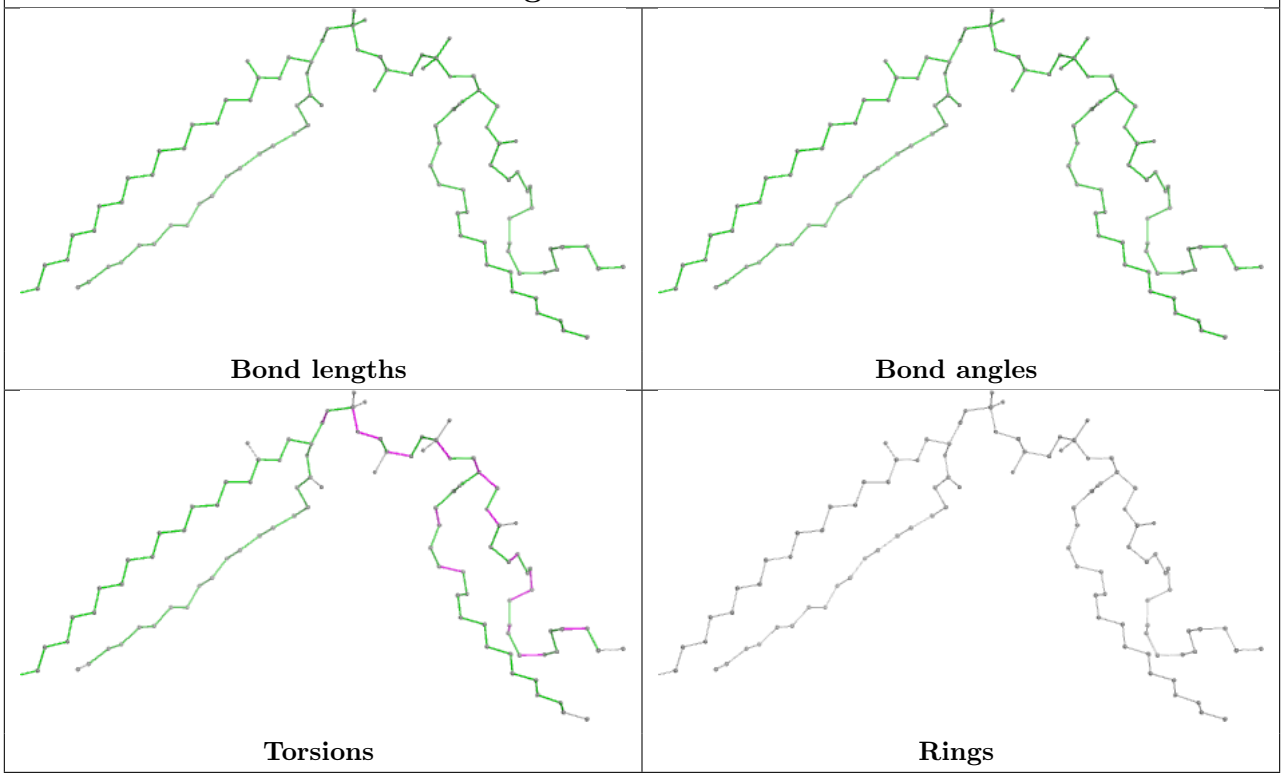
Ligand CDL 3G 403



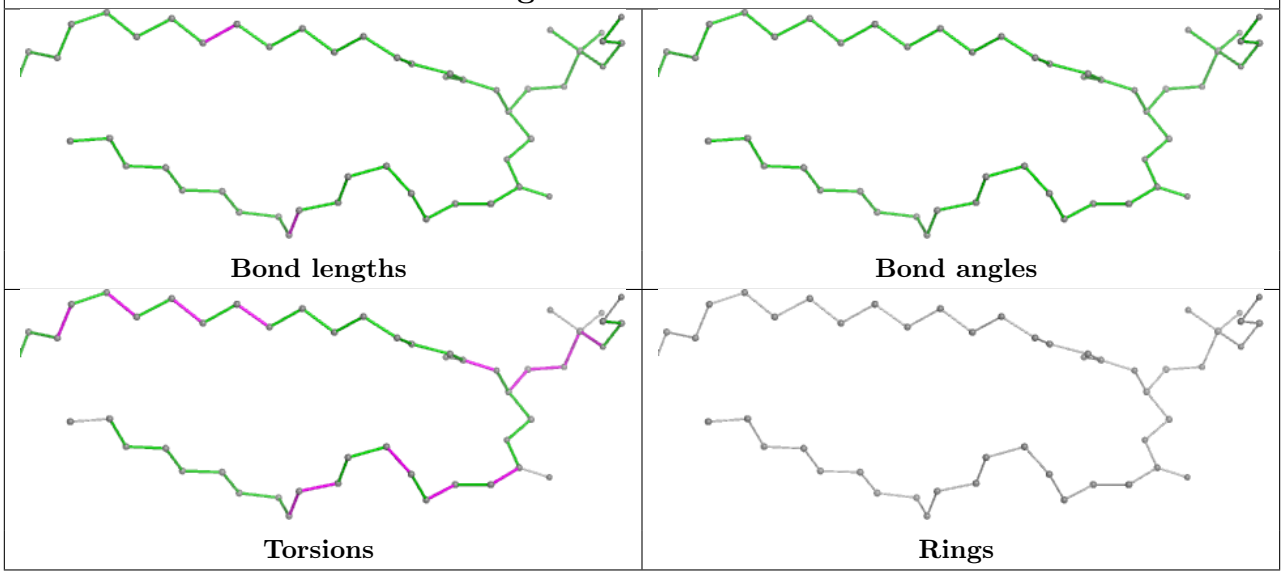
Ligand PC1 3a 502



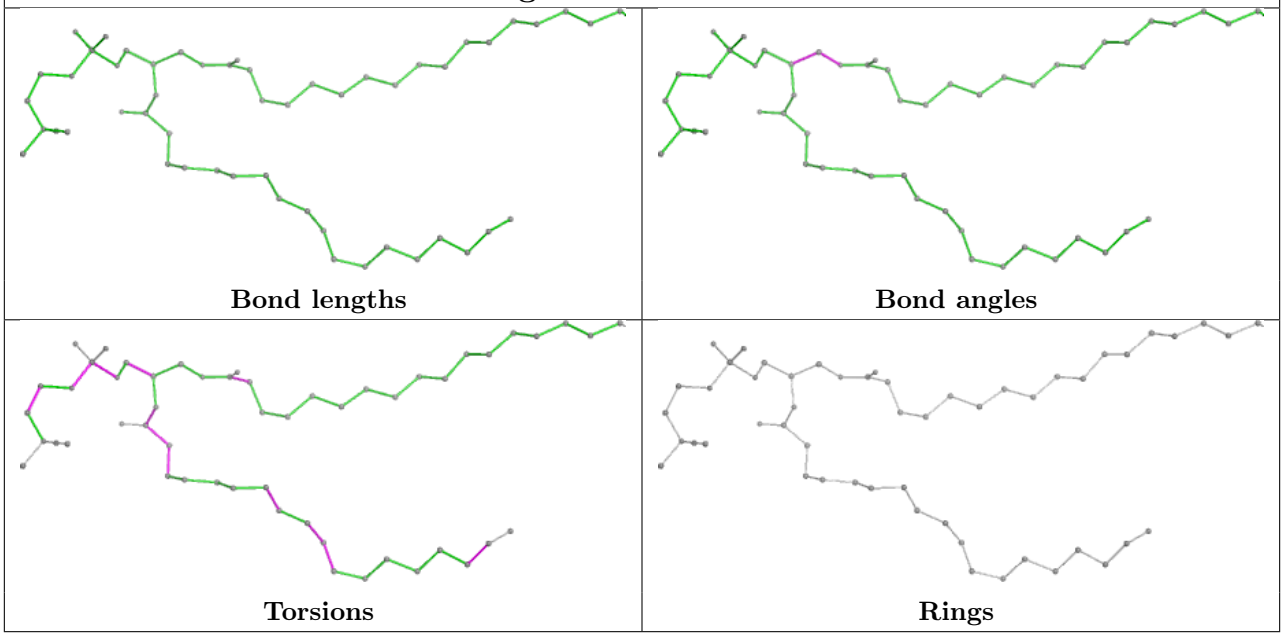
Ligand CDL 3i 201



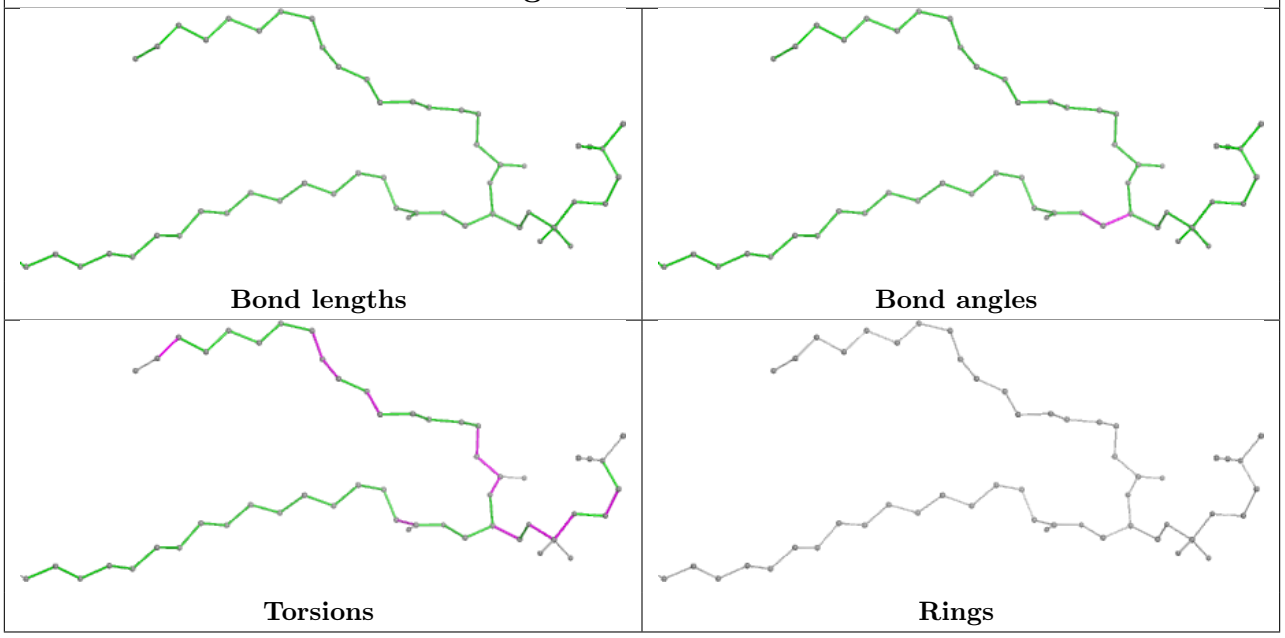
Ligand PEE 4R 201



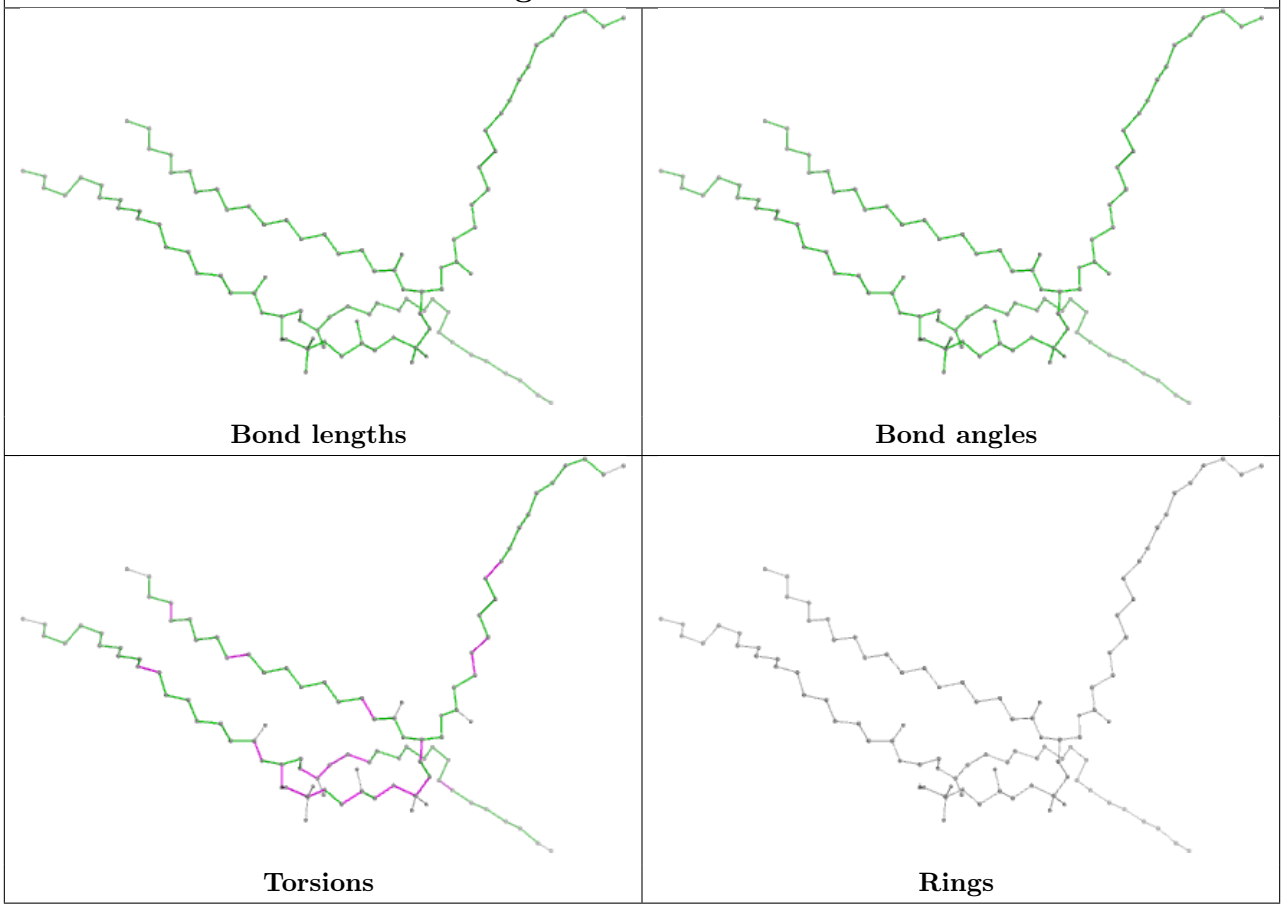
Ligand PC1 3A 501



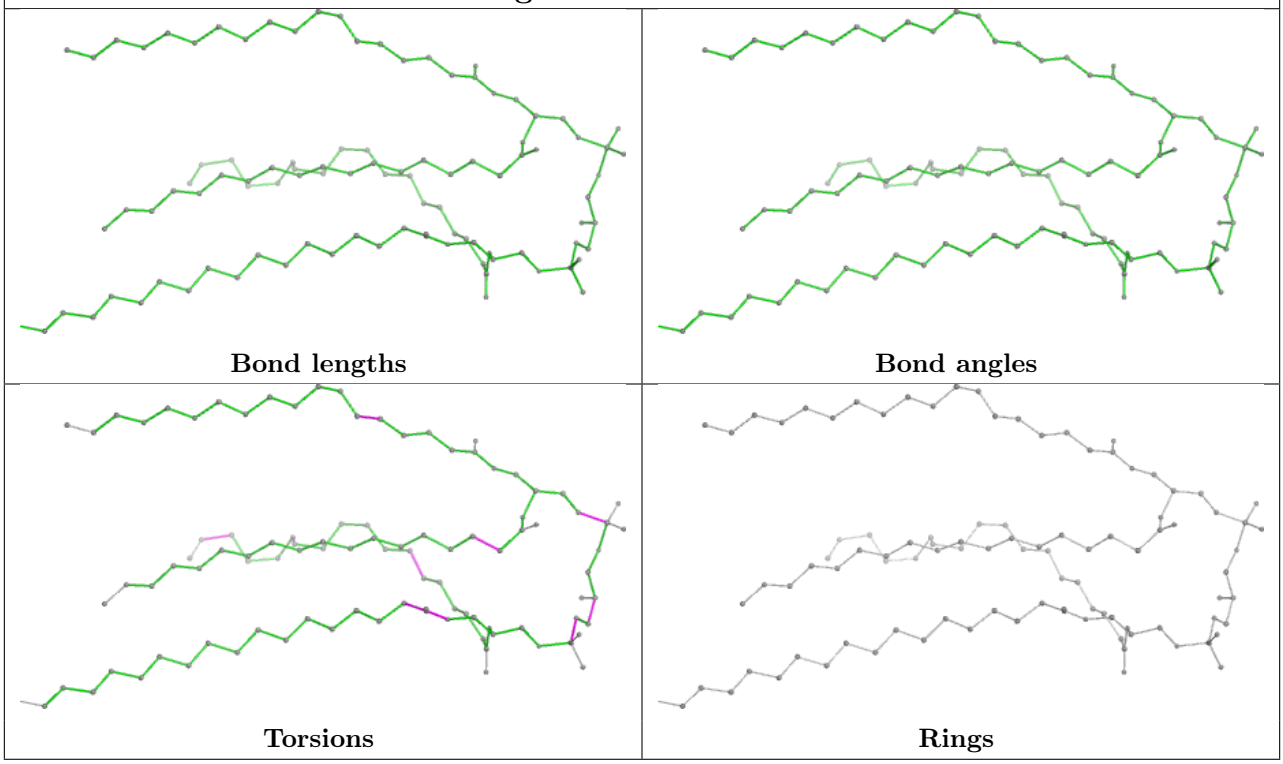
Ligand PC1 3a 501



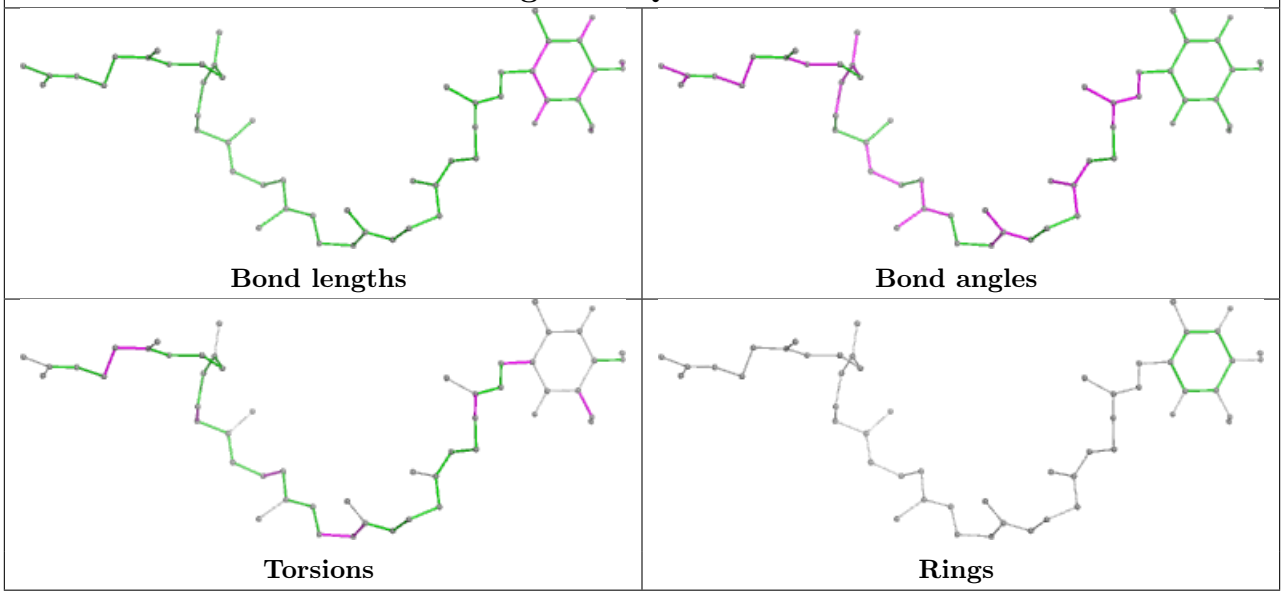
Ligand CDL 4K 202



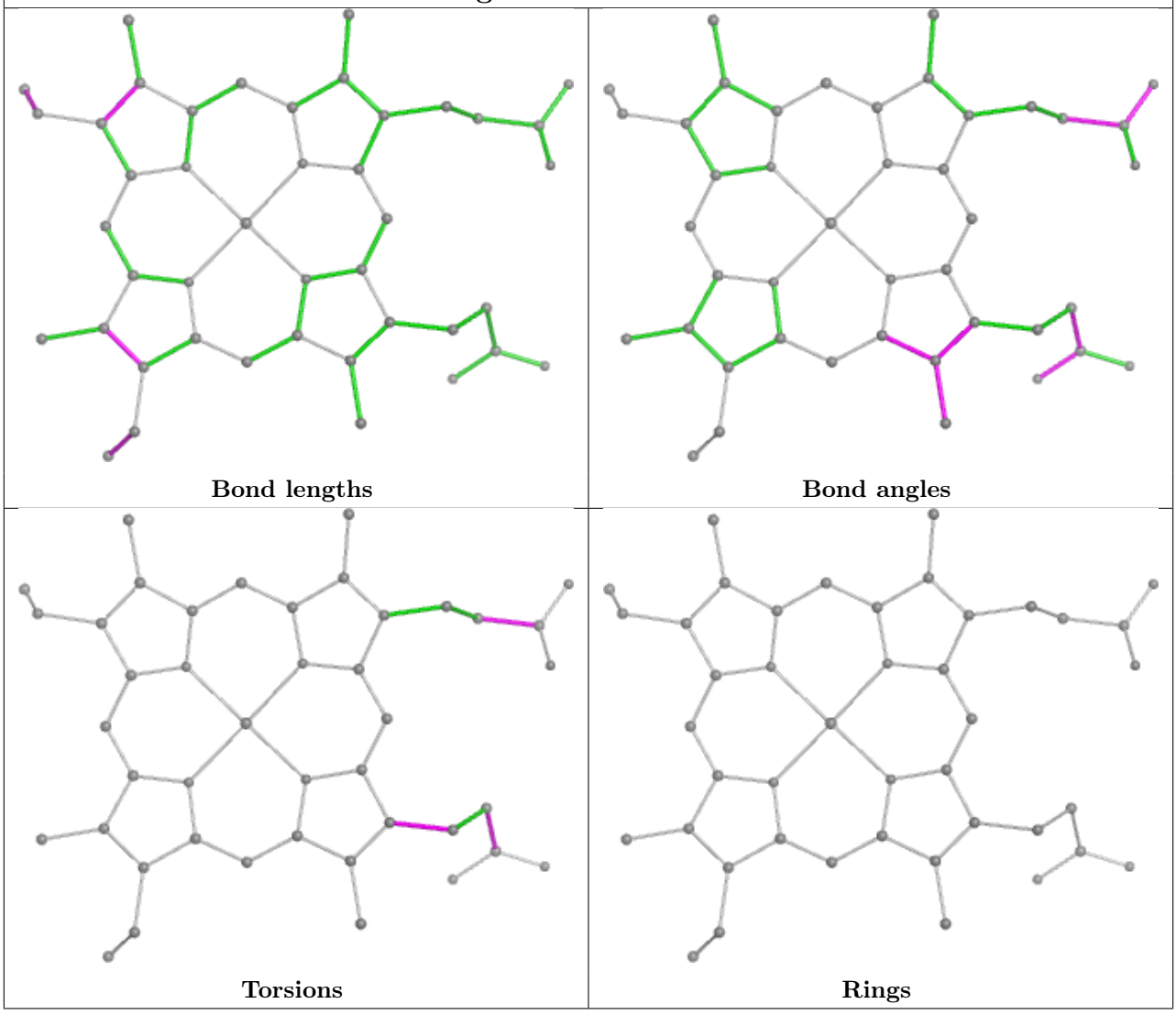
Ligand CDL 3H 402



Ligand UQ8 3d 203



Ligand HEC 3c 301



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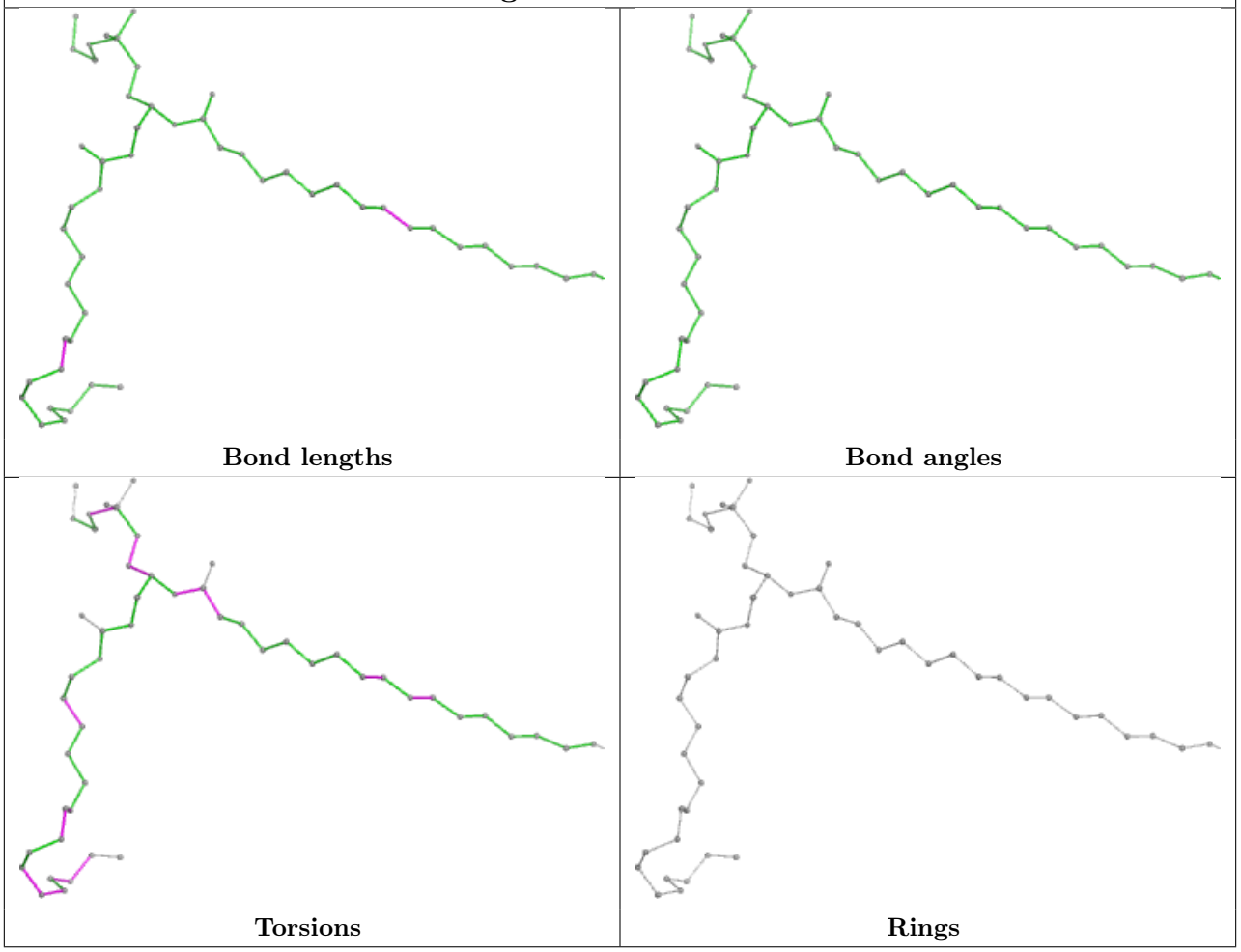

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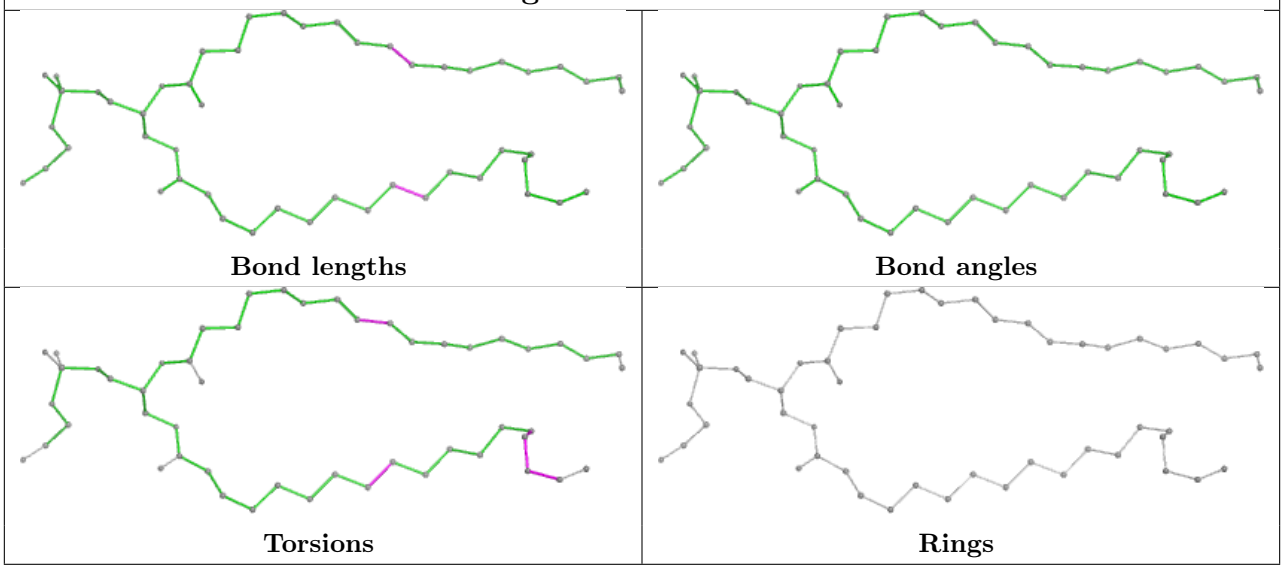

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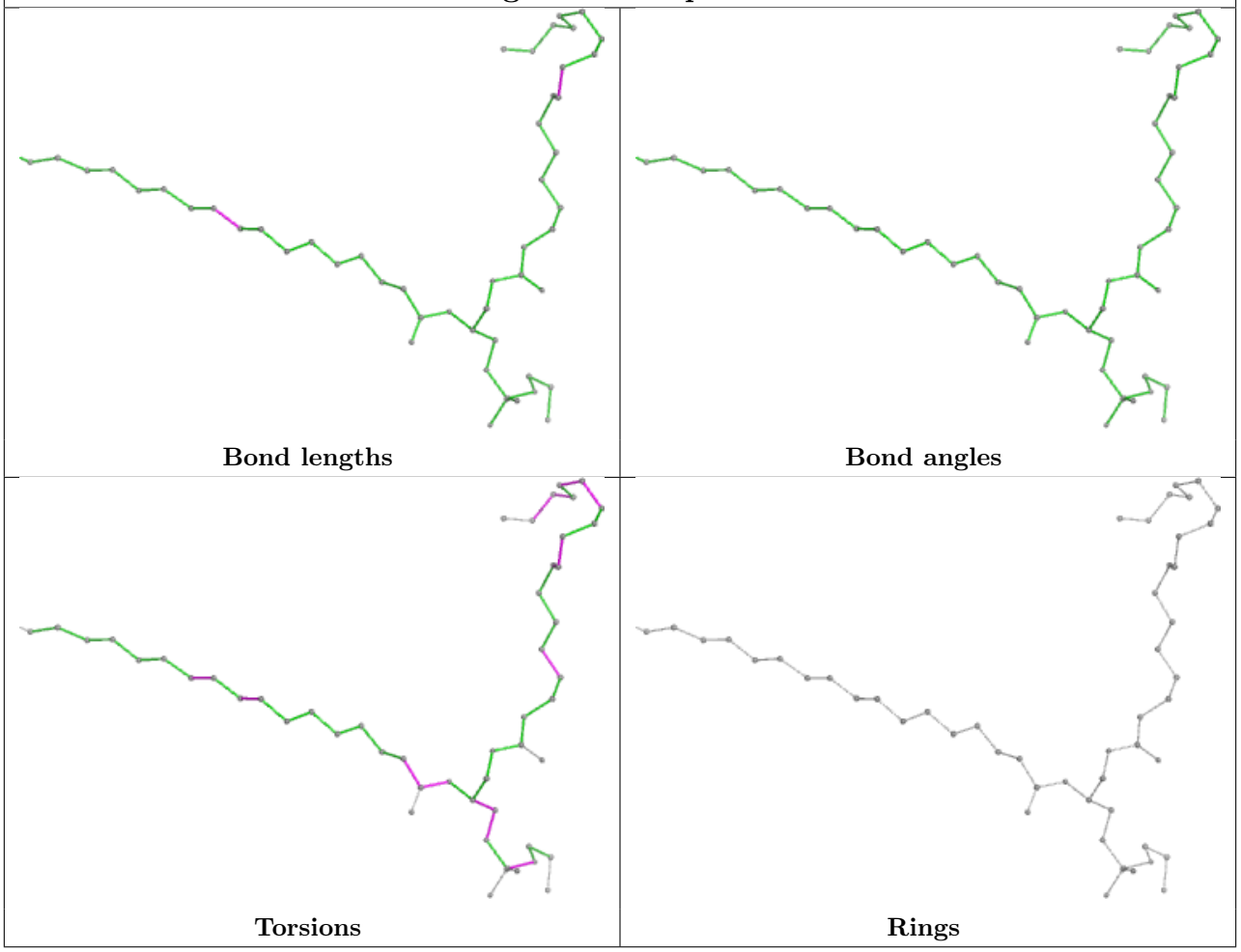
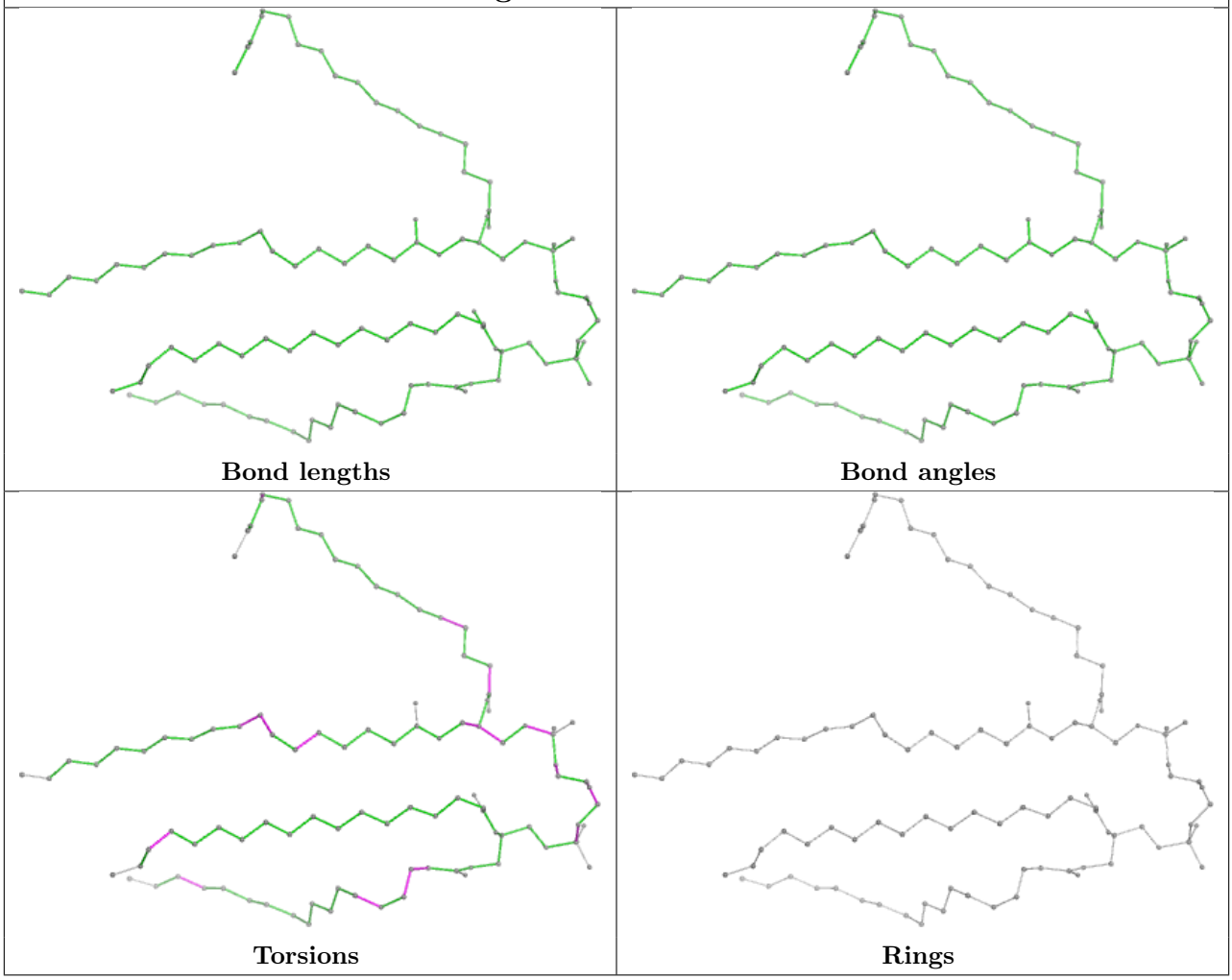
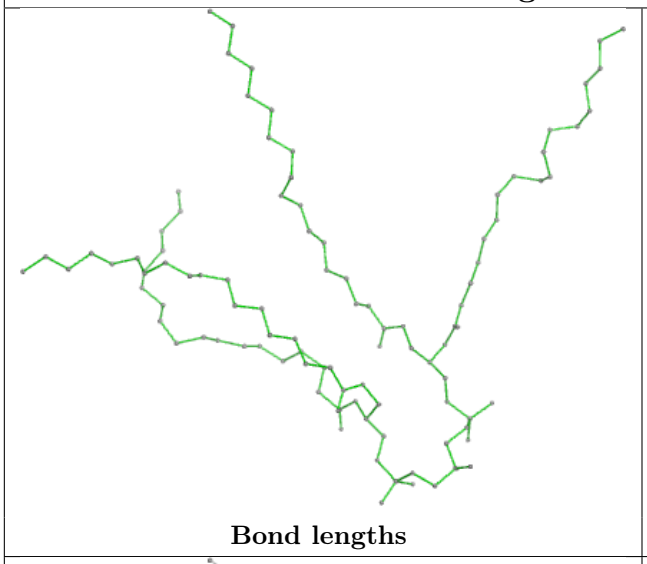


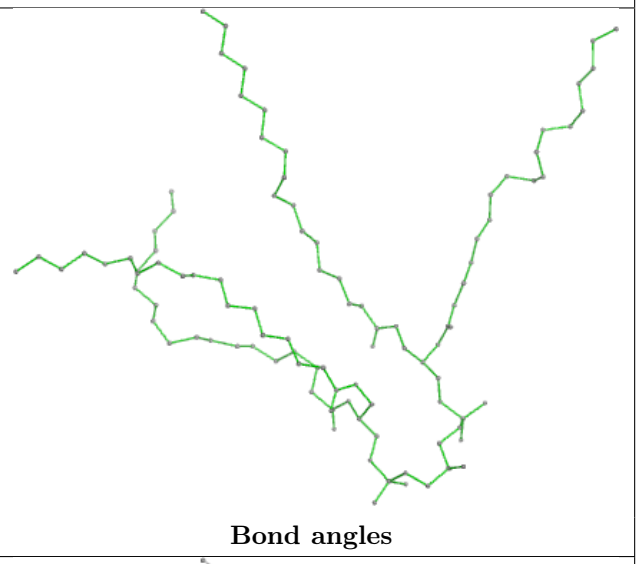
Ligand CDL 2O 204



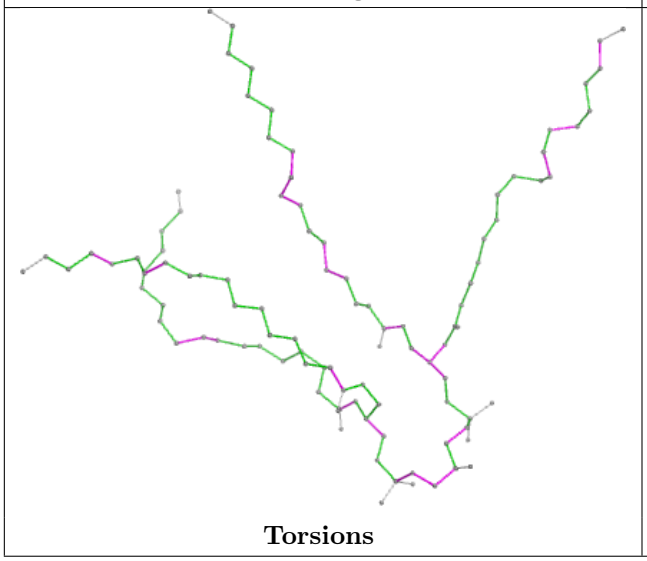
Ligand CDL 3L 701



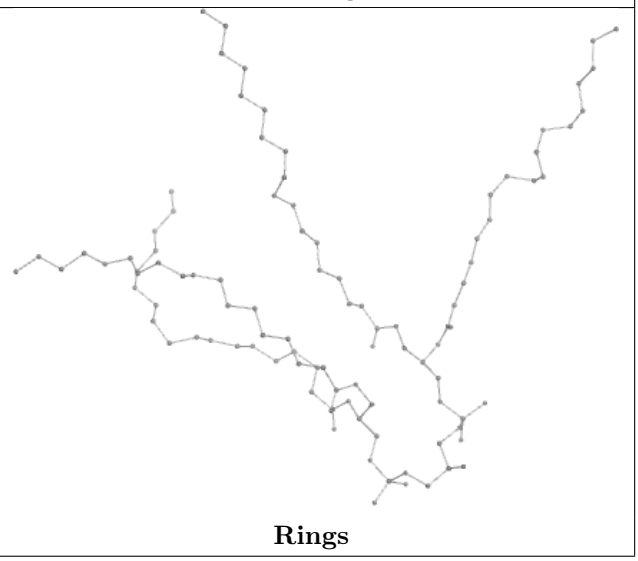
Bond lengths



Bond angles

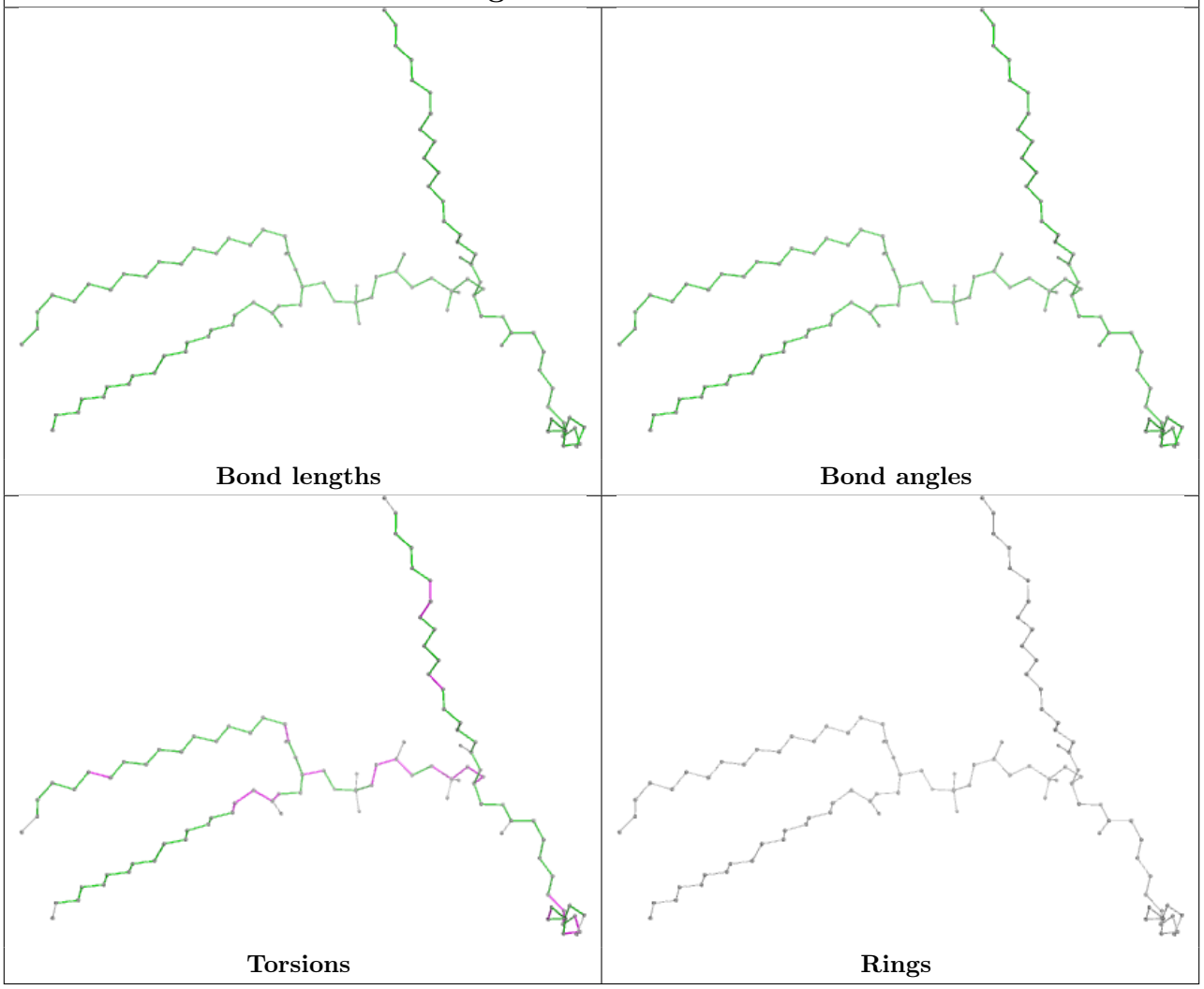


Torsions

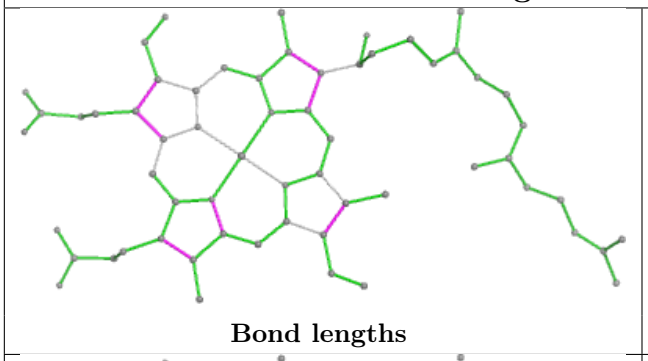


Rings

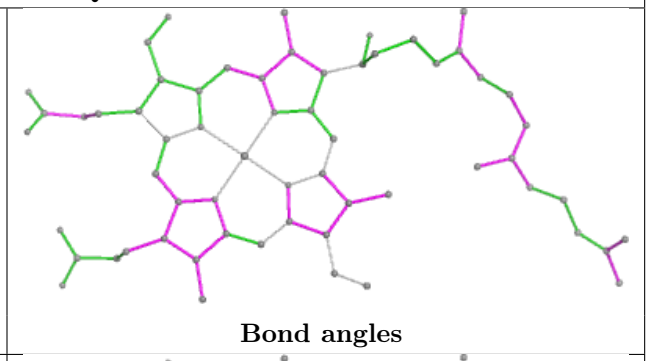
Ligand CDL 3e 202



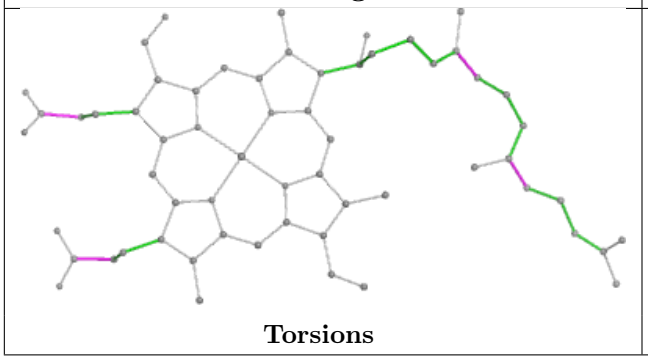
Ligand HEA 4Q 904



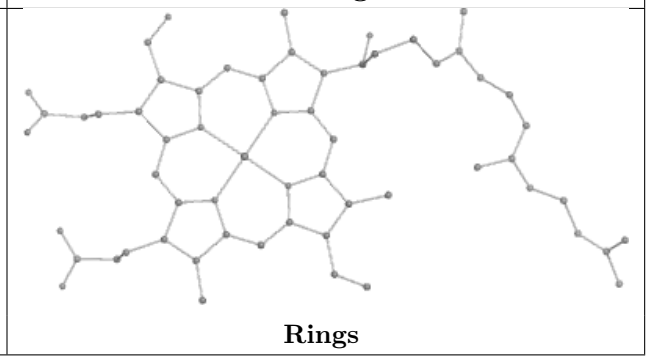
Bond lengths



Bond angles

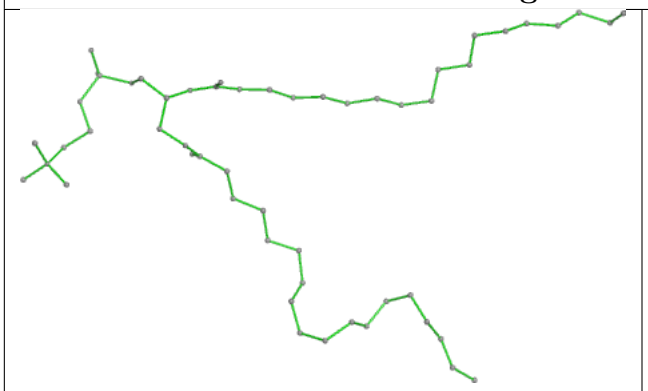


Torsions

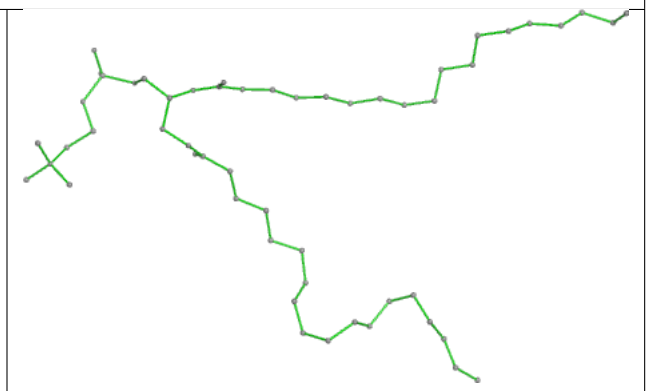


Rings

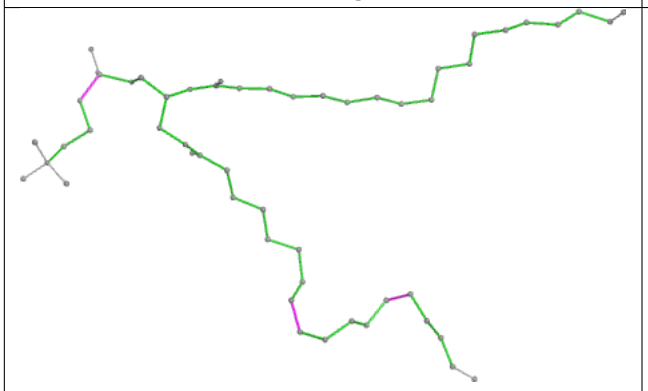
Ligand PC1 2P 204



Bond lengths



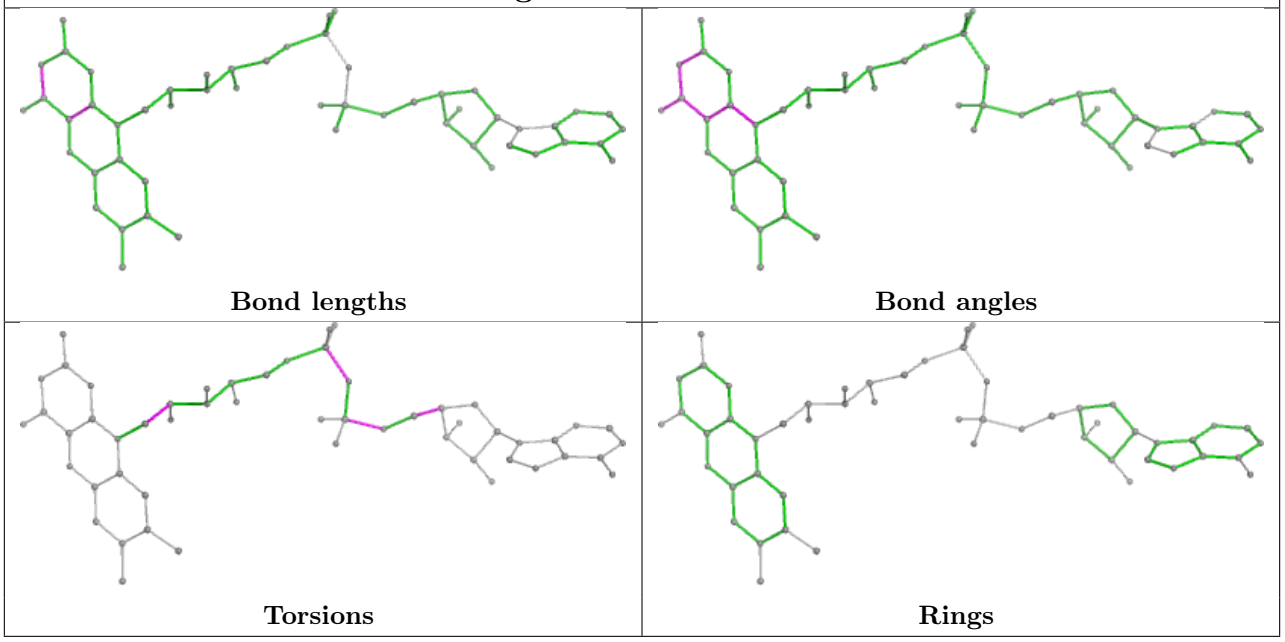
Bond angles



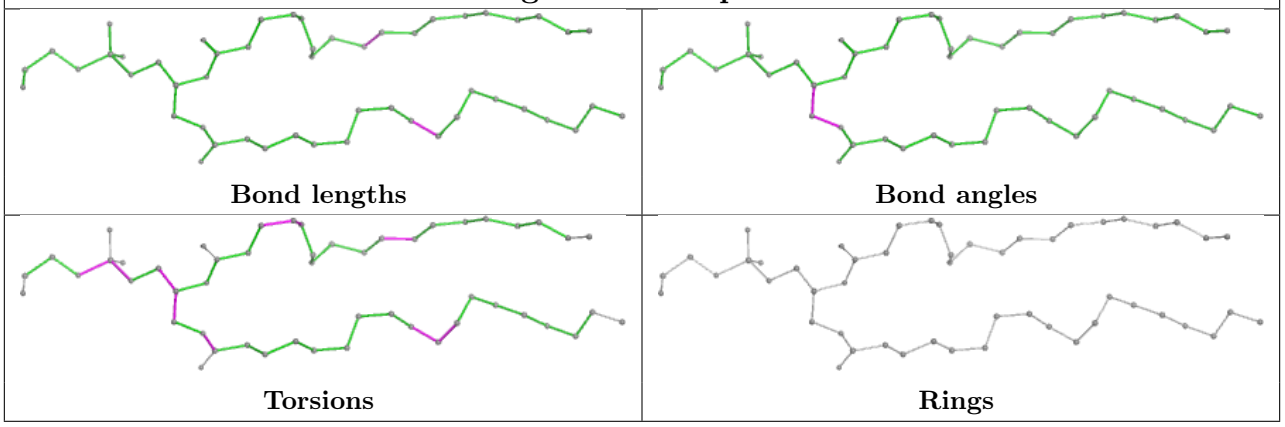
Torsions

Rings

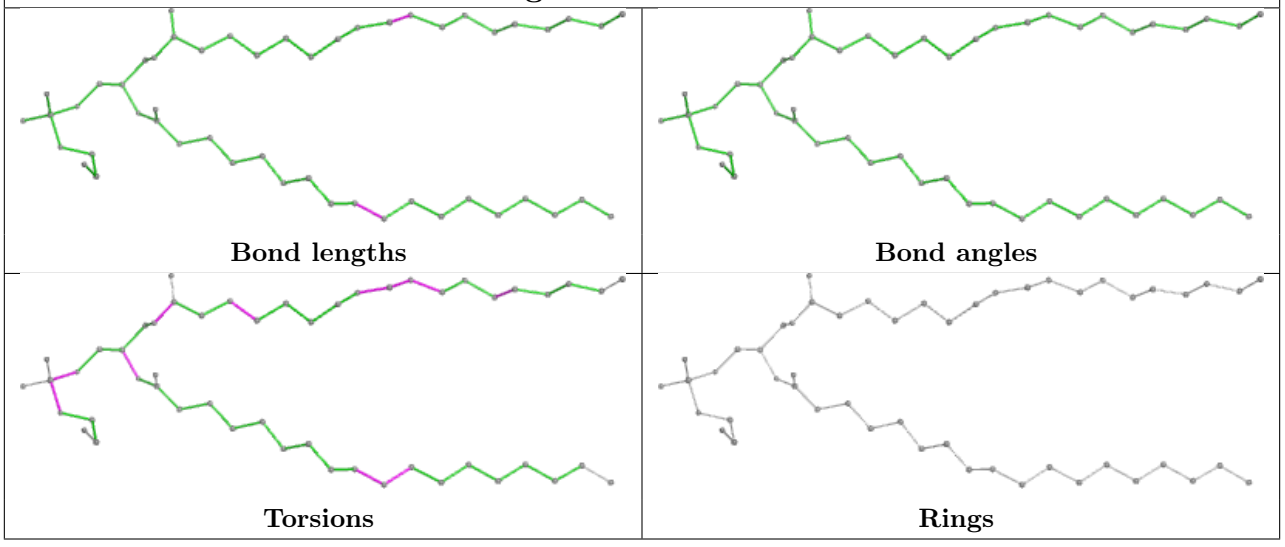
Ligand FAD 2m 701



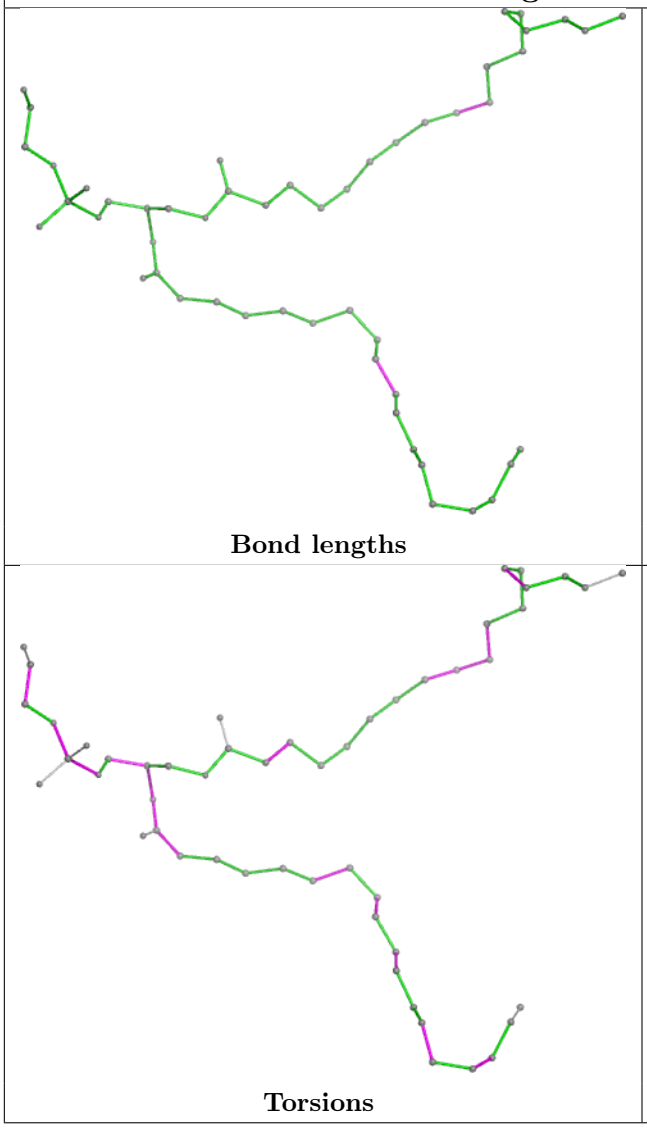
Ligand PEE 4q 910



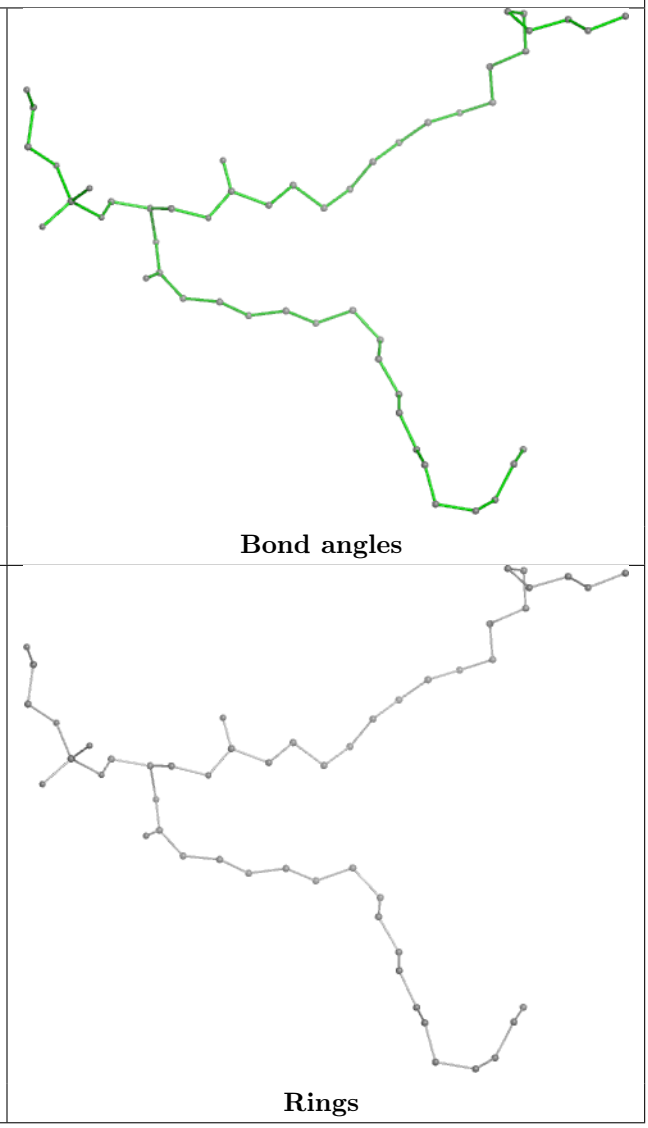
Ligand PEE 3f 101



Ligand PEE 40 303



Bond lengths

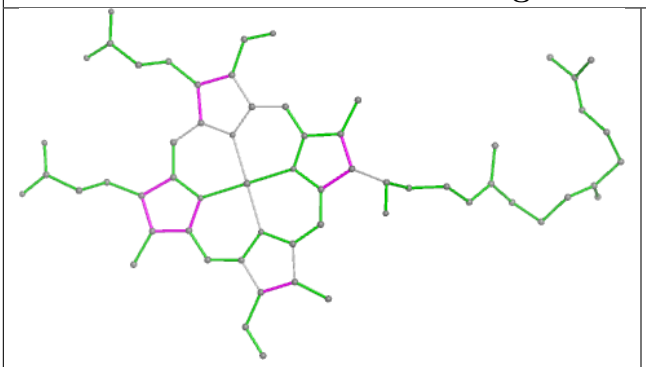


Bond angles

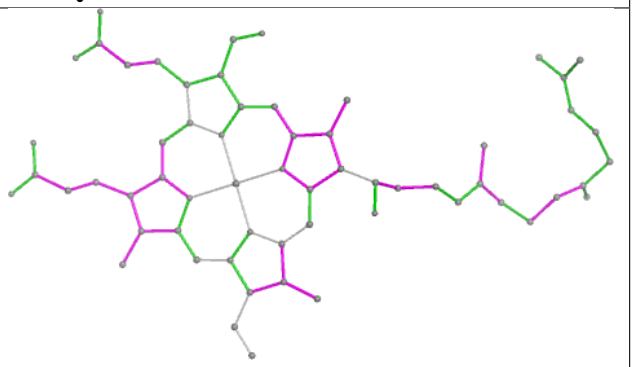
Torsions

Rings

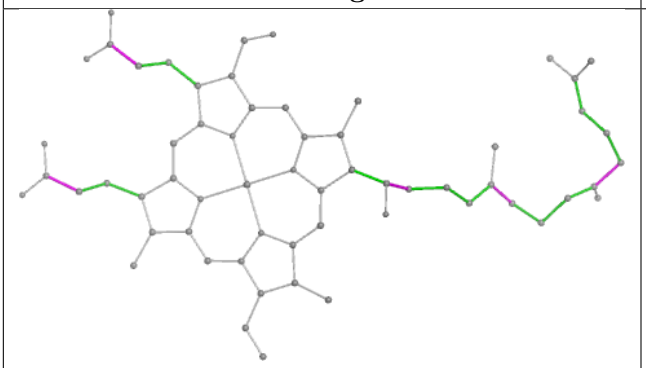
Ligand HEA 4Q 905



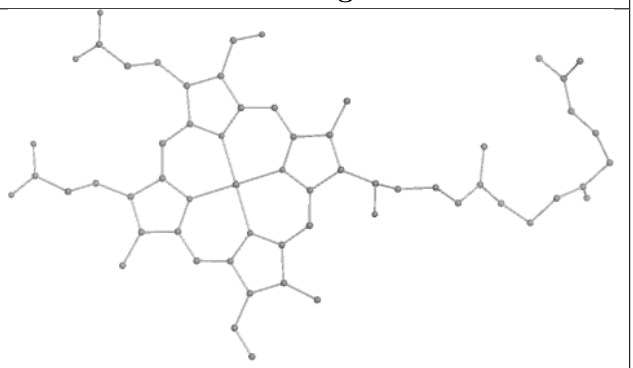
Bond lengths



Bond angles



Torsions

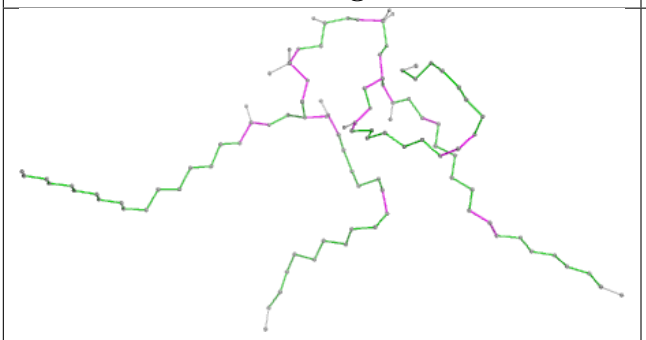


Rings

Ligand CDL 4J 301

Bond lengths

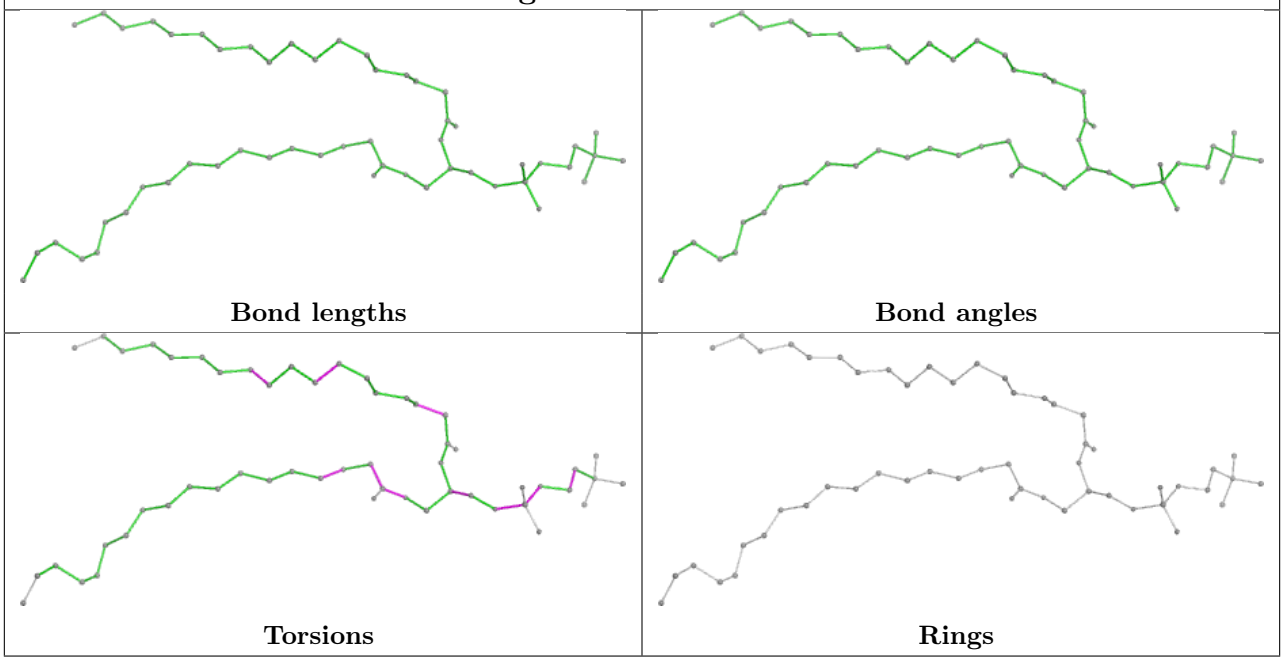
Bond angles



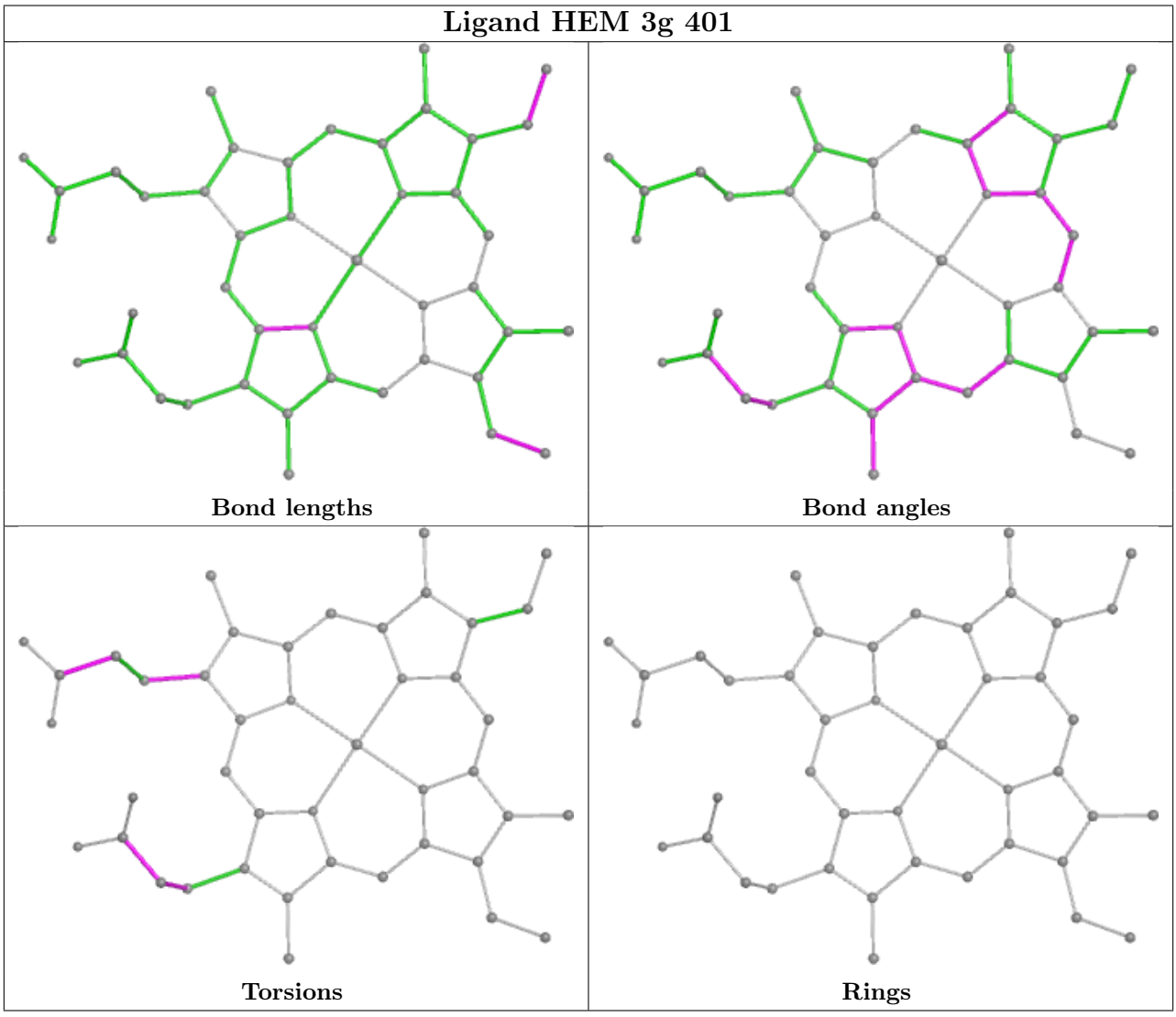
Torsions

Rings

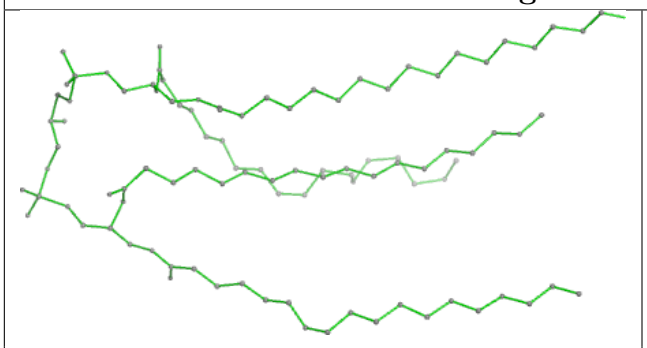
Ligand PC1 3A 502



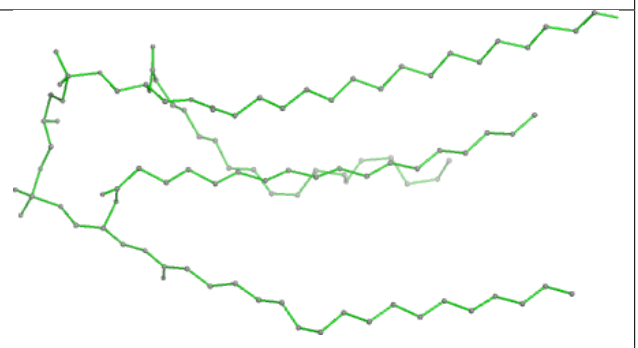
Ligand HEM 3g 401



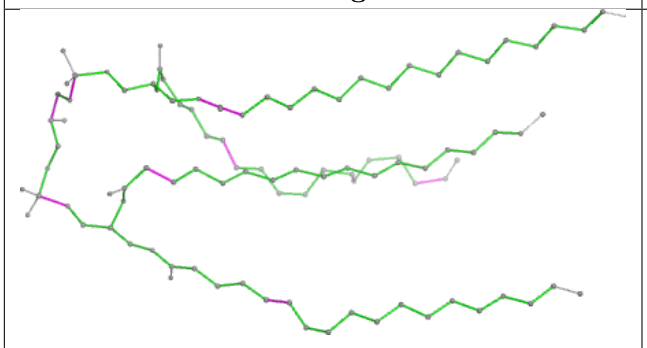
Ligand CDL 3h 402



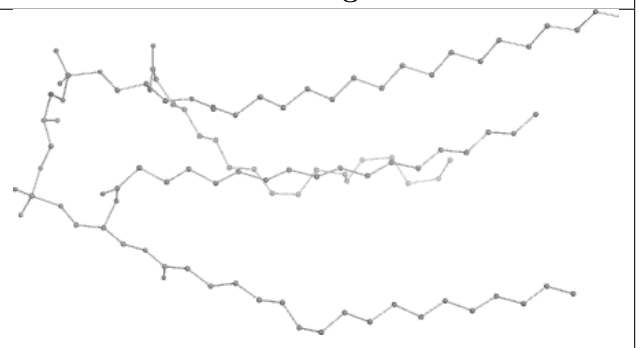
Bond lengths



Bond angles

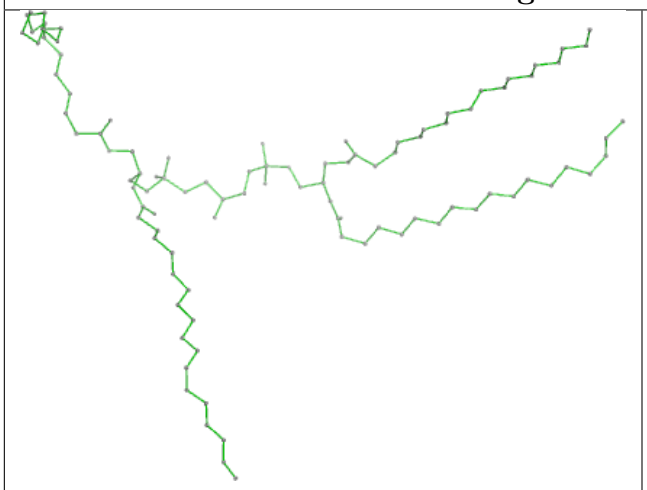


Torsions

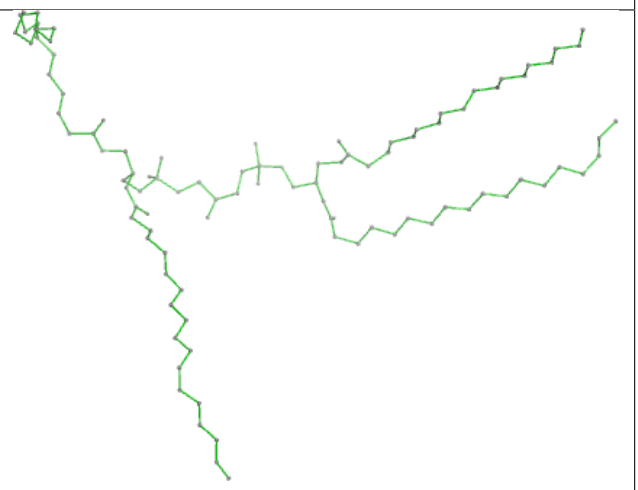


Rings

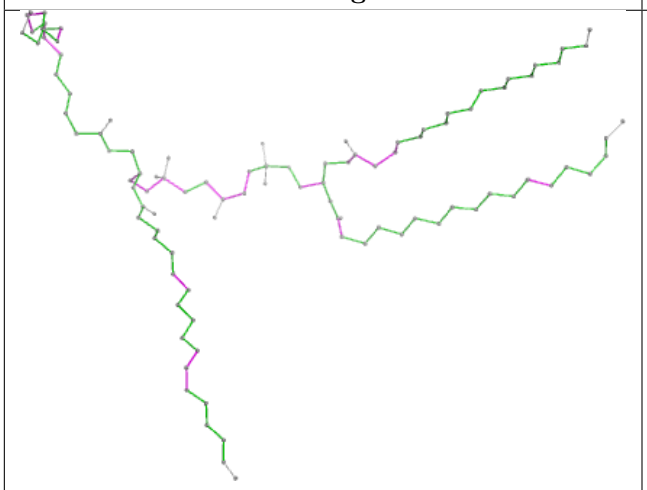
Ligand CDL 3E 202



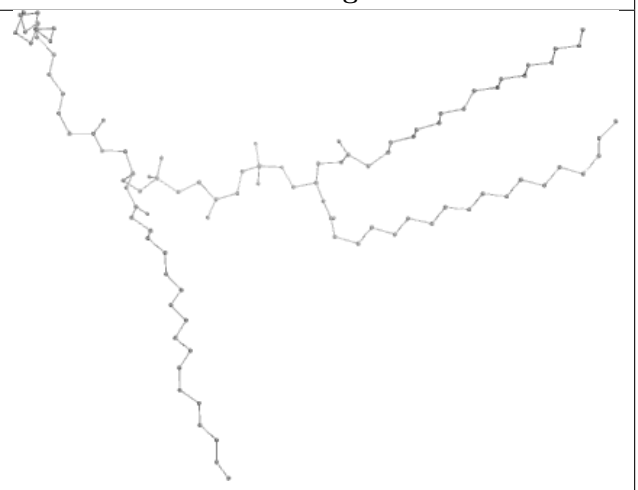
Bond lengths



Bond angles

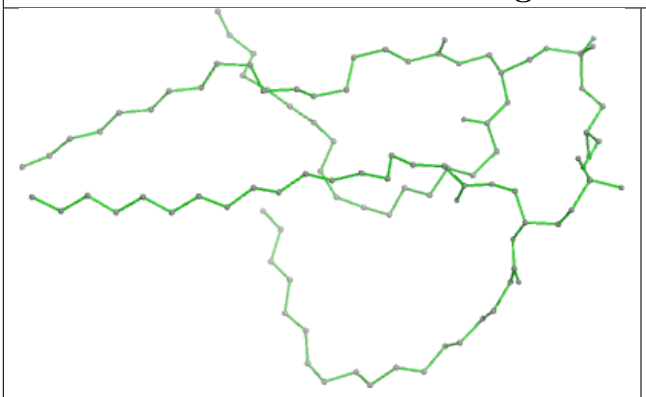


Torsions

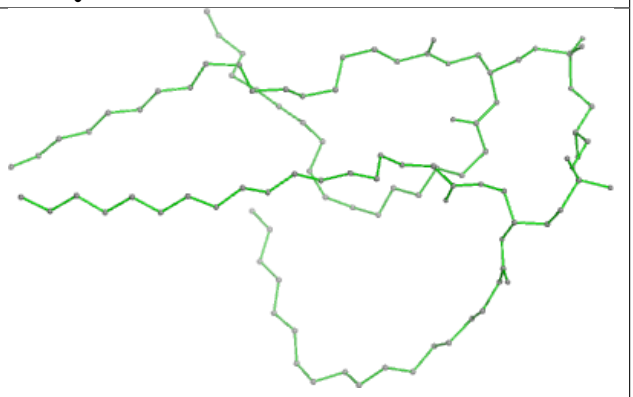


Rings

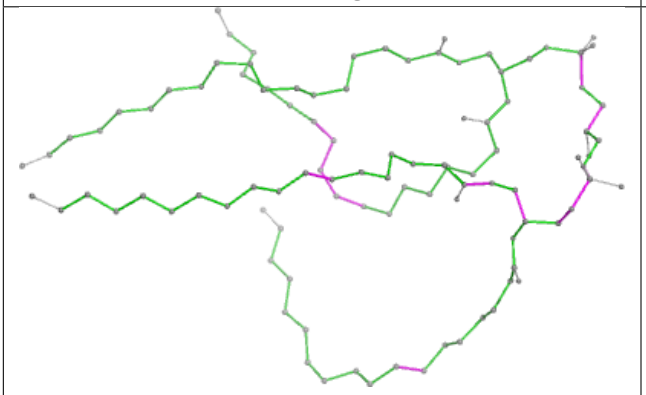
Ligand CDL 4Q 908



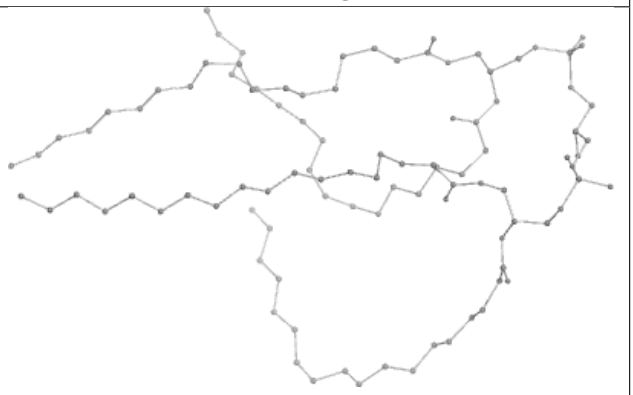
Bond lengths



Bond angles

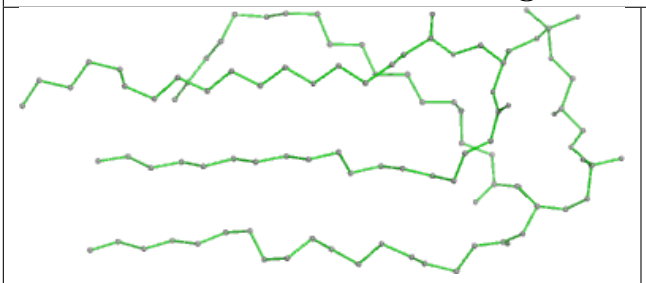


Torsions

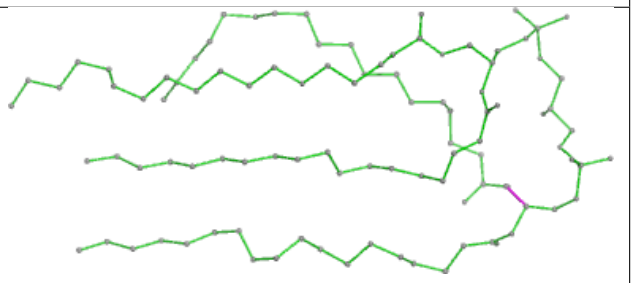


Rings

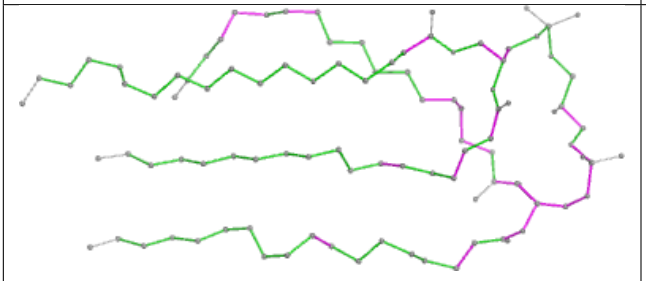
Ligand CDL 4u 501



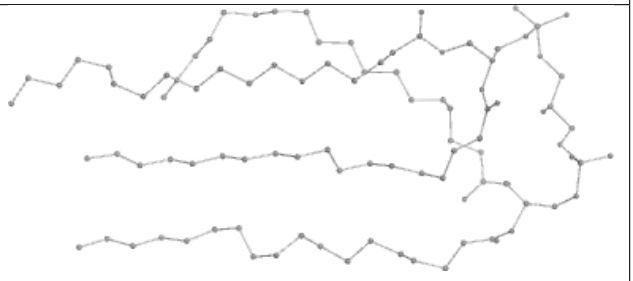
Bond lengths



Bond angles

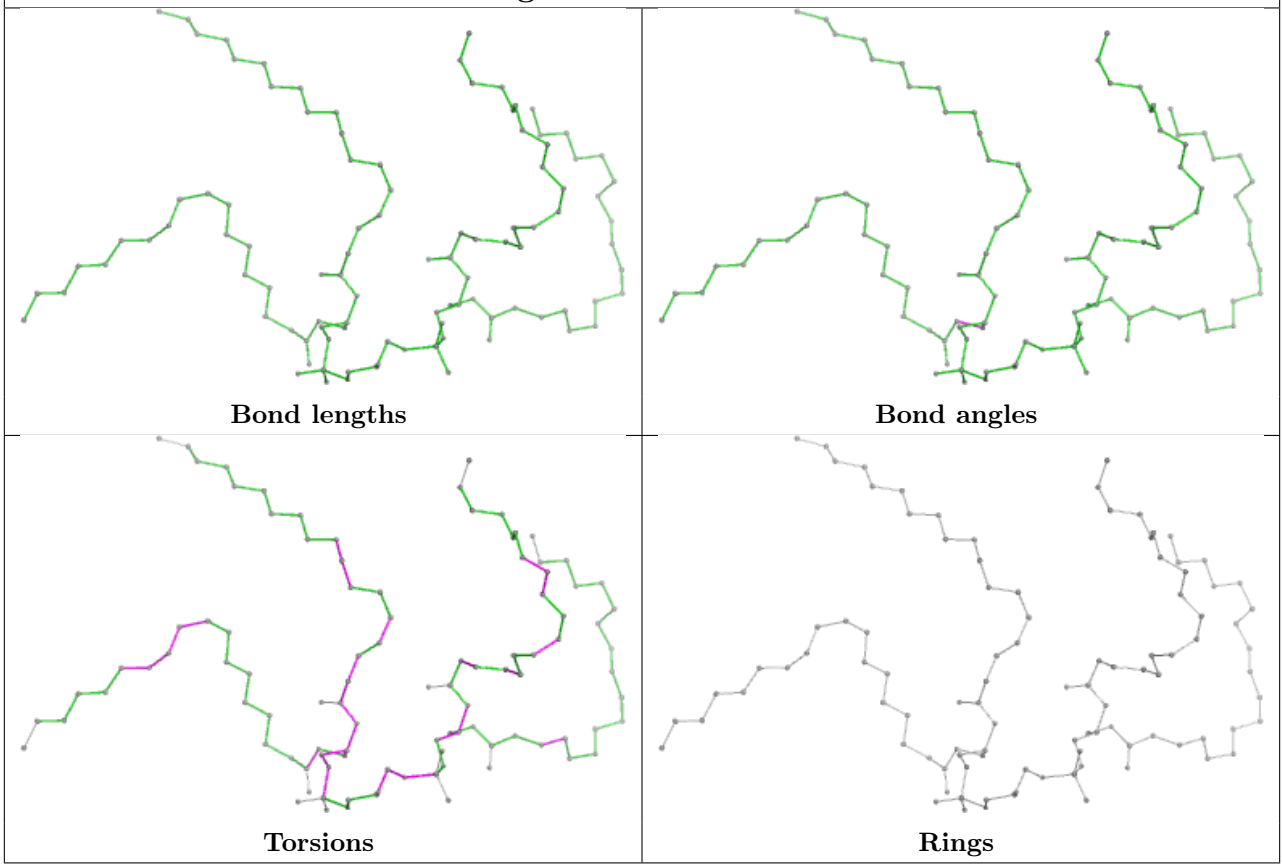


Torsions

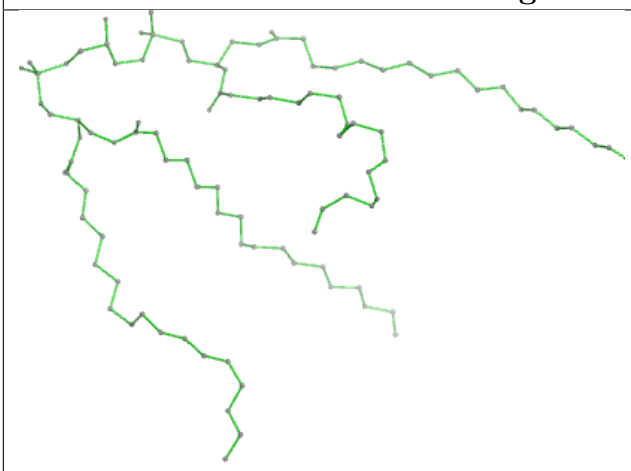


Rings

Ligand CDL 3E 203

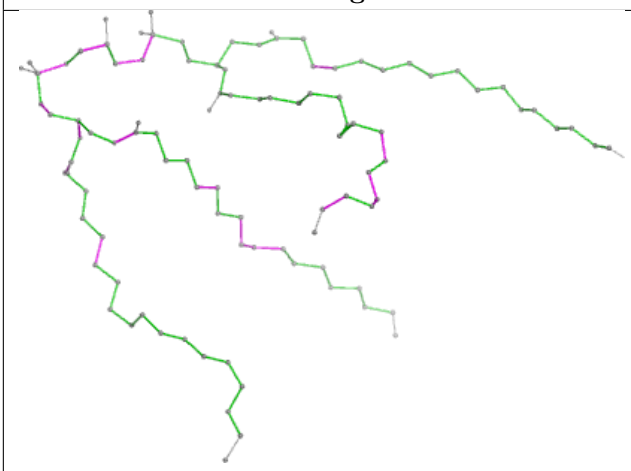


Ligand CDL 3g 403

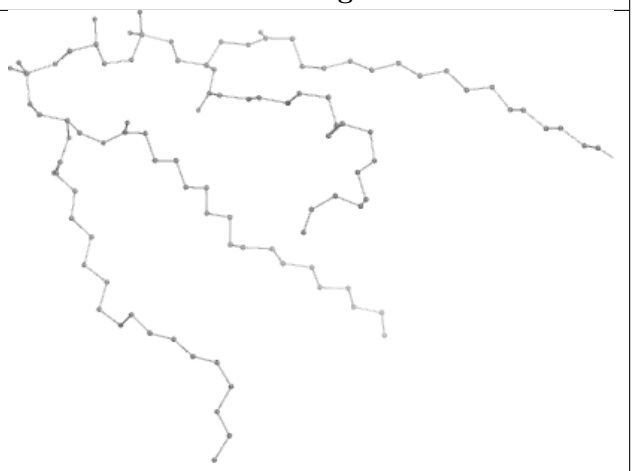


Bond lengths

Bond angles

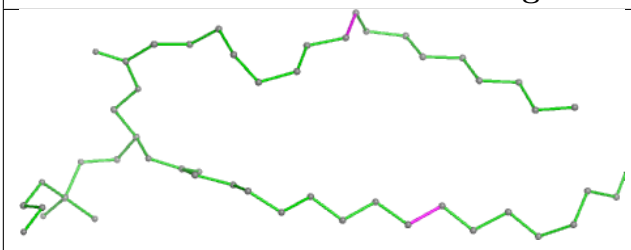


Torsions



Rings

Ligand PEE 4r 201



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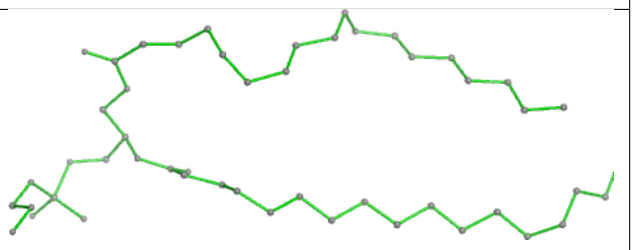
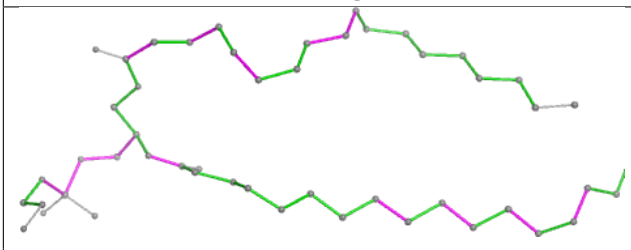


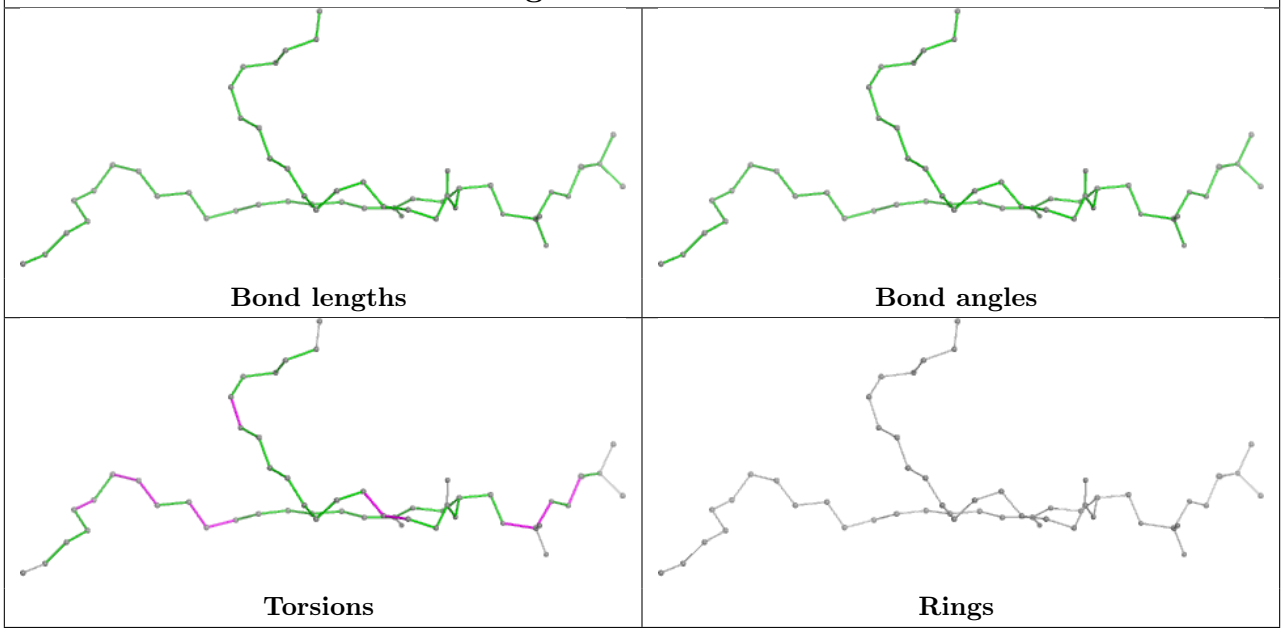
Bond angles



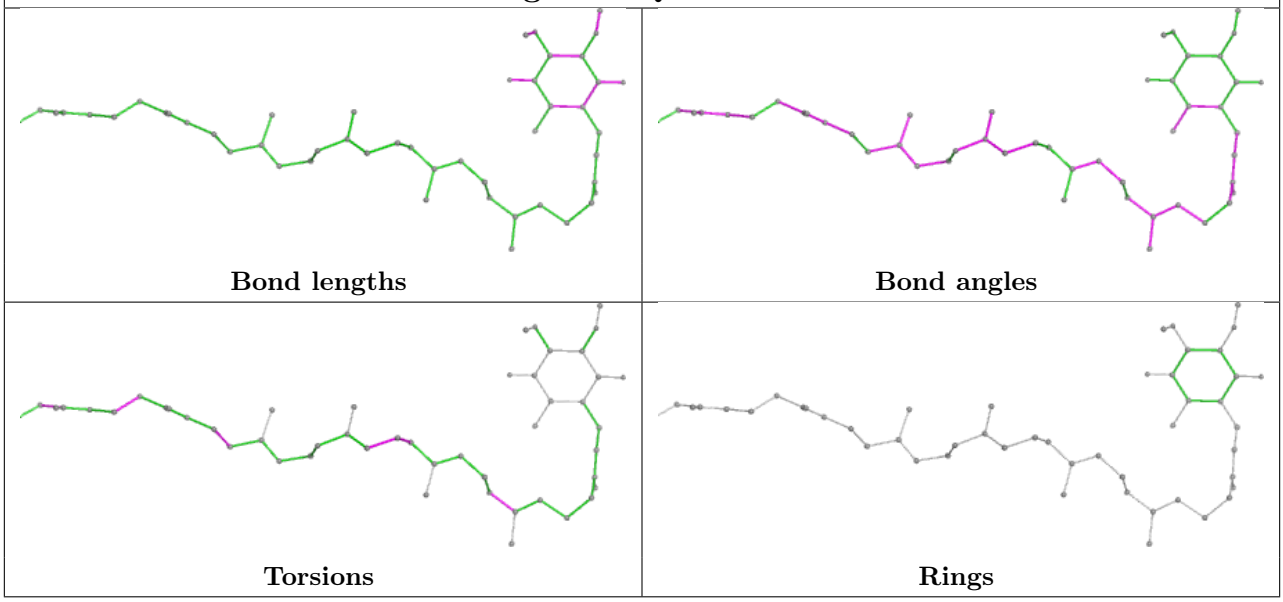
Torsions

Rings

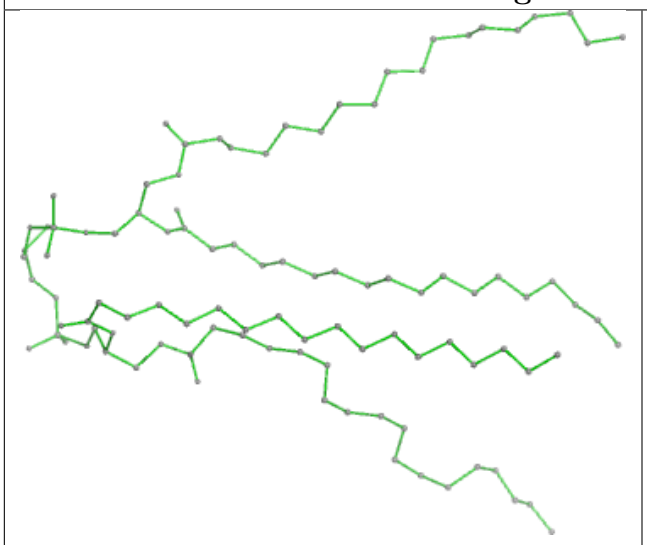
Ligand PC1 2t 101



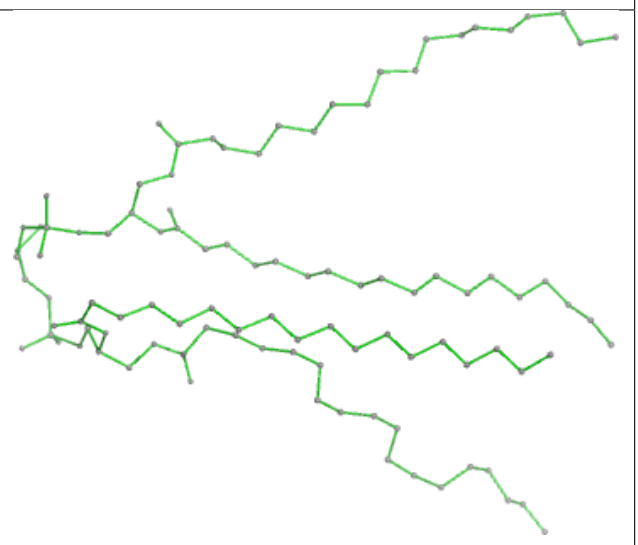
Ligand UQ8 2s 201



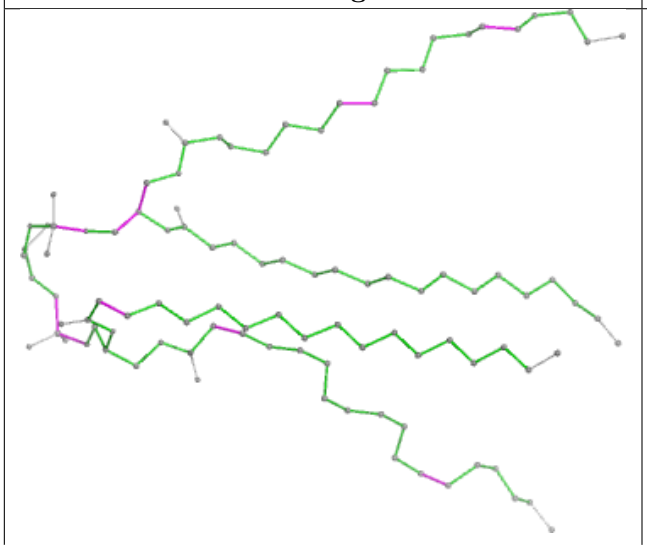
Ligand CDL 4m 201



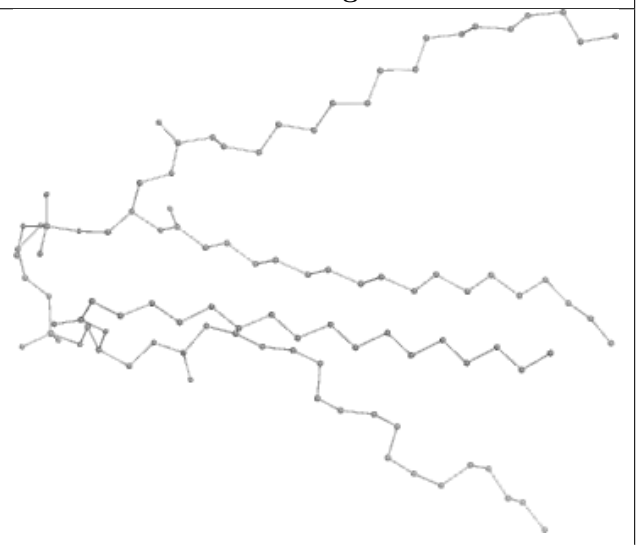
Bond lengths



Bond angles

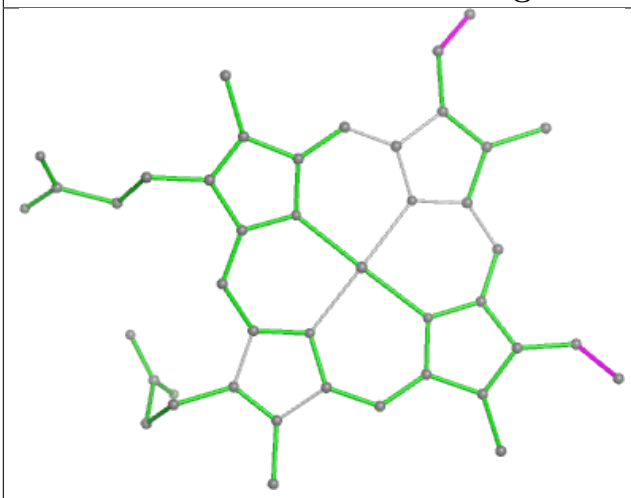


Torsions



Rings

Ligand HEM 3g 402



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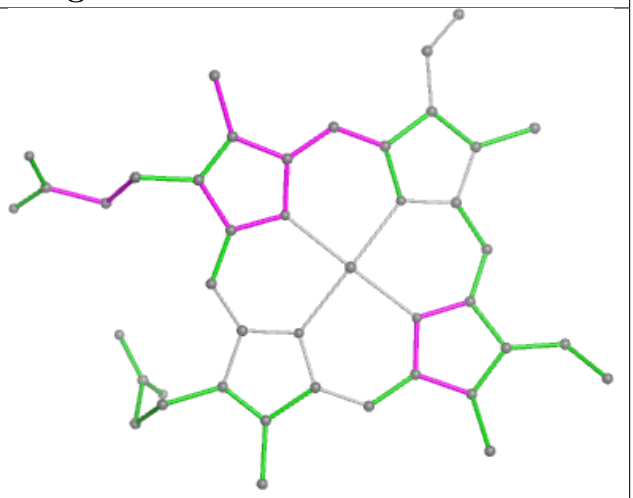
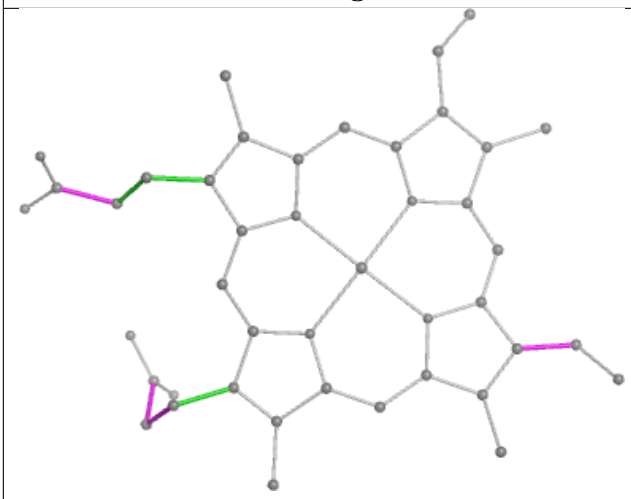


Bond angles



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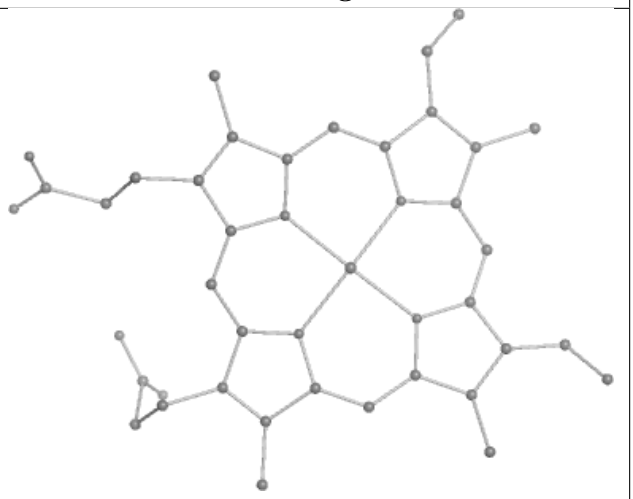
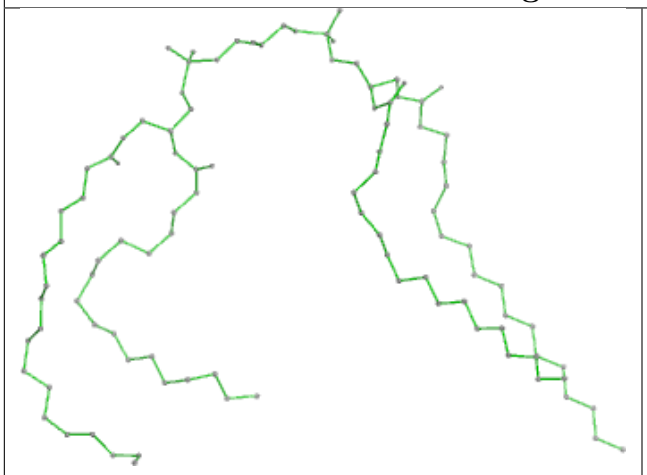


Rings

Ligand CDL 4s 101



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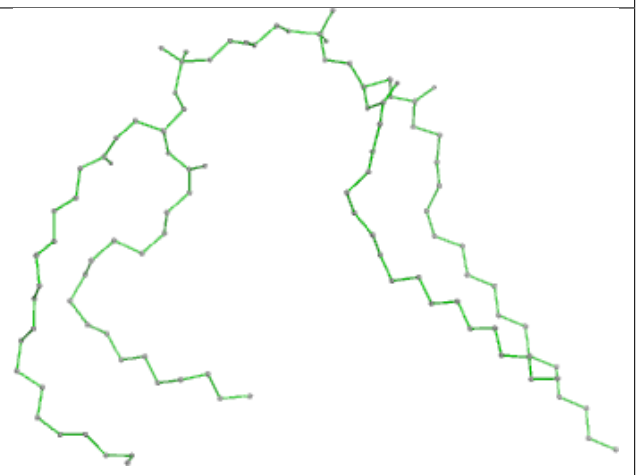
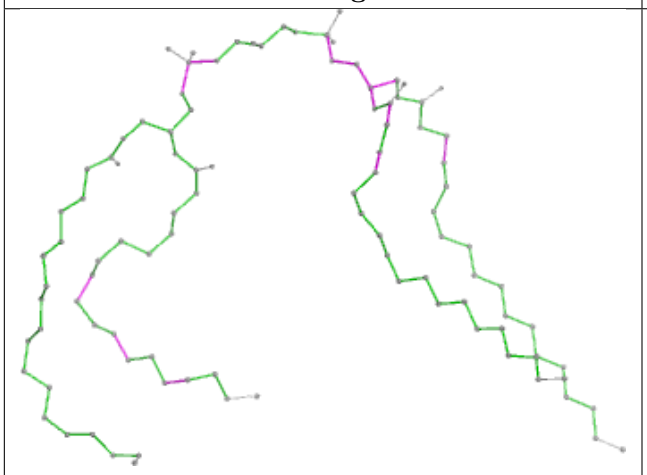
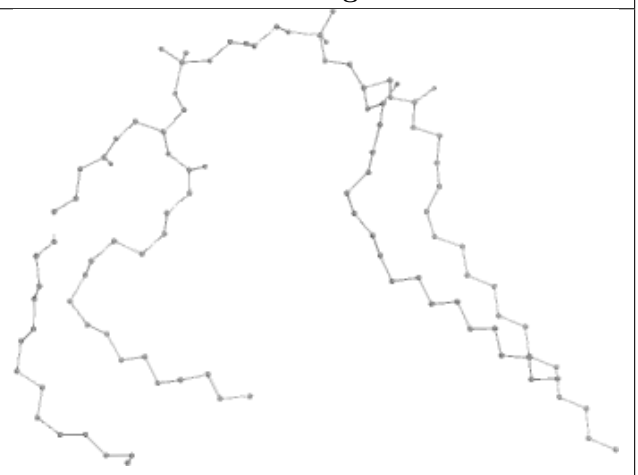


Bond angles

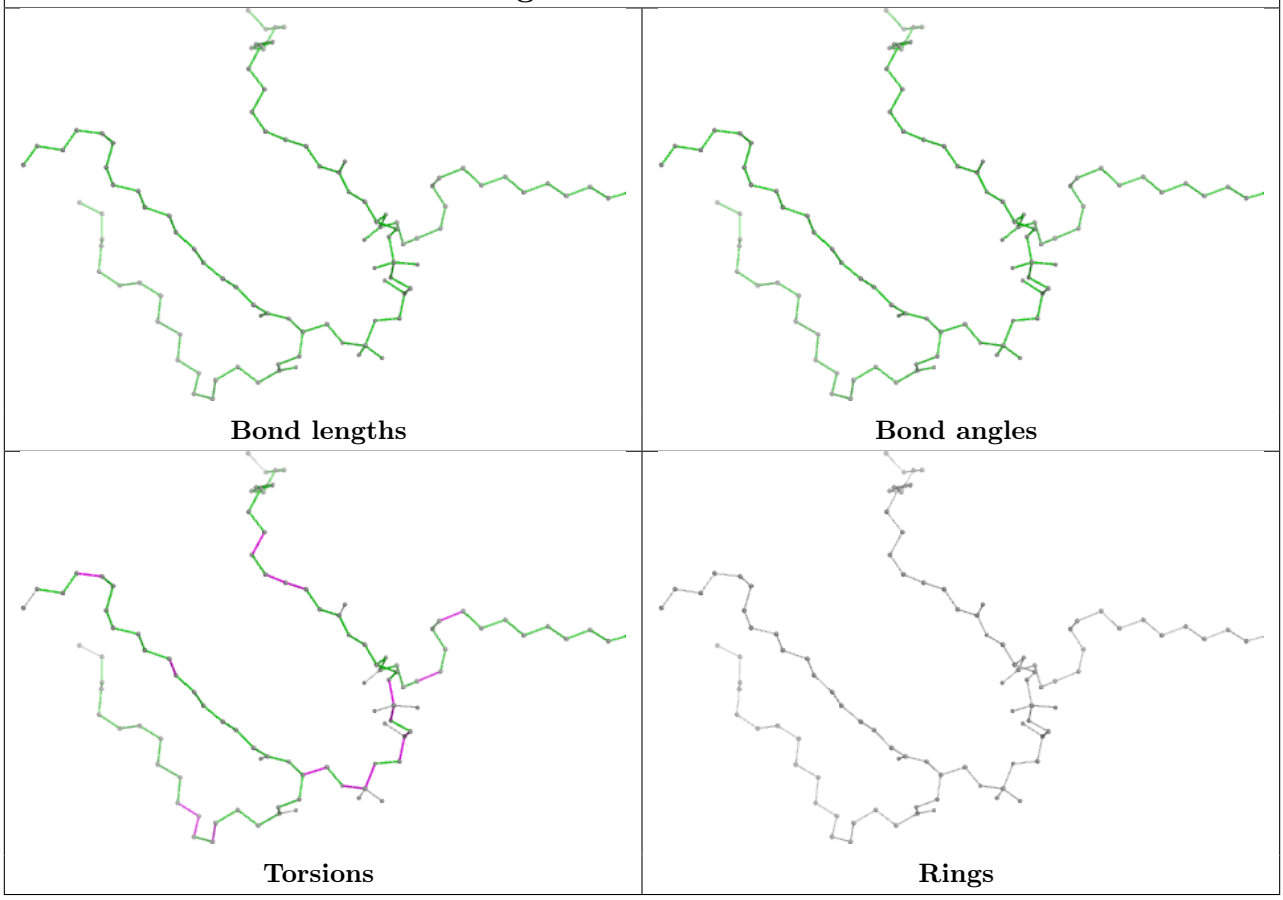


Torsions

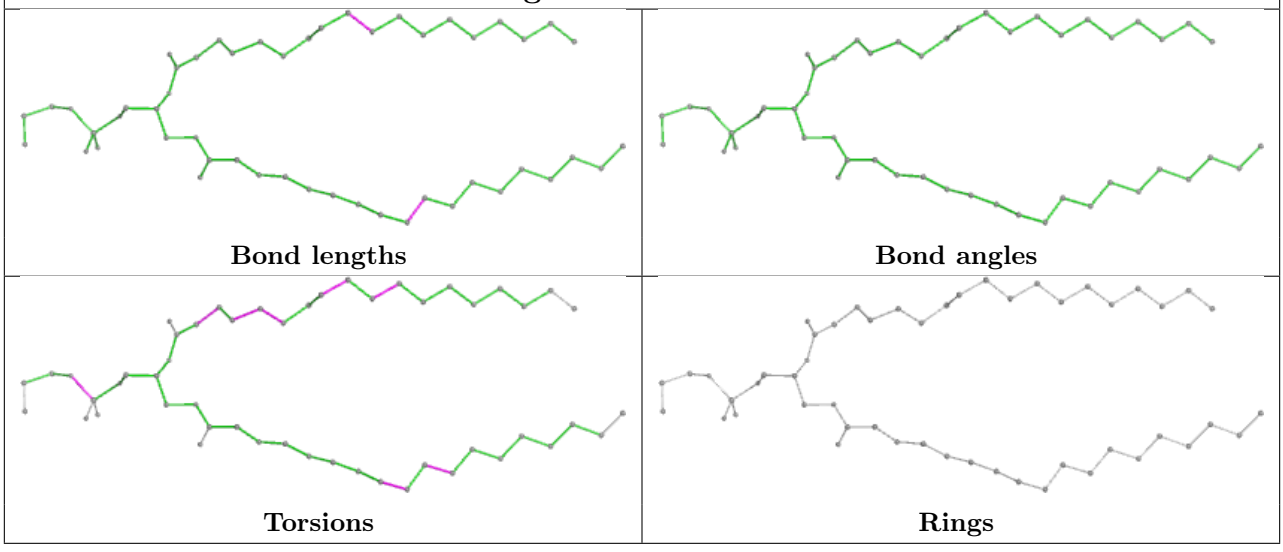


Rings

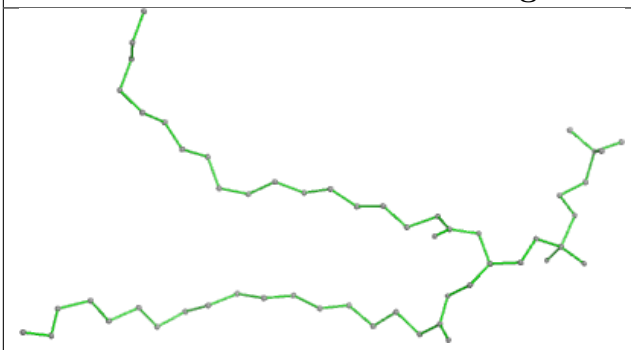
Ligand CDL 2P 201



Ligand PEE 4s 102



Ligand PC1 4E 202



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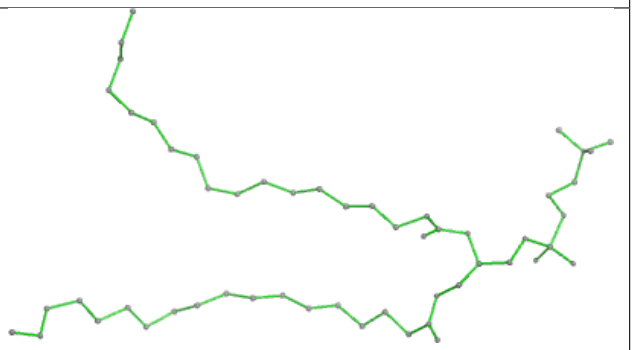
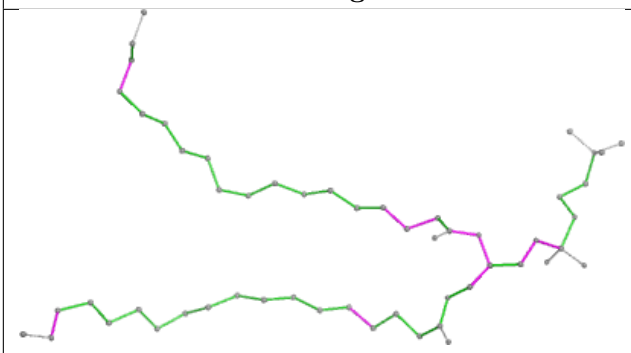


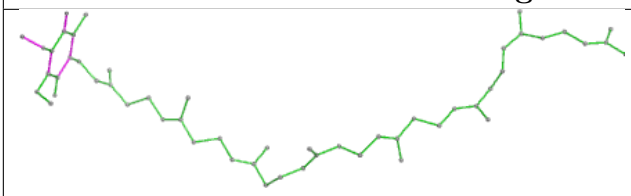
Bond angles



Torsions

Rings

Ligand UQ8 3G 405



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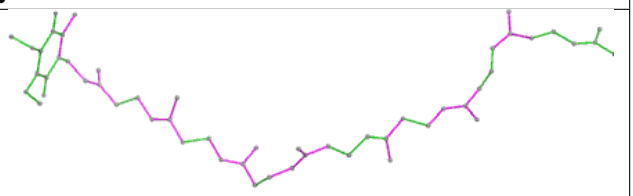
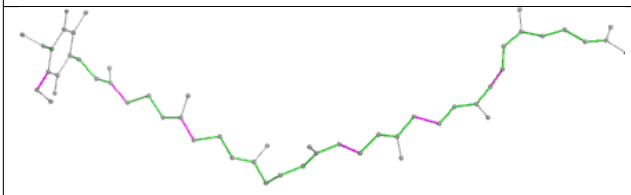
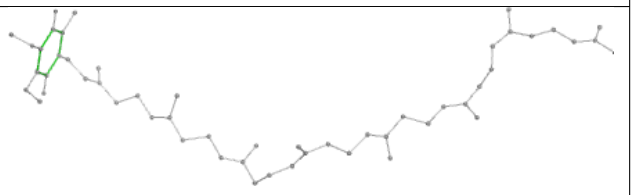


Bond angles

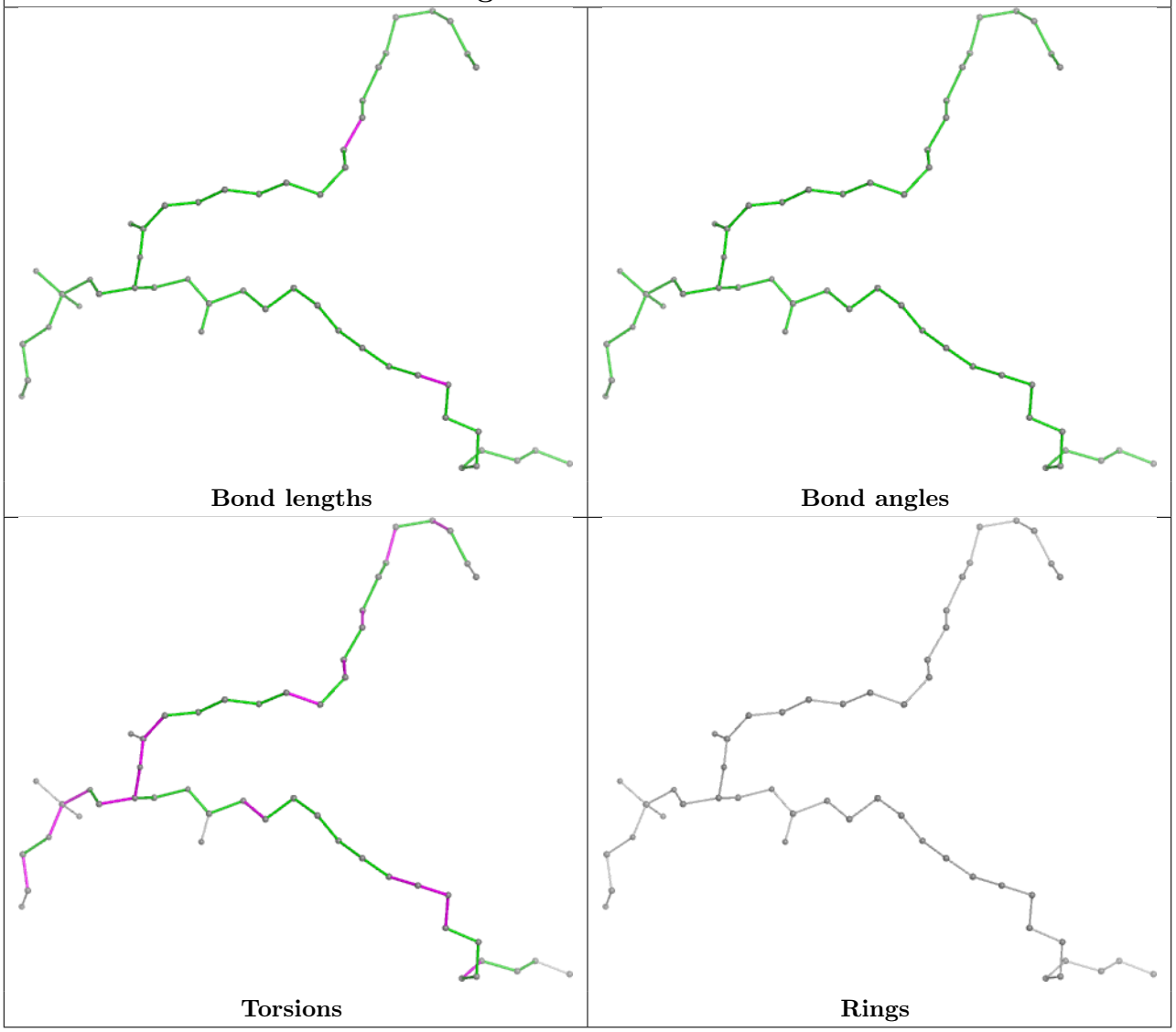


Torsions

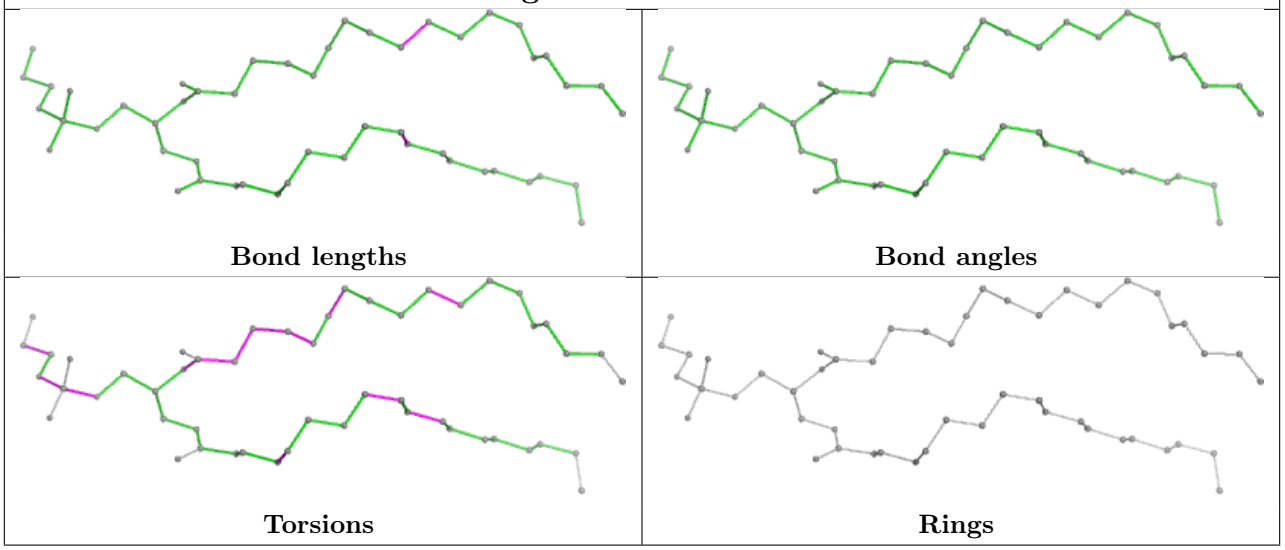


Rings

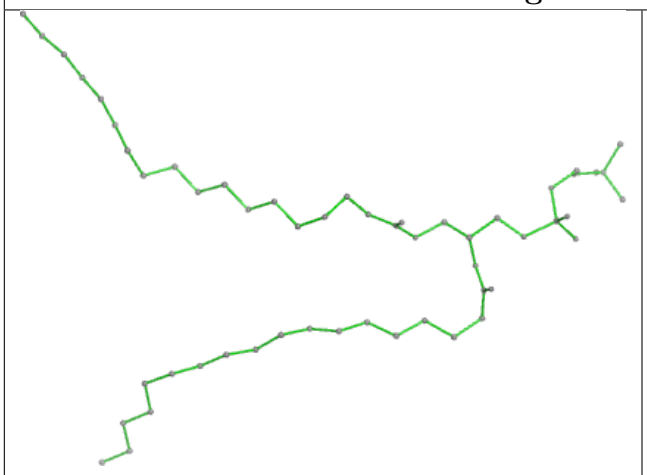
Ligand PEE 41 303



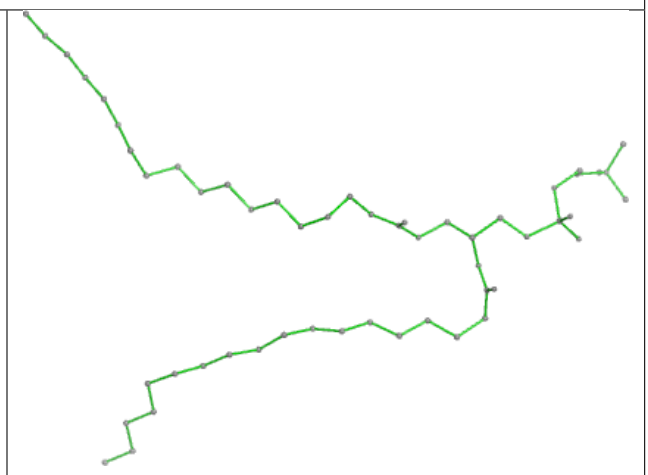
Ligand PEE 41 301



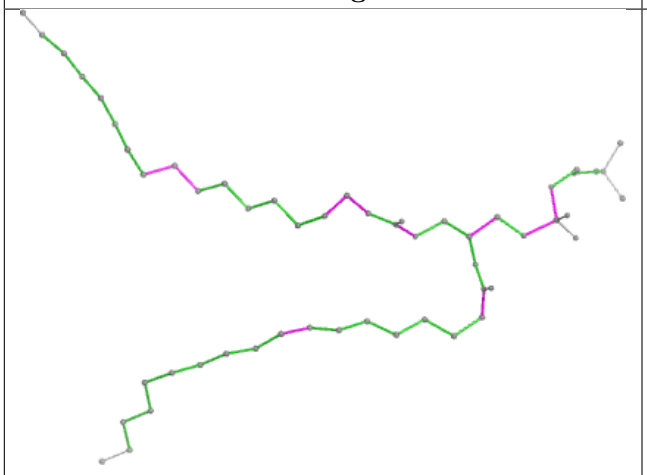
Ligand PC1 2r 202



Bond lengths



Bond angles



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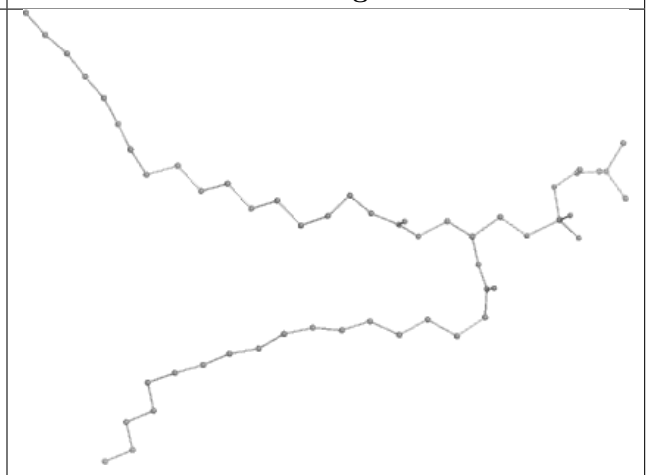
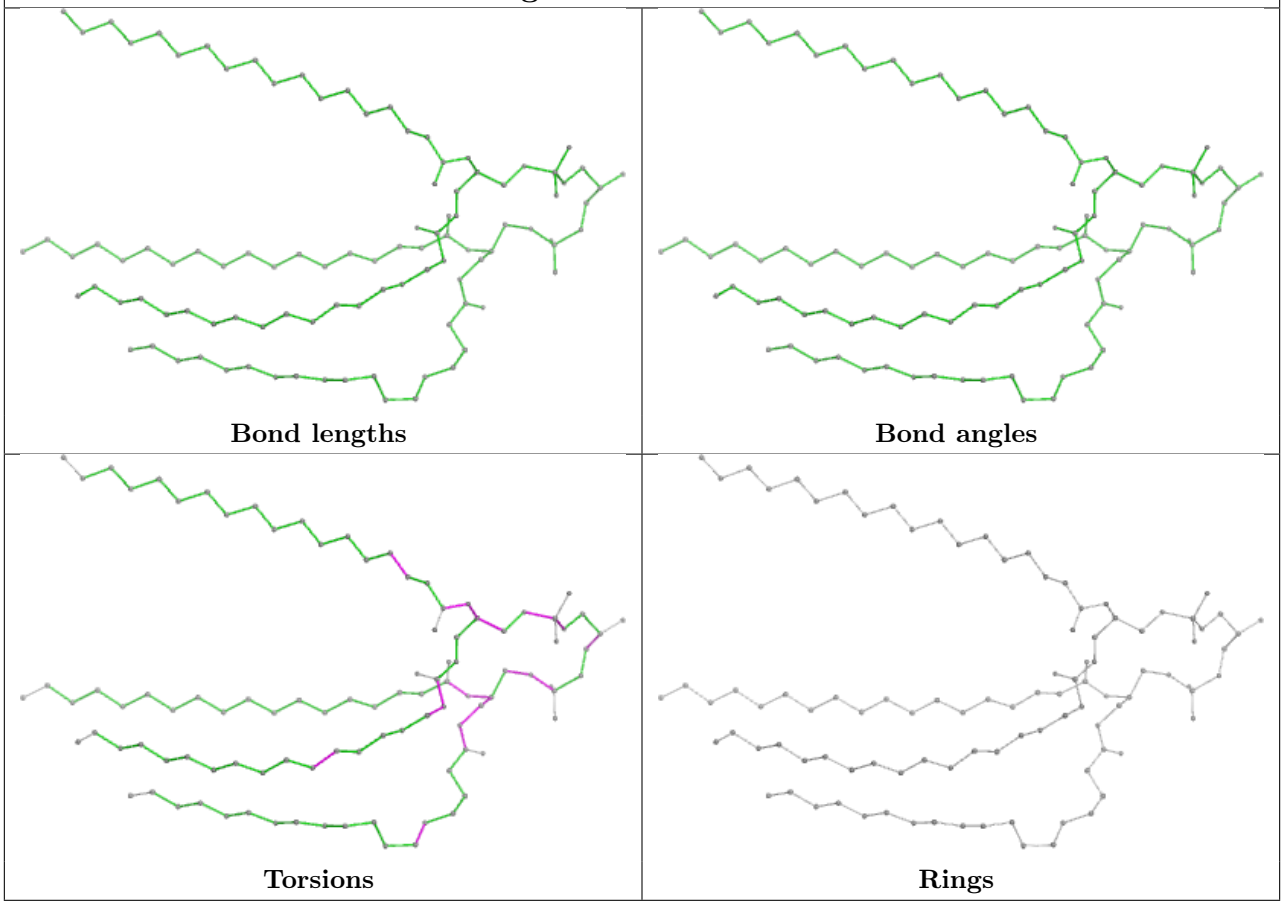


Rings

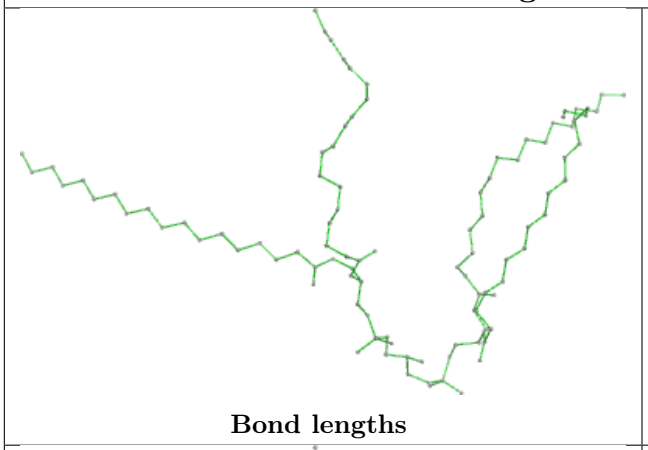
Ligand CDL 4e 201



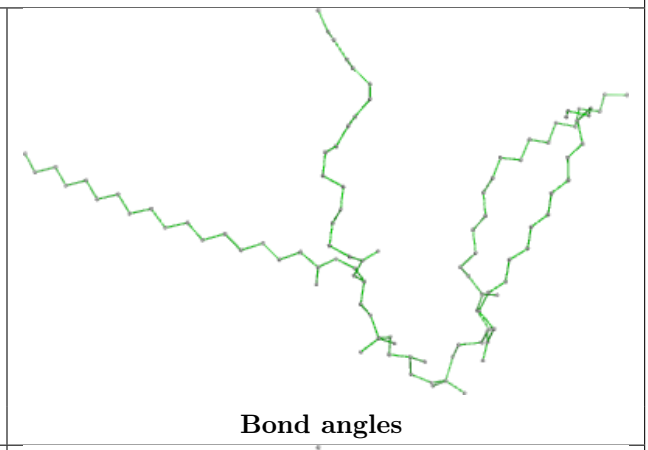
Bond lengths | **Bond angles**

Torsions | **Rings**

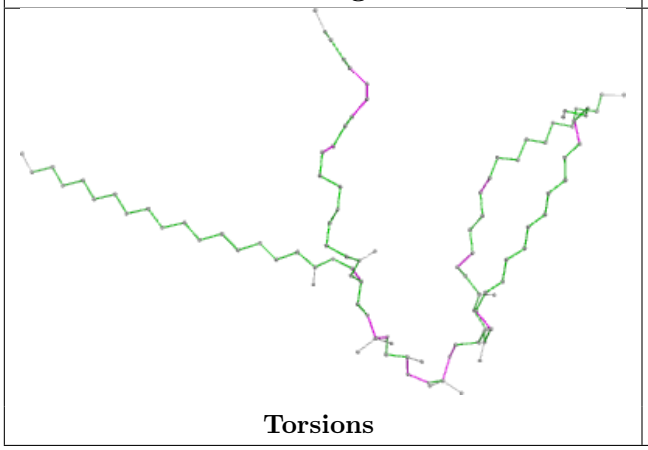
Ligand CDL 2u 101



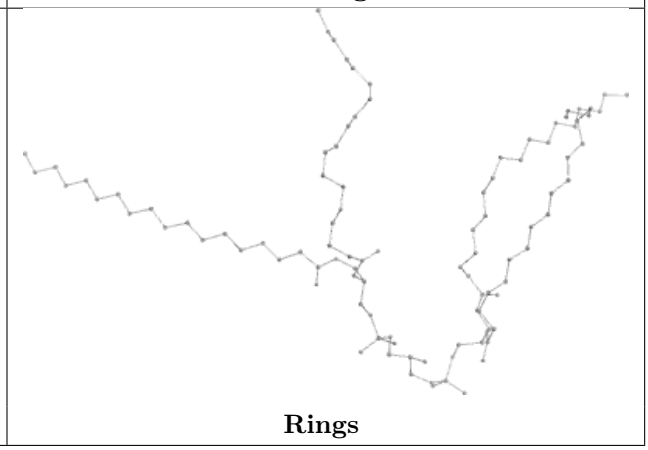
Bond lengths



Bond angles

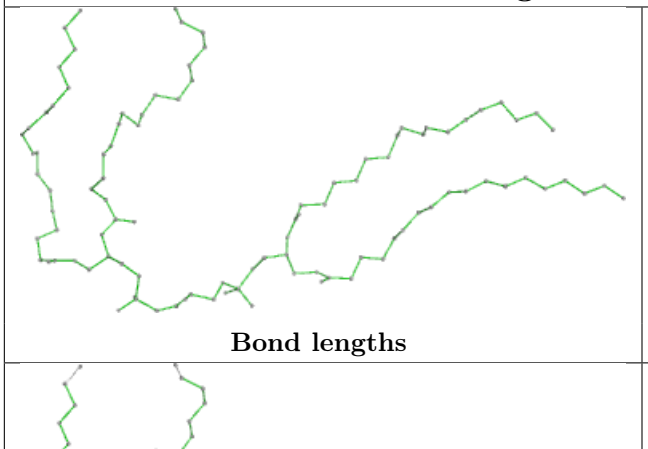


Torsions

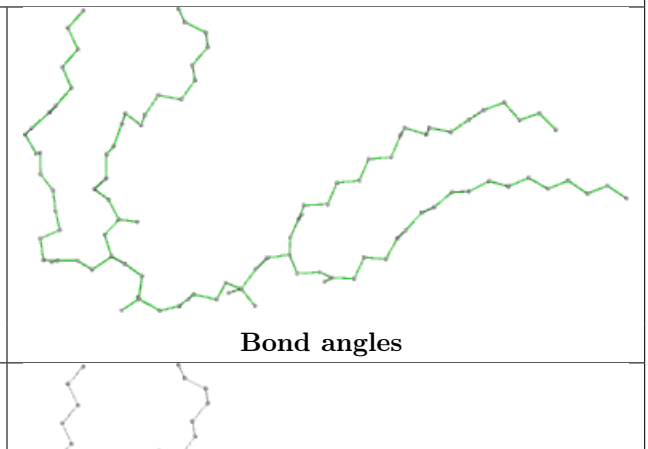


Rings

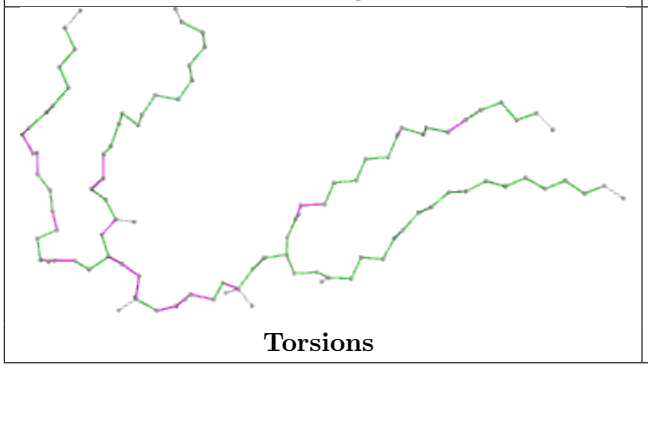
Ligand CDL 4w 202



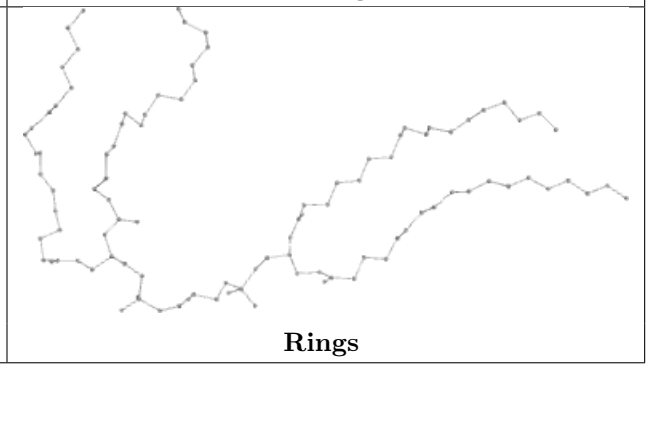
Bond lengths



Bond angles

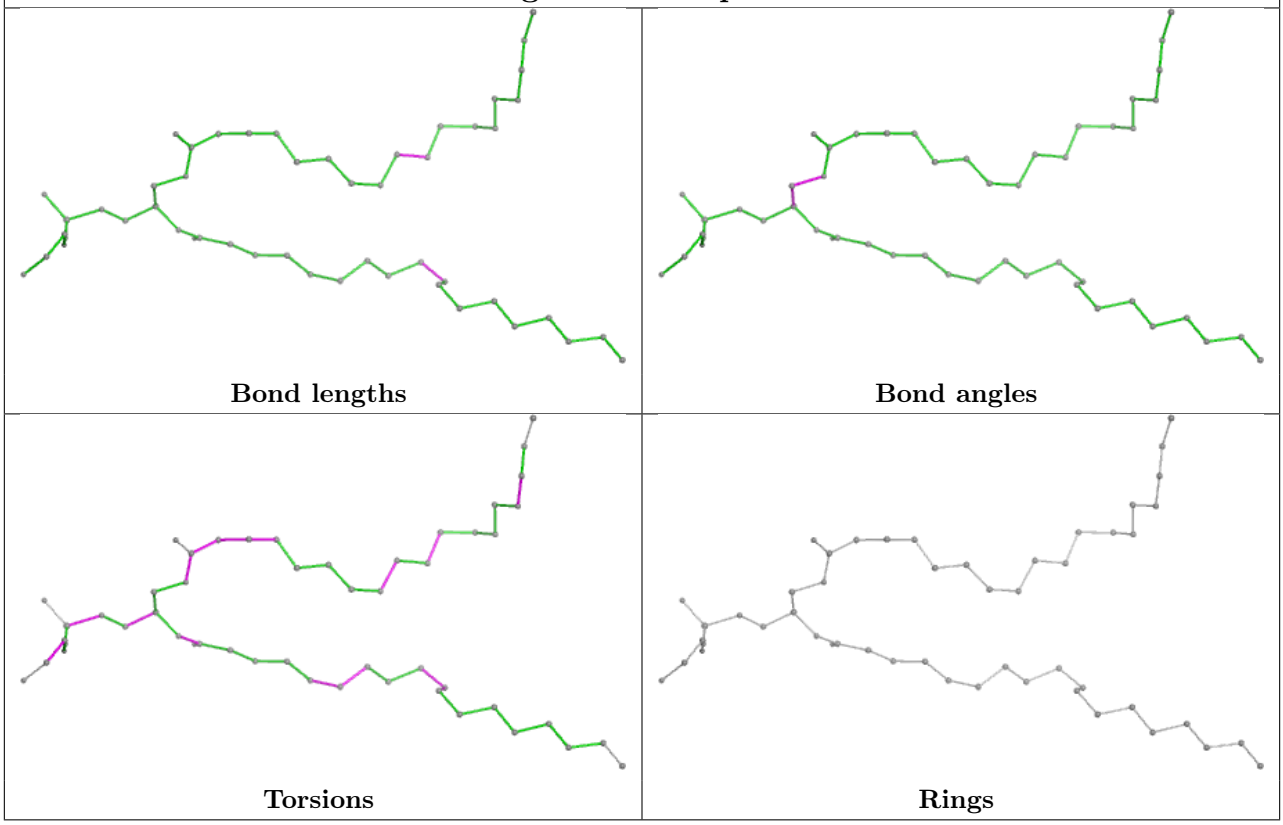


Torsions

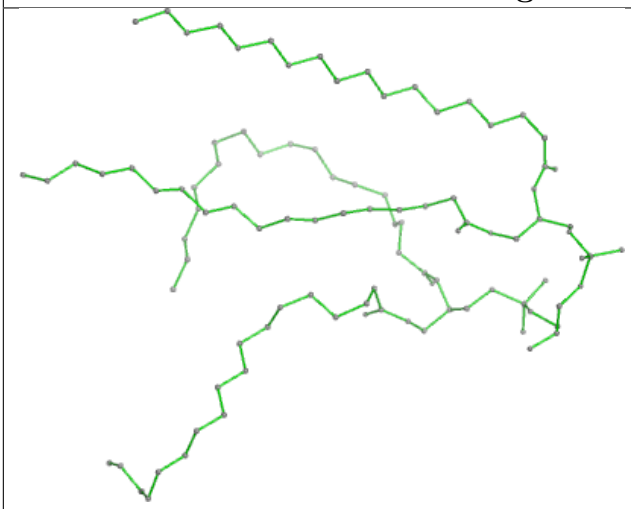


Rings

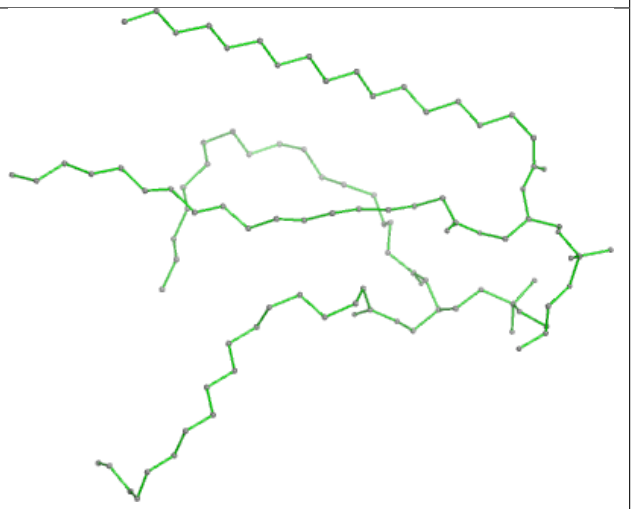
Ligand PEE 4q 909



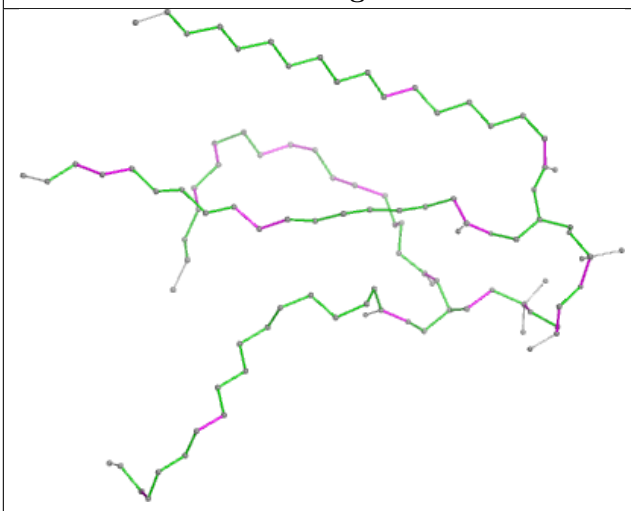
Ligand CDL 3E 201



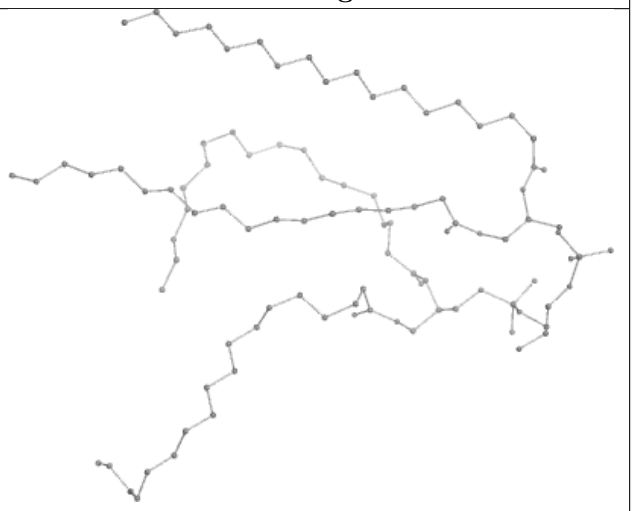
Bond lengths



Bond angles

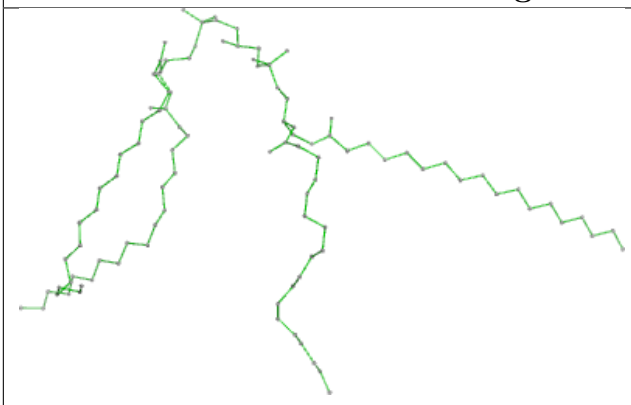


Torsions



Rings

Ligand CDL 2U 101



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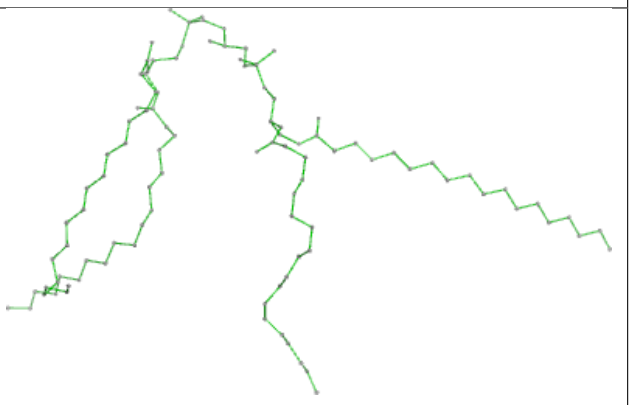
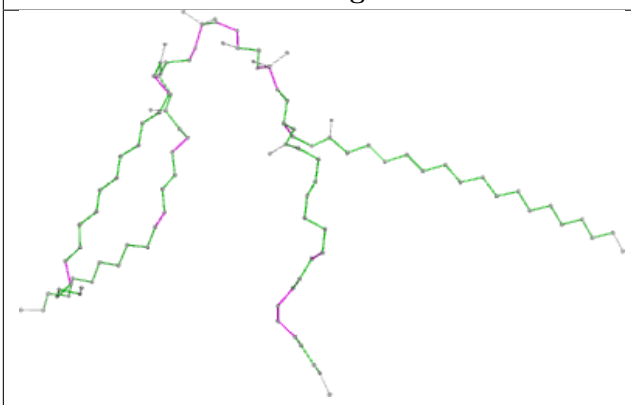
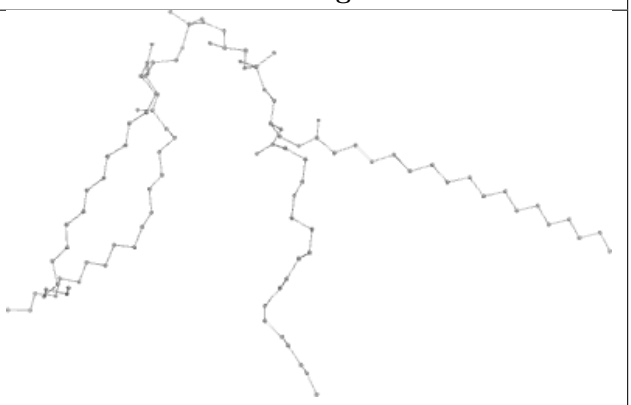


Bond angles

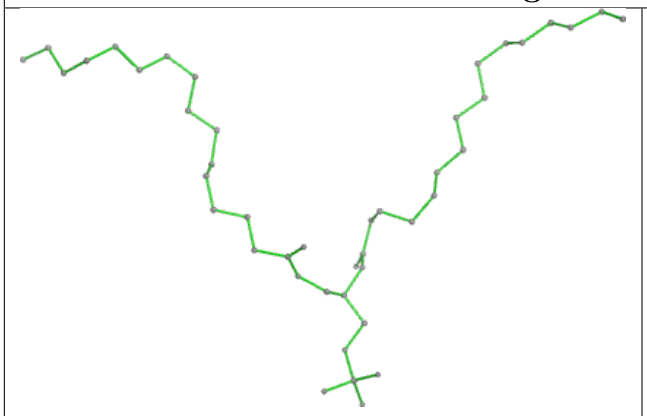


Torsions

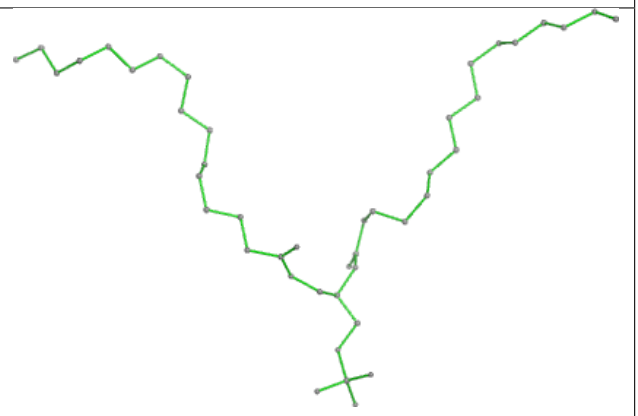


Rings

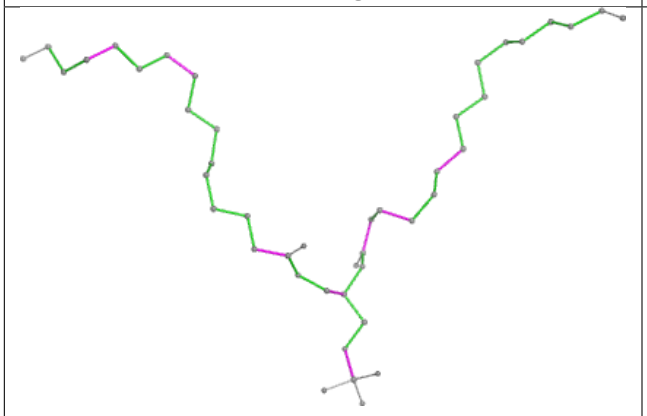
Ligand LPP 4c 101



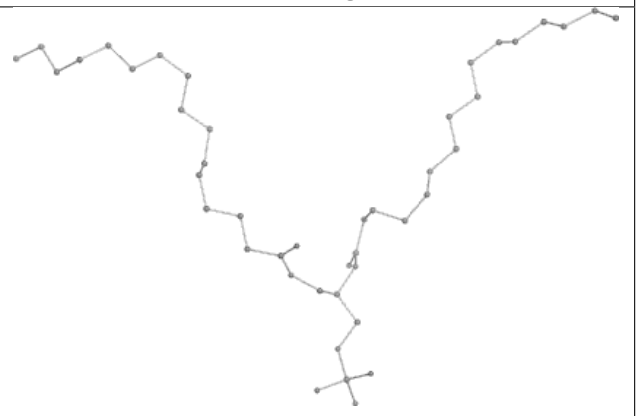
Bond lengths



Bond angles

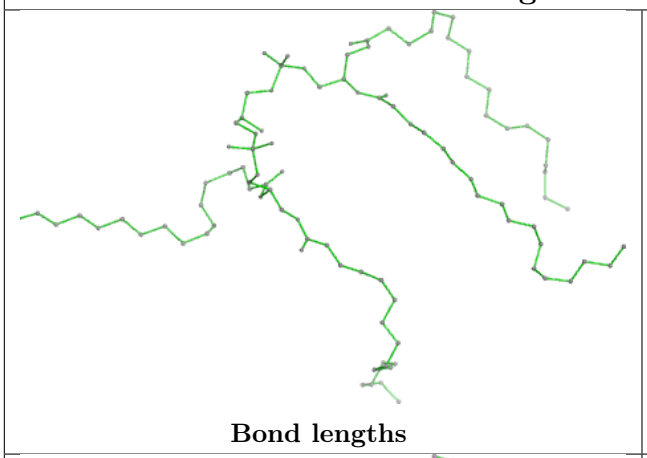


Torsions

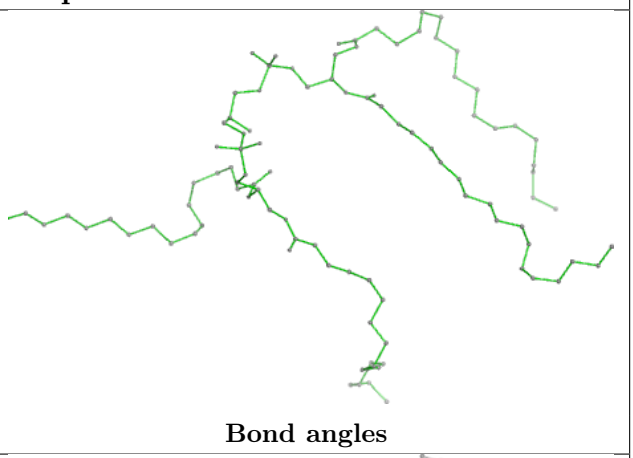


Rings

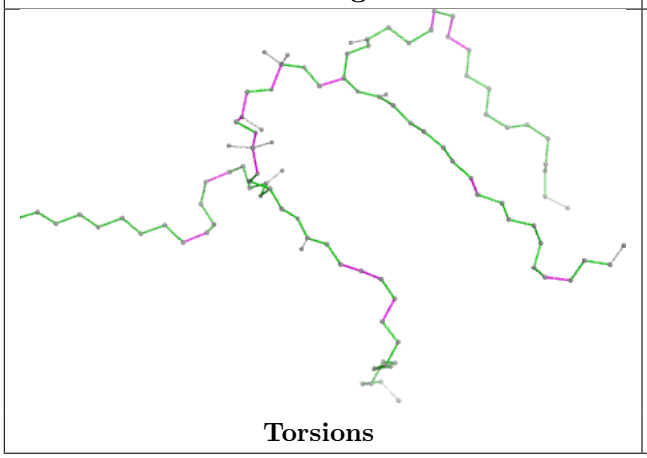
Ligand CDL 2p 201



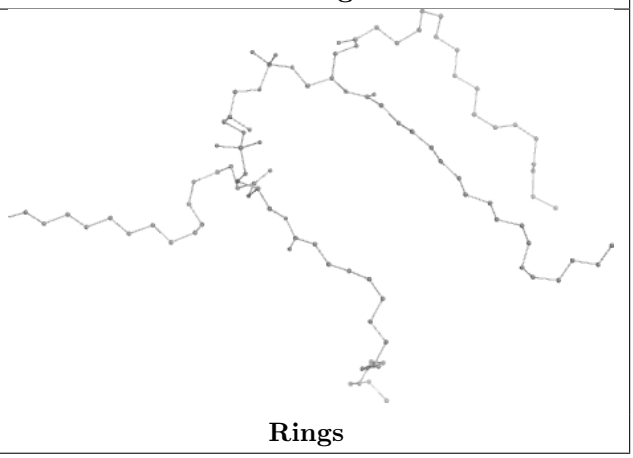
Bond lengths



Bond angles

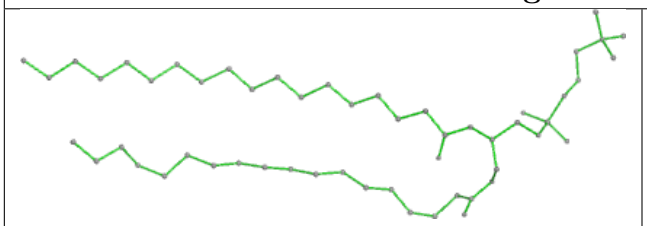


Torsions

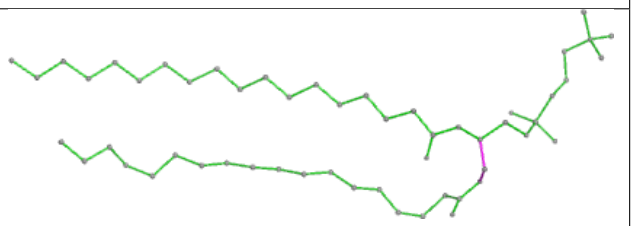


Rings

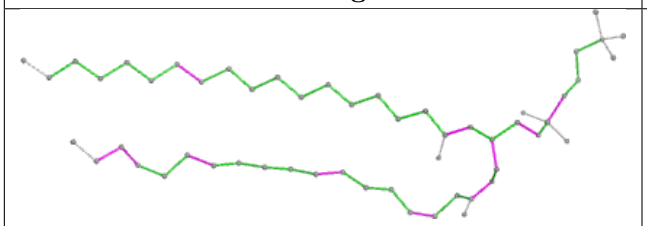
Ligand PC1 2o 204



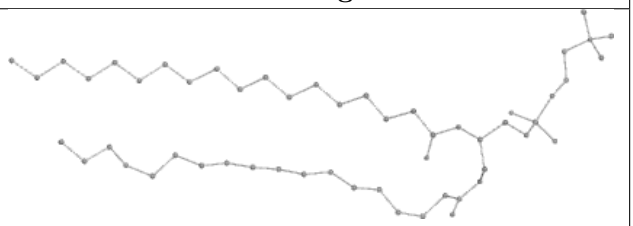
Bond lengths



Bond angles

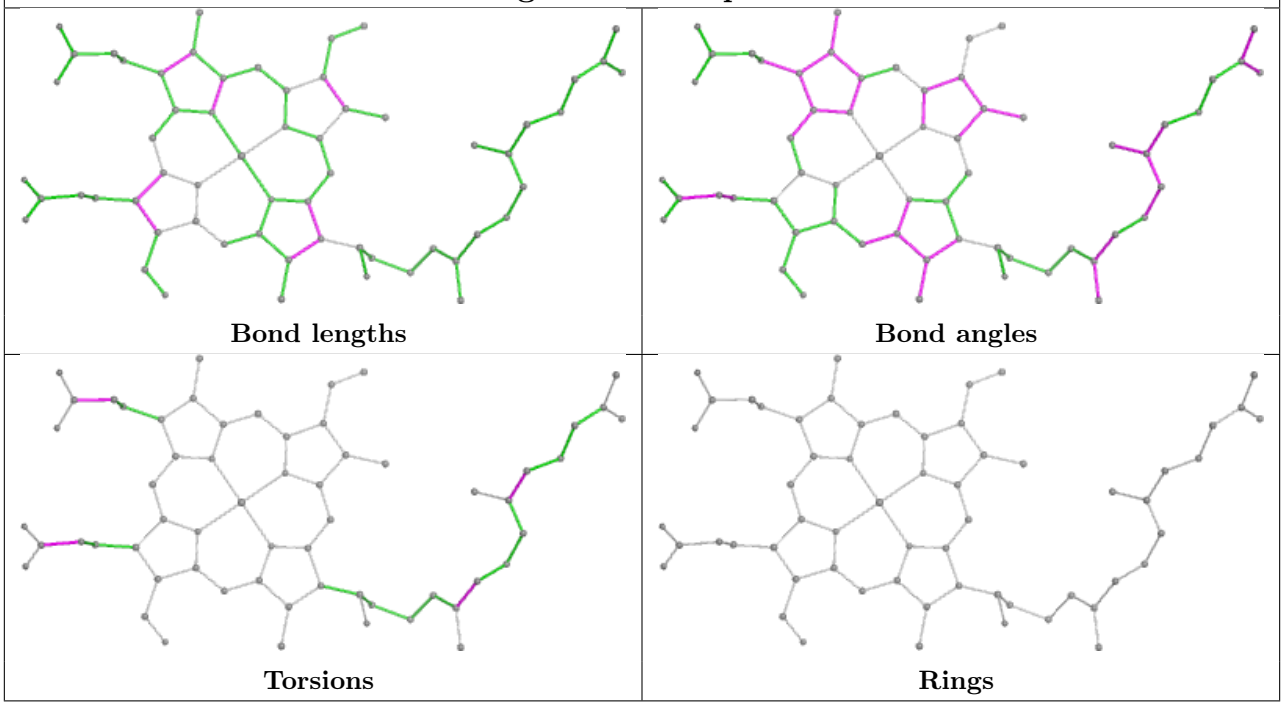


Torsions

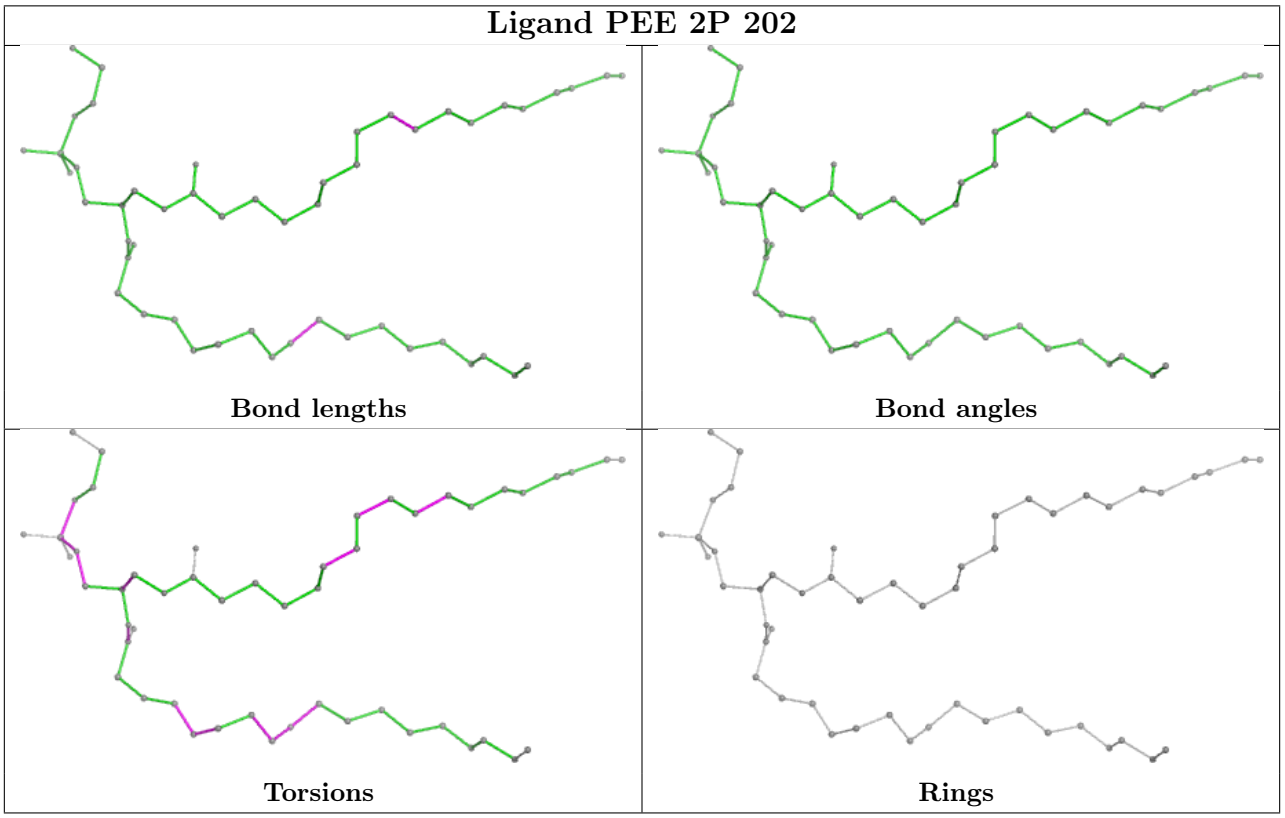


Rings

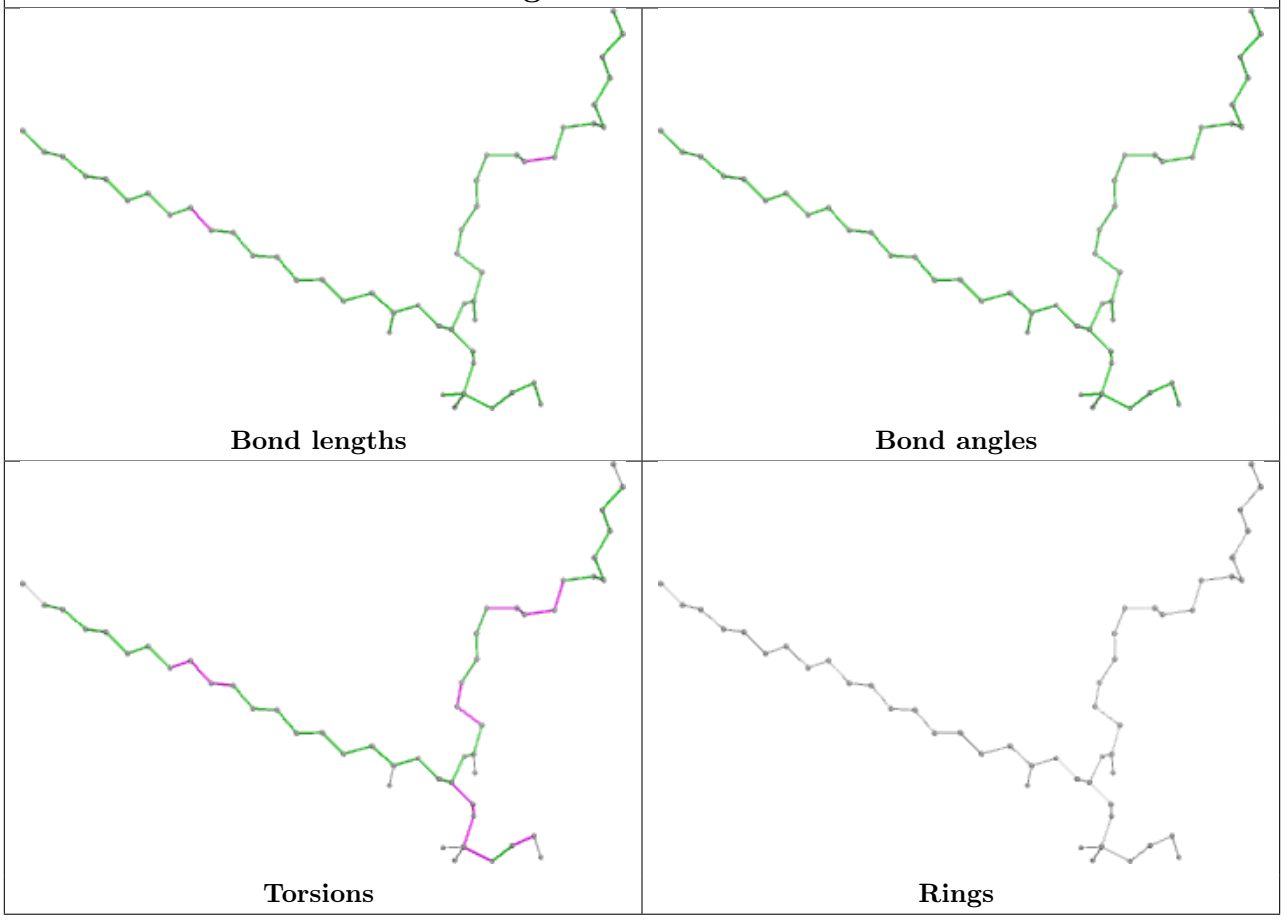
Ligand HEA 4q 904



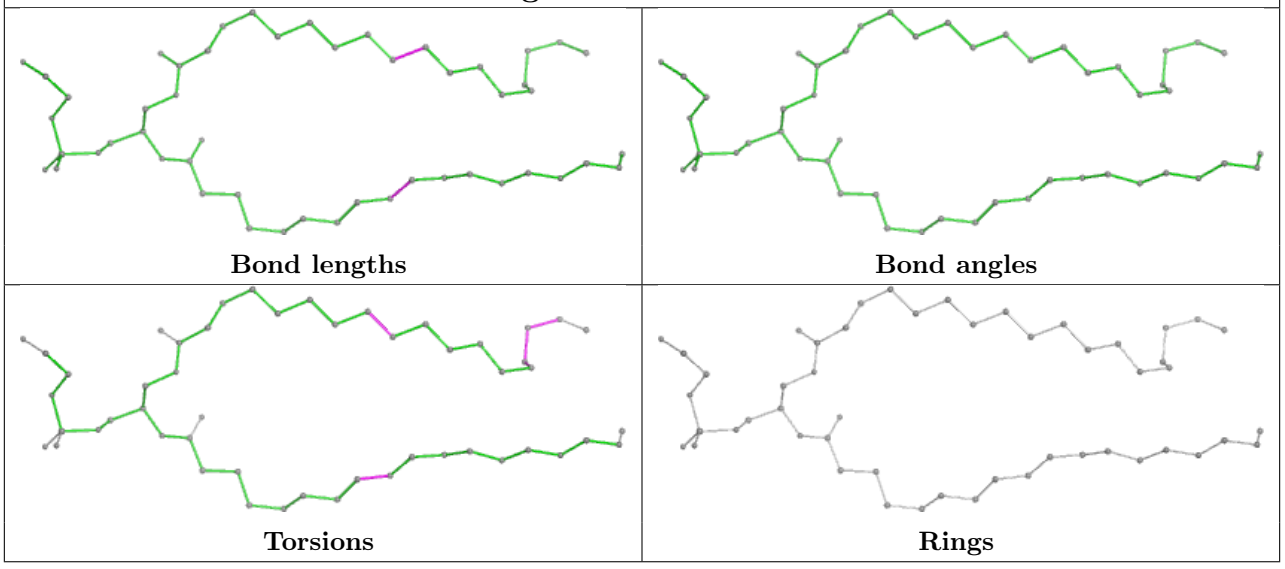
Ligand PEE 2P 202



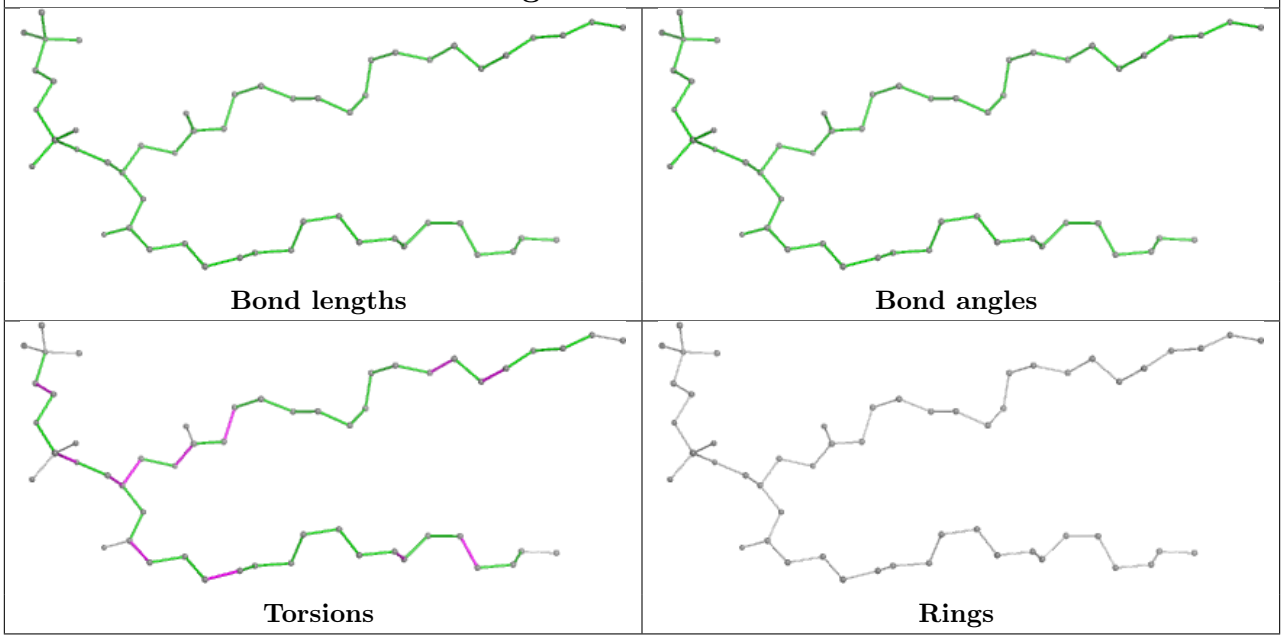
Ligand PEE 2r 201



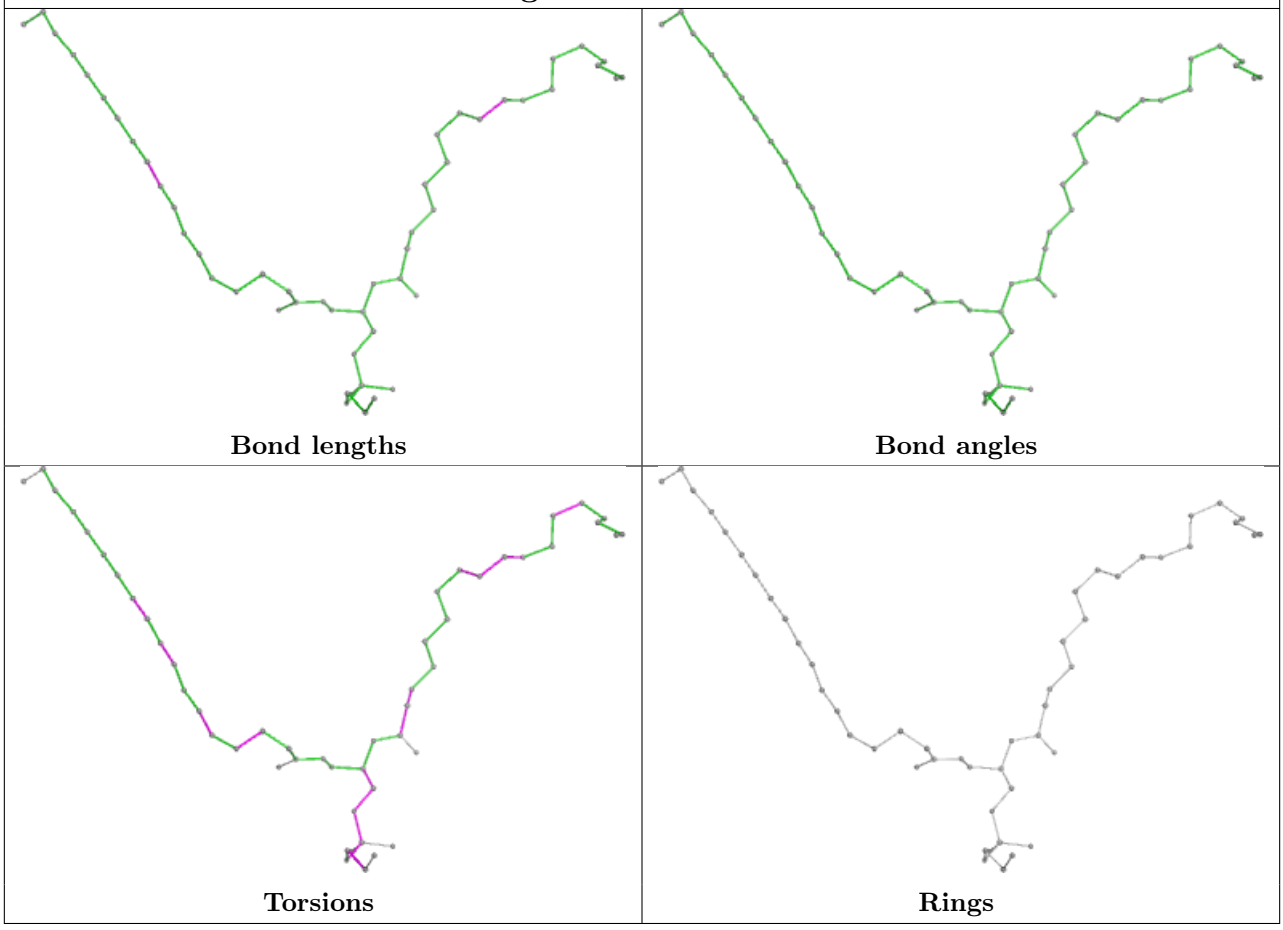
Ligand PEE 41 302



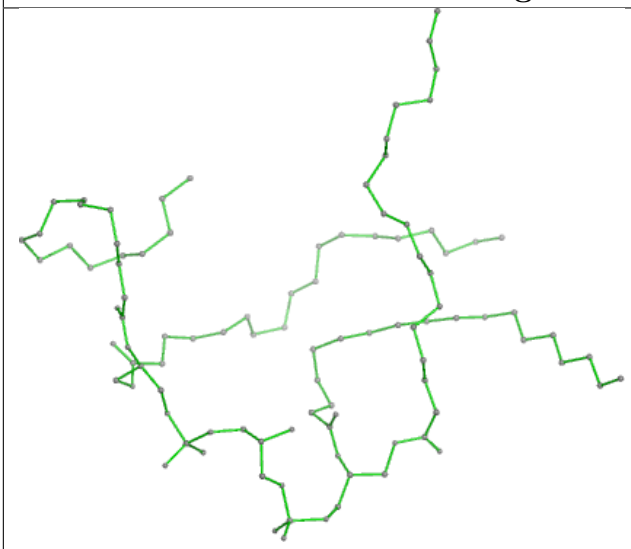
Ligand PC1 3h 403



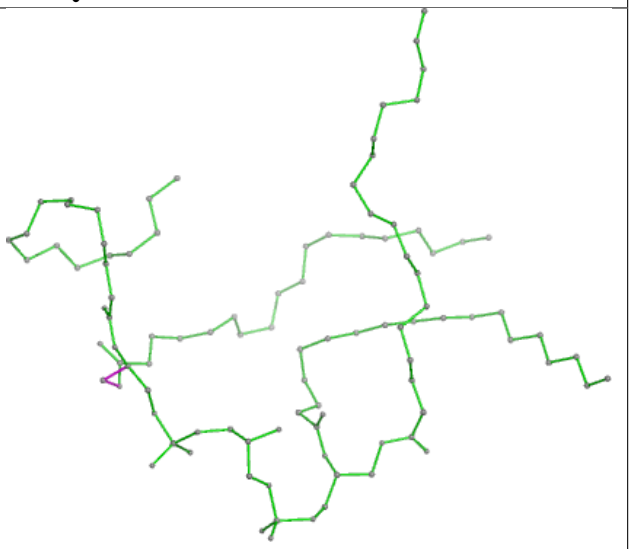
Ligand PEE 4d 101



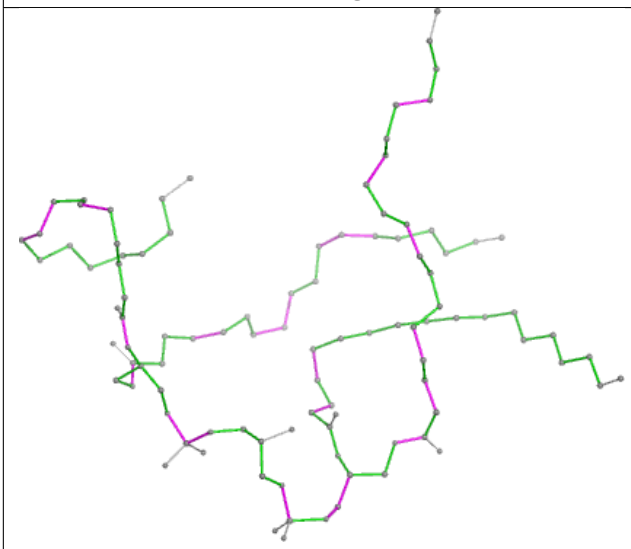
Ligand CDL 2Q 101



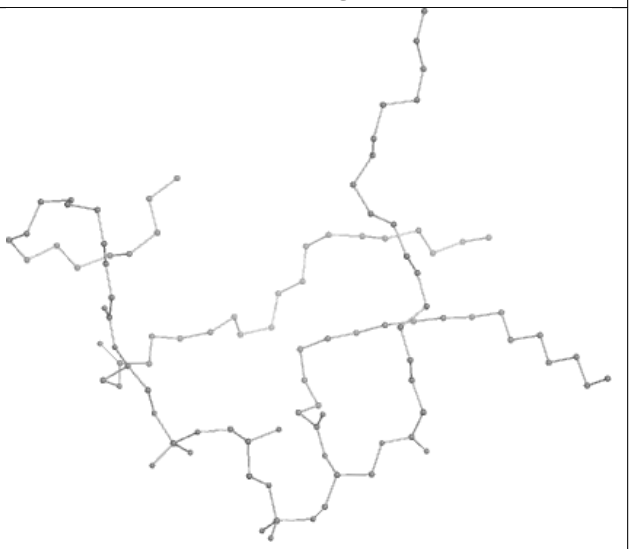
Bond lengths



Bond angles

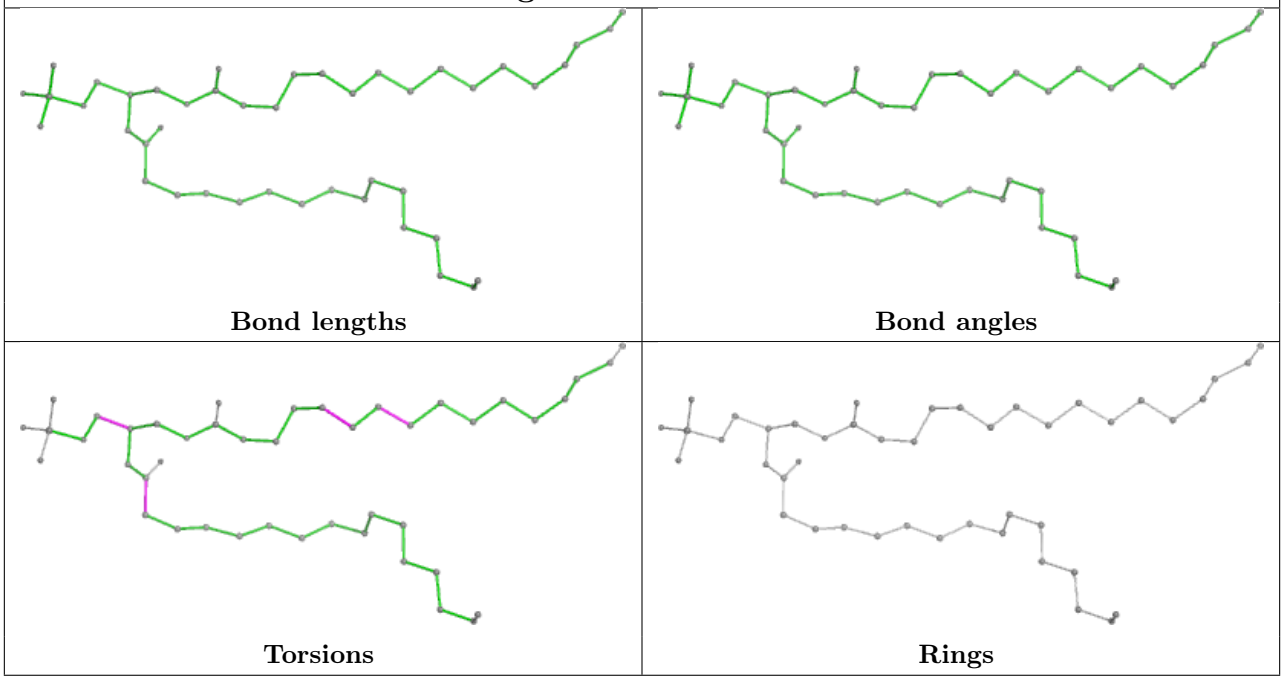


Torsions

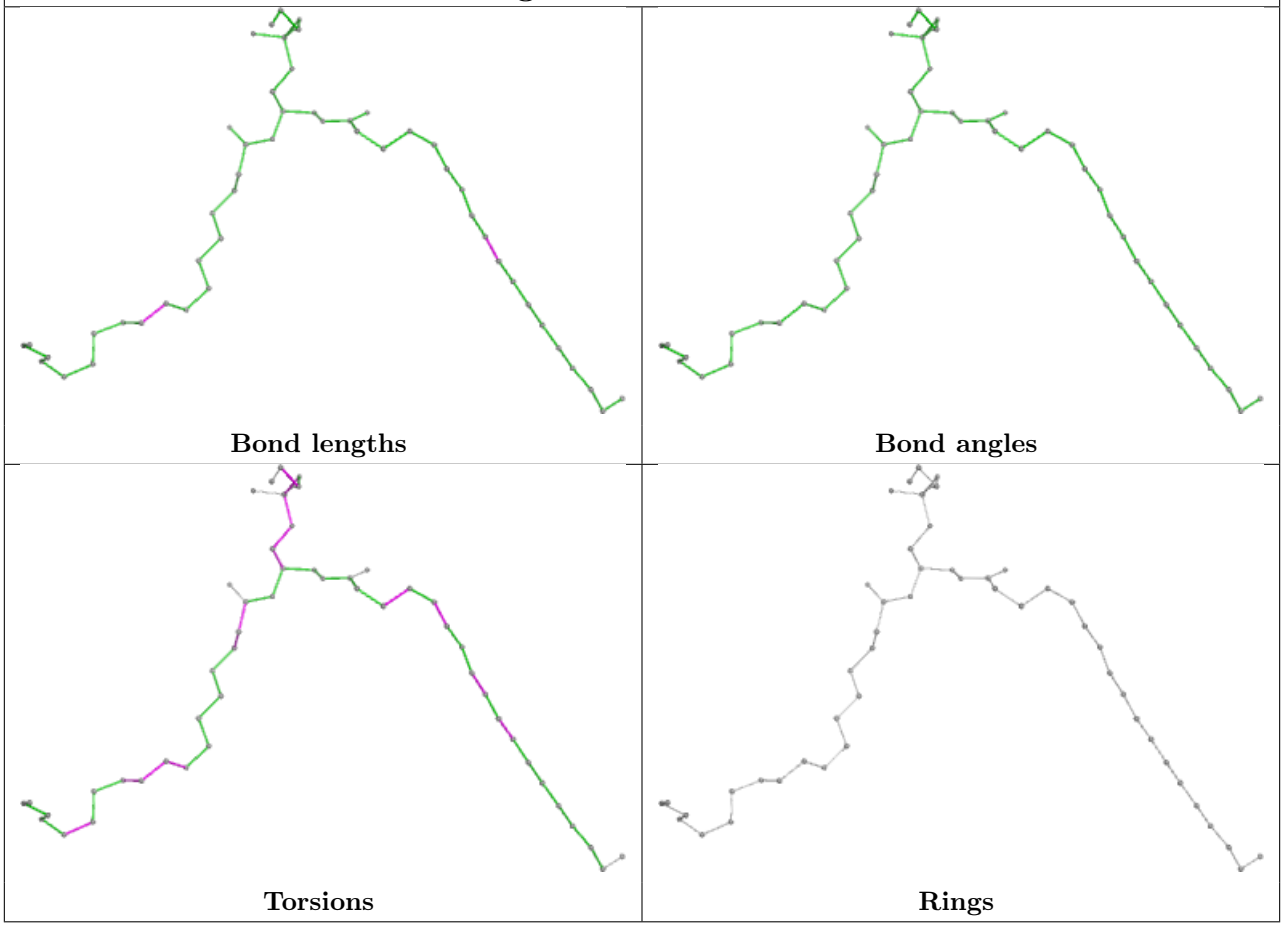


Rings

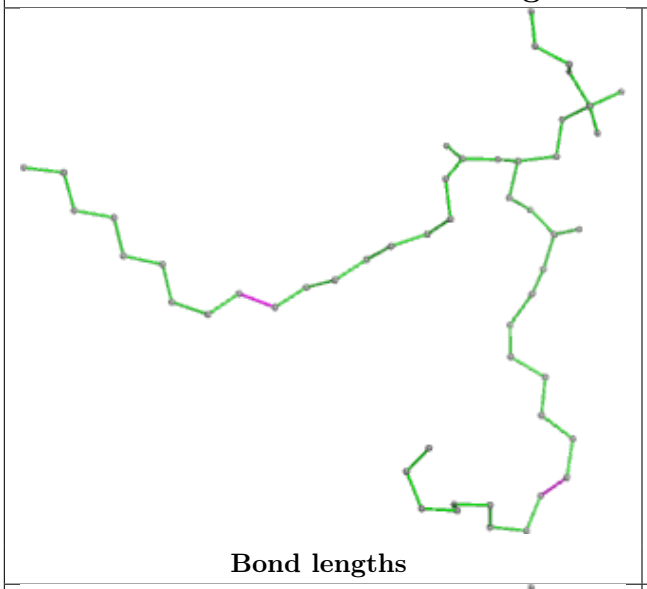
Ligand LPP 4D 102



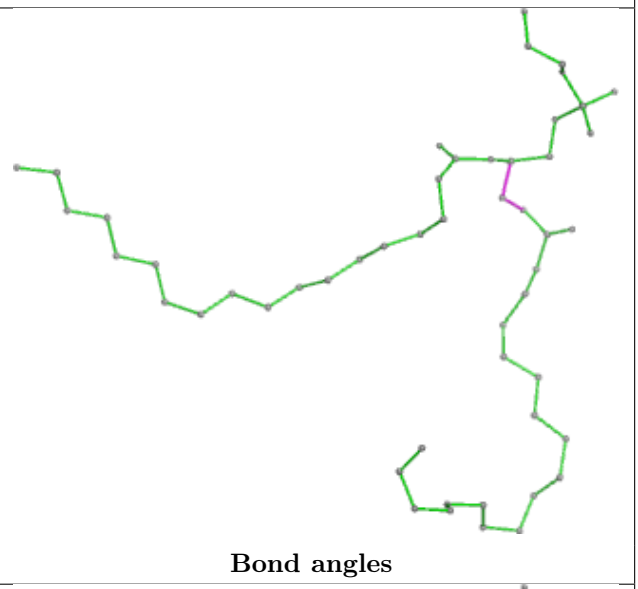
Ligand PEE 4D 101



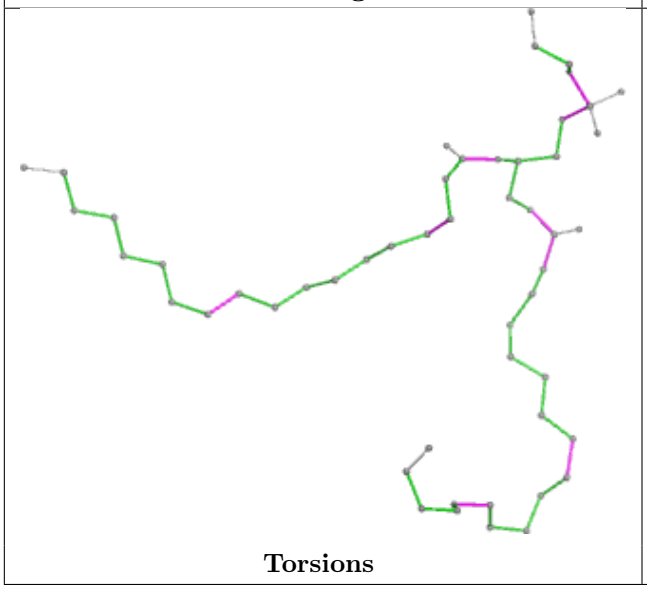
Ligand PEE 3c 302



Bond lengths



Bond angles



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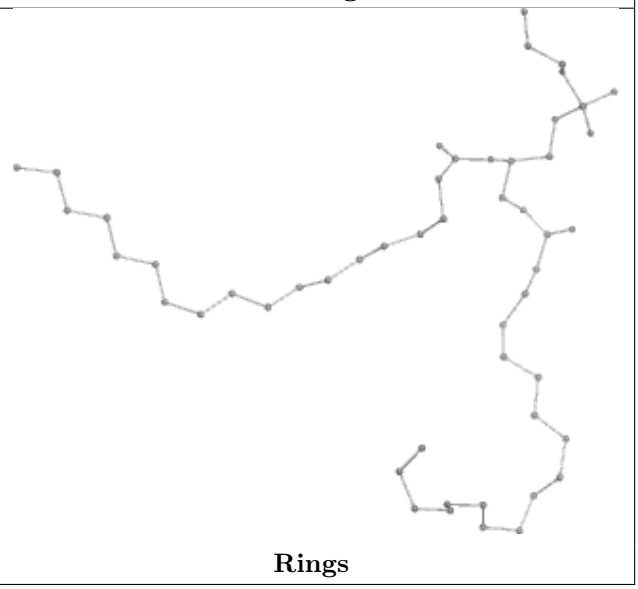
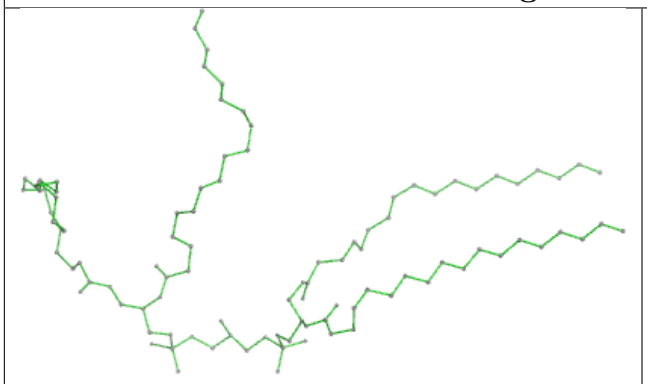
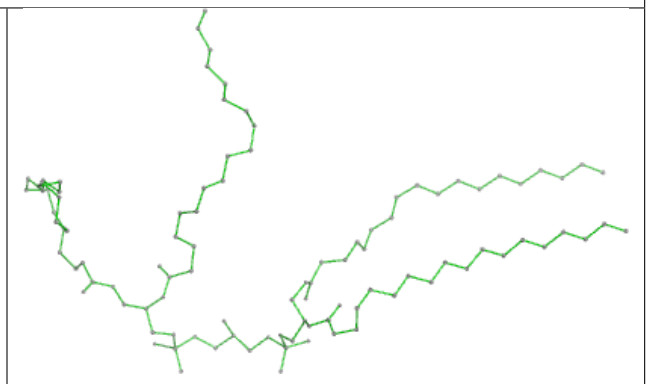


Rings

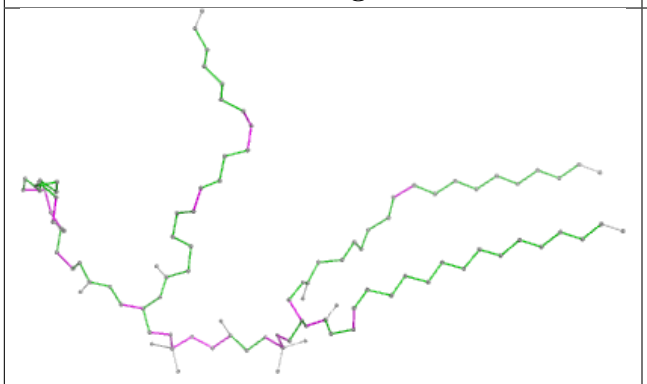
Ligand CDL 4k 201



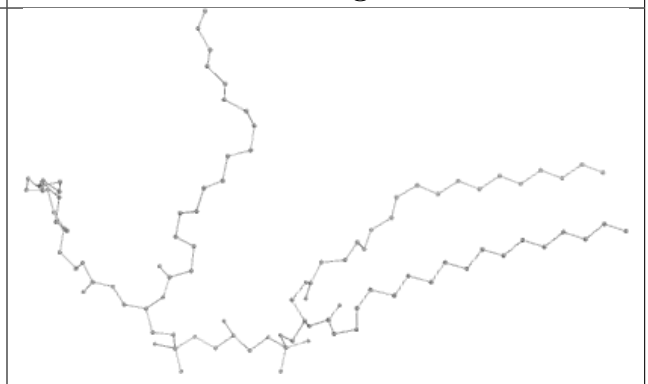
Bond lengths



Bond angles

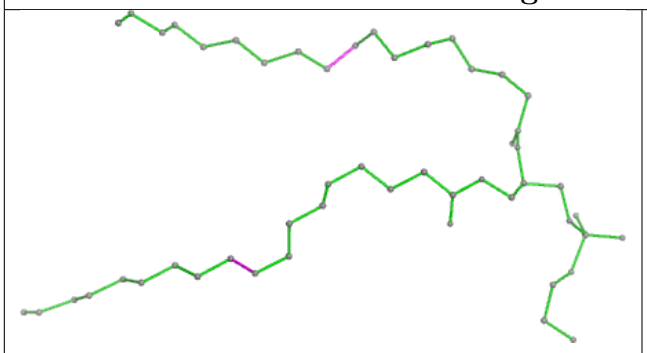


Torsions

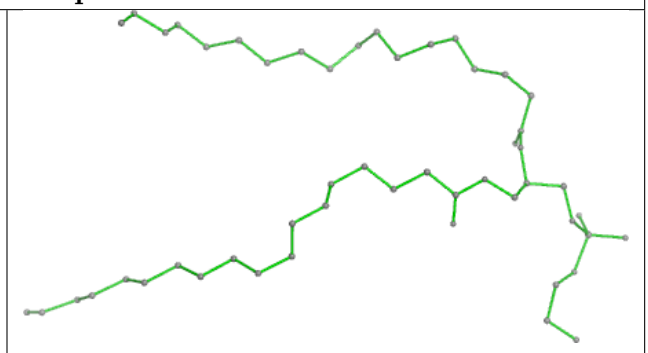


Rings

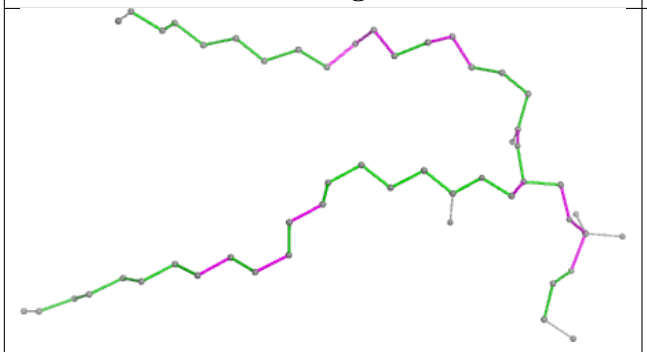
Ligand PEE 2p 202



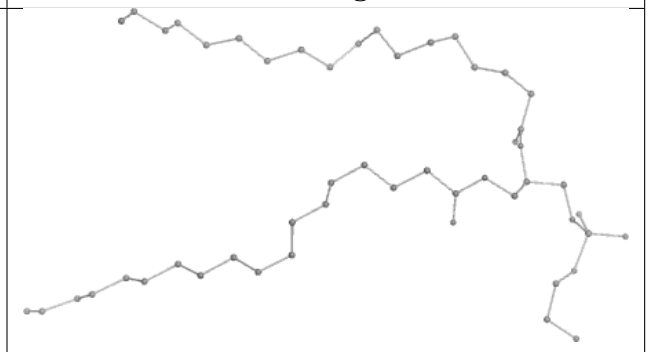
Bond lengths



Bond angles

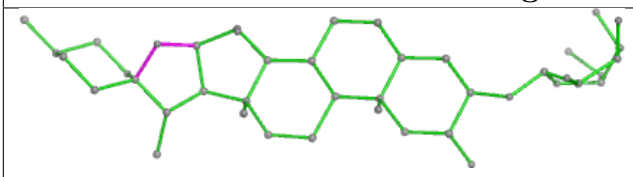


Torsions

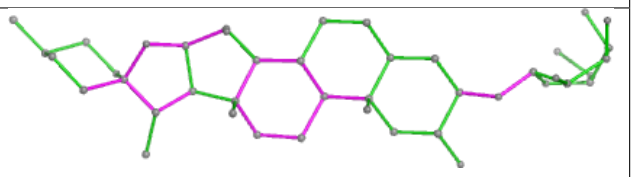


Rings

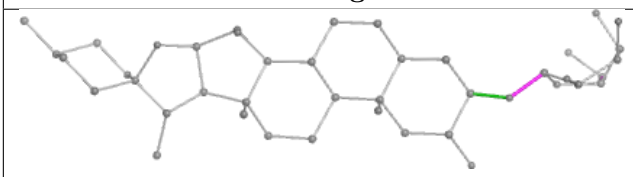
Ligand AJP 40 304



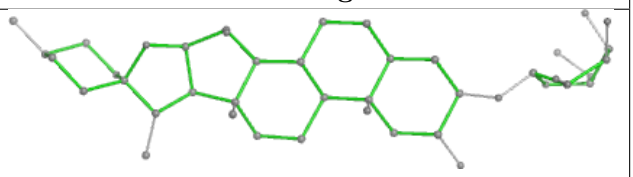
Bond lengths



Bond angles

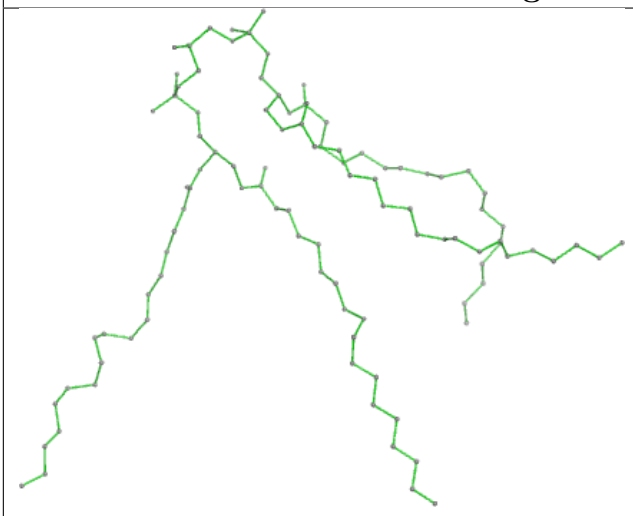


Torsions

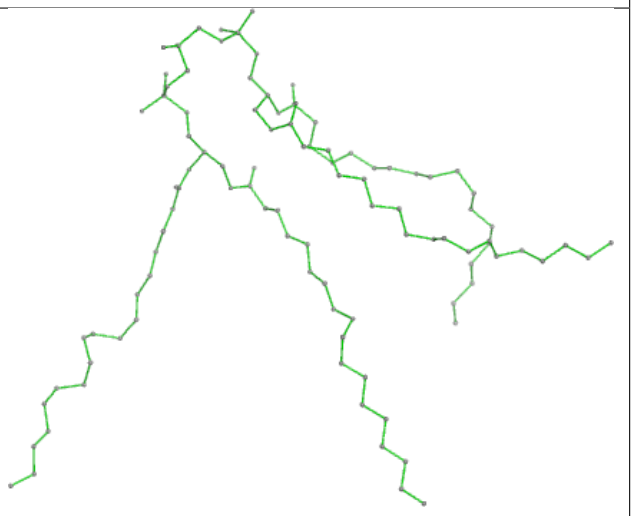


Rings

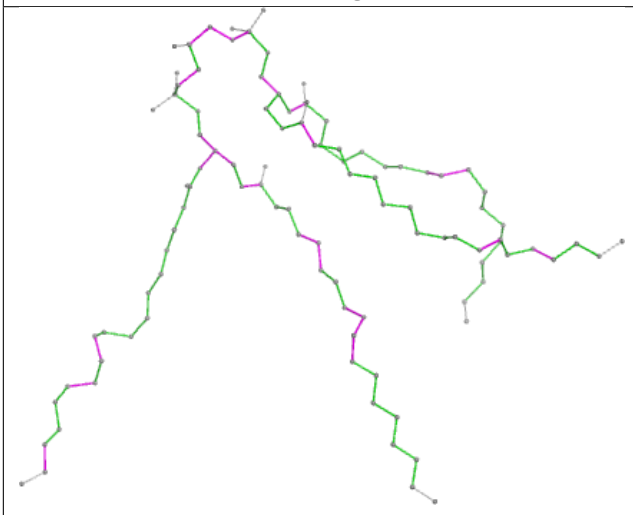
Ligand CDL 3l 701



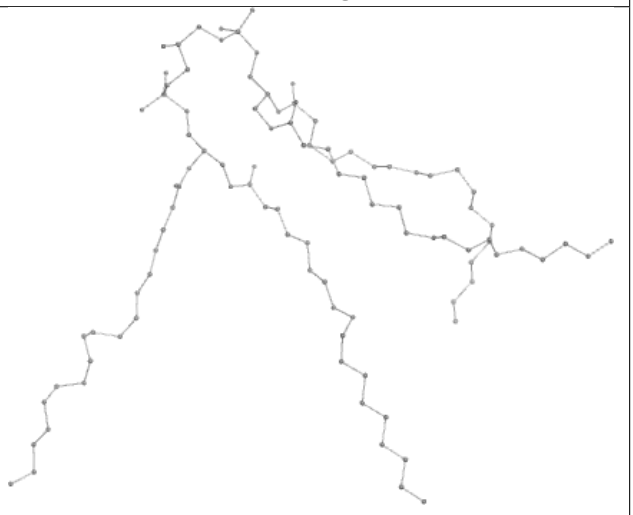
Bond lengths



Bond angles

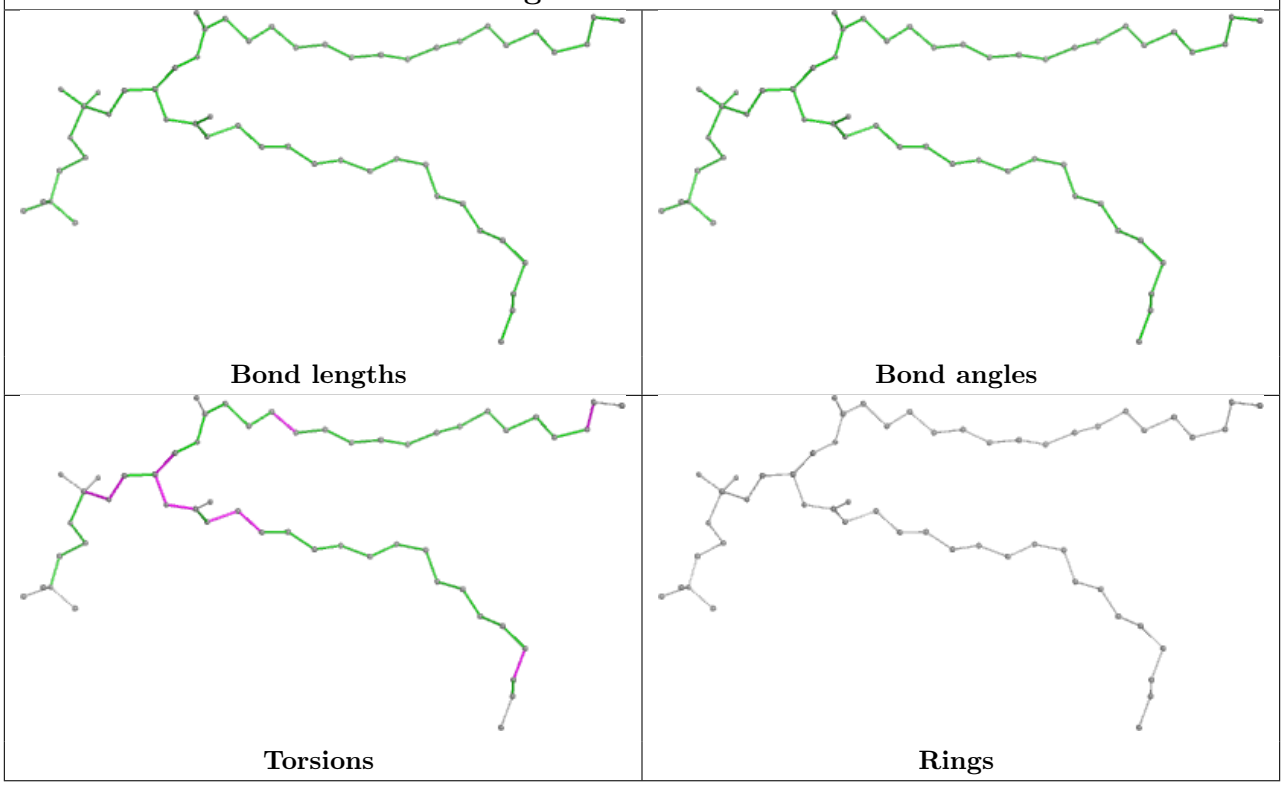


Torsions

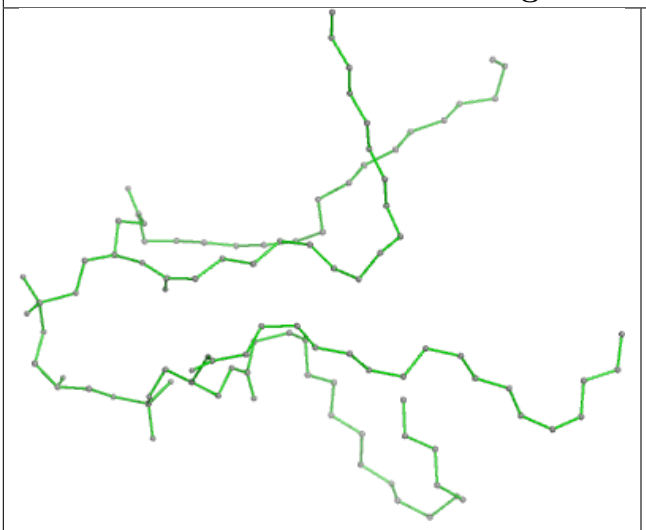


Rings

Ligand PC1 4e 202

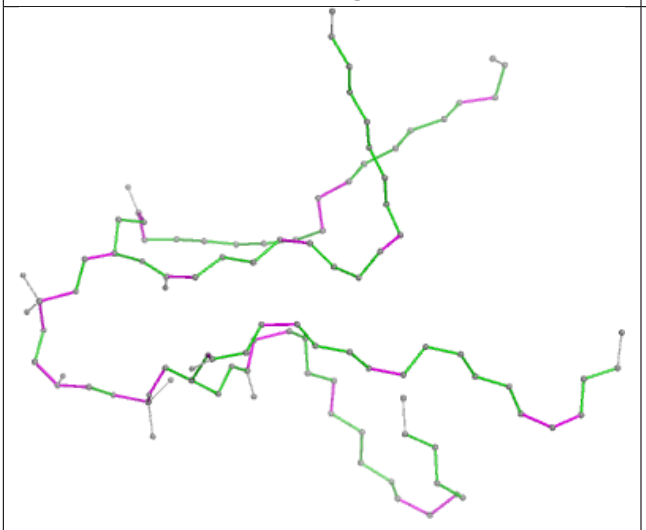


Ligand CDL 3I 202

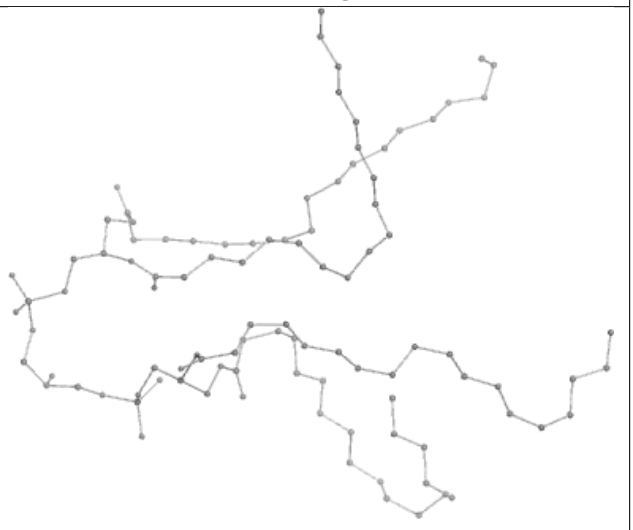


Bond lengths

Bond angles

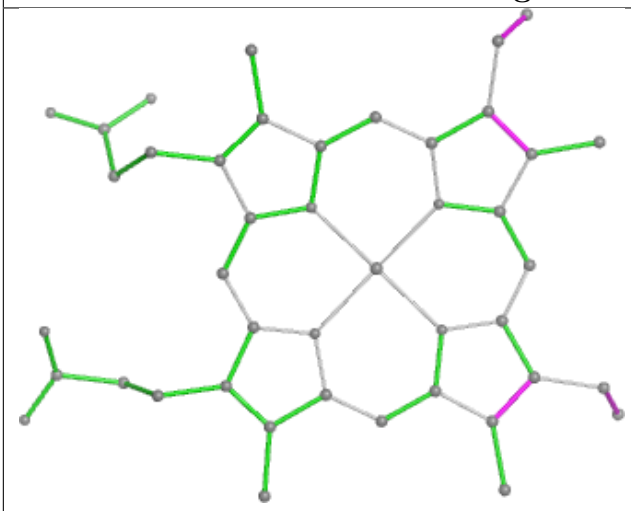


Torsions

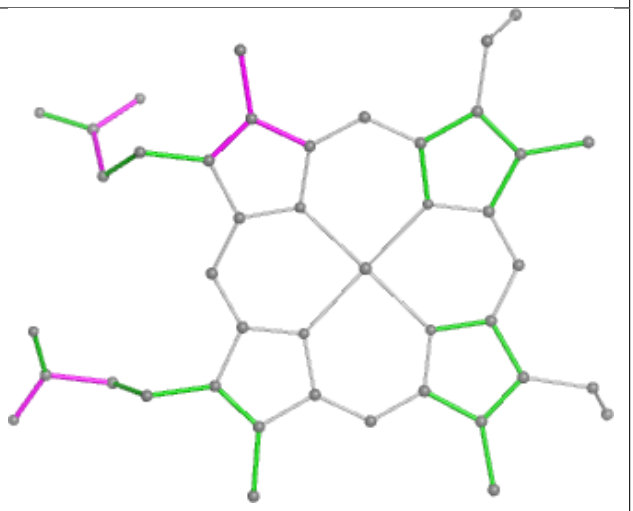


Rings

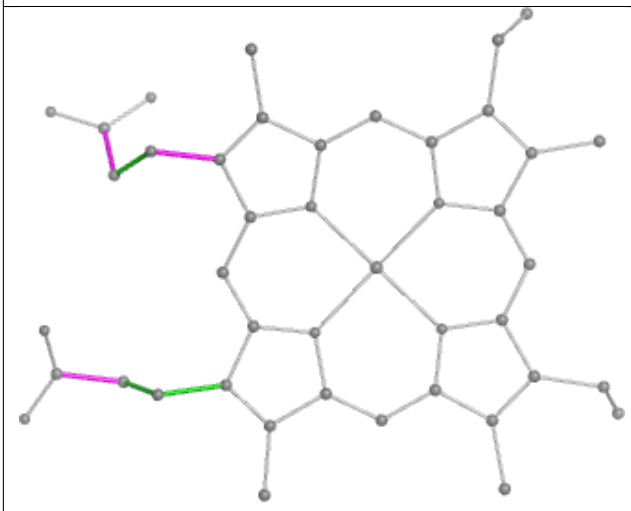
Ligand HEC 3C 301



Bond lengths



Bond angles



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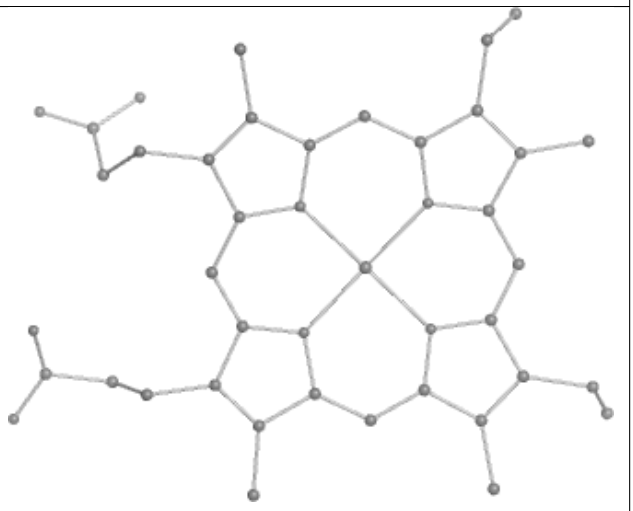
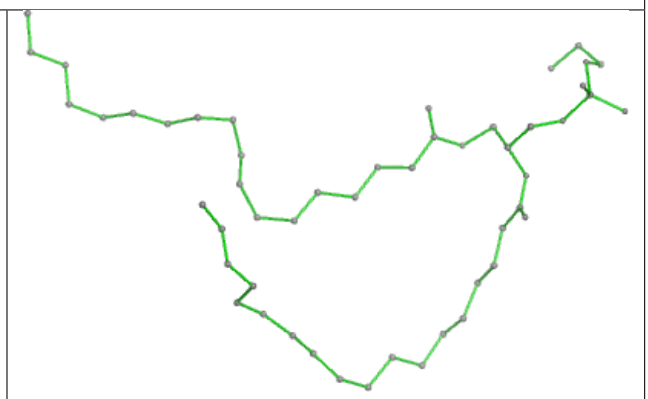


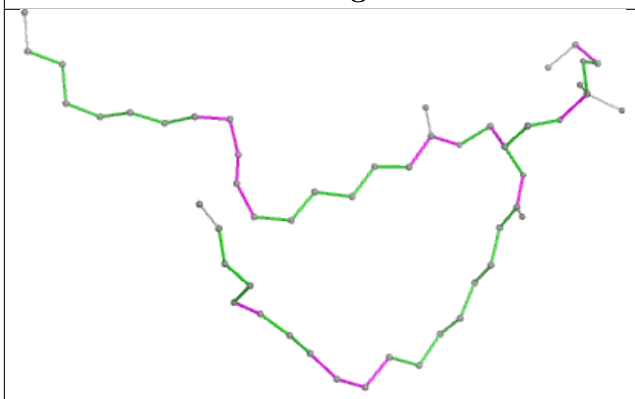
Rings

Ligand PEE 2O 201

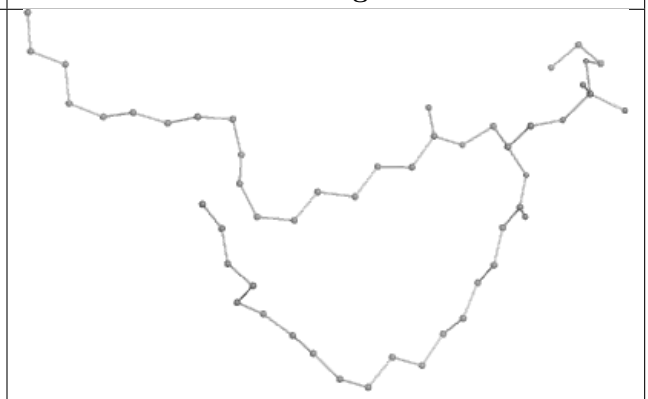
Bond lengths



Bond angles

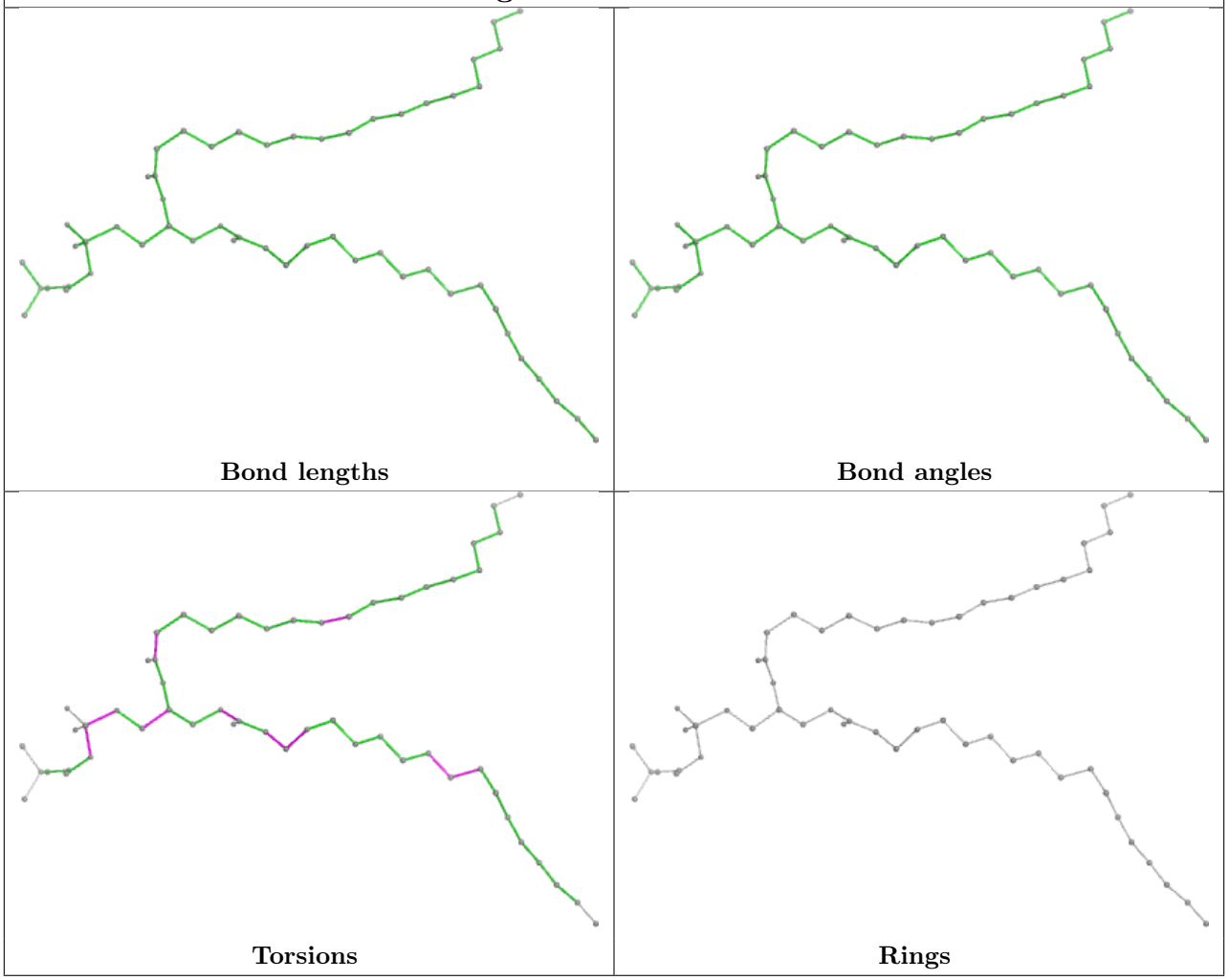


Torsions

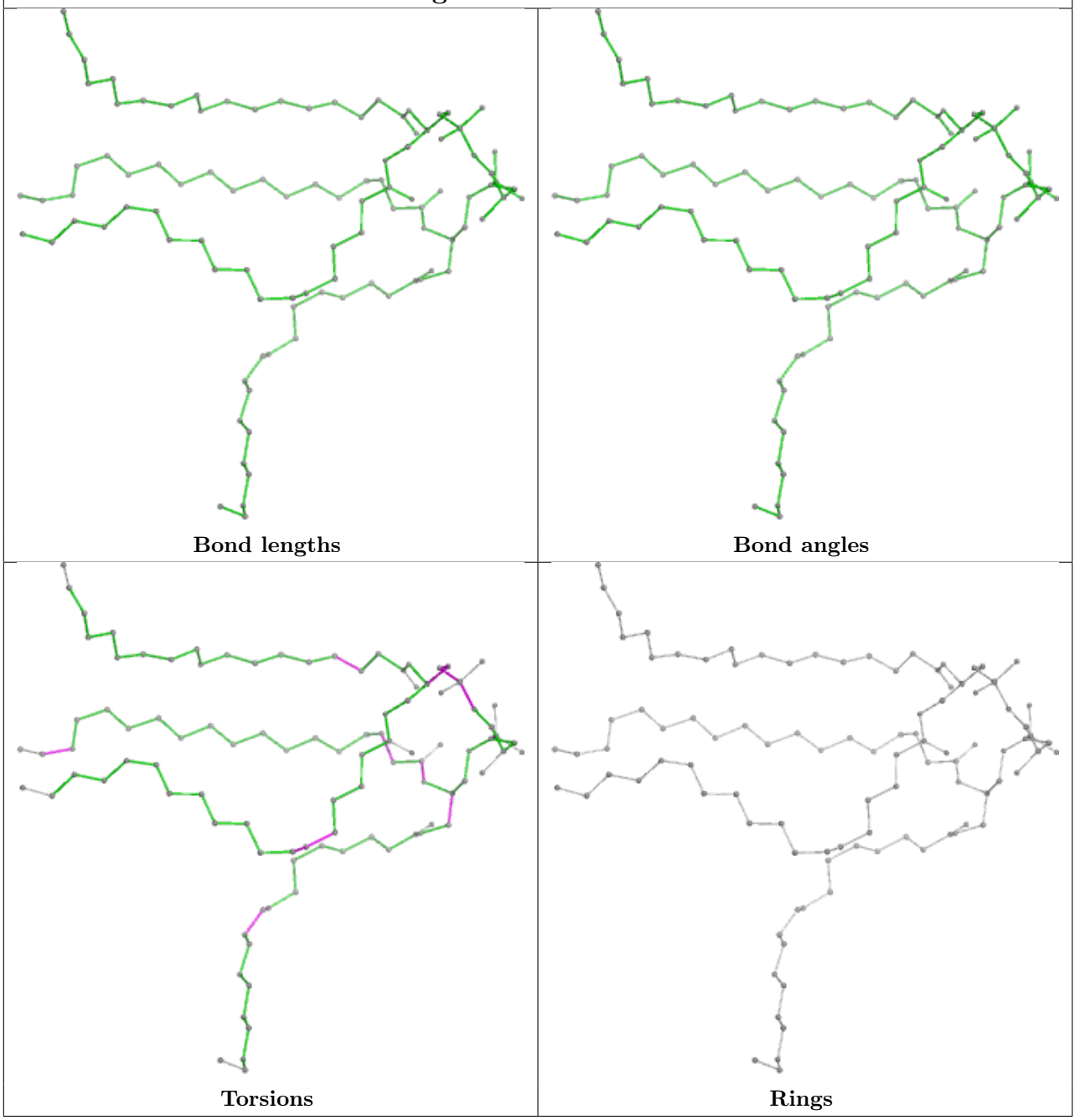


Rings

Ligand PC1 2R 202



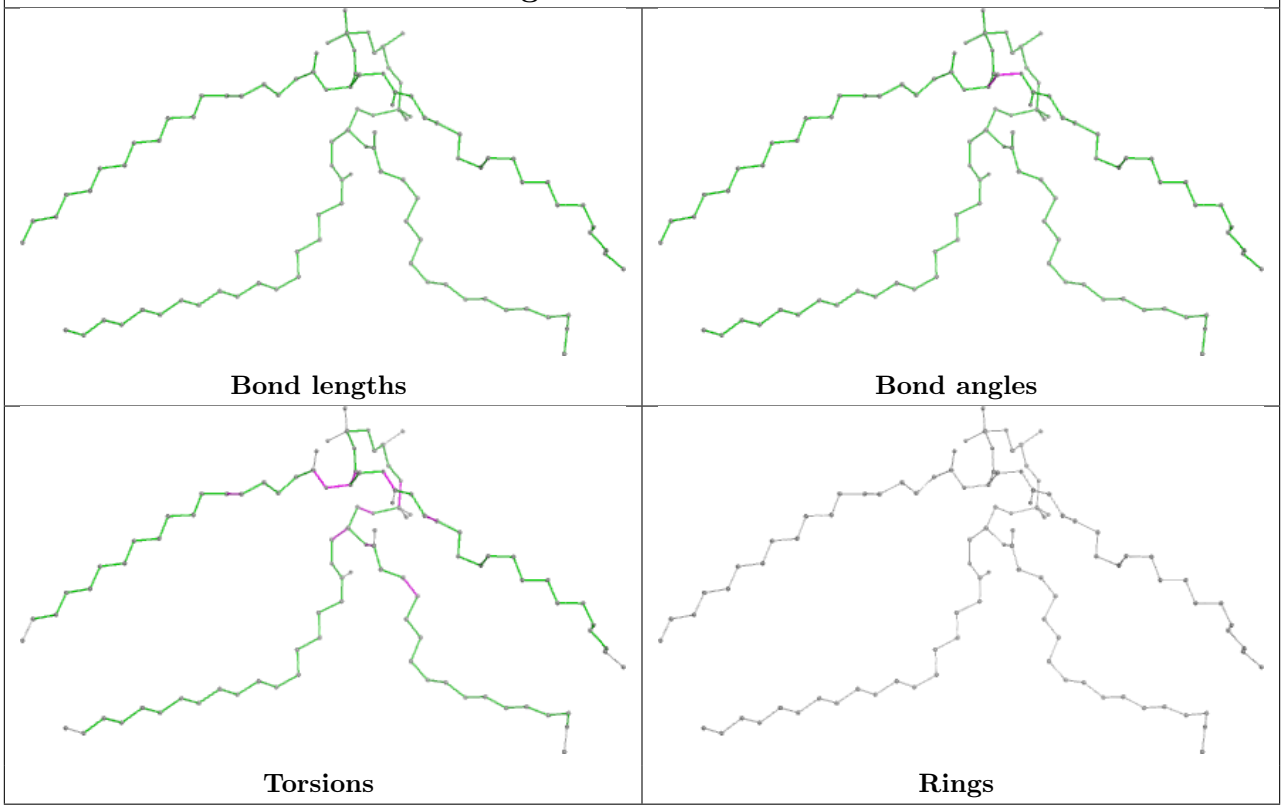
Ligand CDL 4w 201



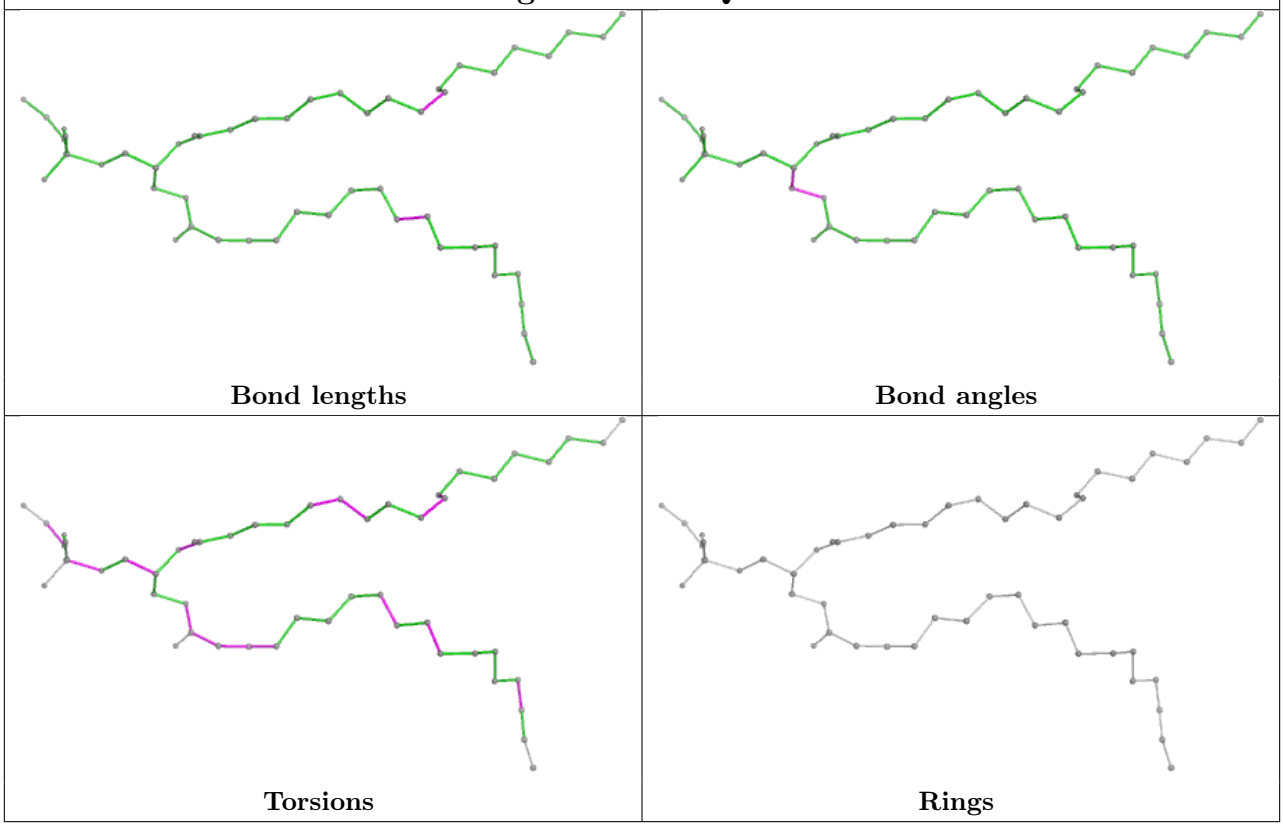
Bond lengths **Bond angles**

Torsions **Rings**

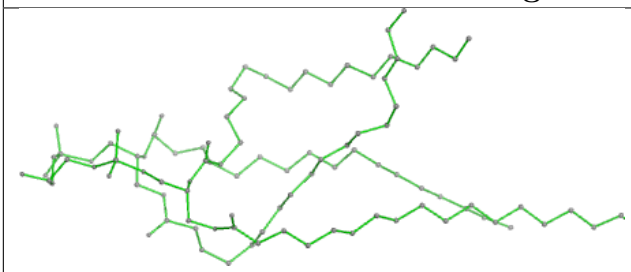
Ligand CDL 4z 301



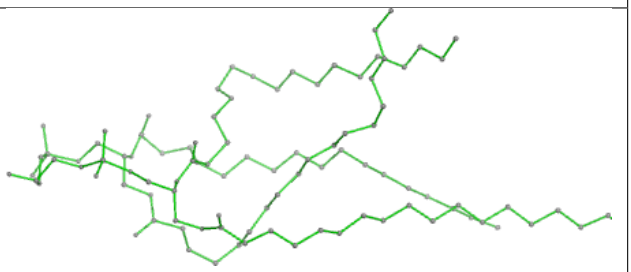
Ligand PEE 4Q 909



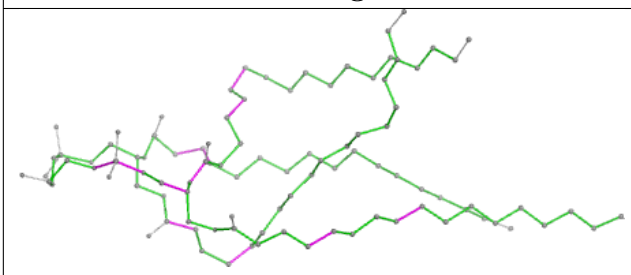
Ligand CDL 4l 201



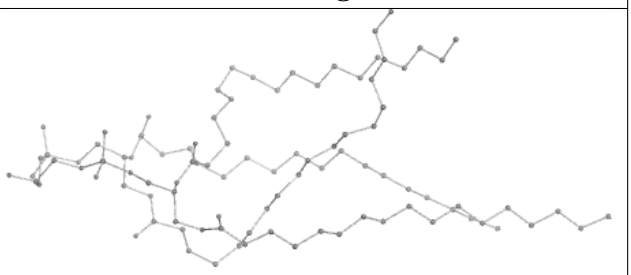
Bond lengths



Bond angles

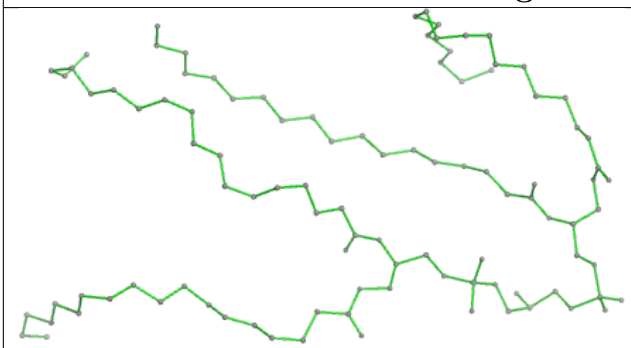


Torsions

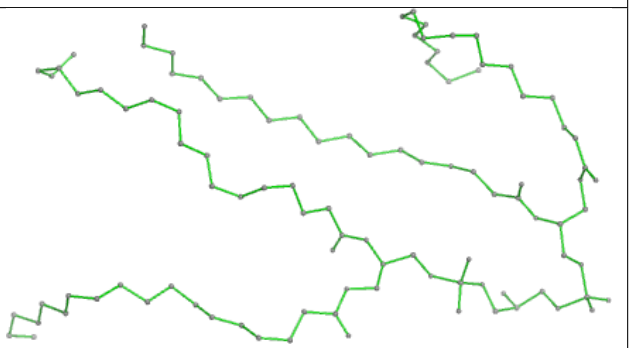


Rings

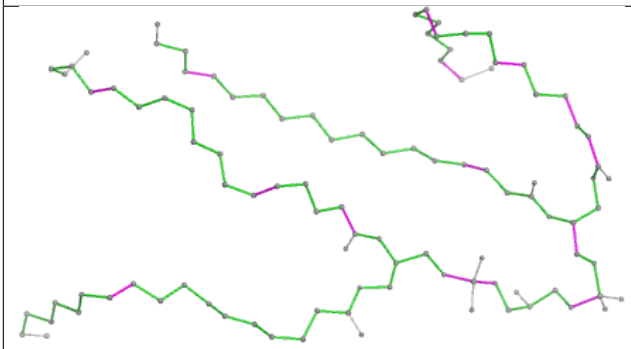
Ligand CDL 4T 203



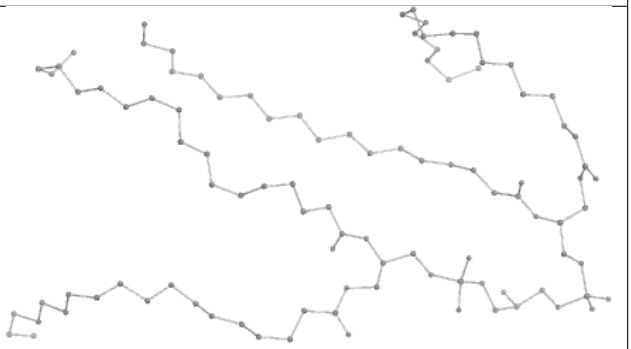
Bond lengths



Bond angles

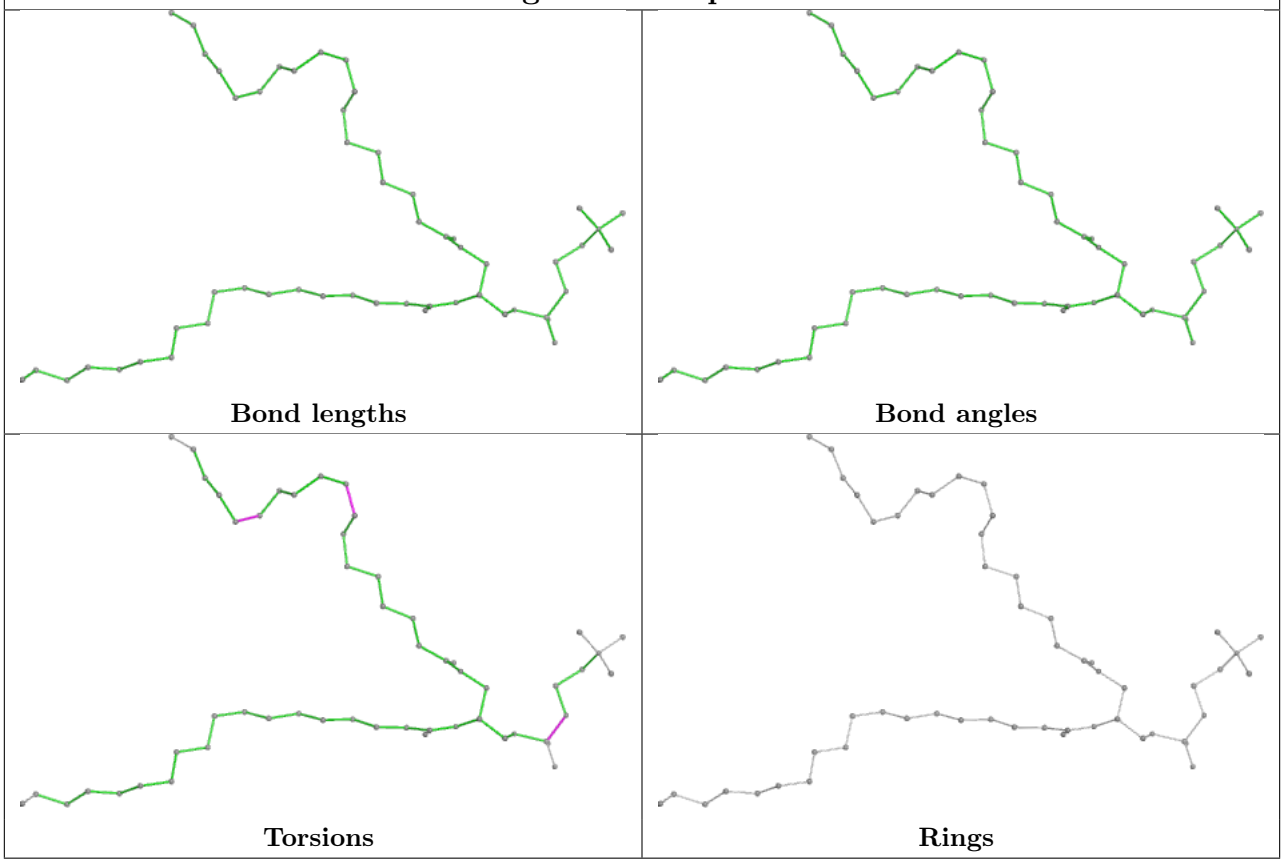


Torsions

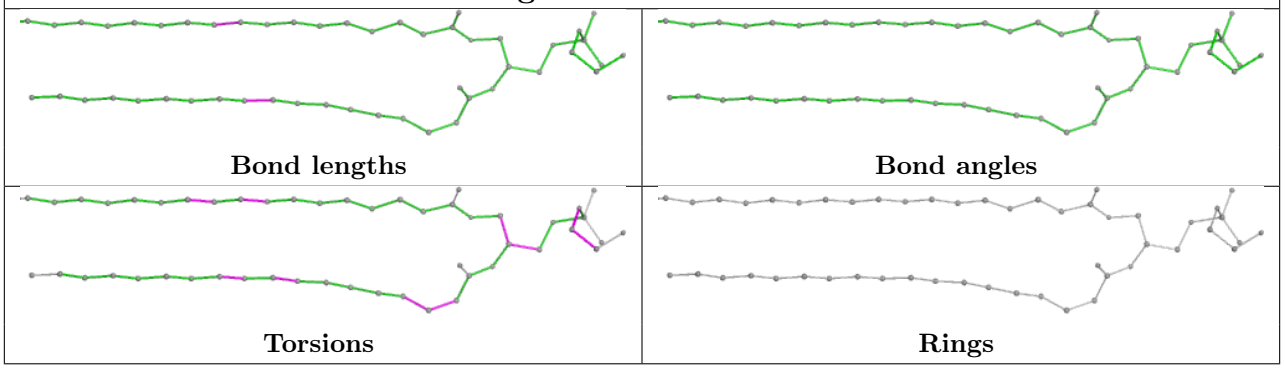


Rings

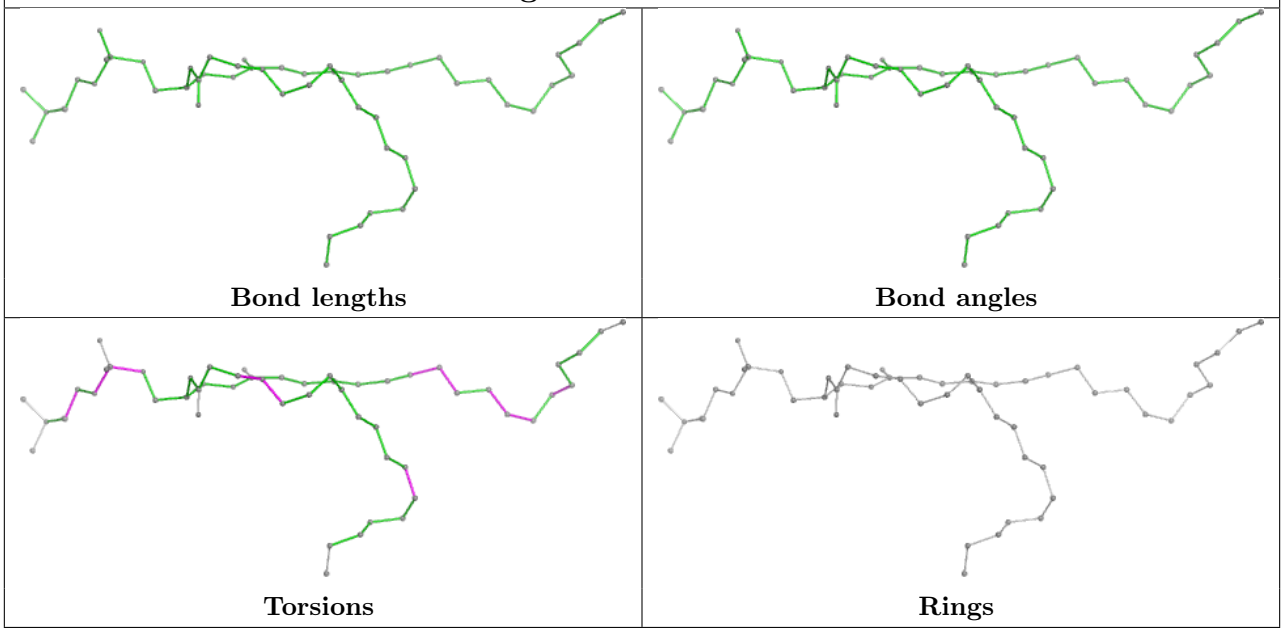
Ligand PC1 2p 204



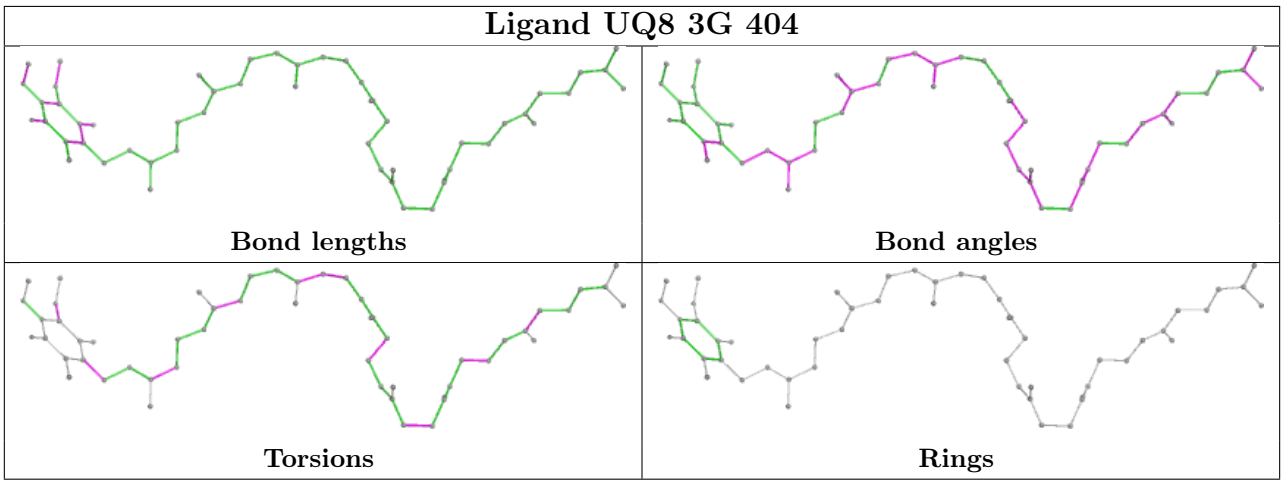
Ligand PEE 4w 203



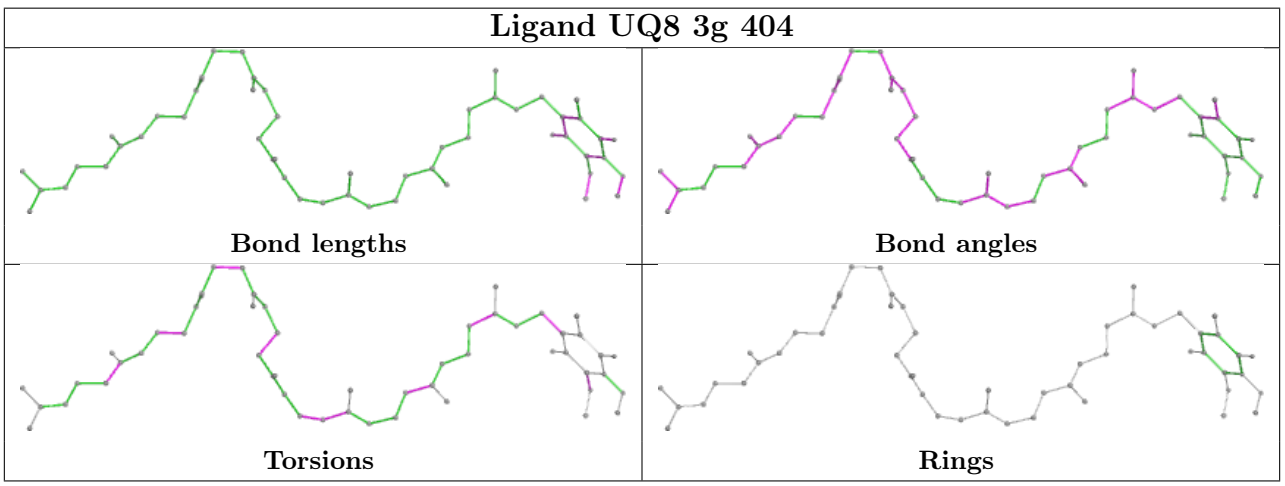
Ligand PC1 2T 101



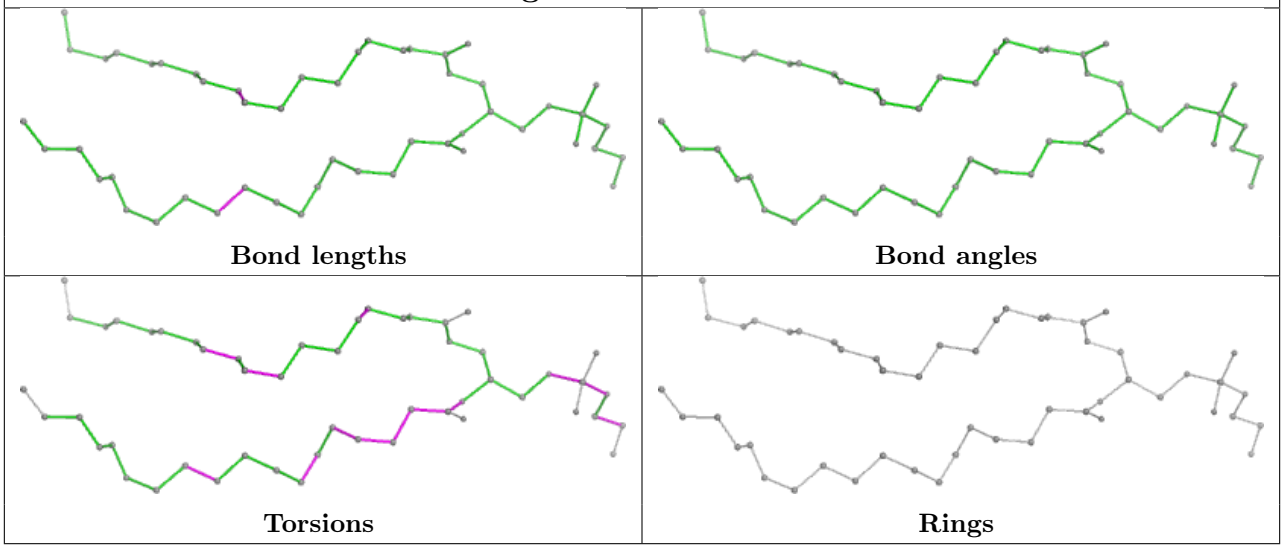
Ligand UQ8 3G 404



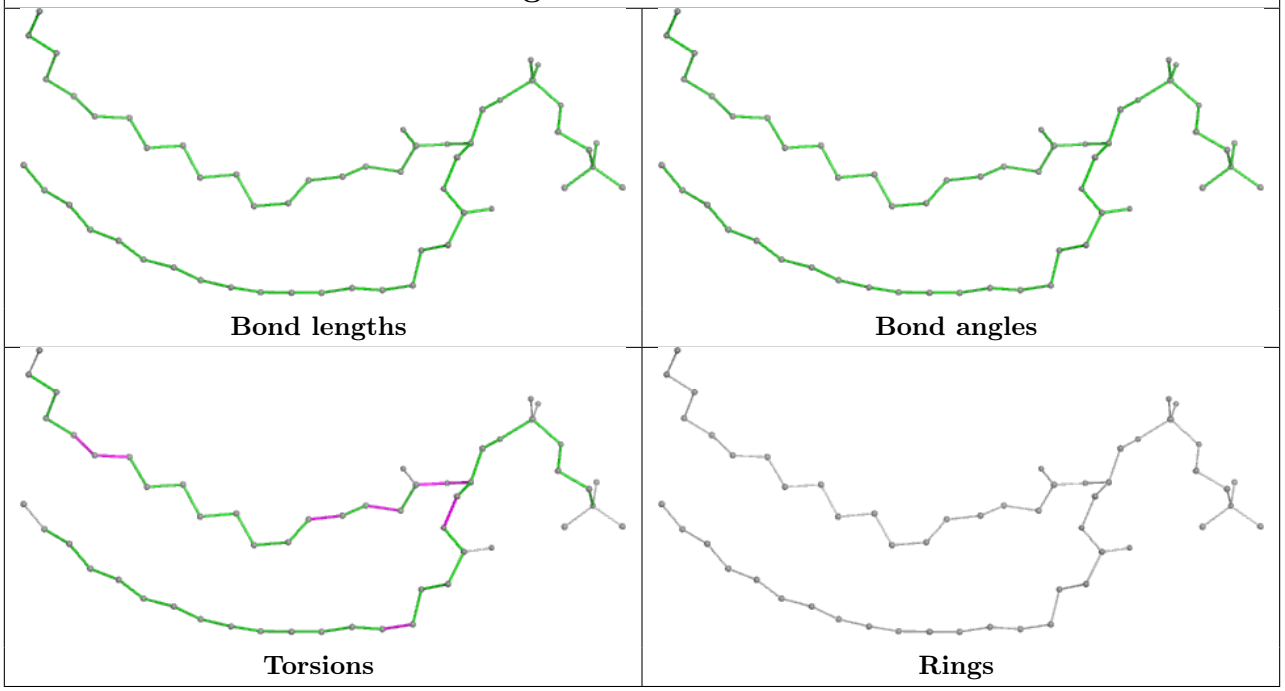
Ligand UQ8 3g 404



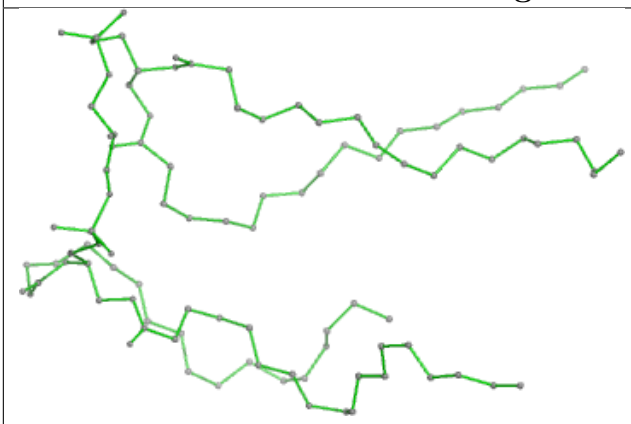
Ligand PEE 40 301



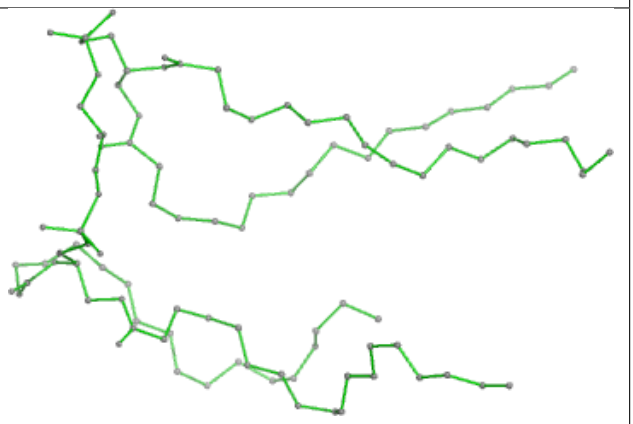
Ligand PC1 2o 203



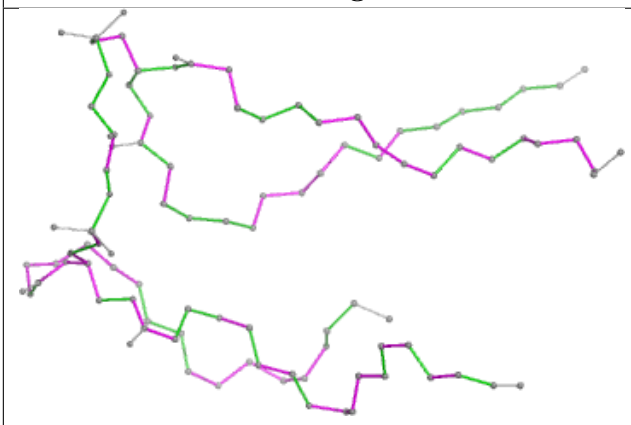
Ligand CDL 3D 202



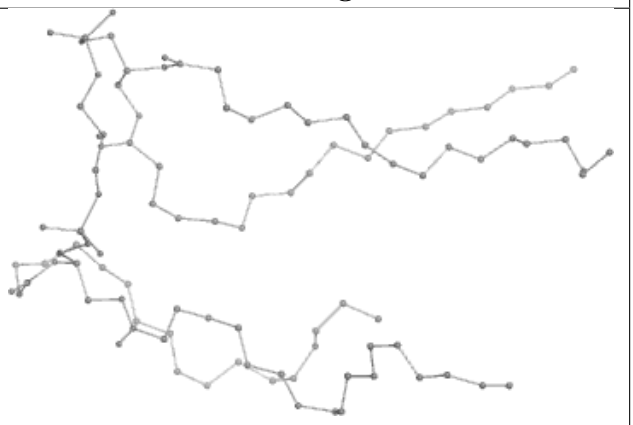
Bond lengths



Bond angles

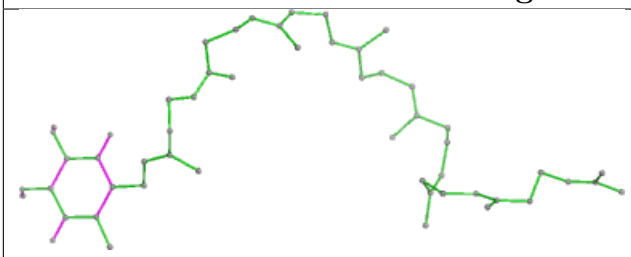


Torsions

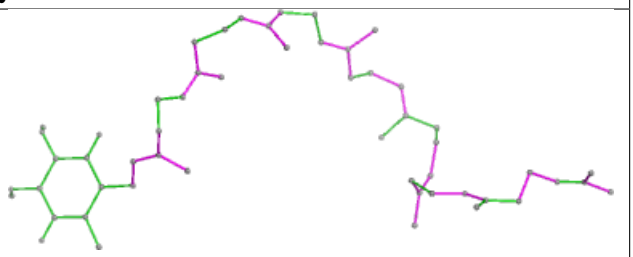


Rings

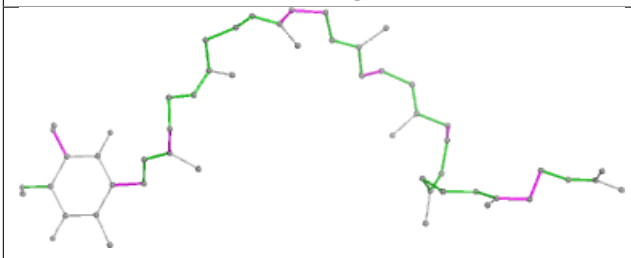
Ligand UQ8 3D 203



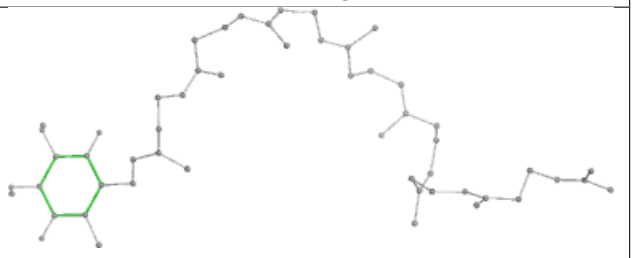
Bond lengths



Bond angles

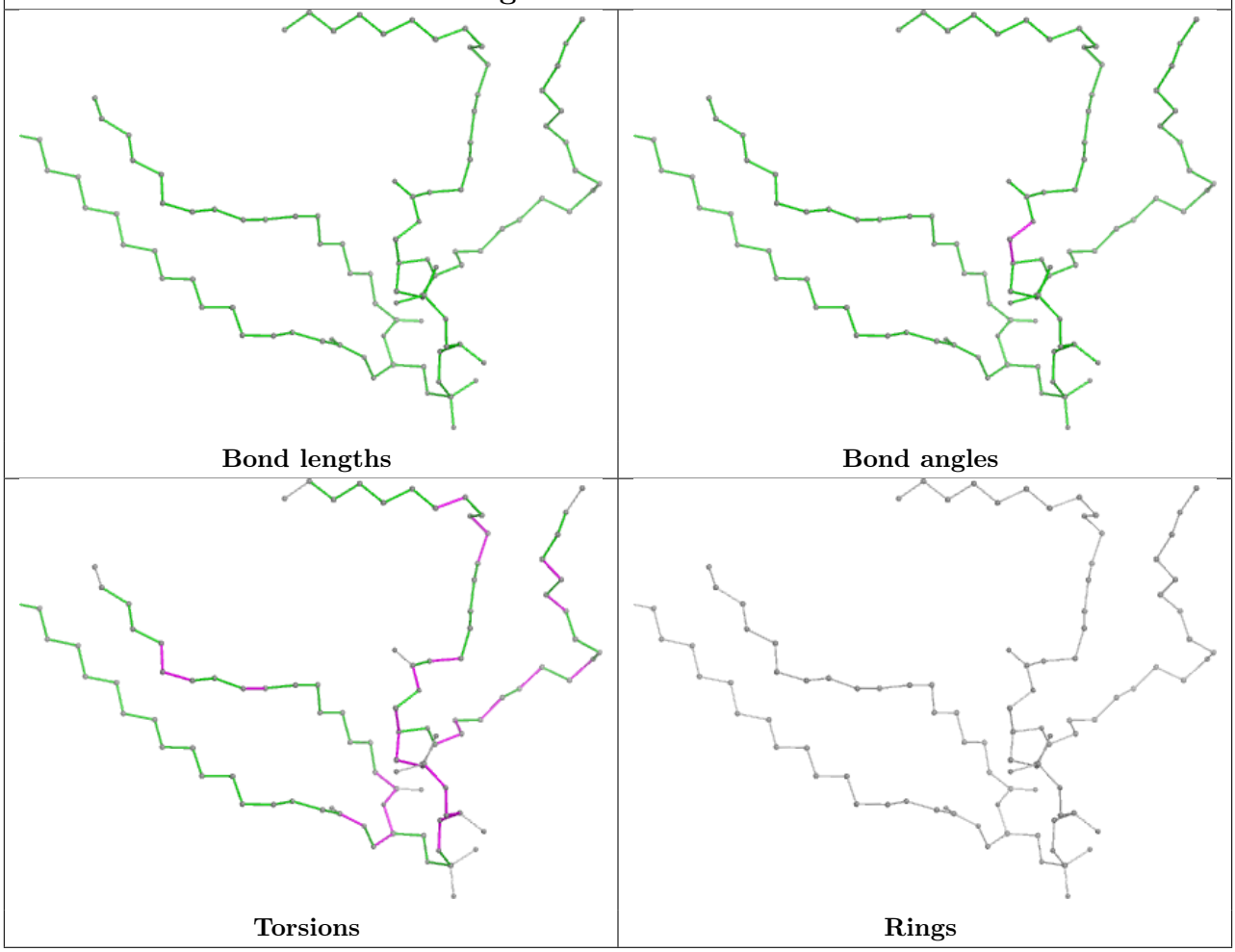


Torsions

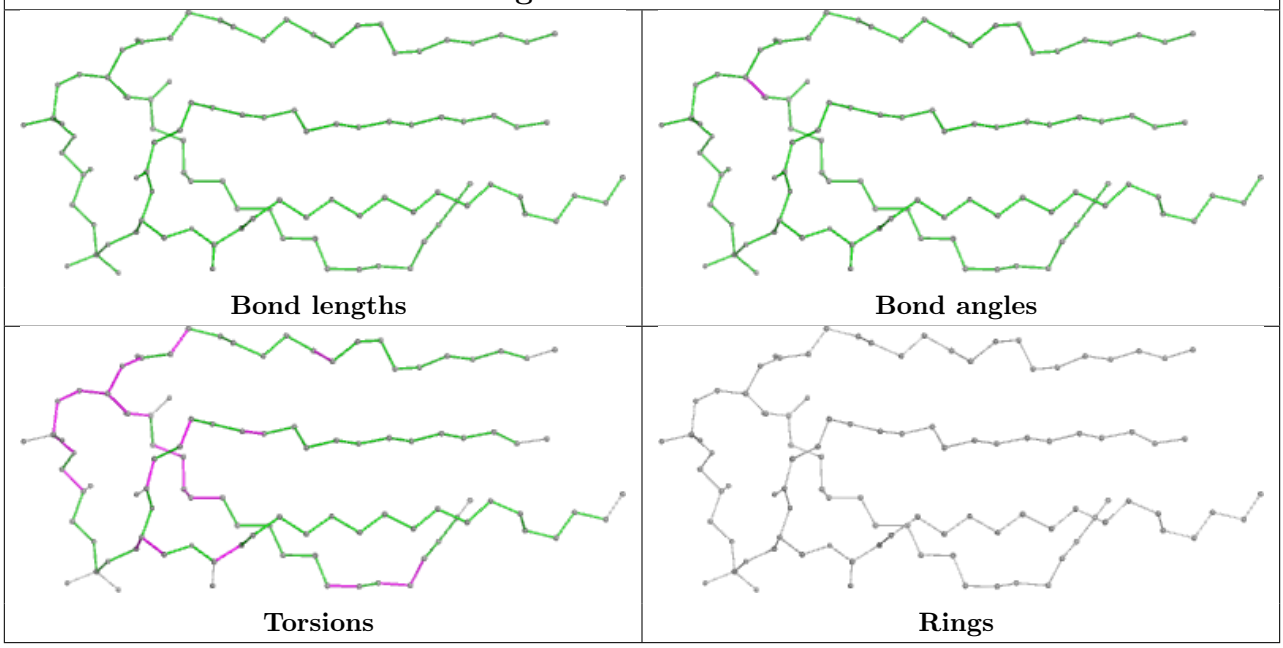


Rings

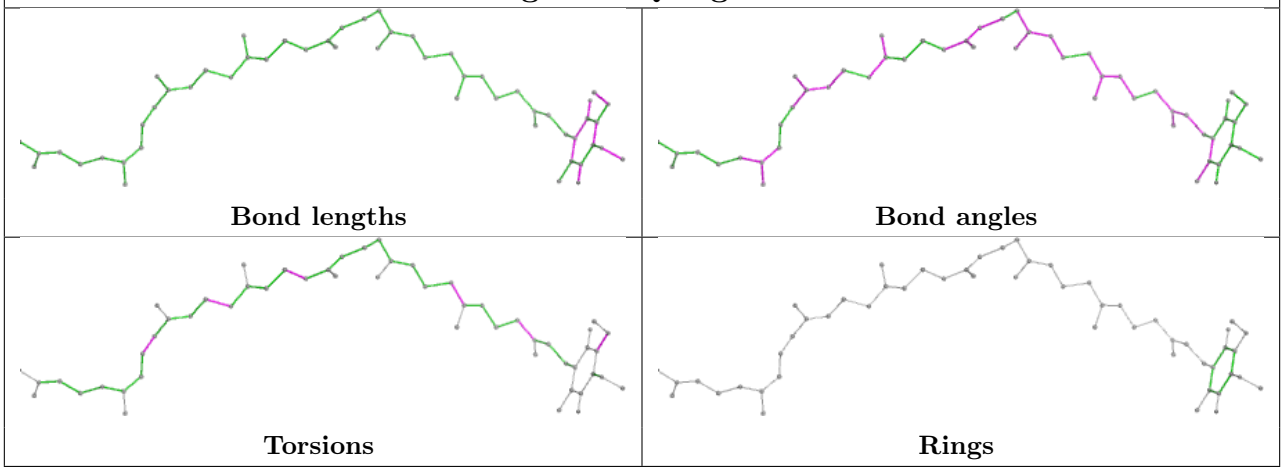
Ligand CDL 3d 201



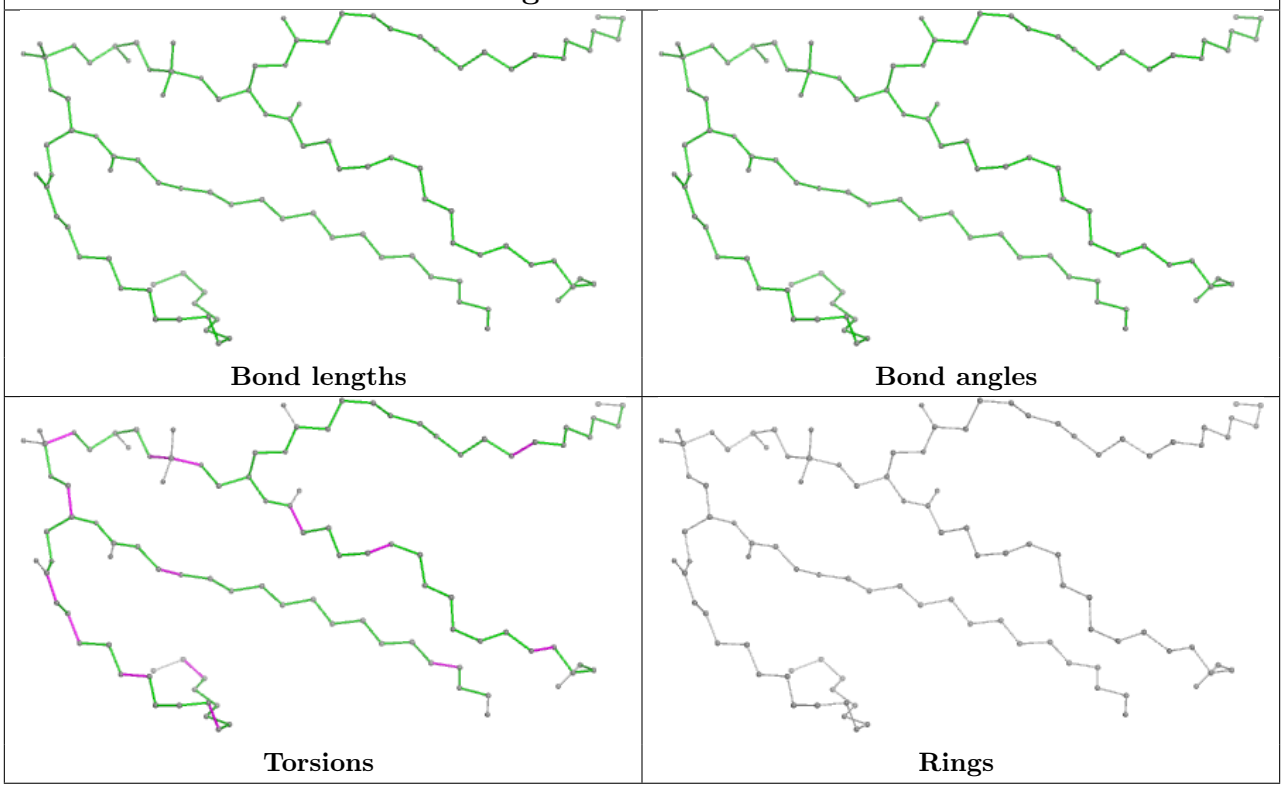
Ligand CDL 4U 501



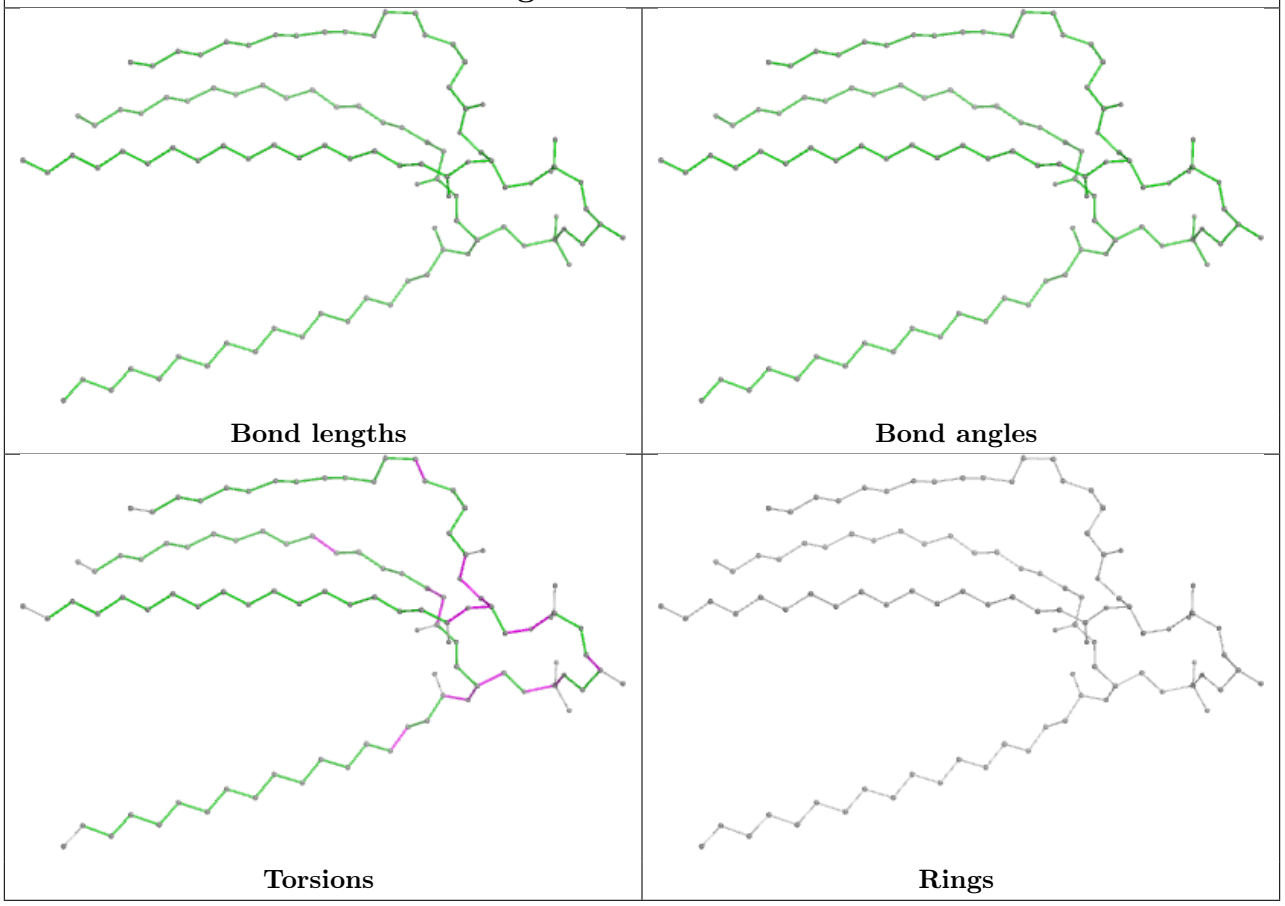
Ligand UQ8 3g 405



Ligand CDL 4t 203



Ligand CDL 4E 201



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.

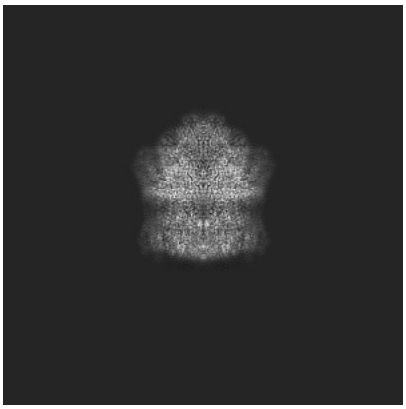
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-50491. These allow visual inspection of the internal detail of the map and identification of artifacts.

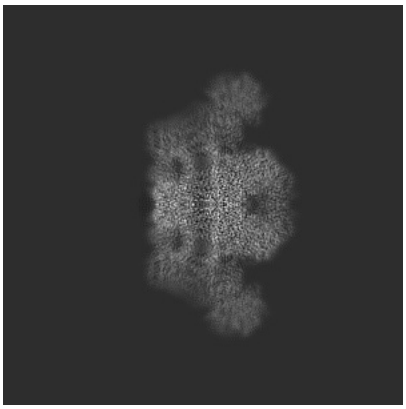
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

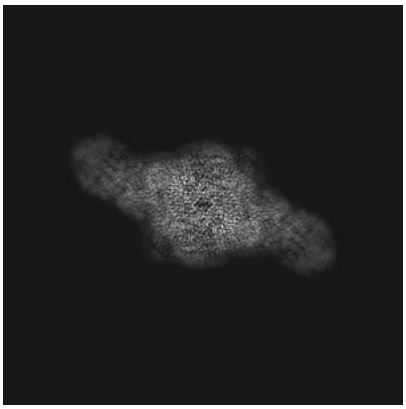
6.1.1 Primary map



X

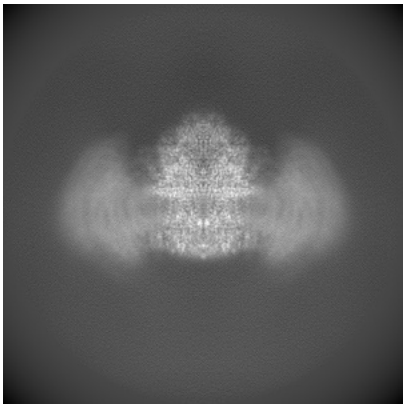


Y

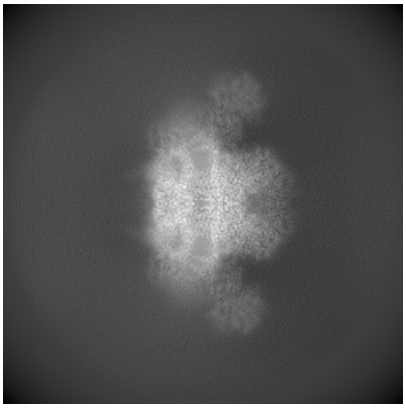


Z

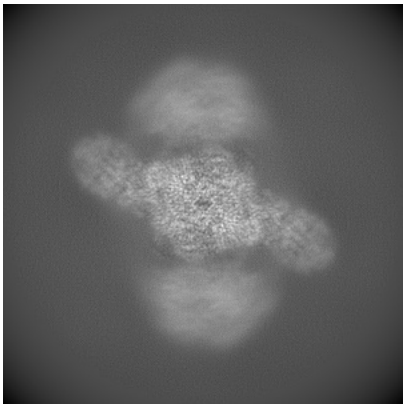
6.1.2 Raw map



X



Y

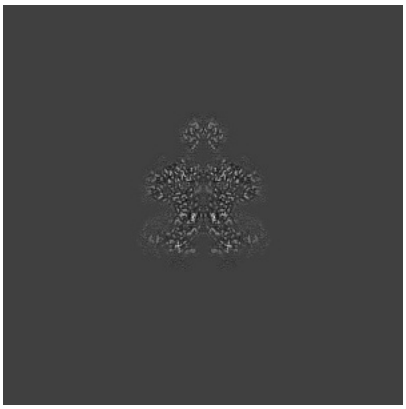


Z

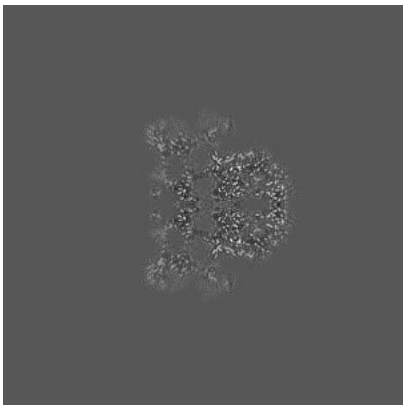
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

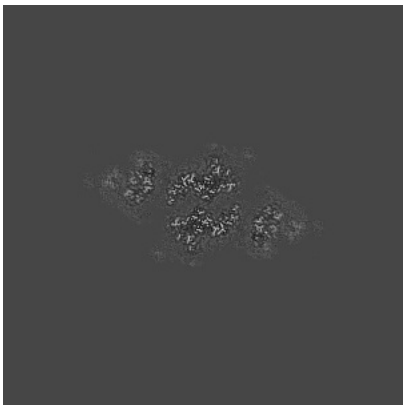
6.2.1 Primary map



X Index: 250

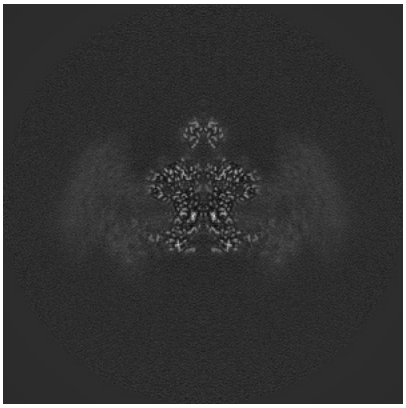


Y Index: 250

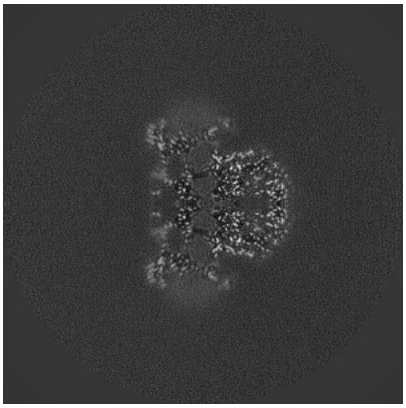


Z Index: 250

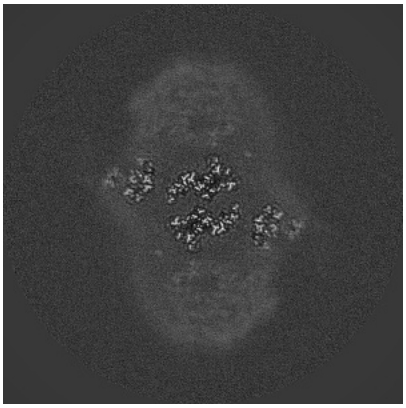
6.2.2 Raw map



X Index: 250



Y Index: 250

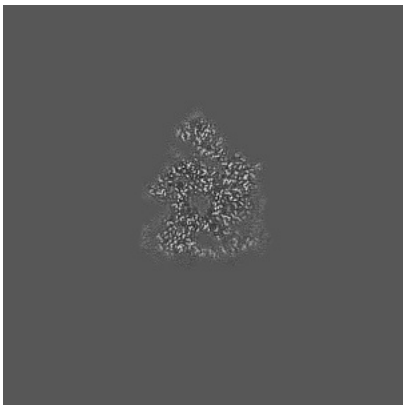


Z Index: 250

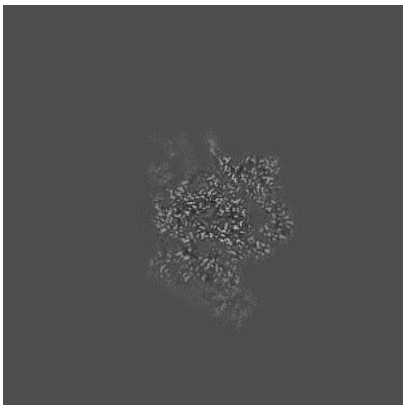
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

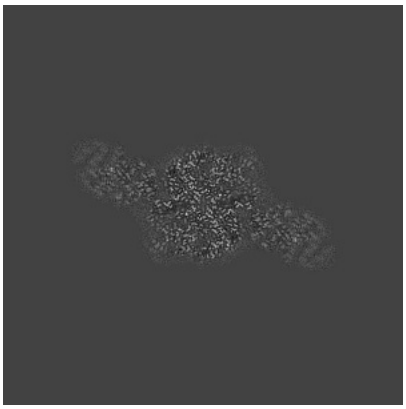
6.3.1 Primary map



X Index: 263

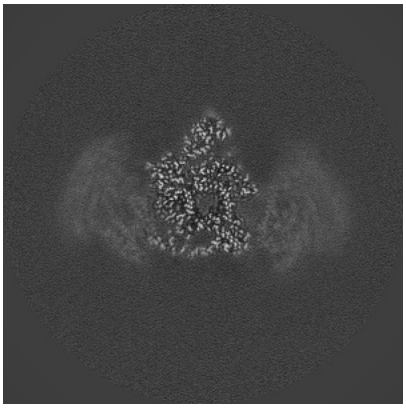


Y Index: 267

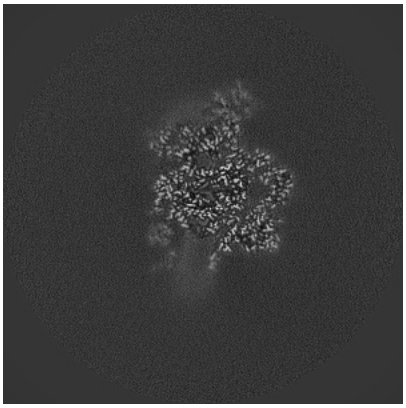


Z Index: 268

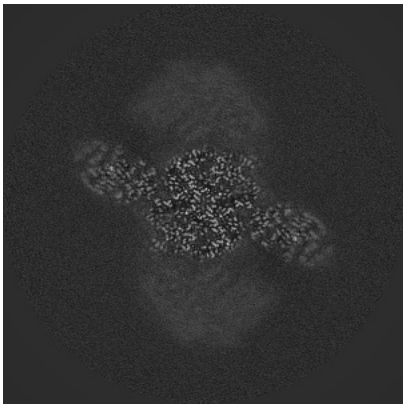
6.3.2 Raw map



X Index: 237



Y Index: 233

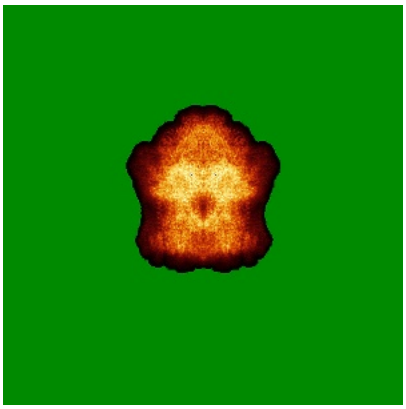


Z Index: 268

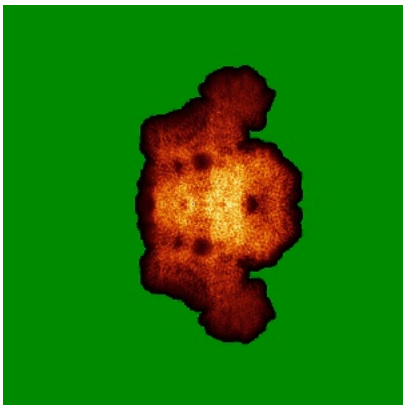
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

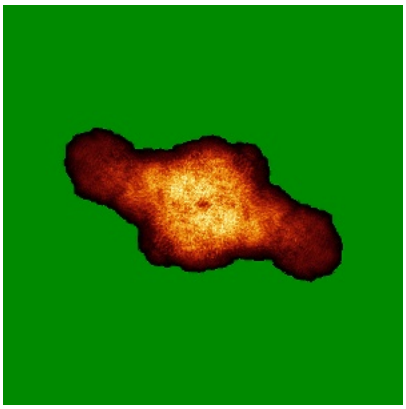
6.4.1 Primary map



X

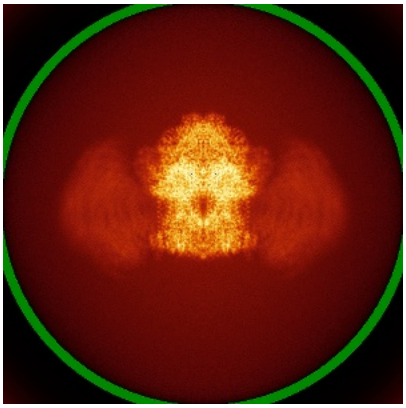


Y

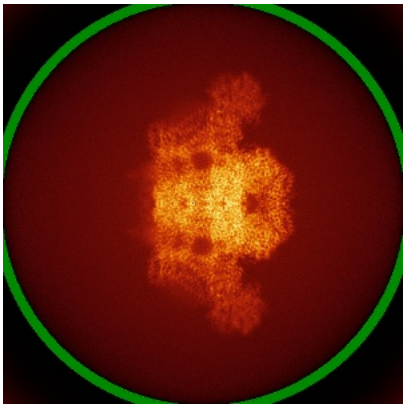


Z

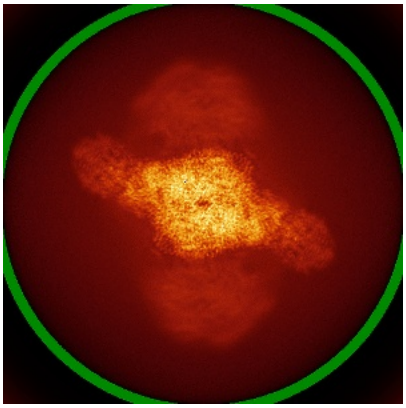
6.4.2 Raw map



X



Y

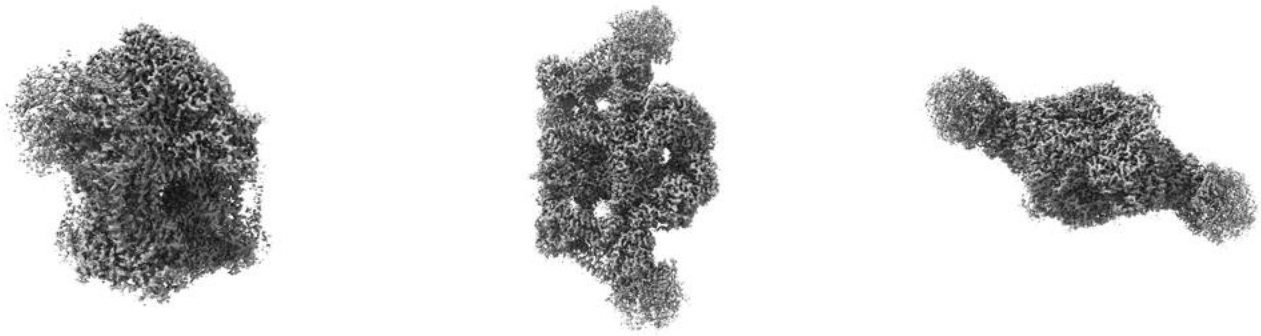


Z

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)

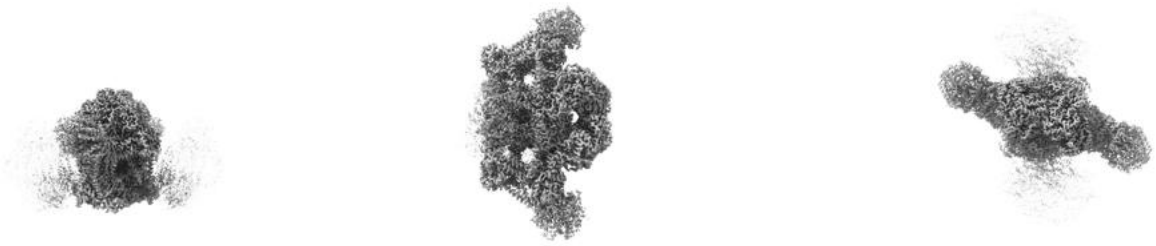
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.0203. 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



X Y Z

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

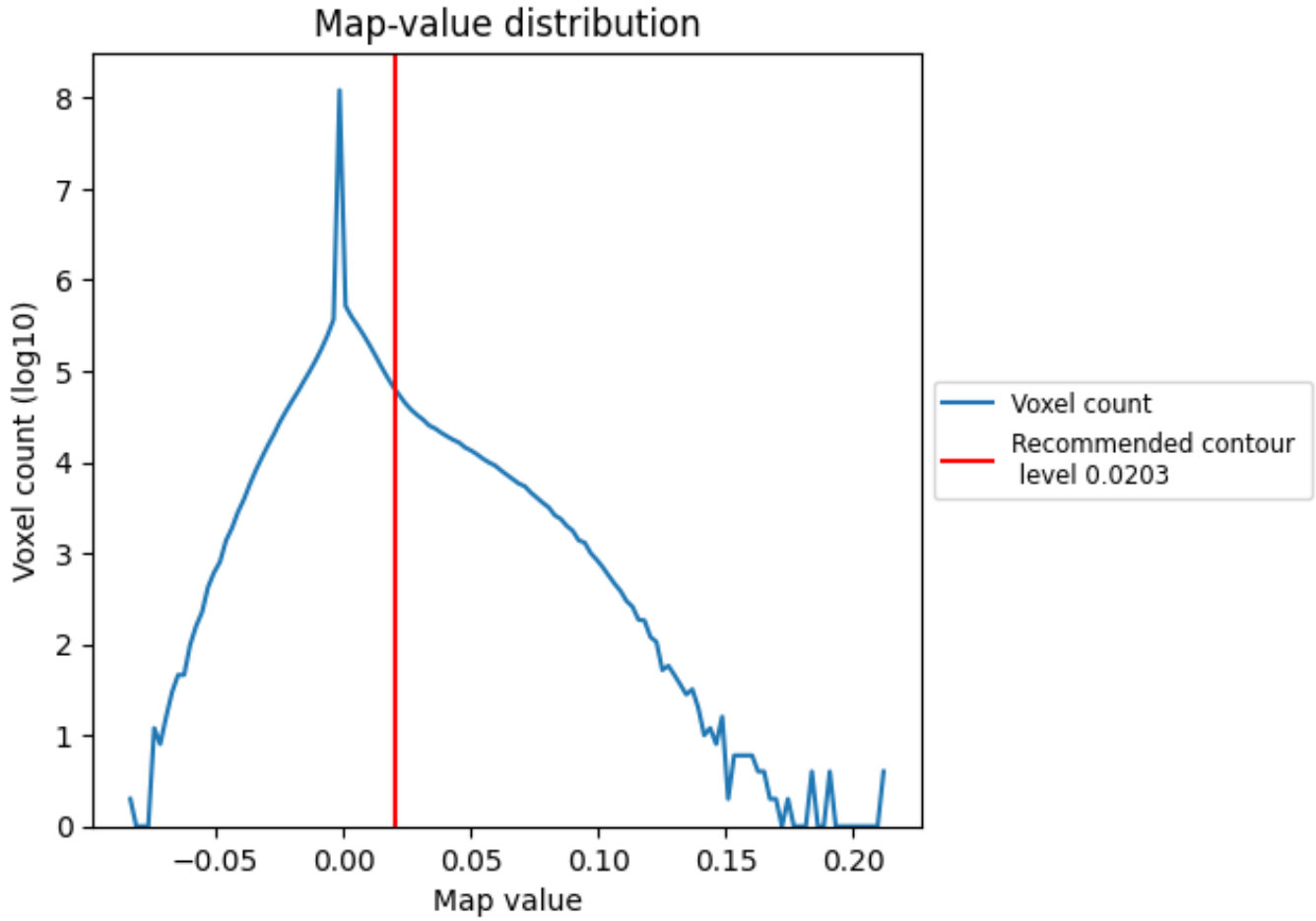
6.6 Mask visualisation (i)

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

7 Map analysis

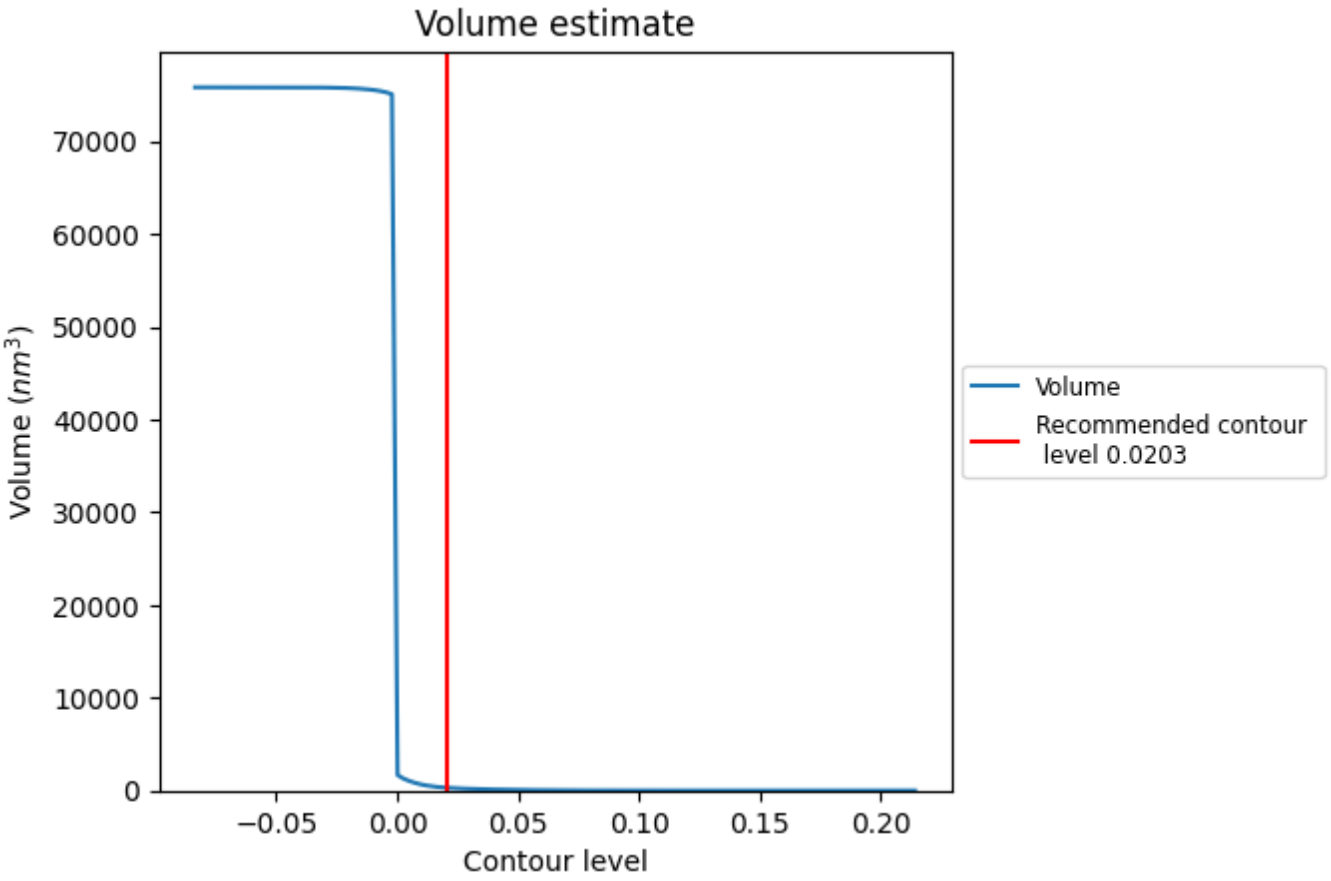
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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.

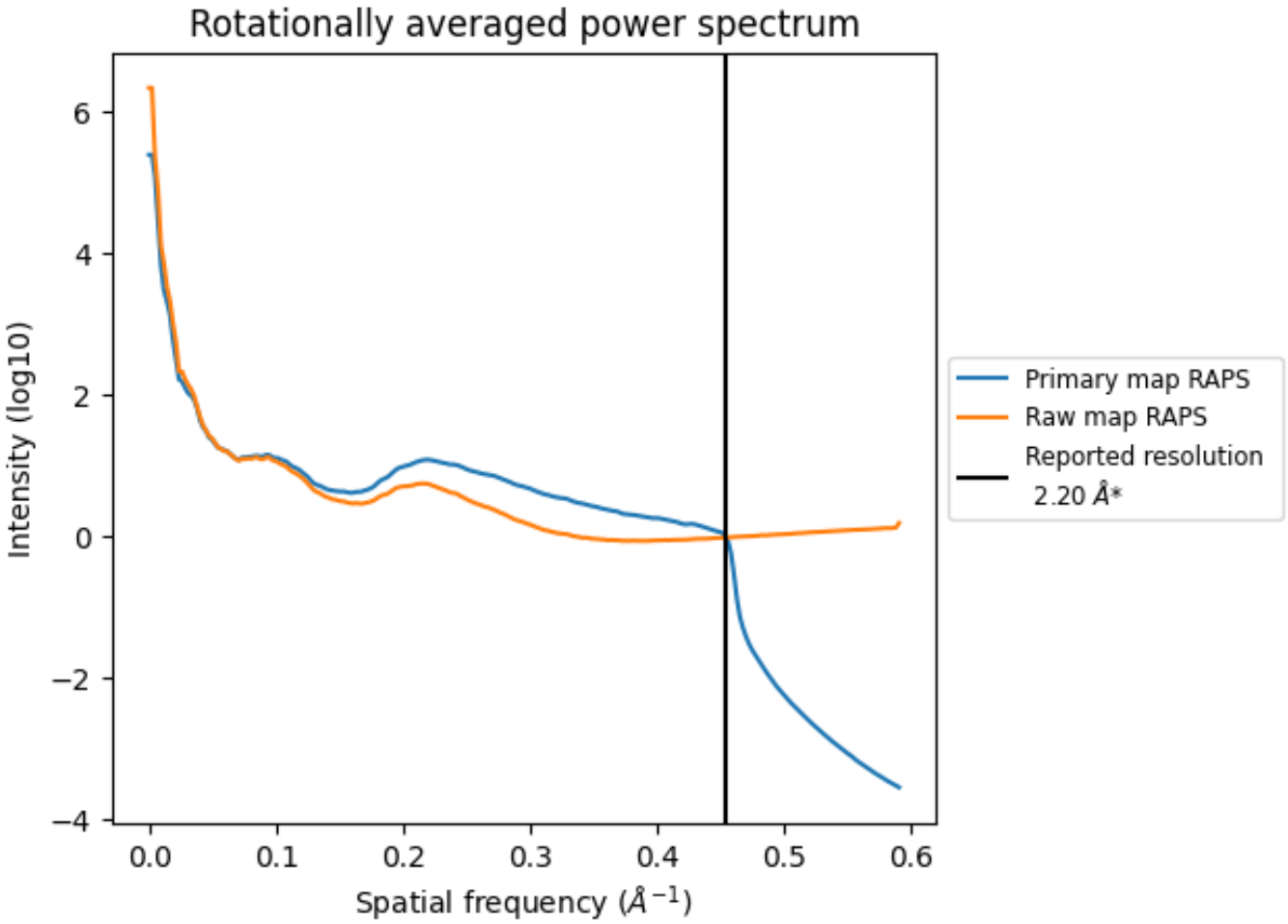
7.2 Volume estimate (i)



The volume at the recommended contour level is 306 nm^3; this corresponds to an approximate mass of 276 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)

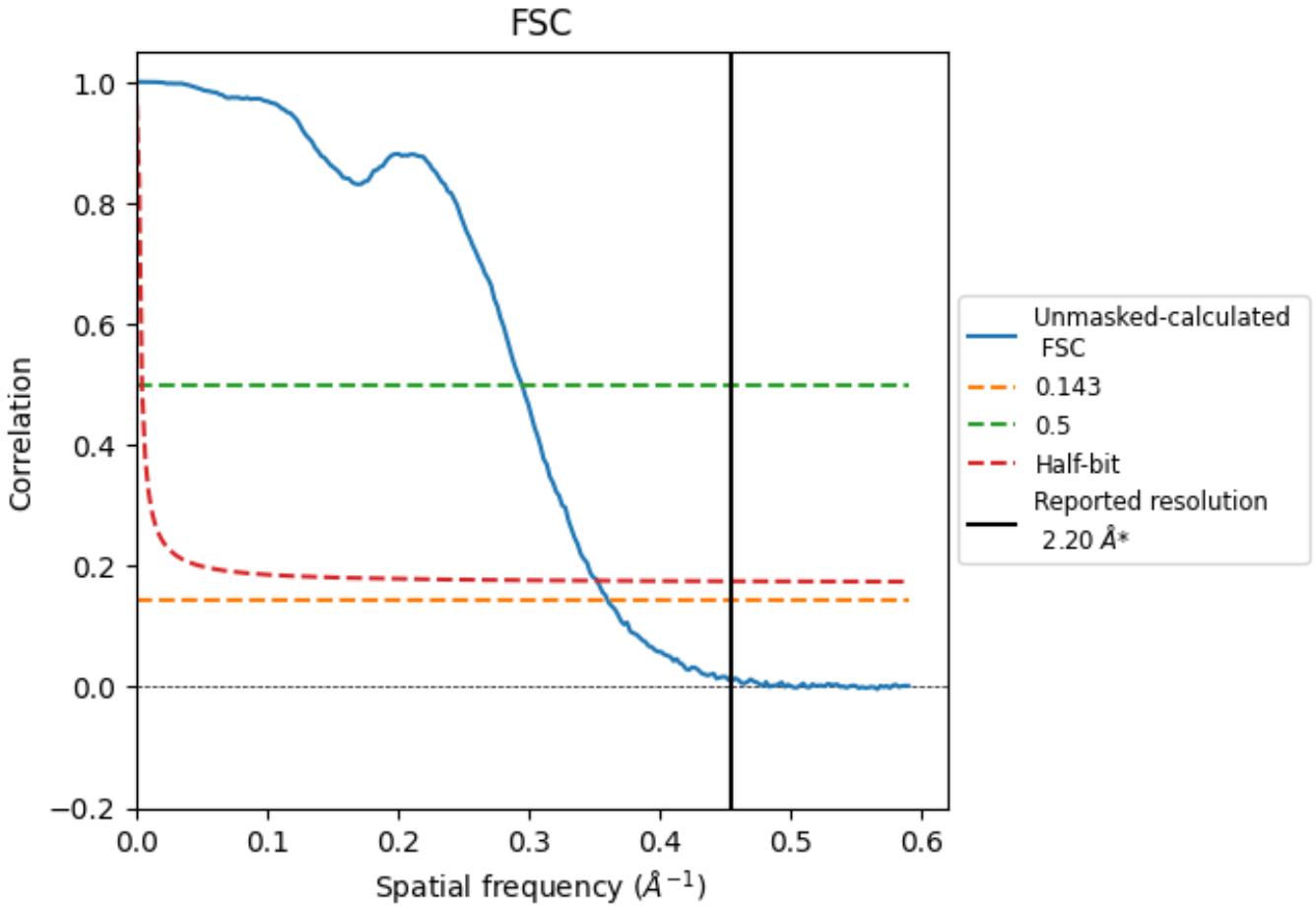


*Reported resolution corresponds to spatial frequency of 0.455 Å^{-1}

8 Fourier-Shell correlation

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



*Reported resolution corresponds to spatial frequency of 0.455 Å^{-1}

8.2 Resolution estimates (i)

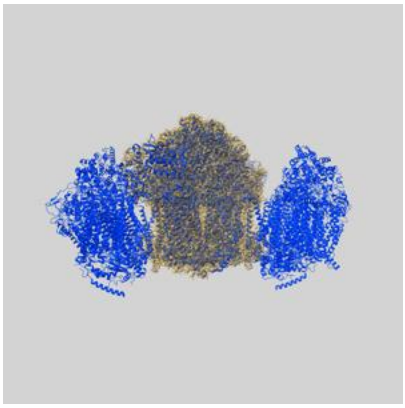
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.20	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	2.77	3.39	2.84

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 2.77 differs from the reported value 2.2 by more than 10 %

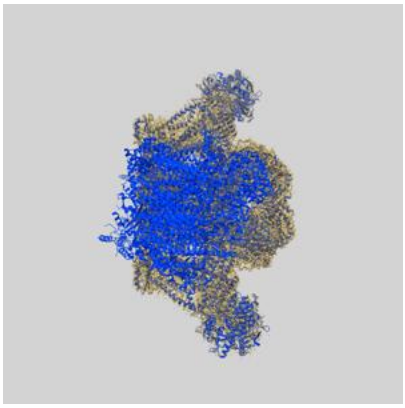
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-50491 and PDB model 9FZL. Per-residue inclusion information can be found in section 3 on page 32.

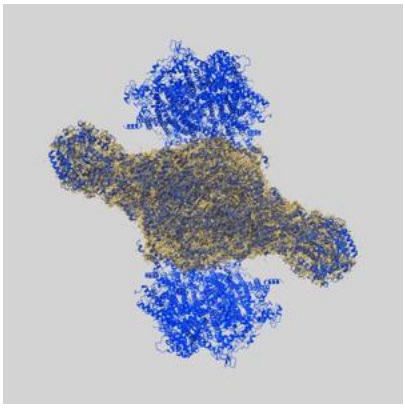
9.1 Map-model overlay



X



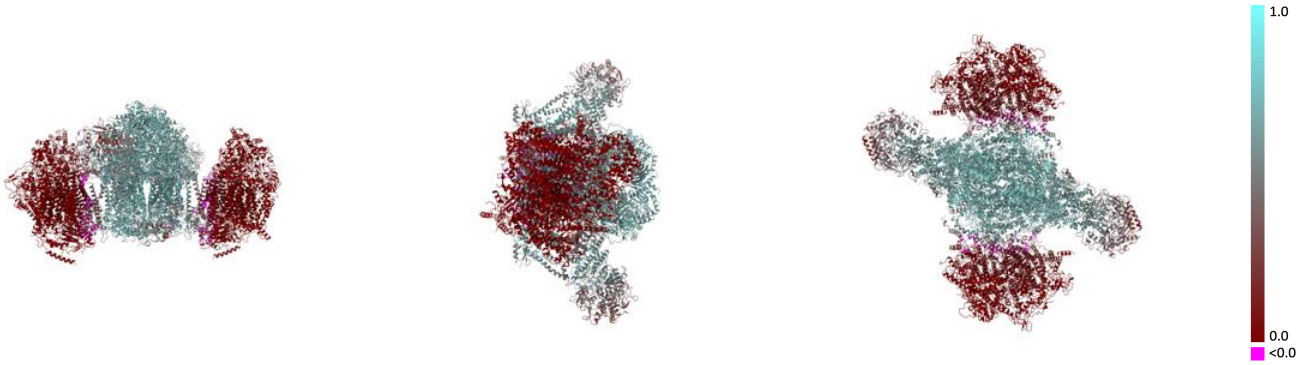
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.0203 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.

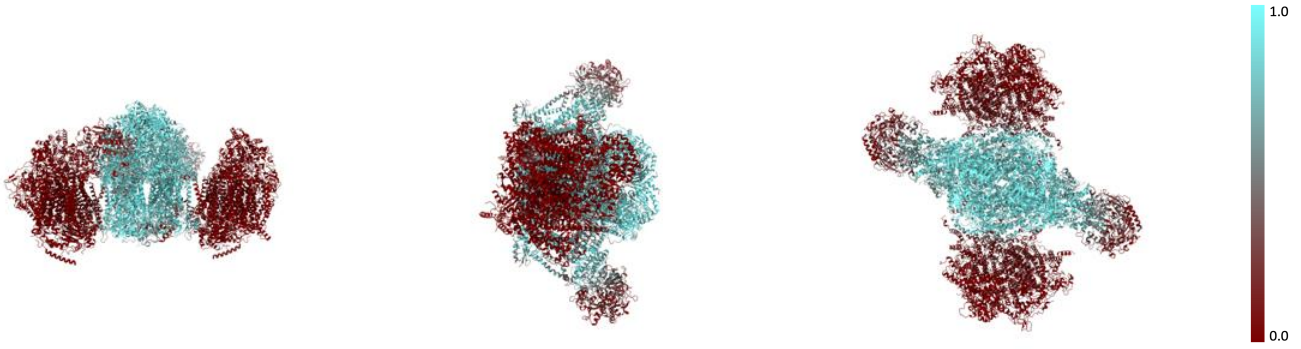
9.2 Q-score mapped to coordinate model



X Y Z

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

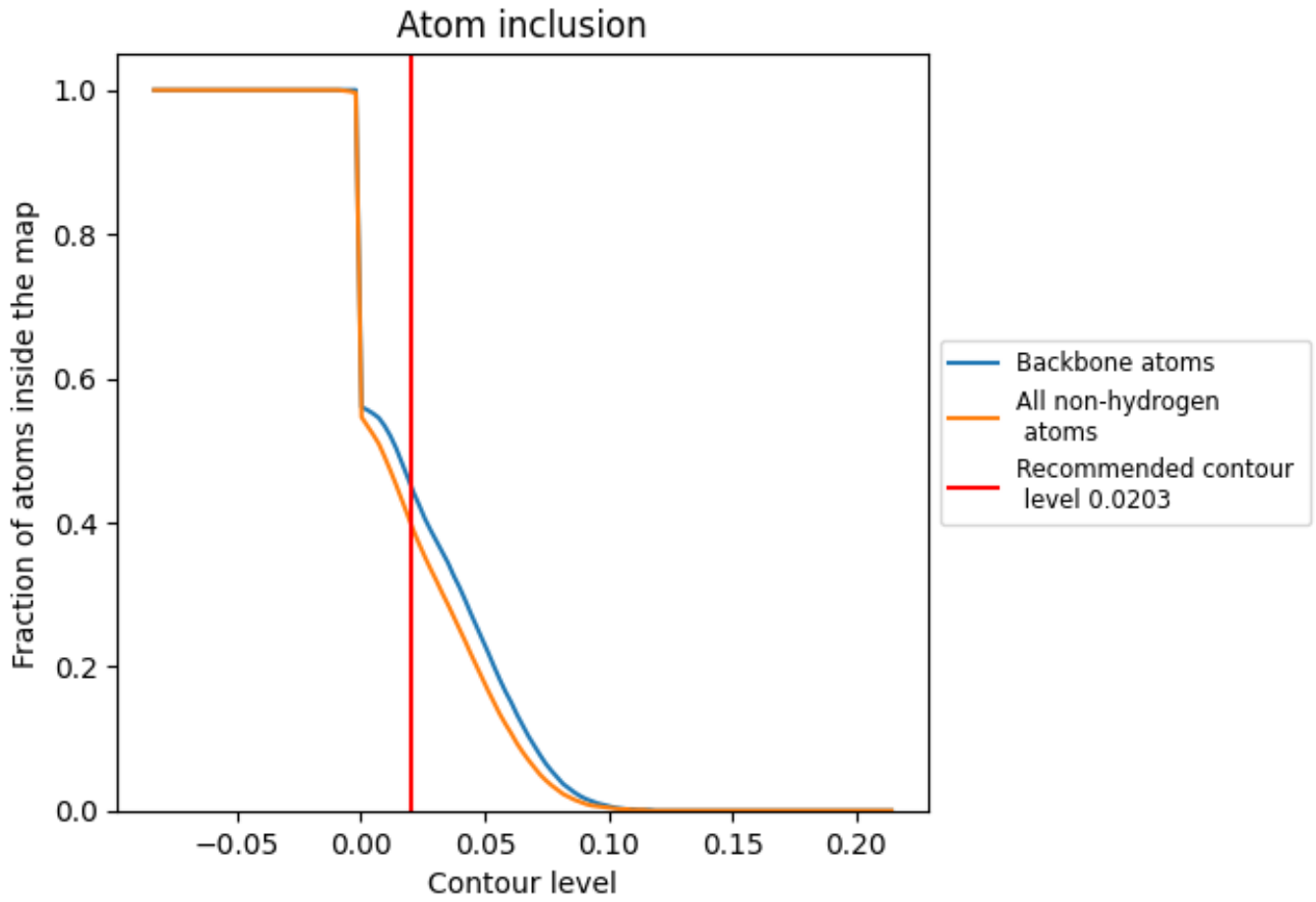
9.3 Atom inclusion mapped to coordinate model



X Y Z

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 (0.0203).

9.4 Atom inclusion (i)



At the recommended contour level, 45% of all backbone atoms, 40% 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 (0.0203) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.3970	0.3250
2M	0.2660	0.4070
2N	0.6330	0.5480
2O	0.7970	0.6040
2P	0.7940	0.5970
2Q	0.7560	0.5850
2R	0.7950	0.6090
2S	0.8110	0.6220
2T	0.8780	0.6560
2U	0.5740	0.5030
2V	0.5780	0.4910
2m	0.2670	0.4070
2n	0.6360	0.5480
2o	0.7970	0.6040
2p	0.7940	0.5950
2q	0.7540	0.5860
2r	0.7950	0.6140
2s	0.8090	0.6250
2t	0.8780	0.6580
2u	0.5700	0.5020
2v	0.5730	0.4930
3A	0.9080	0.6830
3B	0.9090	0.6720
3C	0.9180	0.6900
3D	0.7940	0.6250
3E	0.8240	0.6350
3F	0.9370	0.6950
3G	0.9190	0.6920
3H	0.6570	0.5320
3I	0.8470	0.6510
3J	0.7730	0.5920
3K	0.9210	0.6950
3L	0.6370	0.5310
3a	0.9070	0.6850
3b	0.9100	0.6730

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Chain	Atom inclusion	Q-score
3c	0.9180	0.6880
3d	0.7950	0.6260
3e	0.8250	0.6350
3f	0.9370	0.6940
3g	0.9190	0.6920
3h	0.6570	0.5330
3i	0.8480	0.6520
3j	0.7750	0.5900
3k	0.9210	0.6930
3l	0.6370	0.5320
40	0.0000	0.0000
41	0.0000	0.0000
4A	0.0050	0.0700
4B	0.0530	0.1050
4C	0.0720	0.2140
4D	0.0270	0.1220
4E	0.0000	0.0000
4F	0.0140	0.0510
4G	0.0220	0.0640
4H	0.0000	0.0000
4I	0.0000	0.0000
4J	0.0000	0.0000
4K	0.0000	0.0000
4L	0.0000	0.0000
4M	0.0000	0.0000
4N	0.0000	0.0140
4O	0.0000	0.0000
4P	0.0000	0.0050
4Q	0.0000	0.0000
4R	0.0000	0.0000
4S	0.0000	0.0000
4T	0.0000	0.0000
4U	0.0000	0.0000
4V	0.0000	0.0000
4W	0.0000	-0.0030
4X	0.0000	0.0000
4Y	0.0000	0.0000
4Z	0.0110	0.0760
4a	0.0050	0.0750
4b	0.0520	0.1020
4c	0.0690	0.2070
4d	0.0280	0.1150

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Chain	Atom inclusion	Q-score
4e	0.0000	0.0000
4f	0.0140	0.0530
4g	0.0230	0.0700
4h	0.0000	0.0000
4i	0.0000	0.0000
4j	0.0000	0.0000
4k	0.0000	0.0000
4l	0.0000	0.0000
4m	0.0000	0.0000
4n	0.0000	0.0130
4o	0.0000	0.0000
4p	0.0000	0.0030
4q	0.0000	-0.0000
4r	0.0000	0.0000
4s	0.0000	0.0000
4t	0.0000	0.0000
4u	0.0000	0.0000
4v	0.0000	0.0000
4w	0.0000	-0.0040
4x	0.0000	0.0000
4y	0.0000	0.0000
4z	0.0100	0.0760