



## Full wwPDB EM Validation Report ⓘ

Feb 4, 2023 – 09:04 am GMT

PDB ID : 7R4G  
EMDB ID : EMD-14307  
Title : Bovine complex I in the presence of IM1761092, slack class ii (Composite map)  
Authors : Bridges, H.R.; Blaza, J.N.; Yin, Z.; Chung, I.; Hirst, J.  
Deposited on : 2022-02-08  
Resolution : 2.50 Å (reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.dev43  
Mogul : 1.8.4, CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.32.1

# 1 Overall quality at a glance

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

The reported resolution of this entry is 2.50 Å.

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



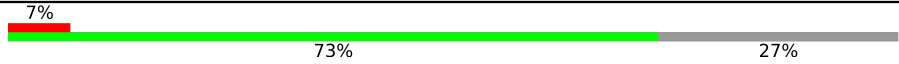
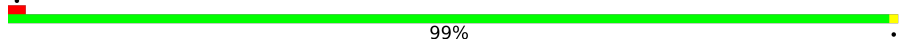

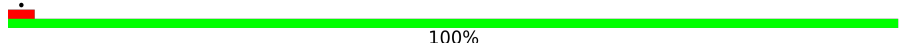
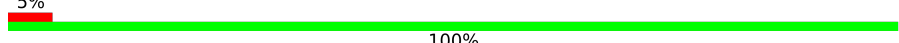
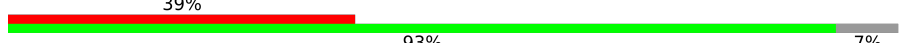


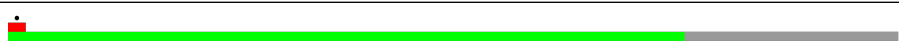




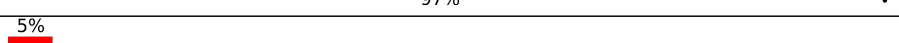
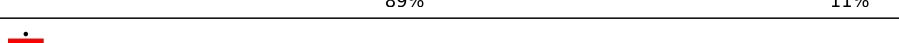
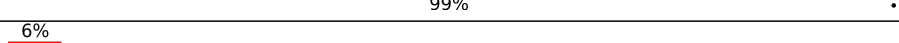
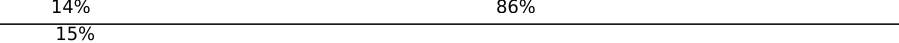
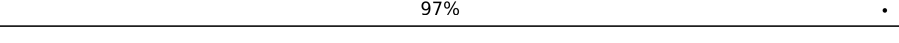
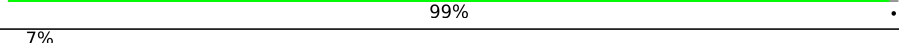
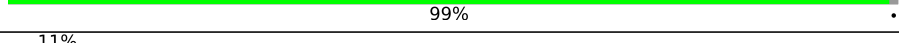

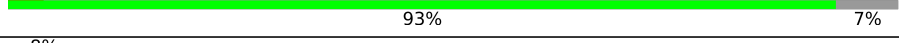
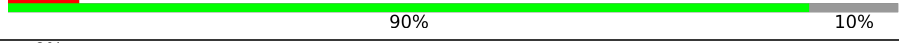
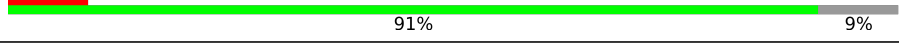

Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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

Mol	Chain	Length	Quality of chain
1	A	115	 6% 80% 19%
2	B	216	 1% 70% 29%
3	C	266	 77% 23%
4	D	463	 1% 83% 17%
5	E	249	 1% 86% 14%
6	F	464	 1% 93% 7%
7	G	727	 1% 94% 5%
8	H	318	 1% 98% 1%
9	I	212	 1% 83% 17%

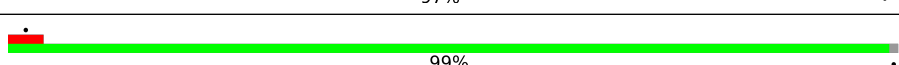
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Mol	Chain	Length	Quality of chain
10	J	175	 7% 73% 27%
11	K	98	 99%
12	L	606	 90% 10%
13	M	459	 100%
14	N	347	 5% 100%
15	O	343	 39% 93% 7%
16	P	380	 76% 24%
17	Q	175	 71% 29%
18	R	124	 76% 24%
19	S	99	 83% 17%
20	T	156	 23% 48% 51%
20	U	156	 54% 46%
21	V	116	 97%
22	W	128	 5% 89% 11%
23	X	172	 99%
24	Y	141	 6% 14% 86%
25	Z	144	 15% 97%
26	a	70	 99%
27	b	84	 7% 99%
28	c	76	 11% 63% 37%
29	d	120	 93% 7%
30	e	106	 8% 90% 10%
31	f	57	 9% 91% 9%
32	g	154	 56% 43%
33	h	189	 73% 27%

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Mol	Chain	Length	Quality of chain
34	i	127	 5% 81% 18%
35	j	108	 62% 38%
36	k	98	 81% 19%
37	l	186	 83% 17%
38	m	129	 84% 16%
39	n	179	 96%
40	o	137	 88% 12%
41	p	176	 97%
42	q	145	 99%
43	r	113	 82% 17%
44	s	109	 39% 61%

## 2 Entry composition i

There are 60 unique types of molecules in this entry. The entry contains 65153 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called NADH-ubiquinone oxidoreductase chain 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	93	748	513	108	122	5	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	154	1230	786	220	210	14	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	206	1714	1107	295	309	3	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	386	3095	1973	536	562	24	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	129	ARG	GLN	variant	UNP P17694

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	E	213	1655	1057	277	311	10	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	F	430	3310	2085	591	614	20	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	G	688	5279	3307	920	1013	39	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	H	313	2468	1655	379	411	23	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	I	176	1414	889	243	270	12	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	J	127	946	635	135	167	9	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	K	98	745	486	112	131	16	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	L	547	4318	2869	665	743	41	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	M	459	3632	2424	565	604	39	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	N	347	2733	1817	416	457	43	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	O	320	2589	1662	429	488	10	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
O	255	LYS	ASN	variant	UNP P34942

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	P	288	2289	1464	413	407	5	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	Q	125	1016	641	181	191	3	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	R	94	720	442	134	141	3	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	S	82	663	416	124	121	2	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	T	76	612	393	90	124	5	0	0
20	U	84	681	439	100	137	5	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	V	112	911	589	154	165	3	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	W	114	971	622	180	165	4	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	X	171	1402	887	253	252	10	0	0

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



Mol	Chain	Residues	Atoms					AltConf	Trace
24	Y	20	Total	C	N	O	S	0	0
			154	102	25	26	1		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
25	Z	140	Total	C	N	O	S	0	0
			1145	736	200	200	9		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
26	a	69	Total	C	N	O	S	0	0
			561	361	103	92	5		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
27	b	83	Total	C	N	O	S	0	0
			651	425	109	115	2		

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

Mol	Chain	Residues	Atoms				AltConf	Trace
28	c	48	Total	C	N	O	0	0
			405	268	69	68		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
29	d	112	Total	C	N	O	S	0	0
			934	613	157	161	3		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
30	e	95	Total	C	N	O	S	0	0
			799	506	150	137	6		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	f	52	451	296	79	75	1	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	g	88	733	474	122	133	4	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	h	138	1154	759	196	197	2	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	i	104	892	588	151	152	1	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	j	67	580	381	95	103	1	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	k	79	638	418	107	111	2	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
37	l	155	1304	844	213	239	8	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
38	m	108	908	580	161	167		0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
39	n	171	1487	952	272	256	7	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
40	o	120	1035	645	199	183	8	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
41	p	170	1435	900	265	262	8	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
42	q	143	1192	768	214	206	4	0	0

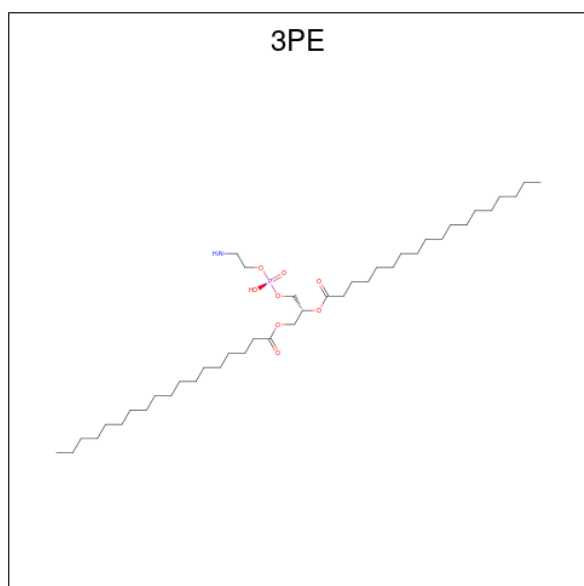
- Molecule 43 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
43	r	94	767	485	143	136	3	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
44	s	43	364	228	65	70	1	0	0

- Molecule 45 is 1,2-Distearoyl-sn-glycerophosphoethanolamine (three-letter code: 3PE) (formula:  $C_{41}H_{82}NO_8P$ ).



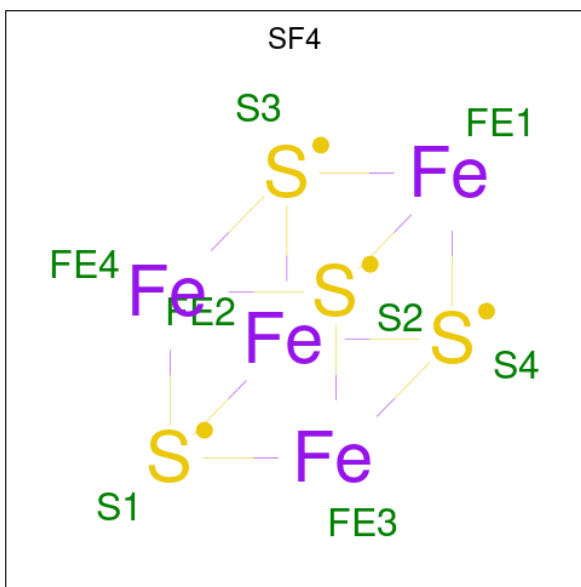
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
45	A	1	48	38	1	8	1	0
45	A	1	44	34	1	8	1	0
45	H	1	34	24	1	8	1	0
45	I	1	51	41	1	8	1	0
45	I	1	33	23	1	8	1	0
45	L	1	49	39	1	8	1	0
45	L	1	45	35	1	8	1	0

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
45	M	1	Total 43	C 33	N 1	O 8	P 1	0
45	N	1	Total 51	C 41	N 1	O 8	P 1	0
45	O	1	Total 51	C 41	N 1	O 8	P 1	0

- Molecule 46 is IRON/SULFUR CLUSTER (three-letter code: SF4) (formula: Fe<sub>4</sub>S<sub>4</sub>).



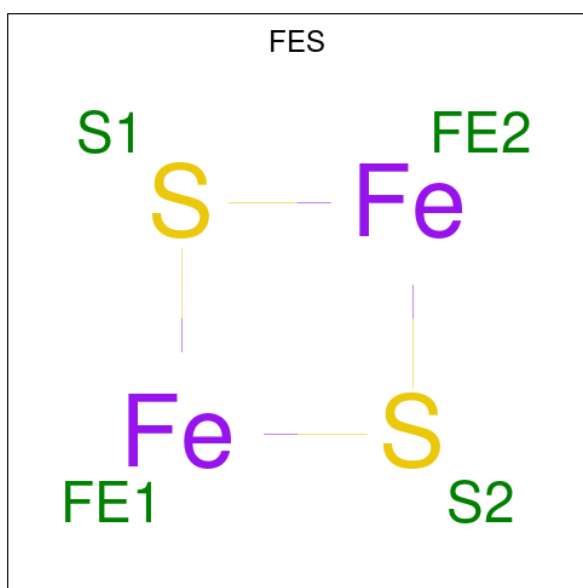
Mol	Chain	Residues	Atoms			AltConf
			Total	Fe	S	
46	B	1	Total 8	Fe 4	S 4	0
46	F	1	Total 8	Fe 4	S 4	0
46	G	1	Total 8	Fe 4	S 4	0
46	G	1	Total 8	Fe 4	S 4	0
46	I	1	Total 8	Fe 4	S 4	0
46	I	1	Total 8	Fe 4	S 4	0

- Molecule 47 is 1,2-DIACYL-SN-GLYCERO-3-PHOSPHOCHOLINE (three-letter code: PC1) (formula: C<sub>44</sub>H<sub>88</sub>NO<sub>8</sub>P).



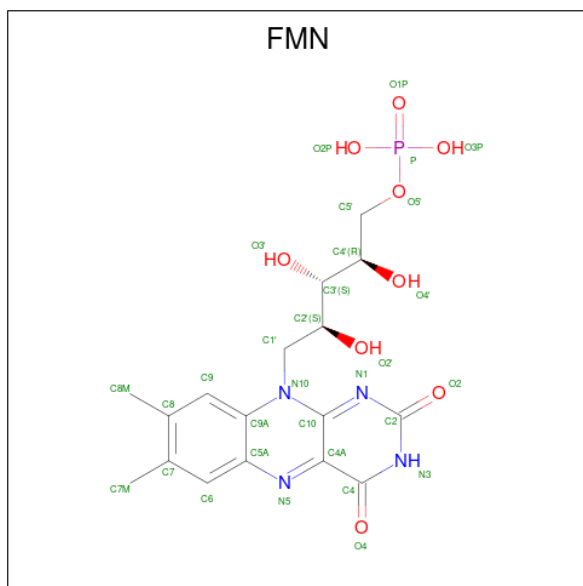
Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
47	B	1	35	25	1	8	1	0
47	M	1	49	39	1	8	1	0

- Molecule 48 is FE2/S2 (INORGANIC) CLUSTER (three-letter code: FES) (formula: Fe<sub>2</sub>S<sub>2</sub>).



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

- Molecule 49 is FLAVIN MONONUCLEOTIDE (three-letter code: FMN) (formula:  $C_{17}H_{21}N_4O_9P$ ).

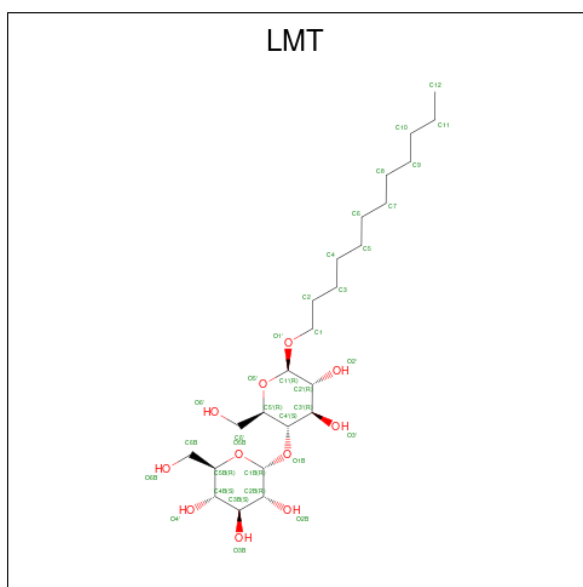


Mol	Chain	Residues	Atoms				AltConf	
49	F	1	Total	C	N	O	P	0
			31	17	4	9	1	

- Molecule 50 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms		AltConf
50	G	1	Total	K	0
			1	1	

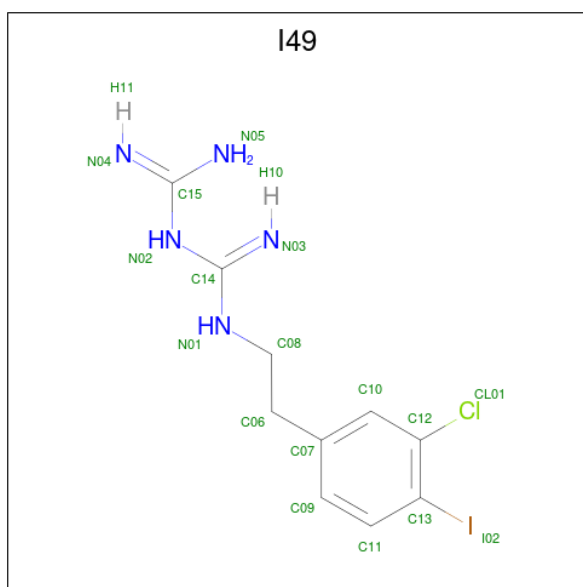
- Molecule 51 is DODECYL-BETA-D-MALTOSE (three-letter code: LMT) (formula:  $C_{24}H_{46}O_{11}$ ).



Mol	Chain	Residues	Atoms			AltConf
51	H	1	Total	C	O	0
			35	24	11	
51	J	1	Total	C	O	0
			35	24	11	
51	K	1	Total	C	O	0
			35	24	11	
51	L	1	Total	C	O	0
			35	24	11	
51	N	1	Total	C	O	0
			35	24	11	
51	b	1	Total	C	O	0
			35	24	11	
51	g	1	Total	C	O	0
			35	24	11	
51	h	1	Total	C	O	0
			35	24	11	
51	l	1	Total	C	O	0
			35	24	11	
51	p	1	Total	C	O	0
			35	24	11	

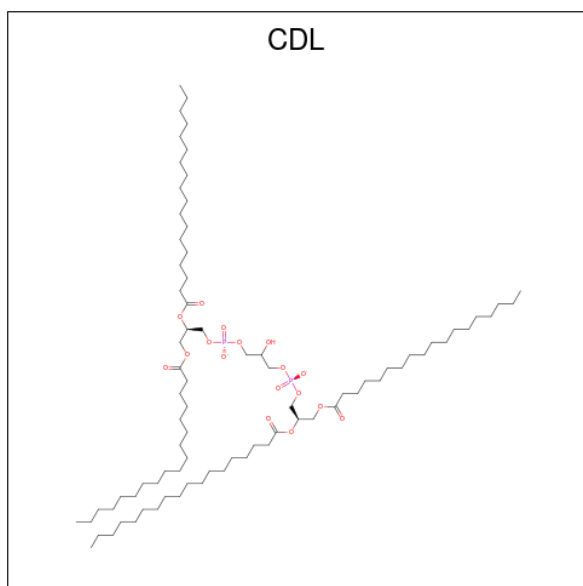
- Molecule 52 is 1-carbamimidoyl-3-[2-(3-chloranyl-4-iodanyl-phenyl)ethyl]guanidine (three-letter code: I49) (formula: C<sub>10</sub>H<sub>13</sub>ClIN<sub>5</sub>) (labeled as "Ligand of Interest" by depositor).





Mol	Chain	Residues	Atoms					AltConf
			Total	C	Cl	I	N	
52	H	1	17	10	1	1	5	0
52	N	1	17	10	1	1	5	0

- Molecule 53 is CARDIOLIPIN (three-letter code: CDL) (formula:  $C_{81}H_{156}O_{17}P_2$ ).



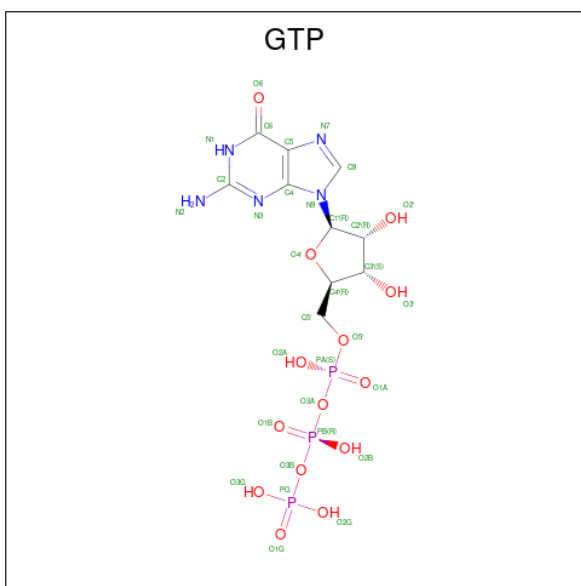
Mol	Chain	Residues	Atoms				AltConf
			Total	C	O	P	
53	L	1	69	50	17	2	0
53	N	1	67	48	17	2	0

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Mol	Chain	Residues	Atoms				AltConf
			Total	C	O	P	
53	N	1	Total	C	O	P	0
			65	46	17	2	
53	X	1	Total	C	O	P	0
			52	33	17	2	
53	h	1	Total	C	O	P	0
			67	48	17	2	
53	q	1	Total	C	O	P	0
			76	57	17	2	

- Molecule 54 is GUANOSINE-5'-TRIPHOSPHATE (three-letter code: GTP) (formula:  $C_{10}H_{16}N_5O_{14}P_3$ ).

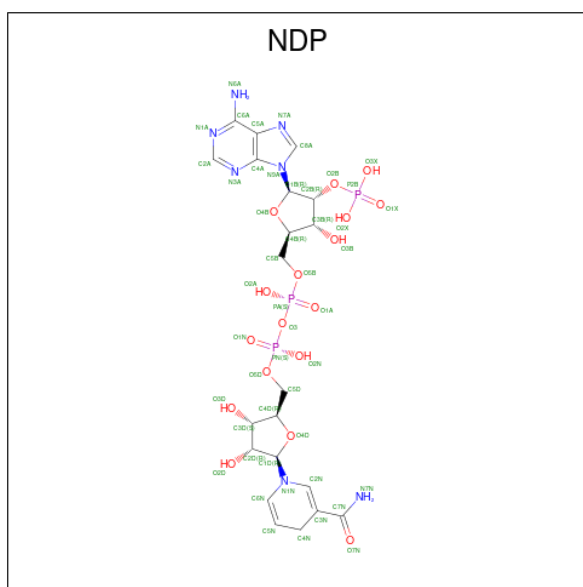


Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
54	O	1	Total	C	N	O	P	0
			32	10	5	14	3	

- Molecule 55 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
55	O	1	Total	Mg	0
			1	1	

- Molecule 56 is NADPH DIHYDRO-NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NDP) (formula:  $C_{21}H_{30}N_7O_{17}P_3$ ).

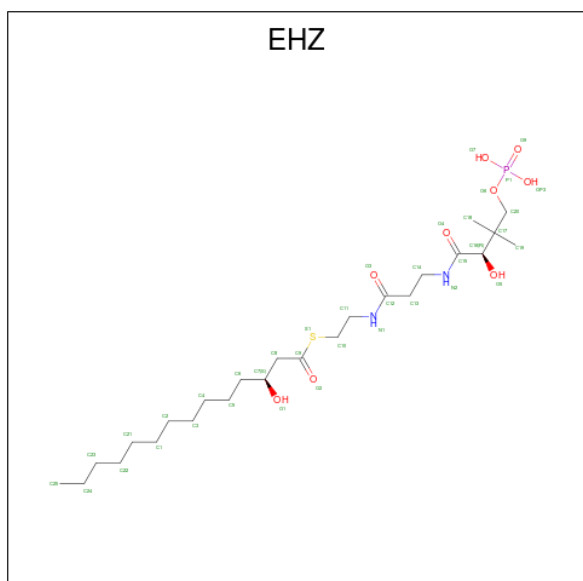


Mol	Chain	Residues	Atoms					AltConf
56	P	1	Total	C	N	O	P	0
			48	21	7	17	3	

- Molecule 57 is ZINC ION (three-letter code: ZN) (formula: Zn).

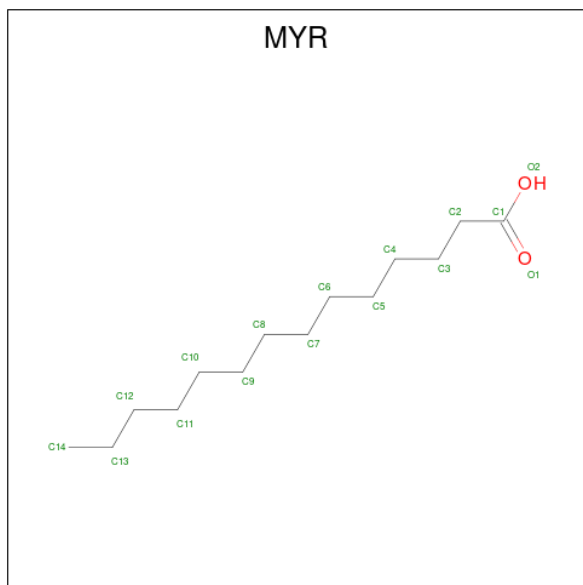
Mol	Chain	Residues	Atoms		AltConf
57	R	1	Total	Zn	0
			1	1	

- Molecule 58 is {S}-[2-[3-[(2 {R})-3,3-dimethyl-2-oxidanyl-4-phosphonoxy-butanoyl]amino]propanoylamino]ethyl] (3 {S})-3-oxidanyltetradecanethioate (three-letter code: EHZ) (formula: C<sub>25</sub>H<sub>49</sub>N<sub>2</sub>O<sub>9</sub>PS).



Mol	Chain	Residues	Atoms					AltConf	
58	T	1	Total	C	N	O	P	S	0
			37	25	2	8	1	1	
58	U	1	Total	C	N	O	P	S	0
			37	25	2	8	1	1	

- Molecule 59 is MYRISTIC ACID (three-letter code: MYR) (formula:  $C_{14}H_{28}O_2$ ).



Mol	Chain	Residues	Atoms			AltConf
59	o	1	Total	C	O	0
			15	14	1	

- Molecule 60 is water.

Mol	Chain	Residues	Atoms		AltConf
60	A	6	Total	O	0
			6	6	
60	B	36	Total	O	0
			36	36	
60	C	55	Total	O	0
			55	55	
60	D	104	Total	O	0
			104	104	
60	E	8	Total	O	0
			8	8	
60	F	38	Total	O	0
			38	38	
60	G	139	Total	O	0
			139	139	

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Mol	Chain	Residues	Atoms		AltConf
60	H	25	Total 25	O 25	0
60	I	76	Total 76	O 76	0
60	J	1	Total 1	O 1	0
60	K	1	Total 1	O 1	0
60	L	32	Total 32	O 32	0
60	M	25	Total 25	O 25	0
60	N	7	Total 7	O 7	0
60	P	25	Total 25	O 25	0
60	Q	54	Total 54	O 54	0
60	R	25	Total 25	O 25	0
60	U	5	Total 5	O 5	0
60	V	3	Total 3	O 3	0
60	W	7	Total 7	O 7	0
60	X	12	Total 12	O 12	0
60	Y	1	Total 1	O 1	0
60	Z	13	Total 13	O 13	0
60	a	4	Total 4	O 4	0
60	b	5	Total 5	O 5	0
60	d	2	Total 2	O 2	0
60	e	4	Total 4	O 4	0
60	f	6	Total 6	O 6	0

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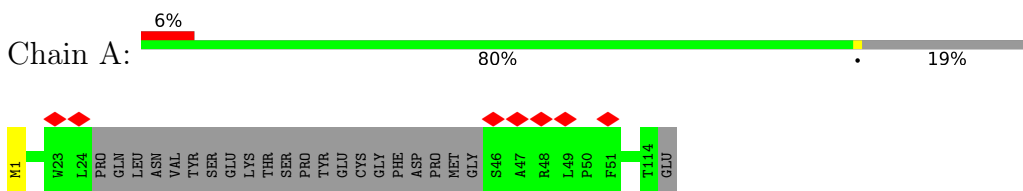
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<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>AltConf</b>
60	g	5	Total 5	O 5	0
60	h	9	Total 9	O 9	0
60	i	1	Total 1	O 1	0
60	j	3	Total 3	O 3	0
60	k	4	Total 4	O 4	0
60	l	11	Total 11	O 11	0
60	m	9	Total 9	O 9	0
60	n	16	Total 16	O 16	0
60	o	5	Total 5	O 5	0
60	p	18	Total 18	O 18	0
60	q	22	Total 22	O 22	0
60	r	26	Total 26	O 26	0
60	s	3	Total 3	O 3	0

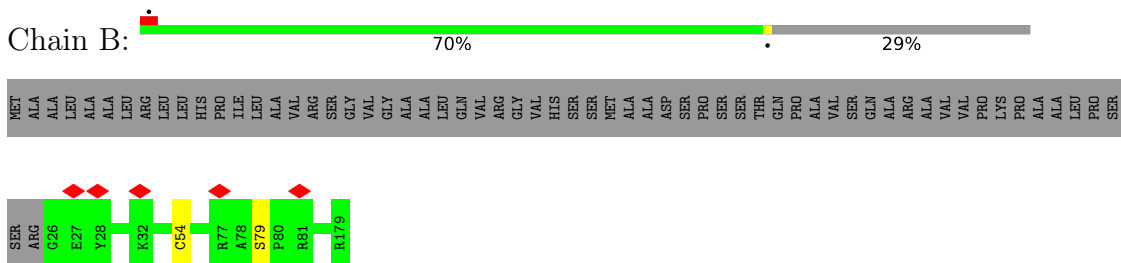
### 3 Residue-property plots

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

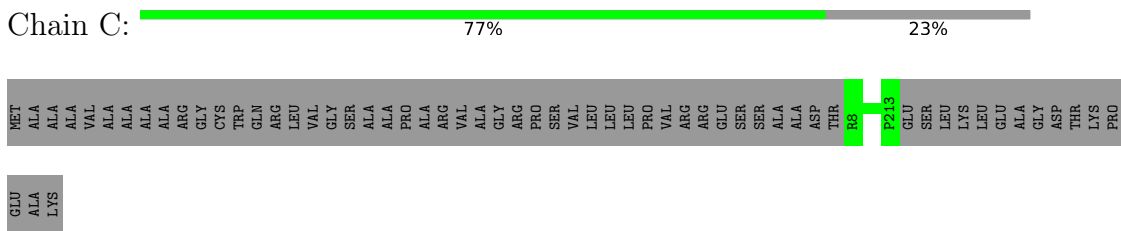
- Molecule 1: NADH-ubiquinone oxidoreductase chain 3



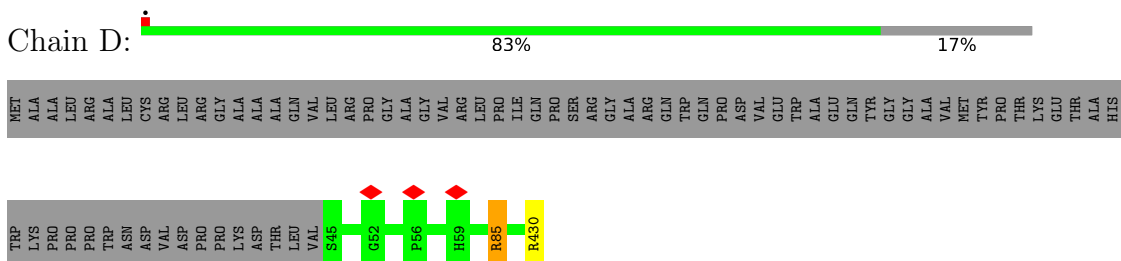
- Molecule 2: NADH dehydrogenase [ubiquinone] iron-sulfur protein 7, mitochondrial




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

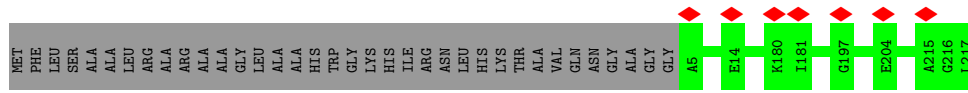


- Molecule 4: NADH dehydrogenase [ubiquinone] iron-sulfur protein 2, mitochondrial

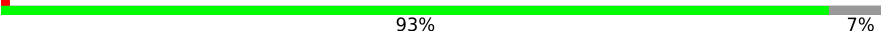


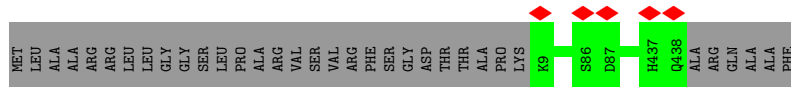
- Molecule 5: NADH dehydrogenase [ubiquinone] flavoprotein 2, mitochondrial

Chain E:  86% 14%



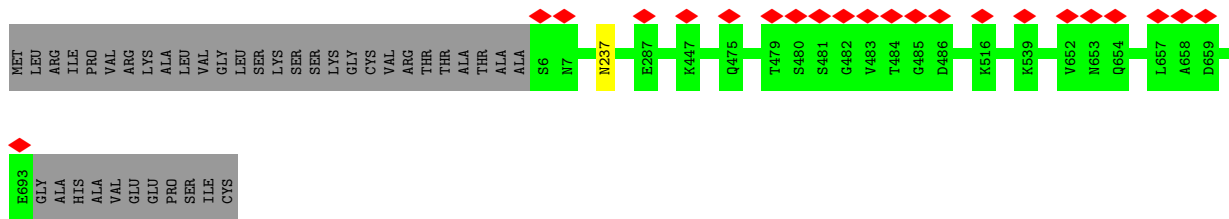
- Molecule 6: NADH dehydrogenase [ubiquinone] flavoprotein 1, mitochondrial

Chain F:  93% 7%



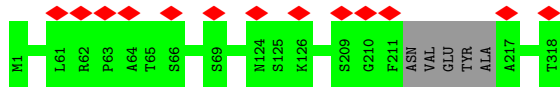
- Molecule 7: NADH-ubiquinone oxidoreductase 75 kDa subunit, mitochondrial

Chain G:  94% 5%




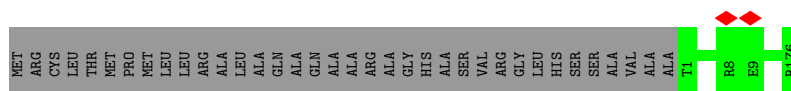
- Molecule 8: NADH-ubiquinone oxidoreductase chain 1

Chain H:  98%



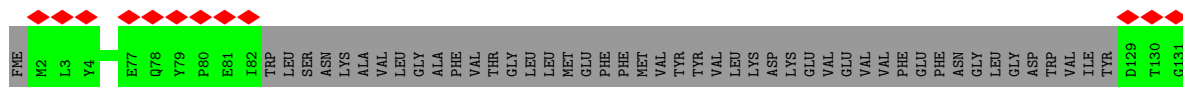
- Molecule 9: NADH dehydrogenase [ubiquinone] iron-sulfur protein 8, mitochondrial

Chain I:  83% 17%



- Molecule 10: NADH-ubiquinone oxidoreductase chain 6

Chain J:  7% 73% 27%



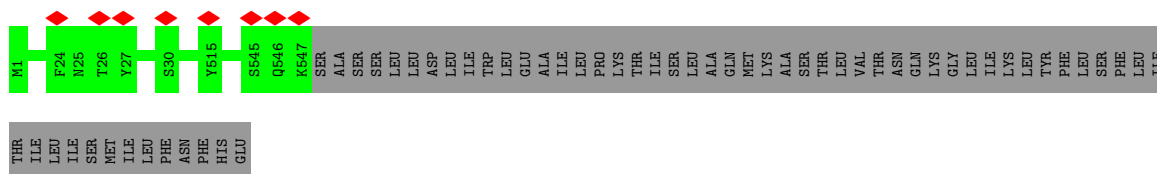
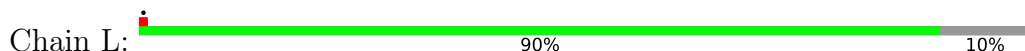




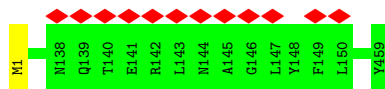
- Molecule 11: NADH-ubiquinone oxidoreductase chain 4L



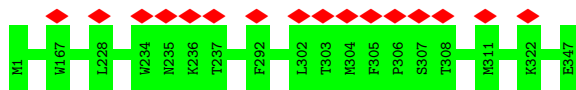
- Molecule 12: NADH-ubiquinone oxidoreductase chain 5



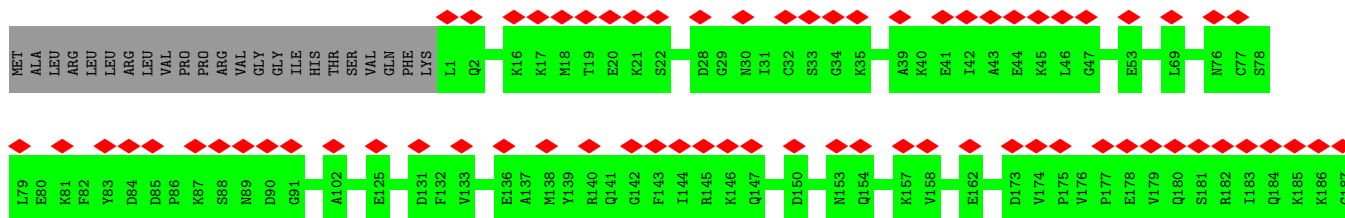
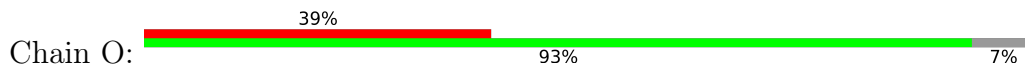
- Molecule 13: NADH-ubiquinone oxidoreductase chain 4

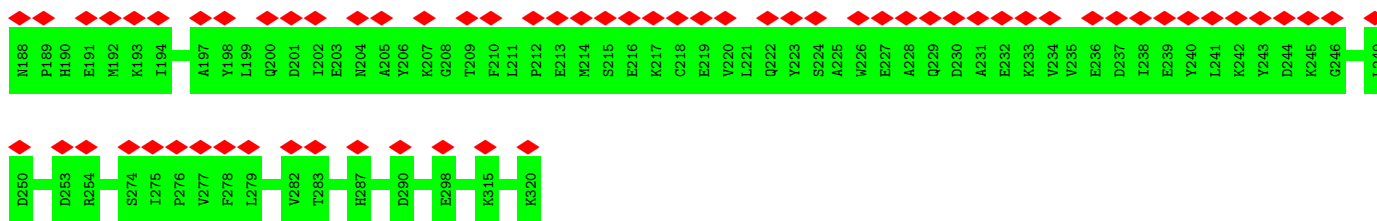


- Molecule 14: NADH-ubiquinone oxidoreductase chain 2

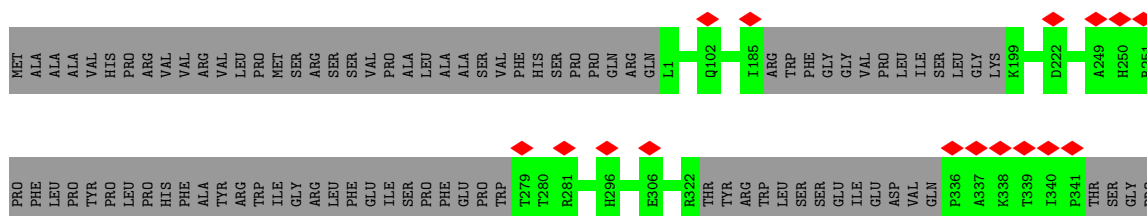
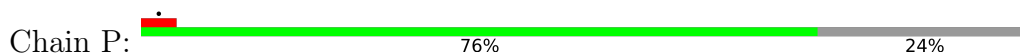


- Molecule 15: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 10, mitochondrial

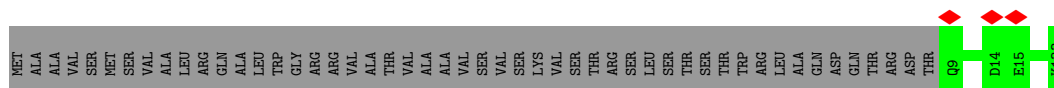




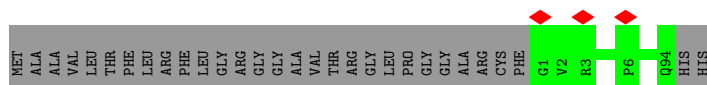
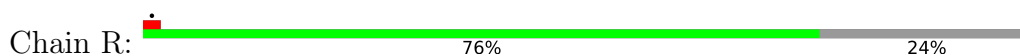
- Molecule 16: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 9, mitochondrial



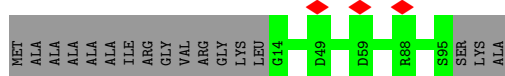
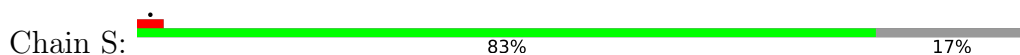
- Molecule 17: NADH dehydrogenase [ubiquinone] iron-sulfur protein 4, mitochondrial



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

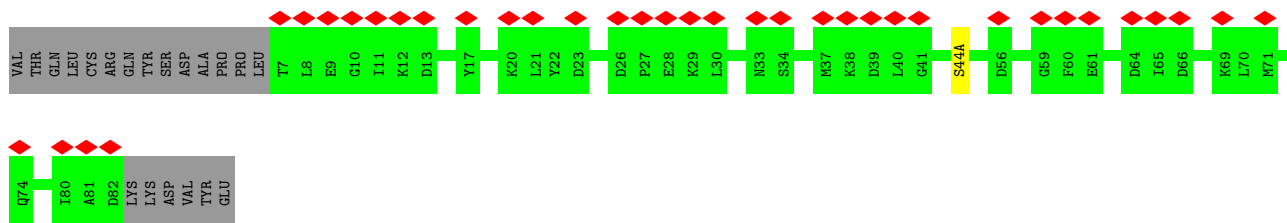


- Molecule 19: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 2

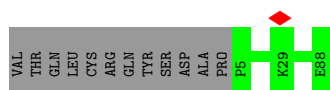
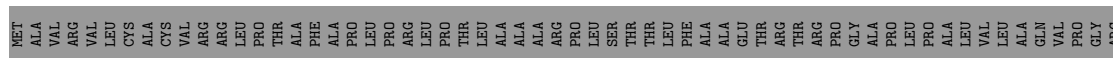


- Molecule 20: Acyl carrier protein, mitochondrial

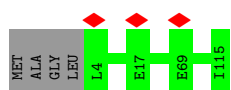




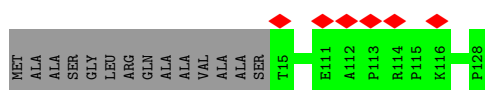
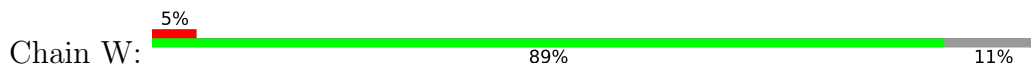
- Molecule 20: Acyl carrier protein, mitochondrial



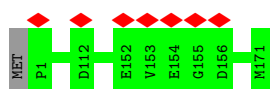
- Molecule 21: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 5



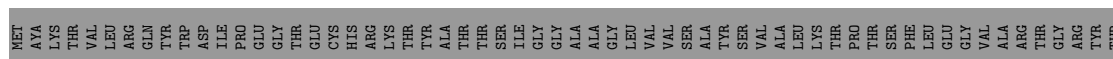
- Molecule 22: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 6

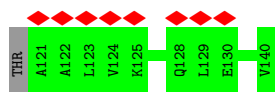


- Molecule 23: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 8

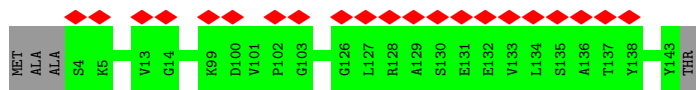


- Molecule 24: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 11





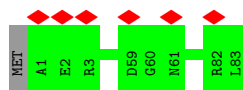
- Molecule 25: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 13



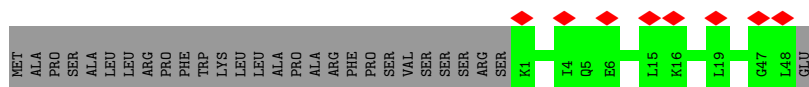
- Molecule 26: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 1



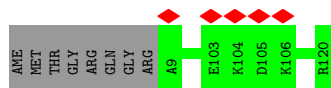
- Molecule 27: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 3



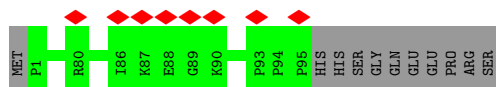
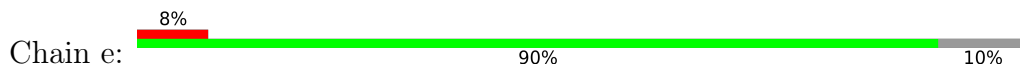
- Molecule 28: NADH dehydrogenase [ubiquinone] 1 subunit C1, mitochondrial



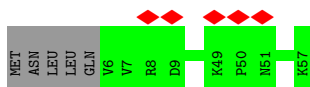
- Molecule 29: NADH dehydrogenase [ubiquinone] 1 subunit C2



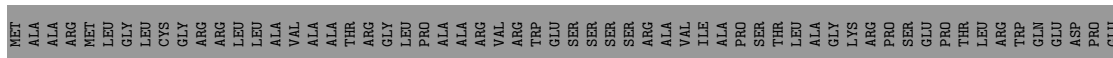
- Molecule 30: NADH dehydrogenase [ubiquinone] iron-sulfur protein 5



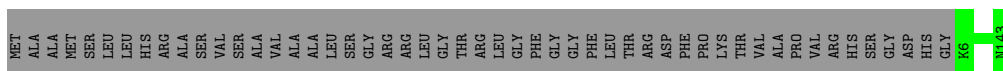
- Molecule 31: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 1



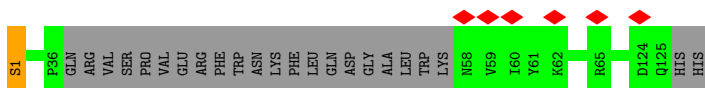
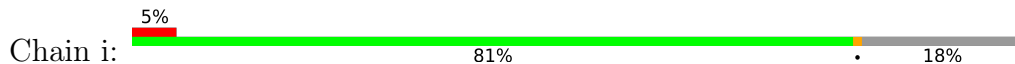
- Molecule 32: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 11, mitochondrial



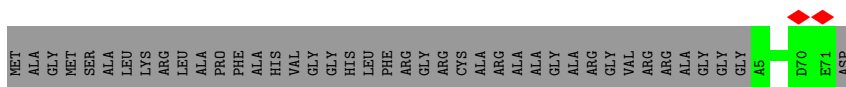
- Molecule 33: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 5, mitochondrial



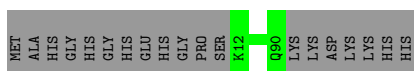
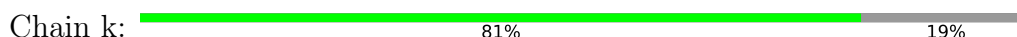
- Molecule 34: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 6



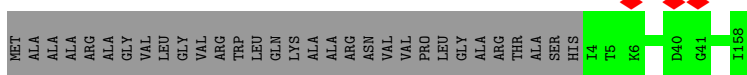
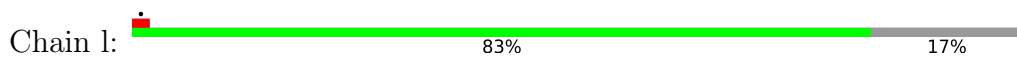
- Molecule 35: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 2, mitochondrial



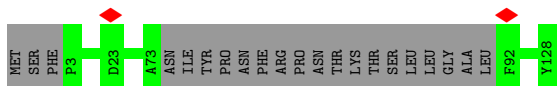
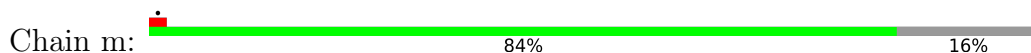
- Molecule 36: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 3



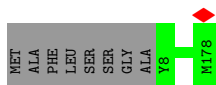
- Molecule 37: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 8, mitochondrial



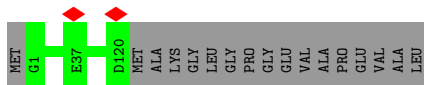
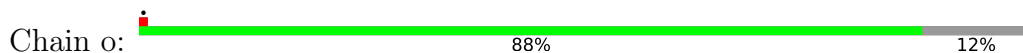
- Molecule 38: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 4



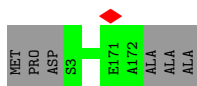
- Molecule 39: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 9



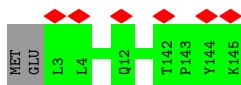
- Molecule 40: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 7



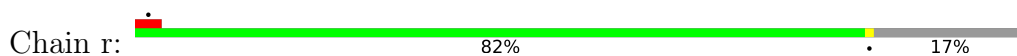
- Molecule 41: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 10

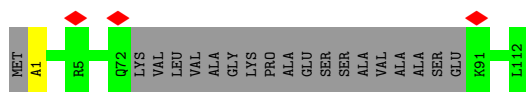


- Molecule 42: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 12

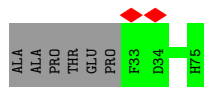
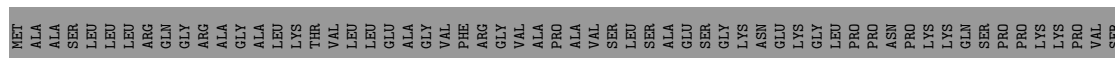


- Molecule 43: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 7





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



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	40154	Depositor
Resolution determination method	OTHER	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	40	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	33.163	Depositor
Minimum map value	-13.512	Depositor
Average map value	0.011	Depositor
Map value standard deviation	1.066	Depositor
Recommended contour level	6.0	Depositor
Map size (Å)	482.46, 482.46, 482.46	wwPDB
Map dimensions	660, 660, 660	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.731, 0.731, 0.731	Depositor



## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SAC, I49, MG, NDP, 3PE, PC1, 2MR, MYR, FME, ZN, FES, AYA, FMN, GTP, CDL, SF4, EHZ, K, LMT

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.34	0/756	0.43	0/1034
2	B	0.43	1/1261 (0.1%)	0.49	0/1706
3	C	0.37	0/1765	0.46	0/2403
4	D	0.36	0/3155	0.46	0/4264
5	E	0.32	0/1695	0.44	0/2307
6	F	0.34	0/3384	0.45	0/4573
7	G	0.33	0/5367	0.46	0/7274
8	H	0.34	0/2528	0.43	0/3452
9	I	0.38	0/1445	0.46	0/1956
10	J	0.36	0/968	0.44	0/1311
11	K	0.31	0/745	0.44	0/1008
12	L	0.37	0/4426	0.43	0/6025
13	M	0.35	0/3716	0.43	0/5069
14	N	0.31	0/2792	0.42	0/3800
15	O	0.29	0/2651	0.42	0/3587
16	P	0.32	0/2339	0.45	0/3159
17	Q	0.33	0/1039	0.45	0/1404
18	R	0.36	0/731	0.45	0/984
19	S	0.30	0/674	0.44	0/908
20	T	0.29	0/621	0.39	0/837
20	U	0.42	0/692	0.41	0/932
21	V	0.30	0/931	0.38	0/1261
22	W	0.31	0/995	0.41	0/1337
23	X	0.33	0/1439	0.43	0/1942
24	Y	0.26	0/157	0.38	0/211
25	Z	0.34	0/1174	0.43	0/1582
26	a	0.36	0/576	0.41	0/775
27	b	0.33	0/672	0.40	0/923
28	c	0.30	0/418	0.36	0/567
29	d	0.35	0/964	0.41	0/1305
30	e	0.31	0/818	0.45	0/1093

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
31	f	0.36	0/464	0.41	0/626
32	g	0.40	0/755	0.40	0/1023
33	h	0.35	0/1188	0.42	0/1607
34	i	0.39	0/912	0.42	0/1241
35	j	0.38	0/607	0.39	0/833
36	k	0.39	0/657	0.41	0/887
37	l	0.41	0/1358	0.41	0/1858
38	m	0.37	0/929	0.42	0/1252
39	n	0.41	0/1540	0.41	0/2085
40	o	0.41	0/1060	0.41	0/1420
41	p	0.38	0/1468	0.42	0/1979
42	q	0.33	0/1233	0.44	0/1676
43	r	0.33	0/780	0.47	0/1056
44	s	0.31	0/375	0.45	0/507
All	All	0.35	1/64220 (0.0%)	0.44	0/87039

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
4	D	0	1
34	i	0	1
All	All	0	2

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	54	CYS	CB-SG	-5.24	1.73	1.81

There are no bond angle outliers.

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
4	D	85	2MR	Mainchain
34	i	1	SAC	Mainchain

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

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

## 5.3 Torsion angles [i](#)

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

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	89/115 (77%)	87 (98%)	2 (2%)	0	100	100
2	B	152/216 (70%)	140 (92%)	11 (7%)	1 (1%)	22	39
3	C	204/266 (77%)	198 (97%)	6 (3%)	0	100	100
4	D	383/463 (83%)	370 (97%)	13 (3%)	0	100	100
5	E	211/249 (85%)	206 (98%)	5 (2%)	0	100	100
6	F	428/464 (92%)	411 (96%)	17 (4%)	0	100	100
7	G	686/727 (94%)	663 (97%)	23 (3%)	0	100	100
8	H	309/318 (97%)	294 (95%)	15 (5%)	0	100	100
9	I	174/212 (82%)	171 (98%)	3 (2%)	0	100	100
10	J	123/175 (70%)	115 (94%)	8 (6%)	0	100	100
11	K	96/98 (98%)	93 (97%)	3 (3%)	0	100	100
12	L	545/606 (90%)	522 (96%)	23 (4%)	0	100	100
13	M	457/459 (100%)	449 (98%)	8 (2%)	0	100	100
14	N	345/347 (99%)	336 (97%)	9 (3%)	0	100	100
15	O	318/343 (93%)	302 (95%)	16 (5%)	0	100	100
16	P	280/380 (74%)	276 (99%)	4 (1%)	0	100	100
17	Q	123/175 (70%)	123 (100%)	0	0	100	100
18	R	92/124 (74%)	89 (97%)	3 (3%)	0	100	100
19	S	80/99 (81%)	79 (99%)	1 (1%)	0	100	100
20	T	74/156 (47%)	71 (96%)	3 (4%)	0	100	100
20	U	82/156 (53%)	81 (99%)	1 (1%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
21	V	110/116 (95%)	109 (99%)	1 (1%)	0	100	100
22	W	112/128 (88%)	109 (97%)	3 (3%)	0	100	100
23	X	169/172 (98%)	164 (97%)	5 (3%)	0	100	100
24	Y	18/141 (13%)	16 (89%)	2 (11%)	0	100	100
25	Z	138/144 (96%)	129 (94%)	9 (6%)	0	100	100
26	a	67/70 (96%)	66 (98%)	1 (2%)	0	100	100
27	b	81/84 (96%)	79 (98%)	2 (2%)	0	100	100
28	c	46/76 (60%)	43 (94%)	3 (6%)	0	100	100
29	d	110/120 (92%)	107 (97%)	3 (3%)	0	100	100
30	e	93/106 (88%)	92 (99%)	1 (1%)	0	100	100
31	f	50/57 (88%)	50 (100%)	0	0	100	100
32	g	86/154 (56%)	83 (96%)	3 (4%)	0	100	100
33	h	136/189 (72%)	135 (99%)	1 (1%)	0	100	100
34	i	100/127 (79%)	97 (97%)	3 (3%)	0	100	100
35	j	65/108 (60%)	63 (97%)	2 (3%)	0	100	100
36	k	77/98 (79%)	74 (96%)	3 (4%)	0	100	100
37	l	153/186 (82%)	147 (96%)	6 (4%)	0	100	100
38	m	104/129 (81%)	100 (96%)	4 (4%)	0	100	100
39	n	169/179 (94%)	166 (98%)	3 (2%)	0	100	100
40	o	118/137 (86%)	112 (95%)	6 (5%)	0	100	100
41	p	168/176 (96%)	166 (99%)	2 (1%)	0	100	100
42	q	141/145 (97%)	139 (99%)	2 (1%)	0	100	100
43	r	90/113 (80%)	86 (96%)	4 (4%)	0	100	100
44	s	41/109 (38%)	39 (95%)	2 (5%)	0	100	100
All	All	7693/9212 (84%)	7447 (97%)	245 (3%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	79	SER

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

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	80/100 (80%)	80 (100%)	0	100	100
2	B	130/175 (74%)	130 (100%)	0	100	100
3	C	187/228 (82%)	187 (100%)	0	100	100
4	D	332/392 (85%)	331 (100%)	1 (0%)	92	97
5	E	183/205 (89%)	183 (100%)	0	100	100
6	F	344/368 (94%)	344 (100%)	0	100	100
7	G	578/608 (95%)	577 (100%)	1 (0%)	93	98
8	H	270/274 (98%)	270 (100%)	0	100	100
9	I	151/175 (86%)	151 (100%)	0	100	100
10	J	100/141 (71%)	100 (100%)	0	100	100
11	K	85/85 (100%)	85 (100%)	0	100	100
12	L	475/533 (89%)	475 (100%)	0	100	100
13	M	406/412 (98%)	406 (100%)	0	100	100
14	N	315/315 (100%)	315 (100%)	0	100	100
15	O	283/303 (93%)	283 (100%)	0	100	100
16	P	247/327 (76%)	247 (100%)	0	100	100
17	Q	112/153 (73%)	112 (100%)	0	100	100
18	R	77/97 (79%)	77 (100%)	0	100	100
19	S	73/82 (89%)	73 (100%)	0	100	100
20	T	70/135 (52%)	69 (99%)	1 (1%)	67	86
20	U	78/135 (58%)	78 (100%)	0	100	100
21	V	100/102 (98%)	100 (100%)	0	100	100
22	W	107/114 (94%)	107 (100%)	0	100	100
23	X	154/155 (99%)	154 (100%)	0	100	100
24	Y	15/102 (15%)	15 (100%)	0	100	100
25	Z	119/121 (98%)	119 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
26	a	58/59 (98%)	58 (100%)	0	100	100
27	b	71/72 (99%)	71 (100%)	0	100	100
28	c	44/68 (65%)	44 (100%)	0	100	100
29	d	100/105 (95%)	100 (100%)	0	100	100
30	e	86/96 (90%)	86 (100%)	0	100	100
31	f	49/54 (91%)	49 (100%)	0	100	100
32	g	79/131 (60%)	78 (99%)	1 (1%)	69	87
33	h	121/158 (77%)	121 (100%)	0	100	100
34	i	99/120 (82%)	99 (100%)	0	100	100
35	j	61/84 (73%)	61 (100%)	0	100	100
36	k	61/76 (80%)	61 (100%)	0	100	100
37	l	139/159 (87%)	139 (100%)	0	100	100
38	m	96/115 (84%)	96 (100%)	0	100	100
39	n	156/161 (97%)	156 (100%)	0	100	100
40	o	109/120 (91%)	109 (100%)	0	100	100
41	p	154/157 (98%)	154 (100%)	0	100	100
42	q	129/131 (98%)	129 (100%)	0	100	100
43	r	84/97 (87%)	84 (100%)	0	100	100
44	s	42/92 (46%)	42 (100%)	0	100	100
All	All	6809/7892 (86%)	6805 (100%)	4 (0%)	93	98

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

Mol	Chain	Res	Type
4	D	430	ARG
7	G	237	ASN
20	T	44(A)	SER
32	g	57	ASN

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

Mol	Chain	Res	Type
2	B	82	GLN
4	D	55	HIS

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Mol	Chain	Res	Type
8	H	304	HIS
12	L	199	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](#)

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

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	2MR	D	85	4	10,12,13	2.68	4 (40%)	5,13,15	1.01	0
14	FME	N	1	14	8,9,10	0.97	0	7,9,11	0.85	0
1	FME	A	1	1	8,9,10	0.91	0	7,9,11	1.15	1 (14%)
34	SAC	i	1	34	7,8,9	1.85	1 (14%)	8,9,11	1.97	1 (12%)
8	FME	H	1	8	8,9,10	0.96	0	7,9,11	1.02	0
11	FME	K	1	11	8,9,10	0.94	0	7,9,11	1.05	1 (14%)
13	FME	M	1	13	8,9,10	0.98	1 (12%)	7,9,11	0.97	1 (14%)
12	FME	L	1	12	8,9,10	0.97	0	7,9,11	0.79	0
43	AYA	r	1	43	6,7,8	1.82	2 (33%)	5,8,10	1.35	1 (20%)

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
4	2MR	D	85	4	-	0/10/13/15	-
14	FME	N	1	14	-	2/7/9/11	-
1	FME	A	1	1	-	4/7/9/11	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
34	SAC	i	1	34	-	5/7/8/10	-
8	FME	H	1	8	-	0/7/9/11	-
11	FME	K	1	11	-	4/7/9/11	-
13	FME	M	1	13	-	1/7/9/11	-
12	FME	L	1	12	-	5/7/9/11	-
43	AYA	r	1	43	-	0/4/6/8	-

All (8) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	D	85	2MR	CZ-NH2	5.14	1.44	1.33
4	D	85	2MR	CZ-NE	4.65	1.44	1.34
34	i	1	SAC	O-C	4.23	1.36	1.19
4	D	85	2MR	O-C	3.97	1.35	1.19
43	r	1	AYA	CT-N	3.27	1.45	1.34
43	r	1	AYA	OT-CT	-2.12	1.18	1.23
4	D	85	2MR	CQ1-NH1	-2.03	1.42	1.46
13	M	1	FME	CA-N	-2.02	1.43	1.46

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
34	i	1	SAC	O-C-CA	-4.67	112.53	124.78
1	A	1	FME	C-CA-N	2.45	114.16	109.73
43	r	1	AYA	CM-CT-N	2.42	120.19	116.10
13	M	1	FME	C-CA-N	2.14	113.59	109.73
11	K	1	FME	C-CA-N	2.05	113.43	109.73

There are no chirality outliers.

All (21) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	1	FME	O1-CN-N-CA
1	A	1	FME	N-CA-CB-CG
1	A	1	FME	C-CA-CB-CG
11	K	1	FME	C-CA-CB-CG
12	L	1	FME	O1-CN-N-CA
12	L	1	FME	C-CA-CB-CG
14	N	1	FME	O1-CN-N-CA
34	i	1	SAC	O-C-CA-CB

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Mol	Chain	Res	Type	Atoms
34	i	1	SAC	C-CA-CB-OG
34	i	1	SAC	C2A-C1A-N-CA
34	i	1	SAC	OAC-C1A-N-CA
34	i	1	SAC	N-CA-CB-OG
11	K	1	FME	N-CA-CB-CG
12	L	1	FME	N-CA-CB-CG
14	N	1	FME	N-CA-CB-CG
11	K	1	FME	CA-CB-CG-SD
12	L	1	FME	CA-CB-CG-SD
11	K	1	FME	CB-CG-SD-CE
13	M	1	FME	C-CA-CB-CG
1	A	1	FME	CB-CA-N-CN
12	L	1	FME	CB-CA-N-CN

There are no ring outliers.

No monomer is involved in short contacts.

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 47 ligands modelled in this entry, 3 are monoatomic - leaving 44 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$
53	CDL	L	702	-	68,68,99	1.04	7 (10%)	74,80,111	1.09	4 (5%)
53	CDL	h	1001	-	66,66,99	1.06	8 (12%)	72,78,111	1.19	4 (5%)
45	3PE	L	701	-	48,48,50	0.88	3 (6%)	51,53,55	1.16	3 (5%)
46	SF4	F	502	6	0,12,12	-	-	-	-	-
46	SF4	G	802	7	0,12,12	-	-	-	-	-
54	GTP	O	1202	55	26,34,34	2.92	10 (38%)	32,54,54	1.81	11 (34%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
51	LMT	L	704	-	36,36,36	1.22	2 (5%)	47,47,47	0.80	1 (2%)
45	3PE	M	601	-	42,42,50	0.92	4 (9%)	45,47,55	1.02	2 (4%)
51	LMT	g	1101	-	36,36,36	1.22	4 (11%)	47,47,47	0.85	0
51	LMT	h	1002	-	36,36,36	1.14	2 (5%)	47,47,47	1.29	8 (17%)
48	FES	E	301	5	0,4,4	-	-	-	-	-
45	3PE	I	204	-	32,32,50	1.07	4 (12%)	35,37,55	1.08	2 (5%)
51	LMT	l	201	-	36,36,36	1.23	3 (8%)	47,47,47	0.89	0
53	CDL	X	201	-	51,51,99	1.18	7 (13%)	57,63,111	1.29	4 (7%)
46	SF4	G	801	7	0,12,12	-	-	-	-	-
47	PC1	M	602	-	48,48,53	1.00	3 (6%)	54,56,61	1.01	2 (3%)
46	SF4	I	202	9	0,12,12	-	-	-	-	-
53	CDL	N	1304	-	64,64,99	1.06	8 (12%)	70,76,111	1.15	4 (5%)
53	CDL	q	201	-	75,75,99	1.00	7 (9%)	81,87,111	1.12	4 (4%)
58	EHZ	T	101	20	29,36,37	1.79	5 (17%)	35,44,47	1.77	7 (20%)
51	LMT	K	901	-	36,36,36	1.15	2 (5%)	47,47,47	1.11	4 (8%)
56	NDP	P	501	-	45,52,52	2.16	6 (13%)	53,80,80	1.69	10 (18%)
45	3PE	O	1201	-	50,50,50	0.87	4 (8%)	53,55,55	1.04	2 (3%)
45	3PE	N	1301	-	50,50,50	0.86	4 (8%)	53,55,55	1.08	2 (3%)
46	SF4	I	203	9	0,12,12	-	-	-	-	-
49	FMN	F	501	-	33,33,33	1.09	2 (6%)	48,50,50	1.24	6 (12%)
51	LMT	N	1303	-	36,36,36	1.18	3 (8%)	47,47,47	1.05	4 (8%)
52	I49	N	1305	-	15,17,17	1.49	2 (13%)	21,22,22	1.85	5 (23%)
52	I49	H	403	-	15,17,17	1.55	2 (13%)	21,22,22	1.92	7 (33%)
46	SF4	B	201	2	0,12,12	-	-	-	-	-
45	3PE	H	402	-	33,33,50	1.35	4 (12%)	34,37,55	1.21	2 (5%)
47	PC1	B	202	-	34,34,53	1.16	4 (11%)	40,42,61	1.10	2 (5%)
45	3PE	A	902	-	43,43,50	0.93	3 (6%)	46,48,55	1.12	2 (4%)
45	3PE	I	201	-	50,50,50	0.87	4 (8%)	53,55,55	1.07	2 (3%)
48	FES	G	803	7	0,4,4	-	-	-	-	-
53	CDL	N	1302	-	66,66,99	1.05	7 (10%)	72,78,111	1.15	4 (5%)
51	LMT	J	201	-	36,36,36	1.18	3 (8%)	47,47,47	0.93	2 (4%)
51	LMT	p	201	-	36,36,36	1.17	3 (8%)	47,47,47	1.12	5 (10%)
45	3PE	A	901	-	47,47,50	0.88	4 (8%)	50,52,55	1.20	3 (6%)
51	LMT	H	401	-	36,36,36	1.23	4 (11%)	47,47,47	1.02	2 (4%)
51	LMT	b	301	-	36,36,36	1.20	2 (5%)	47,47,47	0.95	1 (2%)
58	EHZ	U	101	20	29,36,37	1.64	4 (13%)	35,44,47	1.47	3 (8%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
59	MYR	o	201	40	14,14,15	0.85	0	13,13,15	0.70	0
45	3PE	L	703	-	44,44,50	0.90	3 (6%)	47,49,55	1.25	3 (6%)

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
53	CDL	L	702	-	-	21/79/79/110	-
53	CDL	h	1001	-	-	36/77/77/110	-
45	3PE	L	701	-	-	23/52/52/54	-
46	SF4	F	502	6	-	-	0/6/5/5
54	GTP	O	1202	55	-	6/18/38/38	0/3/3/3
46	SF4	G	802	7	-	-	0/6/5/5
51	LMT	L	704	-	-	8/21/61/61	0/2/2/2
45	3PE	M	601	-	-	18/46/46/54	-
51	LMT	g	1101	-	-	6/21/61/61	0/2/2/2
51	LMT	h	1002	-	-	4/21/61/61	0/2/2/2
48	FES	E	301	5	-	-	0/1/1/1
45	3PE	I	204	-	-	16/36/36/54	-
51	LMT	l	201	-	-	9/21/61/61	0/2/2/2
53	CDL	X	201	-	-	18/61/61/110	-
46	SF4	G	801	7	-	-	0/6/5/5
47	PC1	M	602	-	-	25/52/52/57	-
46	SF4	I	202	9	-	-	0/6/5/5
53	CDL	N	1304	-	-	28/75/75/110	-
53	CDL	q	201	-	-	41/86/86/110	-
58	EHZ	T	101	20	-	15/42/44/45	-
51	LMT	K	901	-	-	7/21/61/61	0/2/2/2
56	NDP	P	501	-	-	7/30/77/77	0/5/5/5
45	3PE	O	1201	-	-	29/54/54/54	-
45	3PE	N	1301	-	-	18/54/54/54	-
49	FMN	F	501	-	-	3/18/18/18	0/3/3/3
51	LMT	N	1303	-	-	3/21/61/61	0/2/2/2
46	SF4	I	203	9	-	-	0/6/5/5
52	I49	N	1305	-	-	4/10/10/10	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
52	I49	H	403	-	-	5/10/10/10	0/1/1/1
46	SF4	B	201	2	-	-	0/6/5/5
45	3PE	H	402	-	-	19/36/36/54	-
47	PC1	B	202	-	-	20/38/38/57	-
45	3PE	A	902	-	-	23/47/47/54	-
45	3PE	I	201	-	-	18/54/54/54	-
53	CDL	N	1302	-	-	40/77/77/110	-
48	FES	G	803	7	-	-	0/1/1/1
51	LMT	J	201	-	-	7/21/61/61	0/2/2/2
51	LMT	p	201	-	-	10/21/61/61	0/2/2/2
45	3PE	A	901	-	-	26/51/51/54	-
51	LMT	H	401	-	-	9/21/61/61	0/2/2/2
51	LMT	b	301	-	-	8/21/61/61	0/2/2/2
58	EHZ	U	101	20	-	14/42/44/45	-
59	MYR	o	201	40	-	7/11/12/13	-
45	3PE	L	703	-	-	19/48/48/54	-

All (147) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
56	P	501	NDP	P2B-O2B	11.86	1.81	1.59
54	O	1202	GTP	O6-C6	8.25	1.40	1.23
58	T	101	EHZ	C15-N2	5.94	1.46	1.33
58	T	101	EHZ	C12-N1	5.35	1.45	1.33
54	O	1202	GTP	O4'-C1'	5.26	1.48	1.41
45	H	402	3PE	O21-C2	-5.18	1.40	1.46
58	U	101	EHZ	C15-N2	5.06	1.44	1.33
58	U	101	EHZ	C12-N1	4.93	1.44	1.33
54	O	1202	GTP	C2-N1	4.75	1.49	1.37
54	O	1202	GTP	C2-N3	4.72	1.44	1.33
52	H	403	I49	C15-N02	-4.69	1.31	1.37
54	O	1202	GTP	C2-N2	4.60	1.45	1.34
52	N	1305	I49	C15-N02	-4.53	1.31	1.37
51	l	201	LMT	O5B-C1B	3.73	1.51	1.41
51	H	401	LMT	O5B-C1B	3.62	1.51	1.41
51	g	1101	LMT	O5B-C1B	3.58	1.51	1.41
51	N	1303	LMT	O5B-C1B	3.51	1.50	1.41
49	F	501	FMN	C4A-N5	3.48	1.37	1.30
51	p	201	LMT	O5B-C1B	3.47	1.50	1.41

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
56	P	501	NDP	PN-O5D	3.44	1.73	1.59
51	b	301	LMT	O5B-C1B	3.44	1.50	1.41
51	h	1002	LMT	O5B-C1B	3.38	1.50	1.41
51	L	704	LMT	O5'-C1'	3.37	1.50	1.41
51	L	704	LMT	O5B-C1B	3.32	1.50	1.41
54	O	1202	GTP	C5-C6	-3.29	1.40	1.47
51	g	1101	LMT	O5'-C1'	3.27	1.50	1.41
54	O	1202	GTP	C2'-C1'	-3.26	1.48	1.53
51	J	201	LMT	O5B-C1B	3.22	1.50	1.41
51	J	201	LMT	O5'-C1'	3.18	1.50	1.41
51	b	301	LMT	O5'-C1'	3.16	1.49	1.41
51	H	401	LMT	O5'-C1'	3.14	1.49	1.41
52	H	403	I49	C14-N03	3.13	1.38	1.29
51	l	201	LMT	O5'-C1'	3.06	1.49	1.41
56	P	501	NDP	O2B-C2B	-3.02	1.33	1.44
52	N	1305	I49	C14-N03	3.01	1.38	1.29
45	H	402	3PE	O21-C21	2.99	1.40	1.33
51	K	901	LMT	O5B-C1B	2.96	1.49	1.41
51	K	901	LMT	O5'-C1'	2.89	1.49	1.41
51	h	1002	LMT	O5'-C1'	2.83	1.49	1.41
51	p	201	LMT	O5'-C1'	2.80	1.49	1.41
51	N	1303	LMT	O5'-C1'	2.78	1.48	1.41
45	L	701	3PE	O21-C2	-2.70	1.39	1.46
53	q	201	CDL	OB6-CB4	-2.69	1.39	1.46
53	L	702	CDL	OA6-CA4	-2.68	1.39	1.46
58	U	101	EHZ	O4-C15	-2.68	1.18	1.23
53	q	201	CDL	OA6-CA4	-2.66	1.39	1.46
53	h	1001	CDL	OB6-CB4	-2.65	1.40	1.46
53	L	702	CDL	OB6-CB4	-2.65	1.40	1.46
53	h	1001	CDL	OA6-CA4	-2.64	1.40	1.46
45	O	1201	3PE	O21-C2	-2.63	1.40	1.46
47	M	602	PC1	O21-C2	-2.60	1.40	1.46
45	L	703	3PE	O21-C2	-2.60	1.40	1.46
53	q	201	CDL	OB8-CB7	2.58	1.40	1.33
53	X	201	CDL	OB6-CB4	-2.57	1.40	1.46
58	T	101	EHZ	O4-C15	-2.56	1.18	1.23
45	I	201	3PE	O21-C2	-2.55	1.40	1.46
53	X	201	CDL	OA6-CA4	-2.54	1.40	1.46
53	N	1302	CDL	OA6-CA4	-2.54	1.40	1.46
45	L	703	3PE	O31-C31	2.52	1.40	1.33
53	N	1304	CDL	OA6-CA4	-2.49	1.40	1.46
45	A	902	3PE	O31-C31	2.48	1.40	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
58	U	101	EHZ	O3-C12	-2.46	1.18	1.23
58	T	101	EHZ	O3-C12	-2.43	1.18	1.23
47	B	202	PC1	O21-C2	-2.42	1.40	1.46
53	N	1302	CDL	OB6-CB4	-2.42	1.40	1.46
45	N	1301	3PE	O21-C2	-2.42	1.40	1.46
45	M	601	3PE	O21-C2	-2.41	1.40	1.46
47	M	602	PC1	O31-C31	2.41	1.40	1.33
45	I	204	3PE	O21-C2	-2.40	1.40	1.46
45	A	902	3PE	O21-C21	2.39	1.41	1.34
53	N	1304	CDL	OB8-CB7	2.38	1.40	1.33
53	N	1302	CDL	OB8-CB7	2.38	1.40	1.33
53	X	201	CDL	OB8-CB7	2.38	1.40	1.33
53	N	1302	CDL	OA8-CA7	2.38	1.40	1.33
51	p	201	LMT	O5B-C5B	2.36	1.50	1.44
45	N	1301	3PE	O31-C31	2.36	1.40	1.33
45	A	901	3PE	O21-C21	2.35	1.40	1.34
45	I	204	3PE	O31-C31	2.34	1.40	1.33
53	N	1304	CDL	OB6-CB4	-2.34	1.40	1.46
45	L	701	3PE	O31-C31	2.34	1.40	1.33
53	q	201	CDL	OA8-CA6	-2.34	1.39	1.45
47	M	602	PC1	O31-C3	-2.33	1.39	1.45
45	O	1201	3PE	O31-C31	2.33	1.40	1.33
45	H	402	3PE	O31-C31	2.33	1.40	1.33
53	h	1001	CDL	OA8-CA7	2.32	1.40	1.33
45	A	901	3PE	O31-C31	2.31	1.40	1.33
45	I	201	3PE	O31-C3	-2.31	1.39	1.45
45	M	601	3PE	O31-C31	2.31	1.40	1.33
53	h	1001	CDL	OB8-CB6	-2.30	1.39	1.45
51	l	201	LMT	O5B-C5B	2.30	1.49	1.44
47	B	202	PC1	O31-C31	2.29	1.40	1.33
45	I	201	3PE	O31-C31	2.29	1.40	1.33
54	O	1202	GTP	PG-O2G	-2.28	1.46	1.54
47	B	202	PC1	O21-C21	2.28	1.40	1.34
45	L	701	3PE	O31-C3	-2.27	1.40	1.45
53	X	201	CDL	OA8-CA7	2.27	1.40	1.33
53	L	702	CDL	OB8-CB6	-2.27	1.40	1.45
53	h	1001	CDL	OA8-CA6	-2.27	1.40	1.45
53	N	1304	CDL	OA8-CA7	2.26	1.39	1.33
53	L	702	CDL	OB8-CB7	2.26	1.39	1.33
53	L	702	CDL	OA8-CA6	-2.26	1.40	1.45
45	A	901	3PE	O21-C2	-2.26	1.40	1.46
53	X	201	CDL	OA8-CA6	-2.25	1.40	1.45

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
45	I	204	3PE	O21-C21	2.24	1.40	1.34
53	N	1302	CDL	OB6-CB5	2.24	1.40	1.34
53	N	1304	CDL	OB8-CB6	-2.23	1.40	1.45
54	O	1202	GTP	C2'-C3'	-2.23	1.47	1.53
53	L	702	CDL	OA8-CA7	2.23	1.39	1.33
45	O	1201	3PE	O31-C3	-2.22	1.40	1.45
53	q	201	CDL	OA8-CA7	2.22	1.39	1.33
53	N	1304	CDL	OA8-CA6	-2.22	1.40	1.45
45	A	901	3PE	O31-C3	-2.21	1.40	1.45
45	I	204	3PE	O31-C3	-2.21	1.40	1.45
54	O	1202	GTP	PG-O3G	-2.21	1.46	1.54
47	B	202	PC1	O31-C3	-2.20	1.40	1.45
49	F	501	FMN	C10-N1	2.20	1.37	1.33
56	P	501	NDP	O4B-C4B	-2.20	1.40	1.45
53	h	1001	CDL	OB8-CB7	2.20	1.39	1.33
53	h	1001	CDL	OB6-CB5	2.19	1.40	1.34
56	P	501	NDP	O5D-C5D	-2.18	1.36	1.44
51	N	1303	LMT	O5B-C5B	2.18	1.49	1.44
45	H	402	3PE	O31-C3	-2.17	1.40	1.45
45	I	201	3PE	O21-C21	2.17	1.40	1.34
45	M	601	3PE	O21-C21	2.17	1.40	1.34
53	N	1302	CDL	OB8-CB6	-2.16	1.40	1.45
53	N	1304	CDL	OB6-CB5	2.15	1.40	1.34
51	g	1101	LMT	O1B-C4'	2.15	1.49	1.43
53	X	201	CDL	OB8-CB6	-2.15	1.40	1.45
58	T	101	EHZ	C9-S1	2.15	1.81	1.76
45	A	902	3PE	O31-C3	-2.14	1.40	1.45
51	H	401	LMT	O1B-C4'	2.11	1.49	1.43
53	N	1304	CDL	OA6-CA5	2.09	1.40	1.34
45	N	1301	3PE	O31-C3	-2.07	1.40	1.45
45	L	703	3PE	O31-C3	-2.07	1.40	1.45
45	O	1201	3PE	O21-C21	2.07	1.40	1.34
53	X	201	CDL	OA6-CA5	2.07	1.39	1.35
51	J	201	LMT	O5'-C5'	2.07	1.49	1.44
53	q	201	CDL	OB6-CB5	2.06	1.40	1.34
53	L	702	CDL	OB6-CB5	2.06	1.40	1.34
45	N	1301	3PE	O21-C21	2.05	1.40	1.34
45	M	601	3PE	O31-C3	-2.05	1.40	1.45
53	N	1302	CDL	OA8-CA6	-2.05	1.40	1.45
53	q	201	CDL	OA6-CA5	2.04	1.40	1.34
51	H	401	LMT	O5'-C5'	2.03	1.49	1.44
51	g	1101	LMT	O5B-C5B	2.02	1.49	1.44

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
56	P	501	NDP	O3D-C3D	-2.01	1.38	1.43
53	h	1001	CDL	OA6-CA5	2.00	1.40	1.34

All (127) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
56	P	501	NDP	PN-O3-PA	-6.82	109.42	132.83
58	U	101	EHZ	C8-C9-S1	6.18	121.27	113.63
58	T	101	EHZ	C16-C15-N2	5.58	127.68	116.58
58	T	101	EHZ	C8-C9-S1	5.38	120.28	113.63
45	A	901	3PE	O21-C21-C22	4.97	122.22	111.50
53	X	201	CDL	OA6-CA5-C11	4.89	120.09	111.09
53	h	1001	CDL	OB6-CB5-C51	4.83	121.91	111.50
45	H	402	3PE	O21-C21-O22	-4.76	119.51	125.57
45	L	703	3PE	O21-C21-C22	4.66	121.55	111.50
47	B	202	PC1	O21-C21-C22	4.45	121.10	111.50
45	L	701	3PE	O21-C21-C22	4.43	121.06	111.50
53	X	201	CDL	OB6-CB5-C51	4.28	120.72	111.50
45	N	1301	3PE	O21-C21-C22	4.25	120.65	111.50
52	N	1305	I49	C14-N02-C15	-4.22	118.18	125.21
52	N	1305	I49	N01-C14-N03	4.19	128.11	120.26
45	I	201	3PE	O21-C21-C22	4.11	120.36	111.50
52	H	403	I49	N01-C14-N03	4.07	127.89	120.26
53	h	1001	CDL	OA6-CA5-C11	4.07	120.27	111.50
53	N	1302	CDL	OB6-CB5-C51	4.07	120.27	111.50
47	M	602	PC1	O21-C21-C22	4.04	120.20	111.50
53	q	201	CDL	OA6-CA5-C11	4.02	120.17	111.50
52	H	403	I49	C14-N02-C15	-3.96	118.61	125.21
54	O	1202	GTP	PB-O3B-PG	-3.95	119.28	132.83
53	q	201	CDL	OB6-CB5-C51	3.94	119.99	111.50
53	L	702	CDL	OA6-CA5-C11	3.91	119.94	111.50
53	N	1302	CDL	OA6-CA5-C11	3.86	119.82	111.50
45	A	902	3PE	O21-C21-C22	3.84	119.79	111.50
45	O	1201	3PE	O21-C21-C22	3.84	119.79	111.50
45	I	204	3PE	O21-C21-C22	3.83	119.76	111.50
53	N	1304	CDL	OA6-CA5-C11	3.79	119.67	111.50
54	O	1202	GTP	C3'-C2'-C1'	3.70	106.55	100.98
45	M	601	3PE	O21-C21-C22	3.61	119.28	111.50
56	P	501	NDP	O2B-P2B-O1X	-3.57	95.62	109.39
58	T	101	EHZ	O4-C15-N2	-3.50	115.48	122.99
53	L	702	CDL	OB6-CB5-C51	3.41	118.85	111.50
49	F	501	FMN	C4-N3-C2	-3.32	119.51	125.64

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
53	N	1304	CDL	OB6-CB5-C51	3.29	119.97	110.80
51	h	1002	LMT	C1'-O5'-C5'	-3.25	107.31	113.69
53	N	1304	CDL	OB8-CB7-C71	3.19	121.93	111.91
51	K	901	LMT	C3B-C4B-C5B	3.19	115.93	110.24
54	O	1202	GTP	C5-C6-N1	3.11	119.44	113.95
54	O	1202	GTP	O2G-PG-O3B	3.06	114.90	104.64
45	A	902	3PE	O31-C31-C32	3.03	121.40	111.91
54	O	1202	GTP	C2-N1-C6	-2.94	119.68	125.10
45	L	703	3PE	O31-C31-C32	2.93	121.12	111.91
45	L	701	3PE	O31-C31-C32	2.91	121.04	111.91
53	q	201	CDL	OA8-CA7-C31	2.89	120.98	111.91
56	P	501	NDP	PA-O5B-C5B	-2.87	104.87	121.68
49	F	501	FMN	C4A-C10-N10	2.86	120.66	116.48
51	p	201	LMT	O1'-C1'-C2'	2.85	112.76	108.30
45	N	1301	3PE	O31-C31-C32	2.85	120.85	111.91
53	h	1001	CDL	OA8-CA7-C31	2.84	120.83	111.91
49	F	501	FMN	C4A-C4-N3	2.77	120.23	113.19
45	H	402	3PE	O31-C31-C32	2.76	120.58	111.91
45	A	901	3PE	O31-C31-C32	2.74	120.52	111.91
53	N	1302	CDL	OB8-CB7-C71	2.74	120.51	111.91
54	O	1202	GTP	O3G-PG-O3B	2.73	113.78	104.64
53	h	1001	CDL	OB8-CB7-C71	2.70	120.39	111.91
52	H	403	I49	N05-C15-N04	-2.70	111.96	120.26
53	N	1304	CDL	OA8-CA7-C31	2.69	120.36	111.91
45	I	204	3PE	O31-C31-C32	2.68	120.30	111.91
56	P	501	NDP	PN-O5D-C5D	-2.67	106.01	121.68
51	H	401	LMT	C1B-C2B-C3B	2.67	115.55	110.00
53	N	1302	CDL	OA8-CA7-C31	2.66	120.25	111.91
52	N	1305	I49	N05-C15-N04	-2.66	112.09	120.26
45	I	201	3PE	O31-C31-C32	2.65	120.21	111.91
53	L	702	CDL	OB8-CB7-C71	2.62	120.12	111.91
53	q	201	CDL	OB8-CB7-C71	2.60	120.07	111.91
53	X	201	CDL	OB8-CB7-C71	2.59	120.05	111.91
51	h	1002	LMT	C1'-C2'-C3'	2.57	115.34	110.00
45	O	1201	3PE	O31-C31-C32	2.55	119.92	111.91
56	P	501	NDP	O5D-PN-O1N	-2.54	99.13	109.07
56	P	501	NDP	O3X-P2B-O2X	2.54	117.35	107.64
53	X	201	CDL	OA8-CA7-C31	2.53	119.85	111.91
45	M	601	3PE	O31-C31-C32	2.52	119.83	111.91
45	L	703	3PE	C2-O21-C21	-2.49	111.66	117.79
52	N	1305	I49	C08-N01-C14	-2.48	118.98	123.50
51	h	1002	LMT	O5B-C5B-C4B	2.47	114.19	109.69

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
49	F	501	FMN	O4-C4-C4A	-2.46	120.08	126.60
56	P	501	NDP	O4B-C4B-C3B	2.45	109.96	105.11
51	K	901	LMT	O5B-C5B-C4B	2.45	114.14	109.69
54	O	1202	GTP	C2'-C3'-C4'	2.42	107.35	102.64
47	M	602	PC1	O31-C31-C32	2.42	119.51	111.91
58	T	101	EHZ	C10-S1-C9	2.41	109.37	101.87
51	N	1303	LMT	C2'-C3'-C4'	2.40	115.17	109.68
56	P	501	NDP	C2A-N1A-C6A	-2.40	114.65	118.75
47	B	202	PC1	O31-C31-C32	2.38	119.39	111.91
53	L	702	CDL	OA8-CA7-C31	2.33	119.23	111.91
51	h	1002	LMT	C3B-C4B-C5B	2.33	114.40	110.24
52	H	403	I49	C08-N01-C14	-2.32	119.26	123.50
52	N	1305	I49	N05-C15-N02	2.32	126.98	117.44
51	H	401	LMT	O5B-C1B-C2B	2.32	115.25	110.35
52	H	403	I49	N05-C15-N02	2.32	126.96	117.44
49	F	501	FMN	C10-C4A-N5	-2.31	119.95	124.86
51	p	201	LMT	C1-O1'-C1'	-2.31	110.01	113.84
56	P	501	NDP	O2N-PN-O1N	2.30	123.61	112.24
54	O	1202	GTP	O2B-PB-O1B	-2.27	101.00	112.24
51	N	1303	LMT	C6B-C5B-C4B	-2.27	107.69	113.00
51	N	1303	LMT	O5B-C5B-C4B	2.25	113.77	109.69
51	p	201	LMT	O5B-C5B-C4B	2.24	113.77	109.69
54	O	1202	GTP	O2A-PA-O1A	-2.24	101.18	112.24
49	F	501	FMN	C4A-C10-N1	-2.23	119.55	124.73
56	P	501	NDP	O7N-C7N-N7N	-2.23	117.66	122.88
51	L	704	LMT	C1B-O1B-C4'	-2.22	112.47	117.96
58	T	101	EHZ	O2-C9-S1	-2.21	119.74	122.61
51	J	201	LMT	C1B-O1B-C4'	-2.21	112.49	117.96
51	h	1002	LMT	C2'-C3'-C4'	2.19	114.68	109.68
51	K	901	LMT	C1B-O5B-C5B	-2.18	109.41	113.69
52	H	403	I49	C12-C10-C07	-2.17	118.98	120.46
51	K	901	LMT	C6B-C5B-C4B	-2.17	107.93	113.00
54	O	1202	GTP	O6-C6-C5	-2.14	120.20	124.37
51	b	301	LMT	C6B-C5B-C4B	-2.11	108.07	113.00
45	A	901	3PE	O21-C21-O22	-2.09	118.64	123.70
58	U	101	EHZ	O2-C9-S1	-2.07	119.92	122.61
58	T	101	EHZ	C14-N2-C15	2.06	126.27	122.59
51	h	1002	LMT	C1-O1'-C1'	2.06	117.25	113.84
51	p	201	LMT	O5'-C5'-C4'	2.06	114.09	109.75
45	L	701	3PE	C2-O21-C21	-2.06	112.73	117.79
51	p	201	LMT	C1'-O5'-C5'	-2.06	109.65	113.69
54	O	1202	GTP	PA-O3A-PB	-2.06	125.77	132.83

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
52	H	403	I49	C09-C07-C10	2.05	121.41	118.54
51	h	1002	LMT	C4B-C3B-C2B	2.04	114.38	110.82
51	h	1002	LMT	O1'-C1'-C2'	2.03	111.48	108.30
58	T	101	EHZ	C13-C12-N1	2.02	119.83	116.42
58	U	101	EHZ	C7-C8-C9	-2.02	109.28	113.89
51	N	1303	LMT	C1'-O5'-C5'	-2.02	109.73	113.69
51	J	201	LMT	C4B-C3B-C2B	2.00	114.32	110.82

There are no chirality outliers.

All (570) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
45	A	901	3PE	C11-O13-P-O14
45	A	901	3PE	C12-C11-O13-P
45	A	901	3PE	O13-C11-C12-N
45	A	901	3PE	O22-C21-O21-C2
45	A	902	3PE	C1-O11-P-O12
45	A	902	3PE	C1-O11-P-O14
45	A	902	3PE	O13-C11-C12-N
45	H	402	3PE	C11-O13-P-O12
45	H	402	3PE	C11-O13-P-O14
45	H	402	3PE	O13-C11-C12-N
45	H	402	3PE	C1-C2-O21-C21
45	H	402	3PE	C3-C2-O21-C21
45	H	402	3PE	O22-C21-O21-C2
45	I	201	3PE	C11-O13-P-O12
45	I	204	3PE	C1-O11-P-O14
45	I	204	3PE	O11-C1-C2-O21
45	L	701	3PE	C11-O13-P-O12
45	L	701	3PE	C11-O13-P-O14
45	L	701	3PE	O13-C11-C12-N
45	L	703	3PE	C1-O11-P-O13
45	L	703	3PE	C1-O11-P-O14
45	L	703	3PE	O13-C11-C12-N
45	M	601	3PE	O13-C11-C12-N
45	N	1301	3PE	O13-C11-C12-N
45	N	1301	3PE	O11-C1-C2-O21
45	N	1301	3PE	O22-C21-O21-C2
45	O	1201	3PE	C1-O11-P-O12
45	O	1201	3PE	C1-O11-P-O13
45	O	1201	3PE	C1-O11-P-O14
45	O	1201	3PE	C11-O13-P-O14

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Mol	Chain	Res	Type	Atoms
45	O	1201	3PE	O13-C11-C12-N
45	O	1201	3PE	O22-C21-O21-C2
47	B	202	PC1	C11-O13-P-O14
47	B	202	PC1	C1-O11-P-O14
47	M	602	PC1	C1-O11-P-O12
47	M	602	PC1	C1-O11-P-O14
47	M	602	PC1	C1-O11-P-O13
47	M	602	PC1	O13-C11-C12-N
49	F	501	FMN	C5'-O5'-P-O1P
51	H	401	LMT	O5'-C1'-O1'-C1
51	K	901	LMT	C2-C1-O1'-C1'
51	g	1101	LMT	O5'-C1'-O1'-C1
51	l	201	LMT	C2'-C1'-O1'-C1
51	l	201	LMT	O5'-C1'-O1'-C1
52	H	403	I49	C07-C06-C08-N01
52	H	403	I49	N05-C15-N02-C14
52	N	1305	I49	C07-C06-C08-N01
52	N	1305	I49	N04-C15-N02-C14
52	N	1305	I49	N05-C15-N02-C14
53	L	702	CDL	CB3-OB5-PB2-OB2
53	L	702	CDL	CB3-OB5-PB2-OB3
53	L	702	CDL	CB3-OB5-PB2-OB4
53	N	1302	CDL	CB2-C1-CA2-OA2
53	N	1302	CDL	CB2-OB2-PB2-OB3
53	N	1302	CDL	CB3-OB5-PB2-OB3
53	N	1302	CDL	CB3-OB5-PB2-OB4
53	X	201	CDL	CA2-OA2-PA1-OA3
53	X	201	CDL	OA7-CA5-OA6-CA4
53	X	201	CDL	C11-CA5-OA6-CA4
53	X	201	CDL	CB3-OB5-PB2-OB3
53	X	201	CDL	CB3-OB5-PB2-OB4
53	h	1001	CDL	O1-C1-CB2-OB2
53	h	1001	CDL	CA2-C1-CB2-OB2
53	h	1001	CDL	CA2-OA2-PA1-OA5
53	h	1001	CDL	CB3-OB5-PB2-OB2
53	h	1001	CDL	CB3-OB5-PB2-OB3
53	h	1001	CDL	CB3-OB5-PB2-OB4
53	h	1001	CDL	OB7-CB5-OB6-CB4
53	h	1001	CDL	C51-CB5-OB6-CB4
53	q	201	CDL	CA3-OA5-PA1-OA2
53	q	201	CDL	CA3-OA5-PA1-OA3
53	q	201	CDL	CB2-OB2-PB2-OB4

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Mol	Chain	Res	Type	Atoms
53	q	201	CDL	CB3-OB5-PB2-OB3
56	P	501	NDP	C2B-O2B-P2B-O1X
58	T	101	EHZ	C6-C7-C8-C9
58	T	101	EHZ	C16-C15-N2-C14
58	T	101	EHZ	C16-C17-C20-O6
58	U	101	EHZ	C11-C10-S1-C9
58	U	101	EHZ	C16-C17-C20-O6
58	U	101	EHZ	C18-C17-C20-O6
58	U	101	EHZ	C19-C17-C20-O6
53	N	1304	CDL	OB9-CB7-OB8-CB6
51	l	201	LMT	O5B-C1B-O1B-C4'
45	A	902	3PE	O32-C31-O31-C3
45	H	402	3PE	O32-C31-O31-C3
45	I	204	3PE	O32-C31-O31-C3
53	L	702	CDL	OB9-CB7-OB8-CB6
53	X	201	CDL	OA9-CA7-OA8-CA6
47	B	202	PC1	O22-C21-O21-C2
53	q	201	CDL	OA7-CA5-OA6-CA4
45	O	1201	3PE	O32-C31-O31-C3
45	A	902	3PE	C32-C31-O31-C3
45	H	402	3PE	C32-C31-O31-C3
47	M	602	PC1	C32-C31-O31-C3
53	N	1304	CDL	C71-CB7-OB8-CB6
53	X	201	CDL	C31-CA7-OA8-CA6
53	h	1001	CDL	C71-CB7-OB8-CB6
45	A	901	3PE	C22-C21-O21-C2
45	N	1301	3PE	C22-C21-O21-C2
45	O	1201	3PE	C22-C21-O21-C2
47	B	202	PC1	C22-C21-O21-C2
51	p	201	LMT	O5B-C5B-C6B-O6B
51	b	301	LMT	O5'-C5'-C6'-O6'
45	A	901	3PE	C32-C31-O31-C3
45	I	204	3PE	C32-C31-O31-C3
45	L	701	3PE	C32-C31-O31-C3
45	O	1201	3PE	C32-C31-O31-C3
53	L	702	CDL	C71-CB7-OB8-CB6
53	N	1302	CDL	C71-CB7-OB8-CB6
51	H	401	LMT	O5'-C5'-C6'-O6'
51	H	401	LMT	C3'-C4'-O1B-C1B
45	A	901	3PE	O32-C31-O31-C3
45	L	701	3PE	O32-C31-O31-C3
53	N	1302	CDL	OB9-CB7-OB8-CB6

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Mol	Chain	Res	Type	Atoms
53	h	1001	CDL	OA9-CA7-OA8-CA6
53	h	1001	CDL	OB9-CB7-OB8-CB6
51	l	201	LMT	O5'-C5'-C6'-O6'
51	b	301	LMT	C3'-C4'-O1B-C1B
53	q	201	CDL	O1-C1-CA2-OA2
53	q	201	CDL	C31-CA7-OA8-CA6
47	M	602	PC1	O32-C31-O31-C3
51	H	401	LMT	O5B-C5B-C6B-O6B
51	H	401	LMT	C4'-C5'-C6'-O6'
58	T	101	EHZ	O4-C15-N2-C14
53	L	702	CDL	C11-CA5-OA6-CA4
53	q	201	CDL	C11-CA5-OA6-CA4
51	J	201	LMT	O5'-C5'-C6'-O6'
51	b	301	LMT	C2-C3-C4-C5
51	p	201	LMT	C4B-C5B-C6B-O6B
56	P	501	NDP	O4D-C4D-C5D-O5D
56	P	501	NDP	C3D-C4D-C5D-O5D
53	h	1001	CDL	C31-CA7-OA8-CA6
51	L	704	LMT	O5B-C5B-C6B-O6B
51	H	401	LMT	C4B-C5B-C6B-O6B
53	q	201	CDL	OA9-CA7-OA8-CA6
51	b	301	LMT	C4'-C5'-C6'-O6'
51	l	201	LMT	C4'-C5'-C6'-O6'
53	X	201	CDL	C71-CB7-OB8-CB6
51	b	301	LMT	C2'-C1'-O1'-C1
51	h	1002	LMT	C2'-C1'-O1'-C1
53	L	702	CDL	OA7-CA5-OA6-CA4
51	J	201	LMT	C4'-C5'-C6'-O6'
51	L	704	LMT	C4B-C5B-C6B-O6B
53	N	1302	CDL	C31-CA7-OA8-CA6
45	A	902	3PE	C21-C22-C23-C24
45	H	402	3PE	C31-C32-C33-C34
47	M	602	PC1	C21-C22-C23-C24
53	h	1001	CDL	CA7-C31-C32-C33
53	X	201	CDL	OB9-CB7-OB8-CB6
51	K	901	LMT	C4'-C5'-C6'-O6'
53	N	1302	CDL	OA9-CA7-OA8-CA6
53	N	1304	CDL	C11-CA5-OA6-CA4
45	A	901	3PE	C11-O13-P-O11
45	A	902	3PE	C1-O11-P-O13
45	H	402	3PE	C11-O13-P-O11
45	I	201	3PE	C11-O13-P-O11

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Mol	Chain	Res	Type	Atoms
45	I	204	3PE	C1-O11-P-O13
45	L	701	3PE	C11-O13-P-O11
45	M	601	3PE	C11-O13-P-O11
53	N	1302	CDL	CB2-OB2-PB2-OB5
53	N	1302	CDL	CB3-OB5-PB2-OB2
53	N	1304	CDL	CA2-OA2-PA1-OA5
53	N	1304	CDL	CA3-OA5-PA1-OA2
53	X	201	CDL	CA2-OA2-PA1-OA5
53	X	201	CDL	CB3-OB5-PB2-OB2
53	q	201	CDL	CB2-OB2-PB2-OB5
53	X	201	CDL	CB5-C51-C52-C53
51	p	201	LMT	O5B-C1B-O1B-C4'
53	N	1304	CDL	OA7-CA5-OA6-CA4
45	I	201	3PE	C32-C31-O31-C3
53	N	1302	CDL	CB7-C71-C72-C73
45	O	1201	3PE	C3E-C3F-C3G-C3H
47	B	202	PC1	C34-C35-C36-C37
45	A	901	3PE	C2A-C2B-C2C-C2D
45	A	902	3PE	C3B-C3C-C3D-C3E
45	I	201	3PE	C2B-C2C-C2D-C2E
47	M	602	PC1	C36-C37-C38-C39
58	T	101	EHZ	C18-C17-C20-O6
58	T	101	EHZ	C19-C17-C20-O6
45	L	703	3PE	C32-C31-O31-C3
45	I	201	3PE	C33-C34-C35-C36
45	L	703	3PE	C27-C28-C29-C2A
47	B	202	PC1	C24-C25-C26-C27
47	M	602	PC1	C25-C26-C27-C28
47	M	602	PC1	C26-C27-C28-C29
53	h	1001	CDL	C18-C19-C20-C21
45	A	901	3PE	C28-C29-C2A-C2B
45	H	402	3PE	C3C-C3D-C3E-C3F
45	N	1301	3PE	C25-C26-C27-C28
45	N	1301	3PE	C2D-C2E-C2F-C2G
53	L	702	CDL	C53-C54-C55-C56
53	h	1001	CDL	C11-C12-C13-C14
53	N	1302	CDL	O1-C1-CA2-OA2
53	q	201	CDL	O1-C1-CB2-OB2
47	M	602	PC1	C2C-C2D-C2E-C2F
45	M	601	3PE	C29-C2A-C2B-C2C
51	g	1101	LMT	C5'-C4'-O1B-C1B
53	N	1304	CDL	C33-C34-C35-C36

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Mol	Chain	Res	Type	Atoms
53	q	201	CDL	C57-C58-C59-C60
45	N	1301	3PE	C29-C2A-C2B-C2C
53	N	1304	CDL	C72-C73-C74-C75
45	M	601	3PE	C32-C33-C34-C35
51	p	201	LMT	C5-C6-C7-C8
53	N	1302	CDL	C76-C77-C78-C79
45	L	701	3PE	C27-C28-C29-C2A
45	M	601	3PE	C2C-C2D-C2E-C2F
53	N	1302	CDL	C72-C73-C74-C75
45	A	902	3PE	C3D-C3E-C3F-C3G
45	L	703	3PE	C33-C34-C35-C36
51	J	201	LMT	C4B-C5B-C6B-O6B
45	N	1301	3PE	C35-C36-C37-C38
51	H	401	LMT	C3-C4-C5-C6
53	N	1302	CDL	C61-C62-C63-C64
51	K	901	LMT	O1'-C1-C2-C3
53	h	1001	CDL	C72-C73-C74-C75
53	X	201	CDL	C72-C73-C74-C75
53	q	201	CDL	C71-C72-C73-C74
45	M	601	3PE	C23-C24-C25-C26
51	l	201	LMT	C4-C5-C6-C7
45	A	902	3PE	C33-C34-C35-C36
51	L	704	LMT	C3-C4-C5-C6
47	B	202	PC1	C21-C22-C23-C24
53	L	702	CDL	C55-C56-C57-C58
45	A	901	3PE	C3C-C3D-C3E-C3F
45	A	901	3PE	C26-C27-C28-C29
45	I	201	3PE	C22-C21-O21-C2
47	M	602	PC1	C39-C3A-C3B-C3C
53	q	201	CDL	C16-C17-C18-C19
45	I	201	3PE	O32-C31-O31-C3
45	L	703	3PE	C21-C22-C23-C24
45	O	1201	3PE	C2B-C2C-C2D-C2E
51	g	1101	LMT	C3'-C4'-O1B-C1B
45	L	703	3PE	O32-C31-O31-C3
45	M	601	3PE	C33-C34-C35-C36
45	L	703	3PE	C38-C39-C3A-C3B
45	O	1201	3PE	C3A-C3B-C3C-C3D
53	N	1302	CDL	C11-CA5-OA6-CA4
51	L	704	LMT	C5-C6-C7-C8
58	U	101	EHZ	C2-C1-C21-C22
53	q	201	CDL	C51-C52-C53-C54

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Mol	Chain	Res	Type	Atoms
56	P	501	NDP	O4D-C1D-N1N-C6N
45	I	201	3PE	O22-C21-O21-C2
47	M	602	PC1	O22-C21-O21-C2
53	N	1302	CDL	OB7-CB5-OB6-CB4
51	p	201	LMT	C2-C3-C4-C5
45	N	1301	3PE	C33-C34-C35-C36
58	T	101	EHZ	C5-C6-C7-C8
53	q	201	CDL	C13-C14-C15-C16
52	H	403	I49	N04-C15-N02-C14
45	M	601	3PE	C2D-C2E-C2F-C2G
47	M	602	PC1	C33-C34-C35-C36
53	h	1001	CDL	C19-C20-C21-C22
51	J	201	LMT	O5B-C5B-C6B-O6B
58	T	101	EHZ	C12-C13-C14-N2
45	O	1201	3PE	C32-C33-C34-C35
45	O	1201	3PE	C2D-C2E-C2F-C2G
47	M	602	PC1	C22-C21-O21-C2
53	N	1302	CDL	C51-CB5-OB6-CB4
53	h	1001	CDL	C11-CA5-OA6-CA4
45	I	201	3PE	O11-C1-C2-O21
53	X	201	CDL	O1-C1-CB2-OB2
45	M	601	3PE	C22-C23-C24-C25
45	A	901	3PE	O21-C2-C3-O31
53	N	1304	CDL	OB6-CB4-CB6-OB8
45	I	204	3PE	C25-C26-C27-C28
53	L	702	CDL	C11-C12-C13-C14
53	q	201	CDL	C15-C16-C17-C18
45	I	201	3PE	C24-C25-C26-C27
53	L	702	CDL	C52-C53-C54-C55
58	U	101	EHZ	C2-C3-C4-C5
53	N	1302	CDL	OA7-CA5-OA6-CA4
53	h	1001	CDL	OA7-CA5-OA6-CA4
47	B	202	PC1	C11-O13-P-O11
47	B	202	PC1	C1-O11-P-O13
53	N	1302	CDL	CA3-OA5-PA1-OA2
53	h	1001	CDL	CB2-OB2-PB2-OB5
45	A	901	3PE	C37-C38-C39-C3A
45	H	402	3PE	C2-C1-O11-P
45	L	701	3PE	C38-C39-C3A-C3B
45	A	901	3PE	O11-C1-C2-C3
45	I	204	3PE	O11-C1-C2-C3
45	N	1301	3PE	O11-C1-C2-C3

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Mol	Chain	Res	Type	Atoms
53	X	201	CDL	OA5-CA3-CA4-CA6
59	o	201	MYR	C2-C3-C4-C5
53	N	1302	CDL	C53-C54-C55-C56
53	q	201	CDL	C38-C39-C40-C41
58	T	101	EHZ	C1-C21-C22-C23
45	O	1201	3PE	C34-C35-C36-C37
53	q	201	CDL	CA2-C1-CB2-OB2
45	A	901	3PE	C2C-C2D-C2E-C2F
51	l	201	LMT	C3'-C4'-O1B-C1B
53	q	201	CDL	C54-C55-C56-C57
45	L	701	3PE	C22-C21-O21-C2
45	I	201	3PE	C39-C3A-C3B-C3C
45	I	201	3PE	C29-C2A-C2B-C2C
45	N	1301	3PE	C2B-C2C-C2D-C2E
45	A	901	3PE	C1-C2-C3-O31
45	H	402	3PE	C1-C2-C3-O31
53	N	1302	CDL	CA3-CA4-CA6-OA8
45	M	601	3PE	C25-C26-C27-C28
53	N	1304	CDL	C77-C78-C79-C80
53	q	201	CDL	CA7-C31-C32-C33
45	L	701	3PE	C35-C36-C37-C38
53	N	1302	CDL	C59-C60-C61-C62
45	L	703	3PE	C29-C2A-C2B-C2C
45	L	701	3PE	C23-C24-C25-C26
45	O	1201	3PE	C29-C2A-C2B-C2C
51	b	301	LMT	O1'-C1-C2-C3
45	I	204	3PE	C22-C21-O21-C2
51	L	704	LMT	O5'-C5'-C6'-O6'
58	T	101	EHZ	C5-C6-C7-O1
58	U	101	EHZ	C5-C6-C7-O1
45	I	204	3PE	C28-C29-C2A-C2B
53	h	1001	CDL	C52-C53-C54-C55
51	l	201	LMT	C5'-C4'-O1B-C1B
51	p	201	LMT	O5'-C5'-C6'-O6'
45	M	601	3PE	O11-C1-C2-O21
53	N	1302	CDL	OA5-CA3-CA4-OA6
53	q	201	CDL	OB5-CB3-CB4-OB6
51	K	901	LMT	O5'-C5'-C6'-O6'
45	O	1201	3PE	C31-C32-C33-C34
47	M	602	PC1	O21-C2-C3-O31
53	N	1302	CDL	OB6-CB4-CB6-OB8
53	N	1302	CDL	C71-C72-C73-C74

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Mol	Chain	Res	Type	Atoms
45	L	701	3PE	C2B-C2C-C2D-C2E
53	h	1001	CDL	C51-C52-C53-C54
51	h	1002	LMT	C5'-C4'-O1B-C1B
45	A	901	3PE	C27-C28-C29-C2A
45	N	1301	3PE	C3A-C3B-C3C-C3D
45	I	201	3PE	O11-C1-C2-C3
53	N	1304	CDL	OB5-CB3-CB4-CB6
51	J	201	LMT	C2B-C1B-O1B-C4'
51	h	1002	LMT	C3'-C4'-O1B-C1B
45	L	703	3PE	C35-C36-C37-C38
58	T	101	EHZ	C21-C22-C23-C24
45	O	1201	3PE	C2-C1-O11-P
45	A	902	3PE	C24-C25-C26-C27
51	g	1101	LMT	O1'-C1-C2-C3
53	h	1001	CDL	C24-C25-C26-C27
45	H	402	3PE	C35-C36-C37-C38
53	N	1304	CDL	CA3-CA4-CA6-OA8
53	N	1304	CDL	CB3-CB4-CB6-OB8
53	N	1304	CDL	CA5-C11-C12-C13
51	b	301	LMT	C5'-C4'-O1B-C1B
47	B	202	PC1	C23-C24-C25-C26
51	J	201	LMT	O5B-C1B-O1B-C4'
51	g	1101	LMT	C2-C3-C4-C5
45	L	703	3PE	C39-C3A-C3B-C3C
59	o	201	MYR	C7-C8-C9-C10
53	q	201	CDL	CB3-OB5-PB2-OB2
45	L	701	3PE	C2F-C2G-C2H-C2I
45	N	1301	3PE	C24-C25-C26-C27
53	q	201	CDL	C36-C37-C38-C39
53	X	201	CDL	OA5-CA3-CA4-OA6
53	N	1302	CDL	CA5-C11-C12-C13
45	O	1201	3PE	C22-C23-C24-C25
45	L	703	3PE	C32-C33-C34-C35
47	B	202	PC1	O21-C2-C3-O31
53	N	1304	CDL	OA6-CA4-CA6-OA8
45	L	701	3PE	C24-C25-C26-C27
53	q	201	CDL	CB2-C1-CA2-OA2
45	I	204	3PE	O22-C21-O21-C2
45	L	701	3PE	O22-C21-O21-C2
53	h	1001	CDL	C20-C21-C22-C23
45	L	701	3PE	C32-C33-C34-C35
47	M	602	PC1	C2-C1-O11-P

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Mol	Chain	Res	Type	Atoms
53	N	1302	CDL	CA4-CA3-OA5-PA1
47	M	602	PC1	C2B-C2C-C2D-C2E
45	L	701	3PE	C3D-C3E-C3F-C3G
45	L	701	3PE	C3C-C3D-C3E-C3F
45	O	1201	3PE	C35-C36-C37-C38
47	M	602	PC1	C28-C29-C2A-C2B
45	A	901	3PE	C33-C34-C35-C36
51	p	201	LMT	C3'-C4'-O1B-C1B
53	h	1001	CDL	C33-C34-C35-C36
58	U	101	EHZ	C21-C1-C2-C3
49	F	501	FMN	C5'-O5'-P-O2P
47	B	202	PC1	C32-C31-O31-C3
45	A	901	3PE	C22-C23-C24-C25
53	N	1304	CDL	C31-C32-C33-C34
45	A	901	3PE	C1-C2-O21-C21
51	H	401	LMT	C5-C6-C7-C8
53	L	702	CDL	C32-C33-C34-C35
58	U	101	EHZ	C12-C13-C14-N2
47	B	202	PC1	C1-C2-C3-O31
52	H	403	I49	N01-C14-N02-C15
53	L	702	CDL	CA3-CA4-CA6-OA8
53	N	1304	CDL	OB5-CB3-CB4-OB6
45	I	201	3PE	C3B-C3C-C3D-C3E
53	h	1001	CDL	C22-C23-C24-C25
58	T	101	EHZ	O1-C7-C8-C9
45	M	601	3PE	C26-C27-C28-C29
51	L	704	LMT	C2'-C1'-O1'-C1
53	N	1302	CDL	OA6-CA4-CA6-OA8
45	A	901	3PE	C34-C35-C36-C37
51	p	201	LMT	C5'-C4'-O1B-C1B
54	O	1202	GTP	C5'-O5'-PA-O3A
58	U	101	EHZ	C21-C22-C23-C24
51	H	401	LMT	C5'-C4'-O1B-C1B
53	h	1001	CDL	C13-C14-C15-C16
47	B	202	PC1	O32-C31-O31-C3
45	N	1301	3PE	C3B-C3C-C3D-C3E
53	h	1001	CDL	C34-C35-C36-C37
45	L	701	3PE	C39-C3A-C3B-C3C
53	N	1304	CDL	C32-C33-C34-C35
45	A	902	3PE	C39-C3A-C3B-C3C
53	q	201	CDL	C1-CB2-OB2-PB2
45	I	201	3PE	C11-O13-P-O14

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Mol	Chain	Res	Type	Atoms
45	I	204	3PE	C1-O11-P-O12
45	M	601	3PE	C11-O13-P-O12
45	M	601	3PE	C11-O13-P-O14
47	B	202	PC1	C1-O11-P-O12
47	M	602	PC1	C11-C12-N-C14
47	M	602	PC1	C11-C12-N-C15
53	N	1302	CDL	CA2-OA2-PA1-OA4
53	N	1302	CDL	CA3-OA5-PA1-OA4
53	N	1304	CDL	CA2-OA2-PA1-OA3
53	N	1304	CDL	CA2-OA2-PA1-OA4
53	N	1304	CDL	CA3-OA5-PA1-OA3
53	N	1304	CDL	CA3-OA5-PA1-OA4
53	h	1001	CDL	CA2-OA2-PA1-OA4
53	h	1001	CDL	CB2-OB2-PB2-OB4
53	q	201	CDL	CB2-OB2-PB2-OB3
45	M	601	3PE	O11-C1-C2-C3
53	N	1302	CDL	OA5-CA3-CA4-CA6
45	H	402	3PE	C3F-C3G-C3H-C3I
45	I	204	3PE	C12-C11-O13-P
45	L	703	3PE	C12-C11-O13-P
45	N	1301	3PE	C12-C11-O13-P
45	A	901	3PE	O11-C1-C2-O21
53	q	201	CDL	OA5-CA3-CA4-OA6
47	M	602	PC1	C2A-C2B-C2C-C2D
53	N	1304	CDL	C11-C12-C13-C14
45	A	902	3PE	C35-C36-C37-C38
45	I	204	3PE	C33-C34-C35-C36
47	M	602	PC1	C1-C2-C3-O31
53	N	1302	CDL	CB3-CB4-CB6-OB8
45	H	402	3PE	O21-C2-C3-O31
53	h	1001	CDL	OA6-CA4-CA6-OA8
53	N	1304	CDL	C38-C39-C40-C41
53	q	201	CDL	C72-C73-C74-C75
45	A	902	3PE	C2-C1-O11-P
53	N	1304	CDL	C43-C44-C45-C46
45	L	703	3PE	C3C-C3D-C3E-C3F
53	L	702	CDL	C59-C60-C61-C62
53	q	201	CDL	C39-C40-C41-C42
51	K	901	LMT	C2-C3-C4-C5
53	h	1001	CDL	C17-C18-C19-C20
45	I	204	3PE	C23-C24-C25-C26
51	N	1303	LMT	O1'-C1-C2-C3

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Mol	Chain	Res	Type	Atoms
45	A	901	3PE	C3F-C3G-C3H-C3I
45	H	402	3PE	C33-C34-C35-C36
53	N	1302	CDL	CA6-CA4-OA6-CA5
53	q	201	CDL	OA5-CA3-CA4-CA6
51	N	1303	LMT	C4'-C5'-C6'-O6'
45	H	402	3PE	C32-C33-C34-C35
53	L	702	CDL	C38-C39-C40-C41
53	N	1304	CDL	C40-C41-C42-C43
59	o	201	MYR	C5-C6-C7-C8
45	O	1201	3PE	C38-C39-C3A-C3B
53	q	201	CDL	CA5-C11-C12-C13
45	A	902	3PE	C22-C23-C24-C25
51	p	201	LMT	C4-C5-C6-C7
45	A	902	3PE	C11-O13-P-O11
45	L	703	3PE	C11-O13-P-O11
45	O	1201	3PE	C11-O13-P-O11
53	L	702	CDL	CB2-OB2-PB2-OB5
53	q	201	CDL	C59-C60-C61-C62
53	h	1001	CDL	CA3-CA4-CA6-OA8
54	O	1202	GTP	PB-O3A-PA-O1A
56	P	501	NDP	PN-O3-PA-O1A
53	L	702	CDL	C32-C31-CA7-OA8
58	T	101	EHZ	C1-C2-C3-C4
45	O	1201	3PE	C23-C24-C25-C26
45	L	703	3PE	C2-C1-O11-P
47	B	202	PC1	C2-C1-O11-P
53	X	201	CDL	C51-C52-C53-C54
47	B	202	PC1	C32-C33-C34-C35
53	L	702	CDL	C13-C14-C15-C16
51	h	1002	LMT	O5'-C5'-C6'-O6'
45	H	402	3PE	C37-C38-C39-C3A
45	A	902	3PE	C37-C38-C39-C3A
47	M	602	PC1	C11-C12-N-C13
56	P	501	NDP	O4B-C4B-C5B-O5B
51	L	704	LMT	O5'-C1'-O1'-C1
54	O	1202	GTP	PG-O3B-PB-O3A
47	B	202	PC1	O11-C1-C2-O21
51	K	901	LMT	C5-C6-C7-C8
45	N	1301	3PE	C3E-C3F-C3G-C3H
53	L	702	CDL	OA6-CA4-CA6-OA8
51	l	201	LMT	C11-C10-C9-C8
45	I	201	3PE	C2D-C2E-C2F-C2G

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Mol	Chain	Res	Type	Atoms
53	N	1302	CDL	C57-C58-C59-C60
45	A	902	3PE	C32-C33-C34-C35
58	T	101	EHZ	C3-C4-C5-C6
45	A	902	3PE	C1-C2-O21-C21
59	o	201	MYR	C11-C10-C9-C8
53	q	201	CDL	OB9-CB7-OB8-CB6
45	A	902	3PE	C3E-C3F-C3G-C3H
53	N	1302	CDL	CB4-CB3-OB5-PB2
51	p	201	LMT	O1'-C1-C2-C3
51	L	704	LMT	C1-C2-C3-C4
45	A	902	3PE	O11-C1-C2-C3
51	g	1101	LMT	C4-C5-C6-C7
45	I	204	3PE	C27-C28-C29-C2A
45	L	701	3PE	O21-C2-C3-O31
53	q	201	CDL	OA6-CA4-CA6-OA8
45	L	703	3PE	C2-C3-O31-C31
53	L	702	CDL	C33-C34-C35-C36
59	o	201	MYR	C6-C7-C8-C9
47	M	602	PC1	C24-C25-C26-C27
54	O	1202	GTP	PA-O3A-PB-O2B
56	P	501	NDP	PN-O3-PA-O2A
58	U	101	EHZ	C3-C4-C5-C6
53	q	201	CDL	C71-CB7-OB8-CB6
53	h	1001	CDL	C16-C17-C18-C19
45	I	201	3PE	C25-C26-C27-C28
53	N	1304	CDL	C76-C77-C78-C79
45	L	701	3PE	O21-C21-C22-C23
51	K	901	LMT	C3-C4-C5-C6
53	N	1304	CDL	C74-C75-C76-C77
53	q	201	CDL	OB5-CB3-CB4-CB6
53	q	201	CDL	C40-C41-C42-C43
58	U	101	EHZ	C22-C23-C24-C25
53	q	201	CDL	C19-C20-C21-C22
53	N	1302	CDL	C55-C56-C57-C58
45	N	1301	3PE	O21-C21-C22-C23
45	O	1201	3PE	C37-C38-C39-C3A
45	A	902	3PE	O31-C31-C32-C33
59	o	201	MYR	C4-C5-C6-C7
58	T	101	EHZ	C10-C11-N1-C12
45	M	601	3PE	C27-C28-C29-C2A
51	J	201	LMT	C7-C8-C9-C10
45	O	1201	3PE	O21-C21-C22-C23

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Mol	Chain	Res	Type	Atoms
51	N	1303	LMT	C9-C10-C11-C12
45	O	1201	3PE	C3D-C3E-C3F-C3G
58	U	101	EHZ	O1-C7-C8-C9
47	B	202	PC1	O21-C21-C22-C23
45	L	703	3PE	C22-C23-C24-C25
54	O	1202	GTP	C4'-C5'-O5'-PA
51	b	301	LMT	O5'-C1'-O1'-C1
53	N	1302	CDL	C72-C71-CB7-OB8
45	O	1201	3PE	C36-C37-C38-C39
53	L	702	CDL	C12-C13-C14-C15
45	M	601	3PE	O21-C21-C22-C23
53	q	201	CDL	C72-C71-CB7-OB8
58	U	101	EHZ	C5-C6-C7-C8
59	o	201	MYR	C3-C4-C5-C6
52	H	403	I49	N03-C14-N02-C15
52	N	1305	I49	N03-C14-N02-C15
45	N	1301	3PE	O22-C21-C22-C23
45	A	902	3PE	O32-C31-C32-C33
47	B	202	PC1	O22-C21-C22-C23
45	A	901	3PE	C2B-C2C-C2D-C2E
45	O	1201	3PE	C21-C22-C23-C24
53	N	1302	CDL	CA3-OA5-PA1-OA3
53	h	1001	CDL	CB2-OB2-PB2-OB3
54	O	1202	GTP	C5'-O5'-PA-O2A
53	N	1302	CDL	C72-C71-CB7-OB9
45	O	1201	3PE	O22-C21-C22-C23
45	L	701	3PE	C22-C23-C24-C25
53	X	201	CDL	C32-C31-CA7-OA8
45	L	701	3PE	C12-C11-O13-P
45	I	204	3PE	C24-C25-C26-C27
45	I	201	3PE	C3C-C3D-C3E-C3F
53	h	1001	CDL	C14-C15-C16-C17
49	F	501	FMN	N10-C1'-C2'-O2'
53	q	201	CDL	C32-C31-CA7-OA8
45	M	601	3PE	O22-C21-C22-C23
45	A	901	3PE	O31-C31-C32-C33

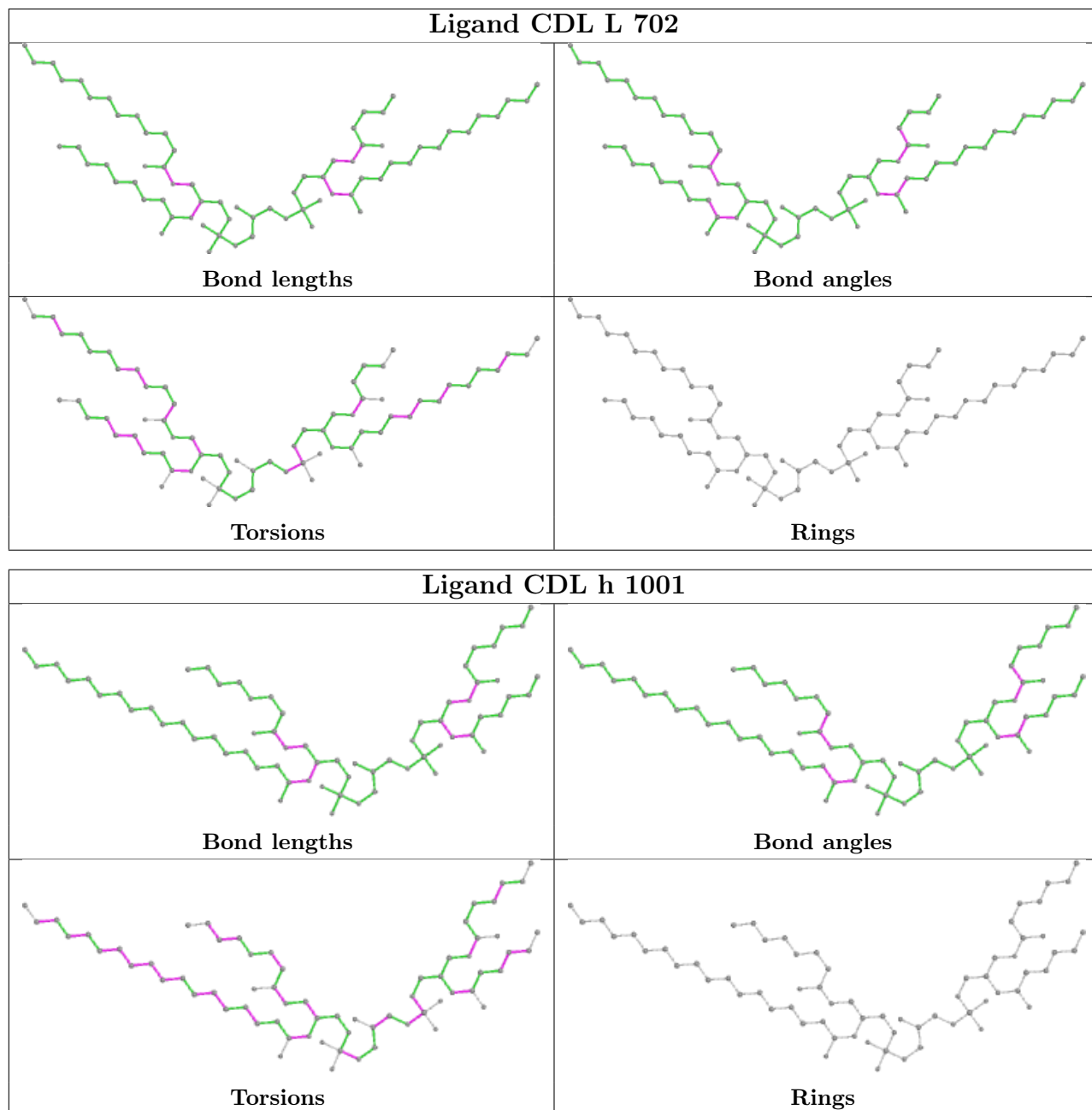
There are no ring outliers.

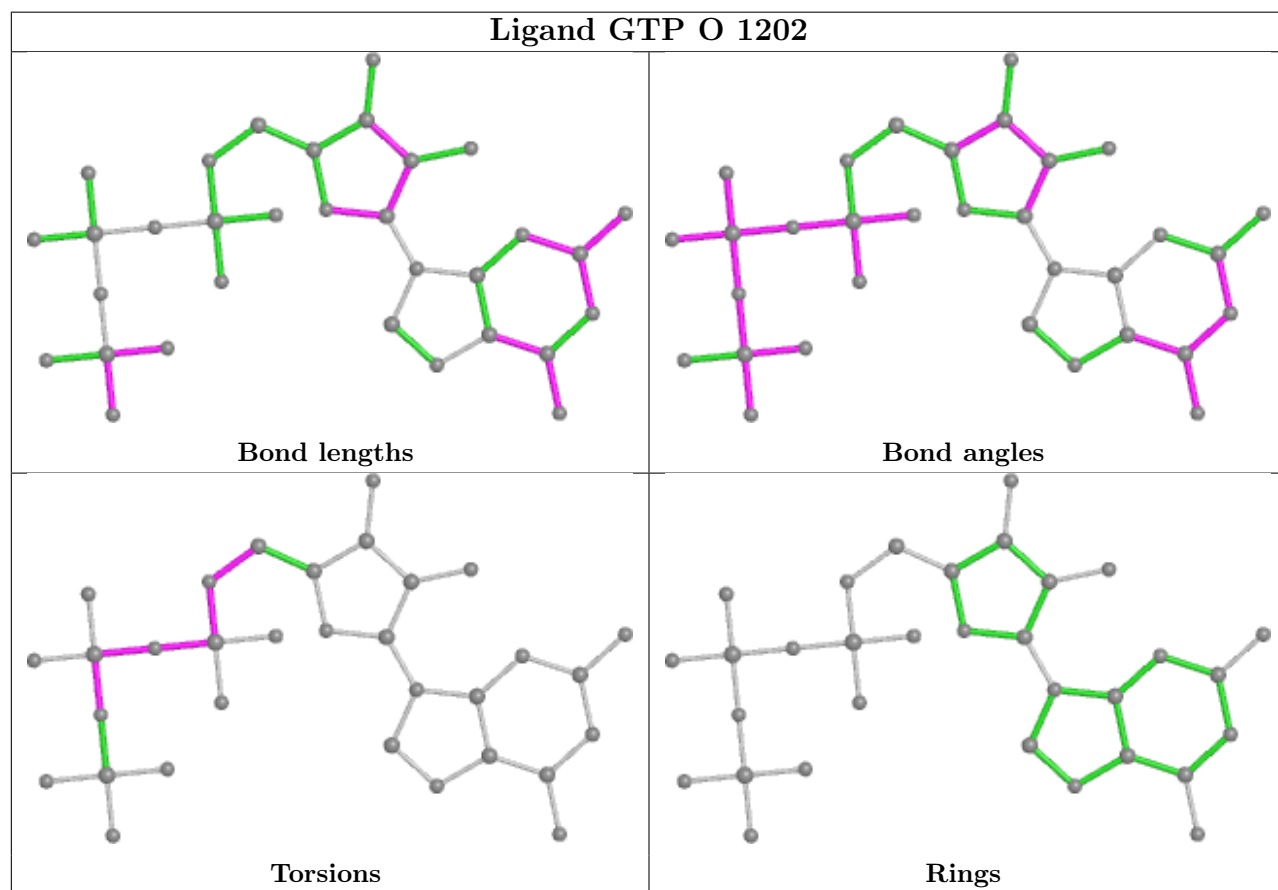
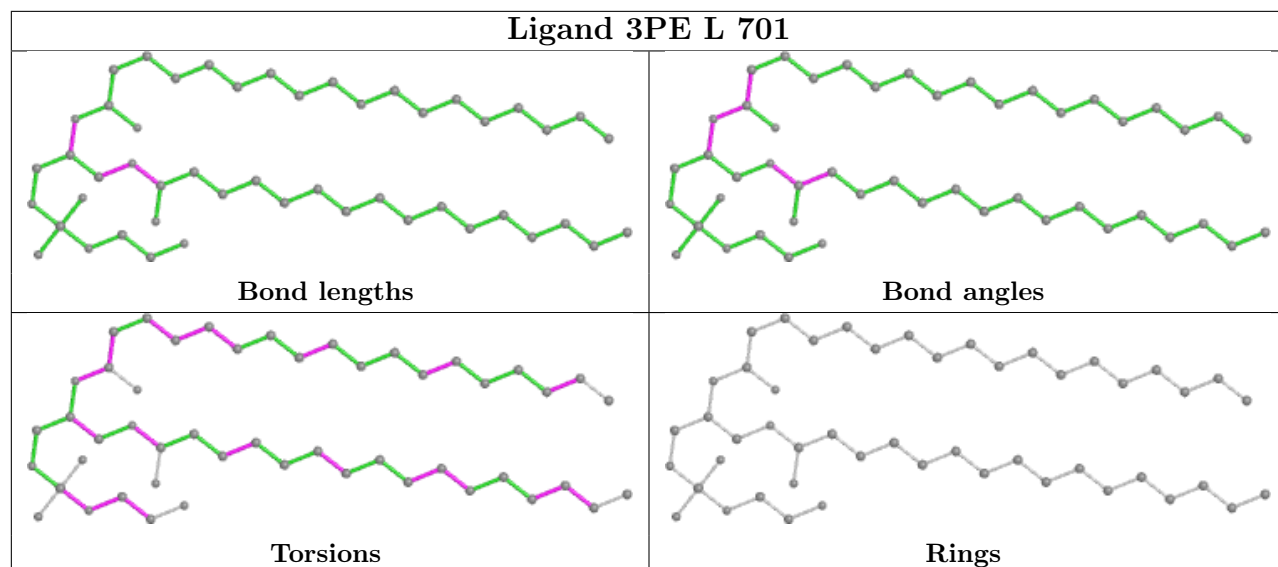
No monomer is involved in short contacts.

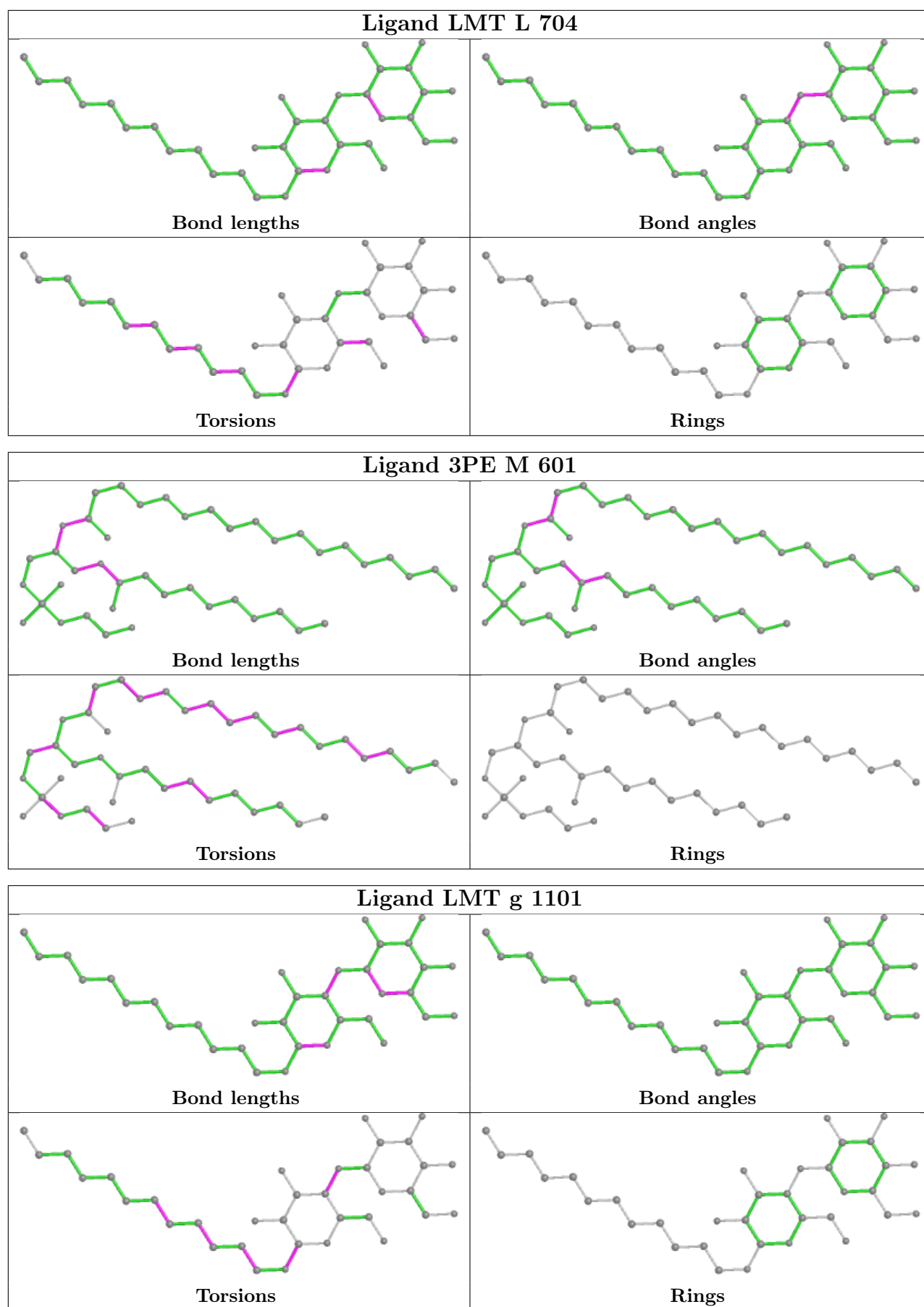
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will

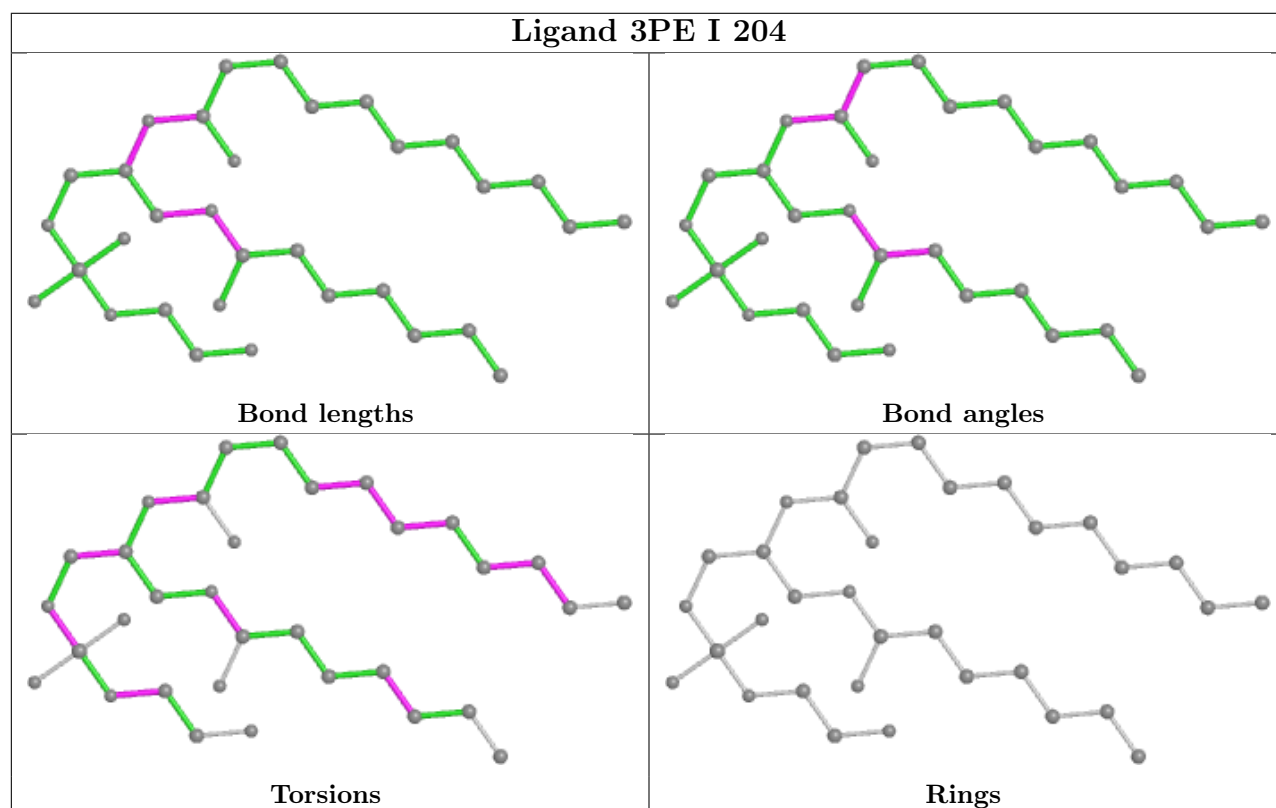
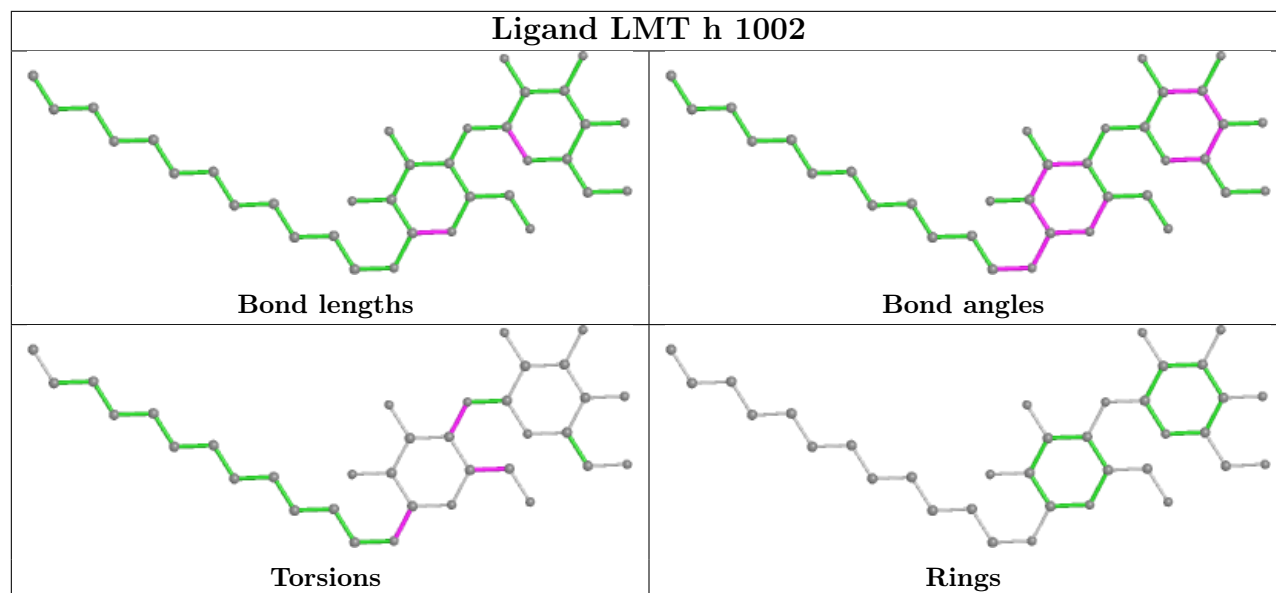


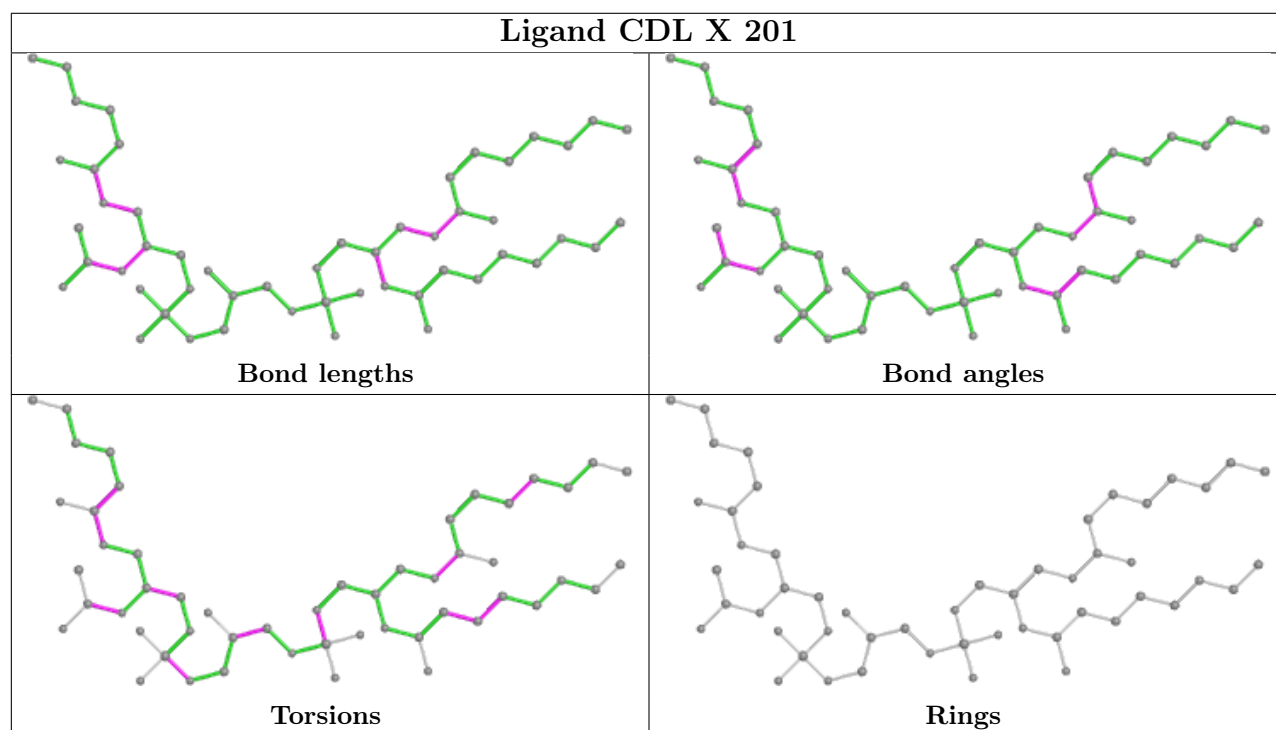
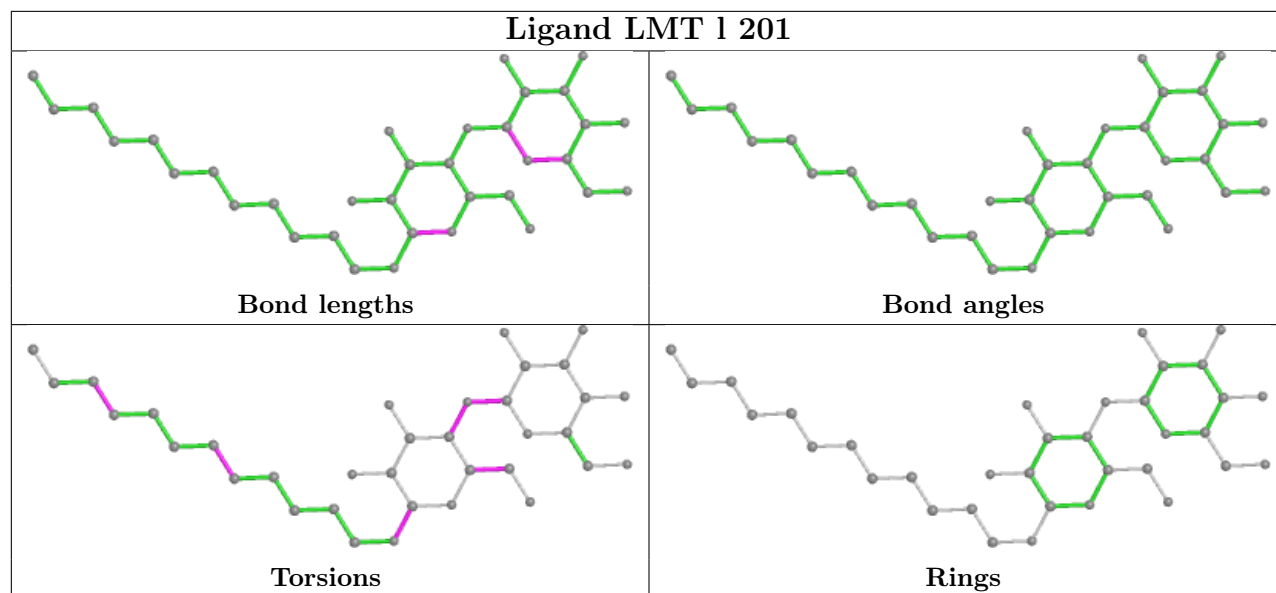
also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

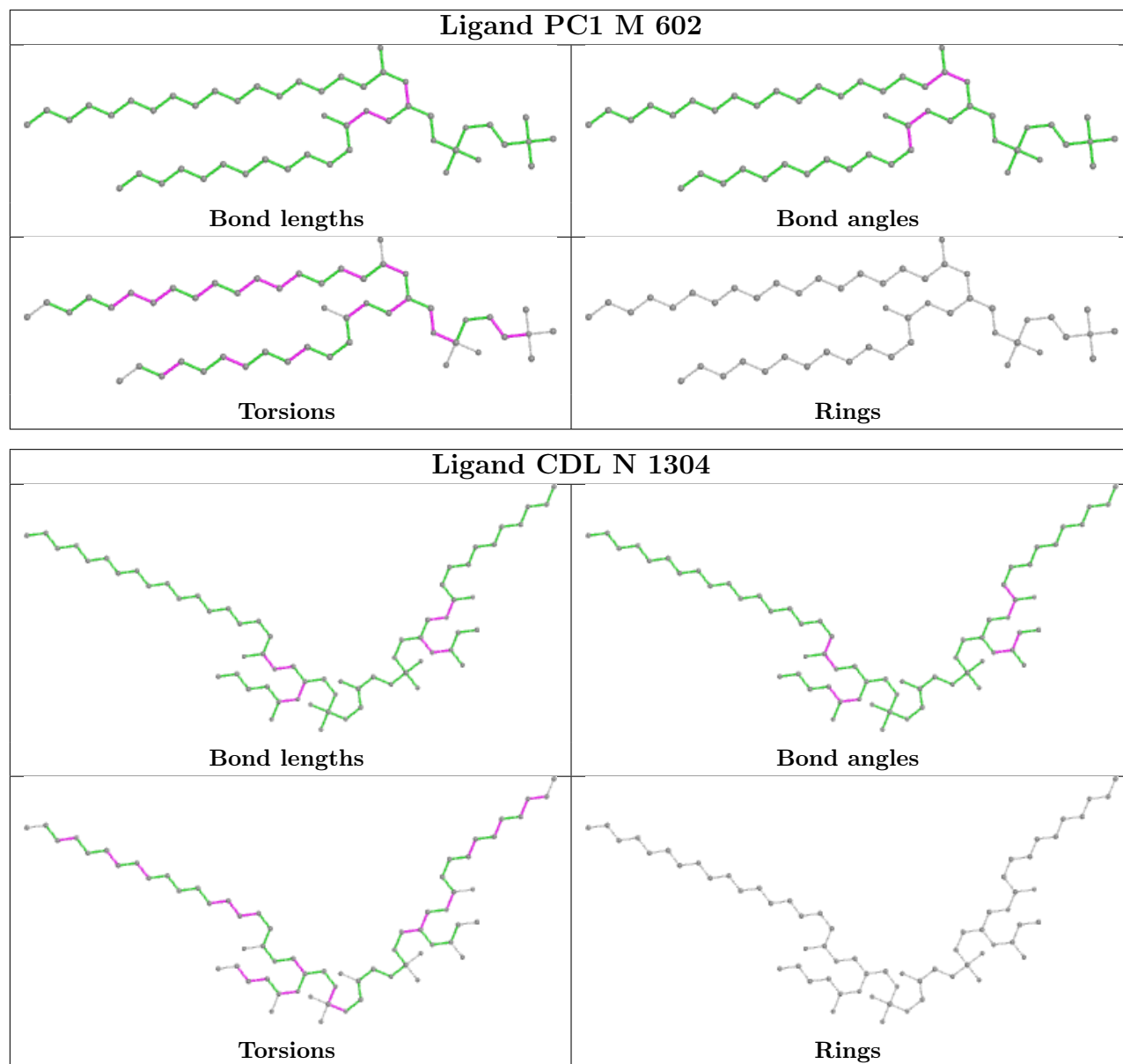


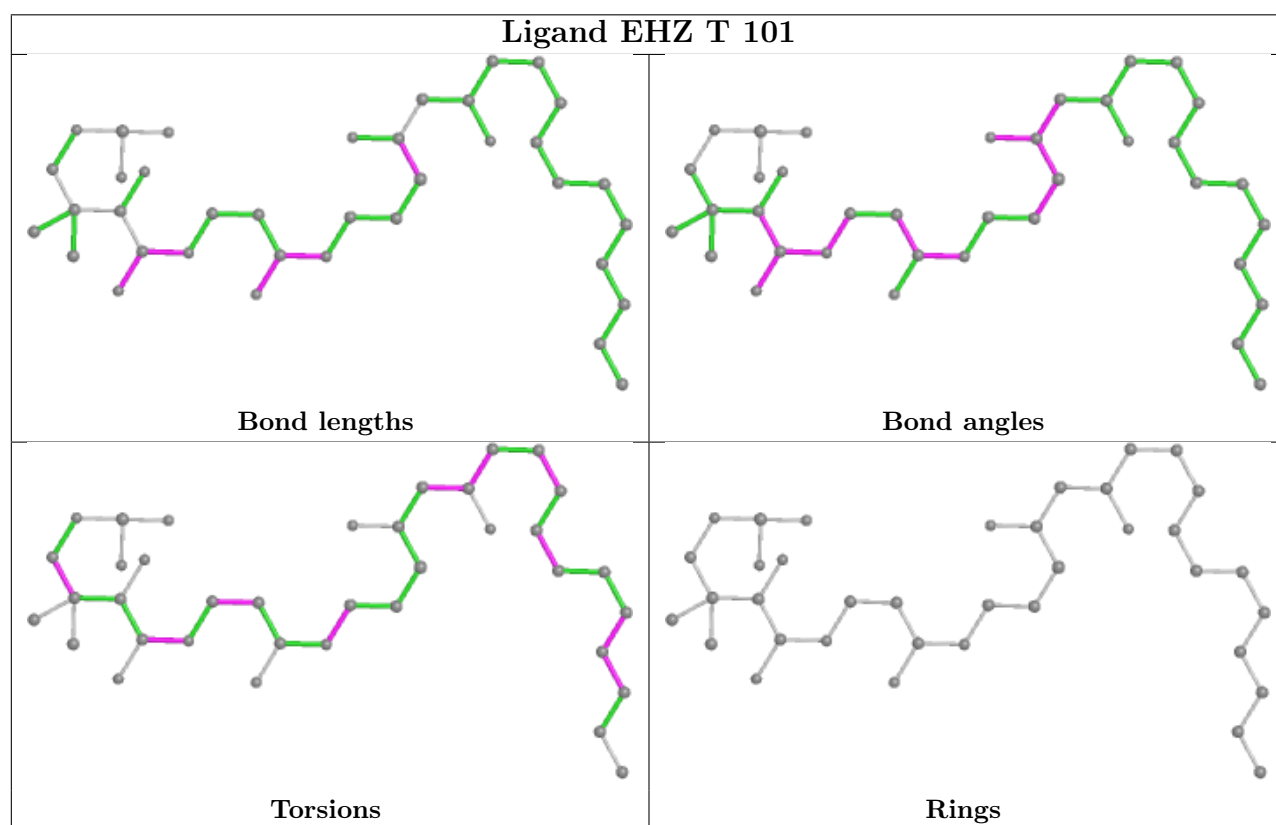
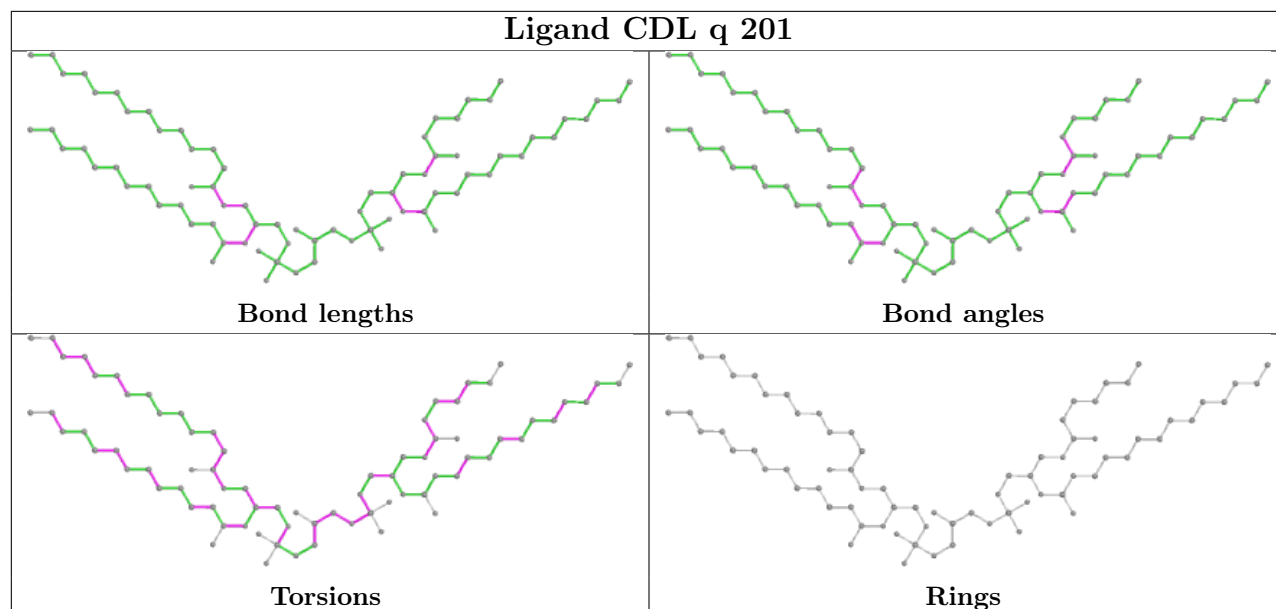


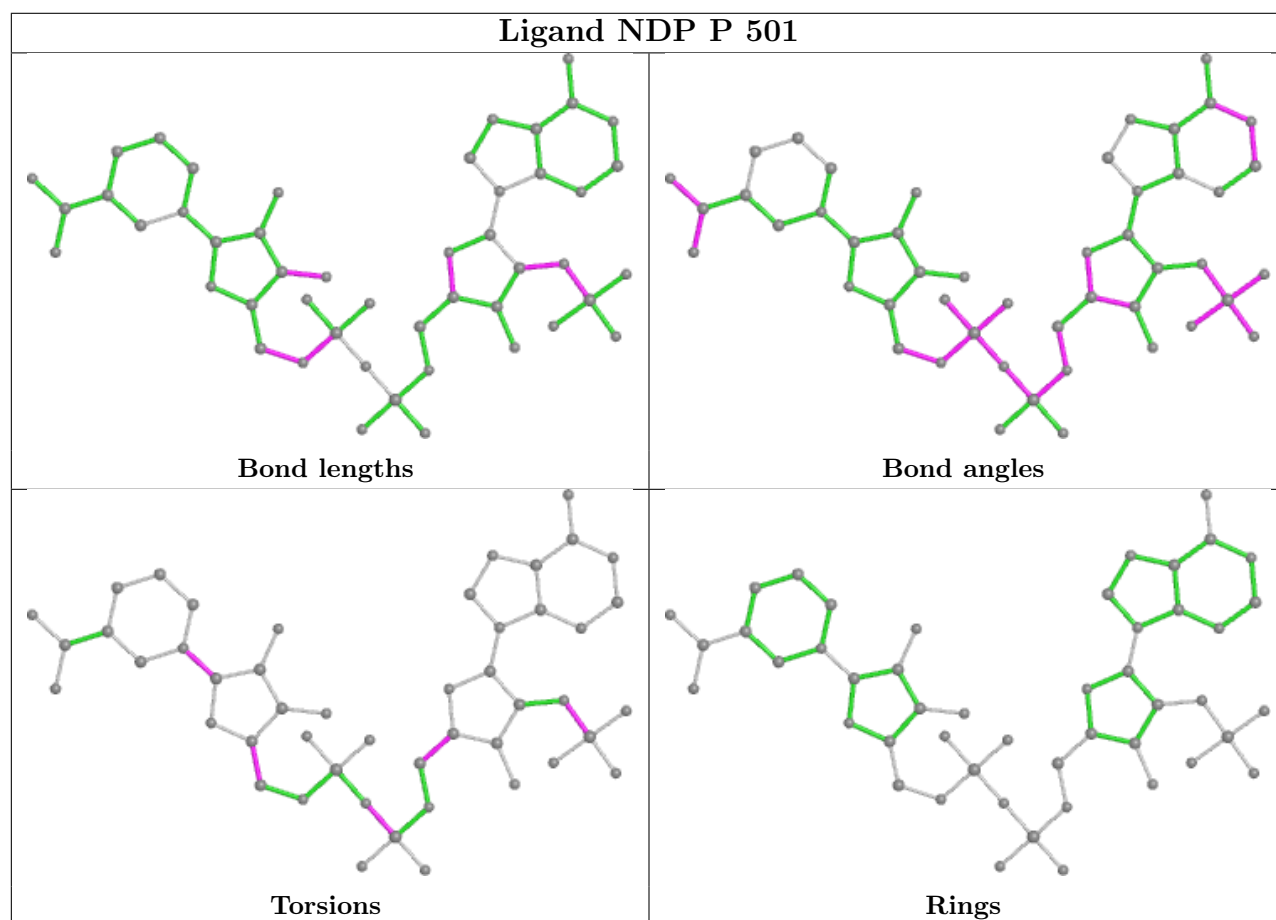
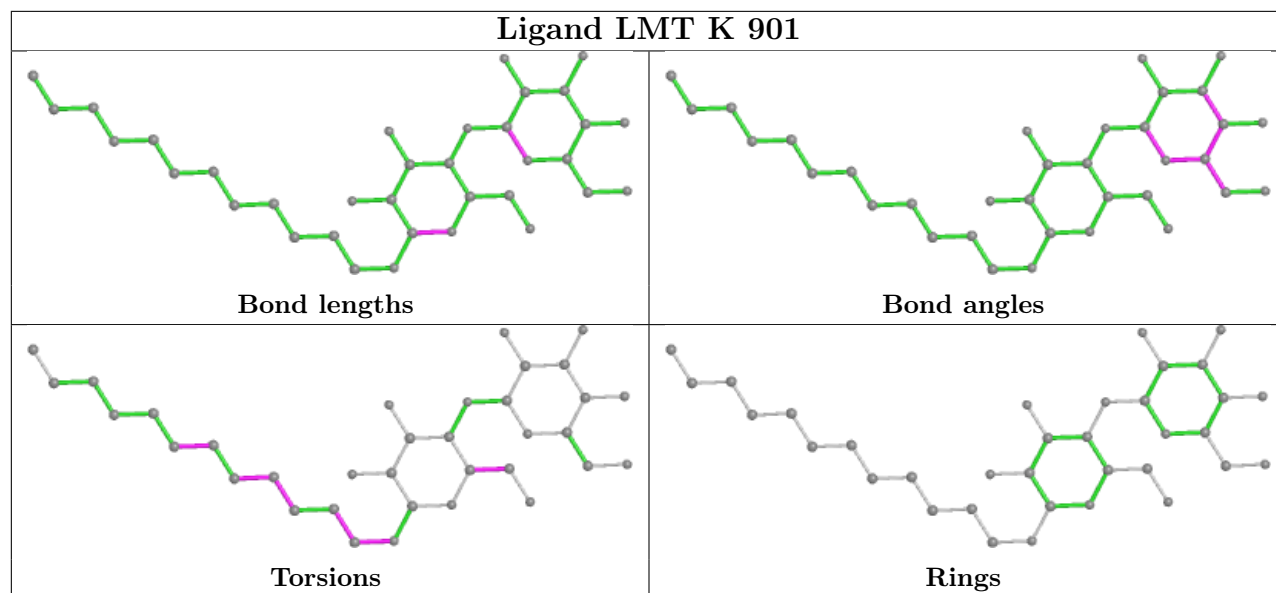




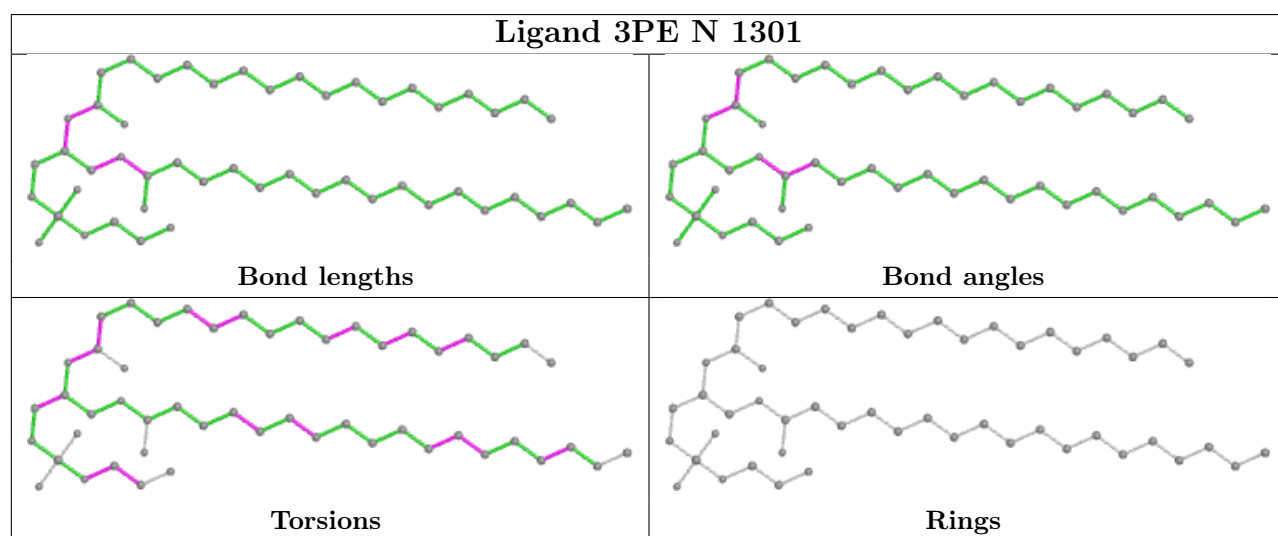
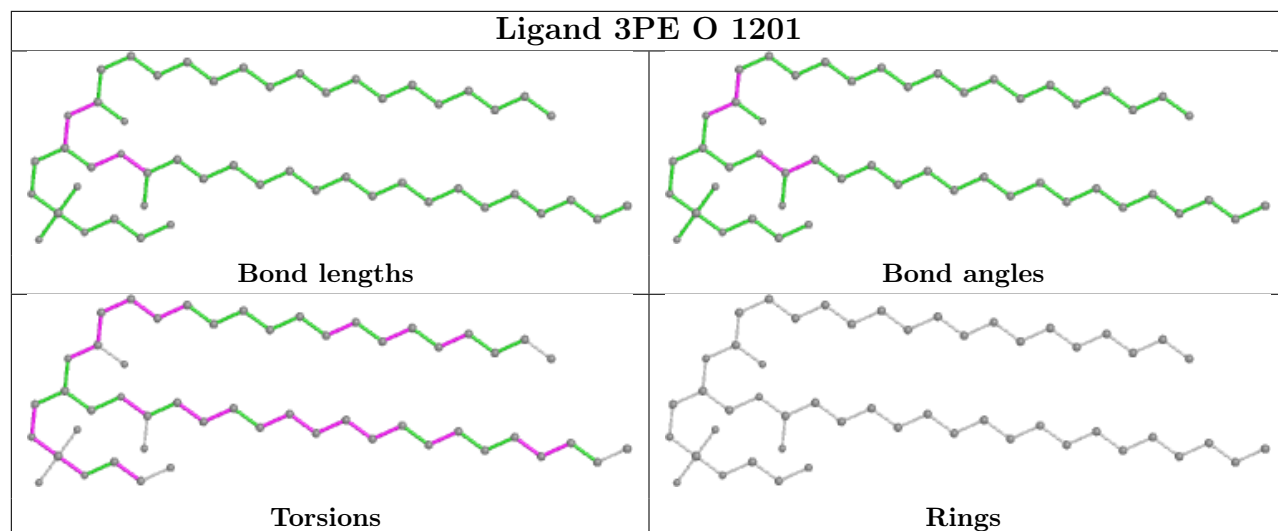


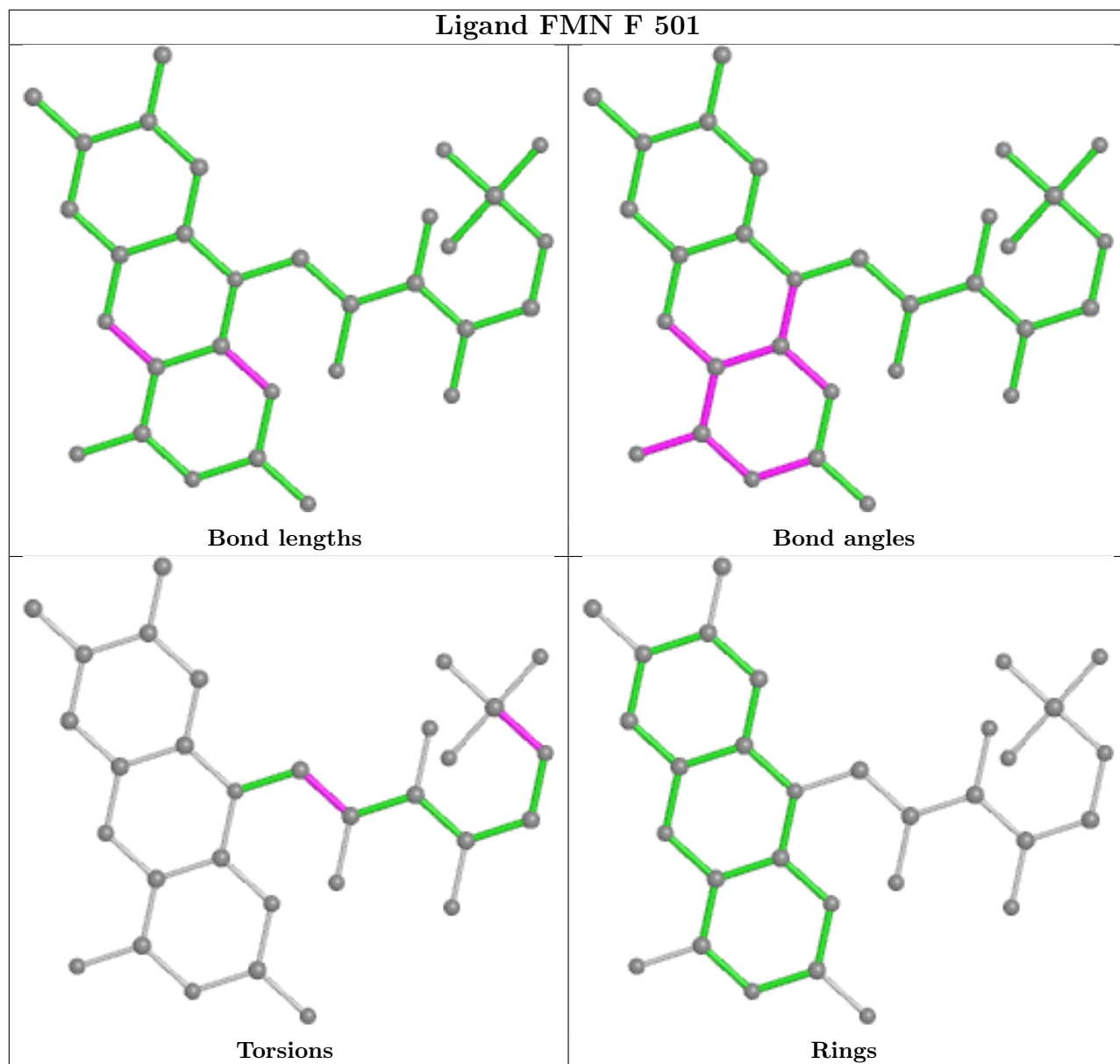


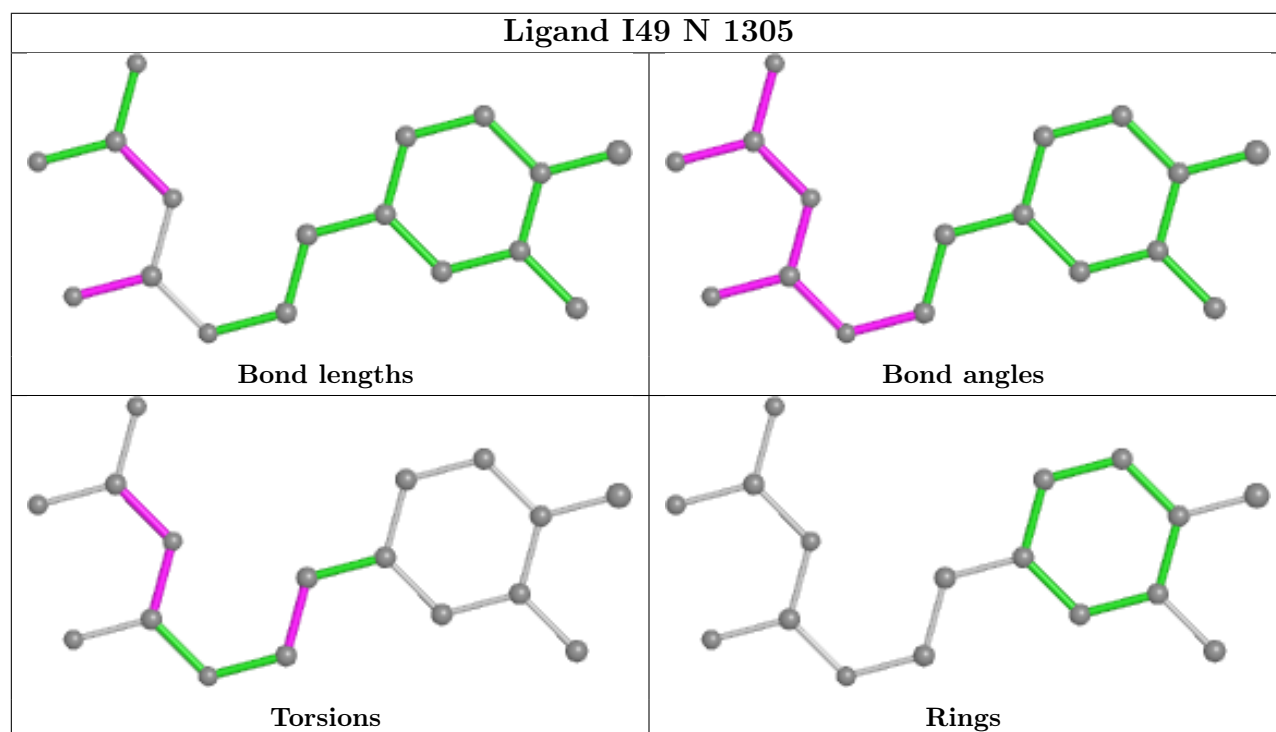
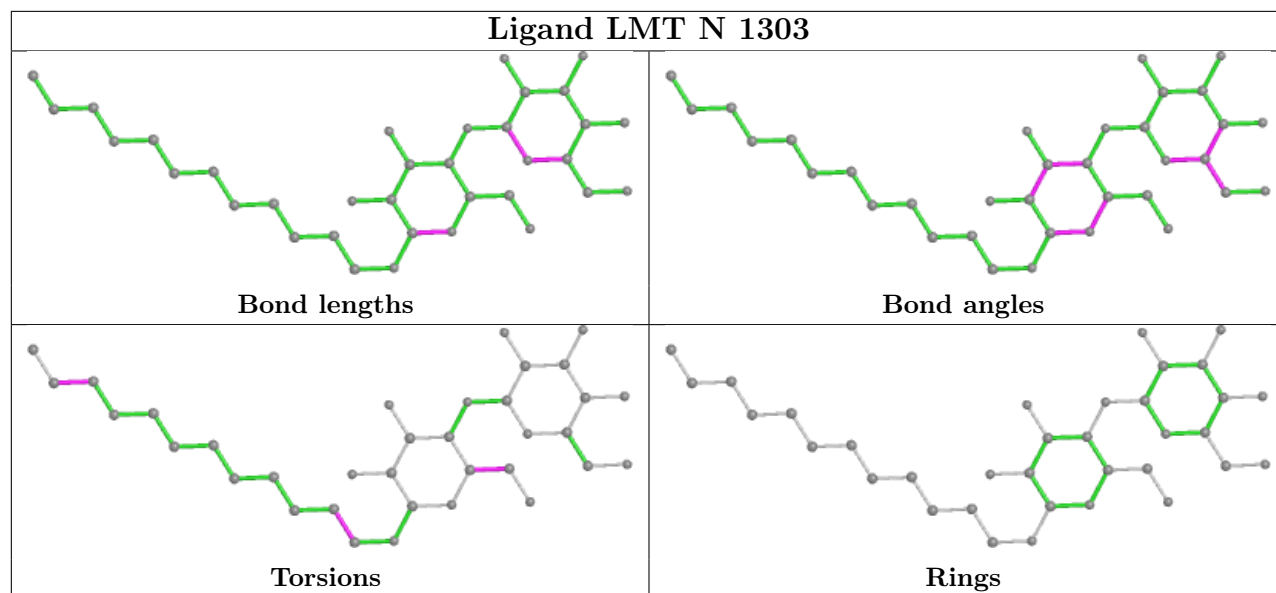


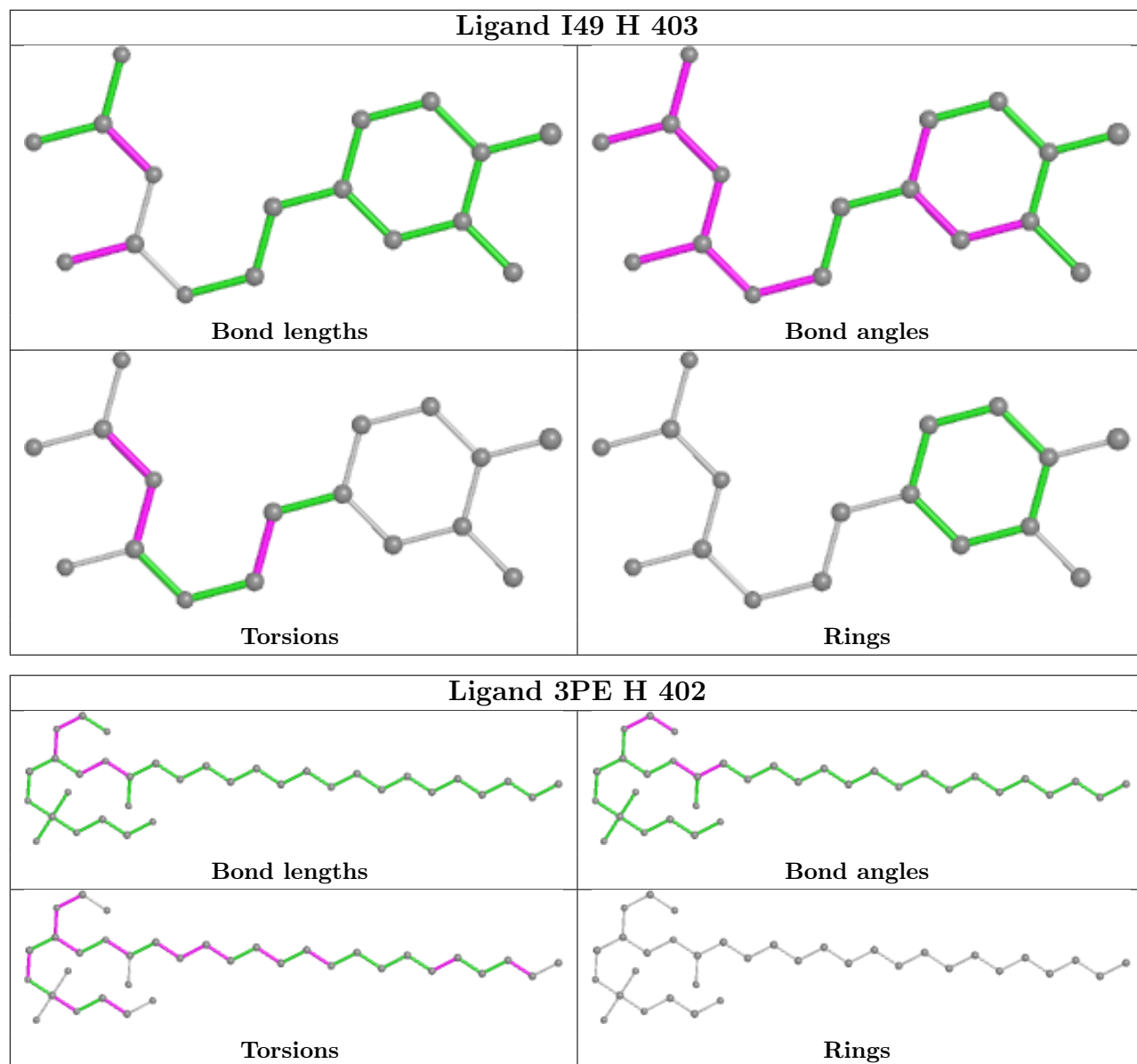


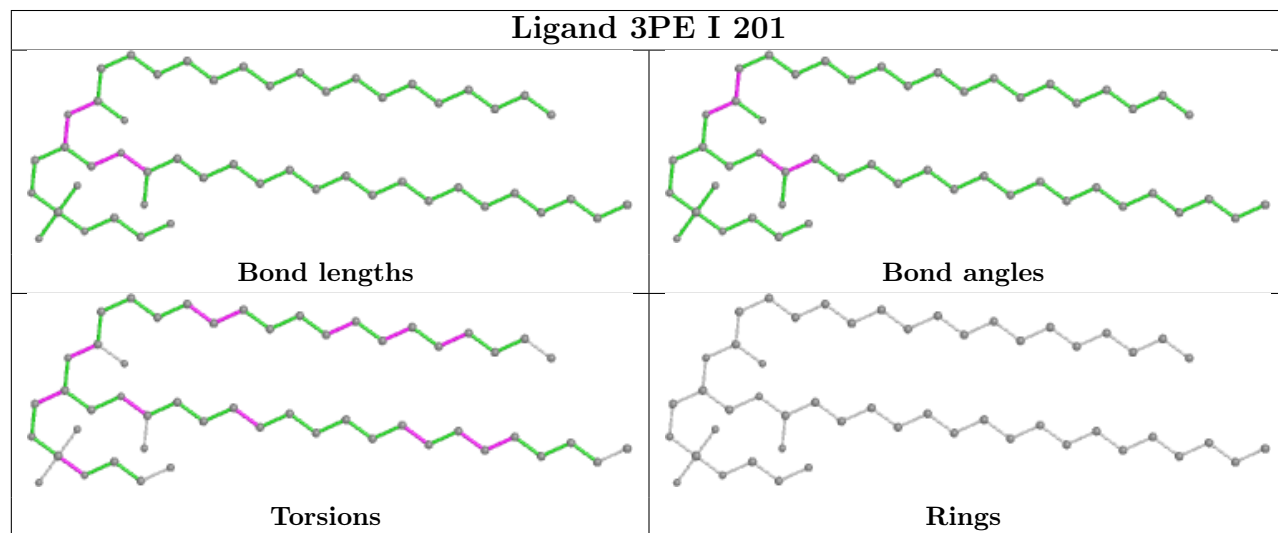
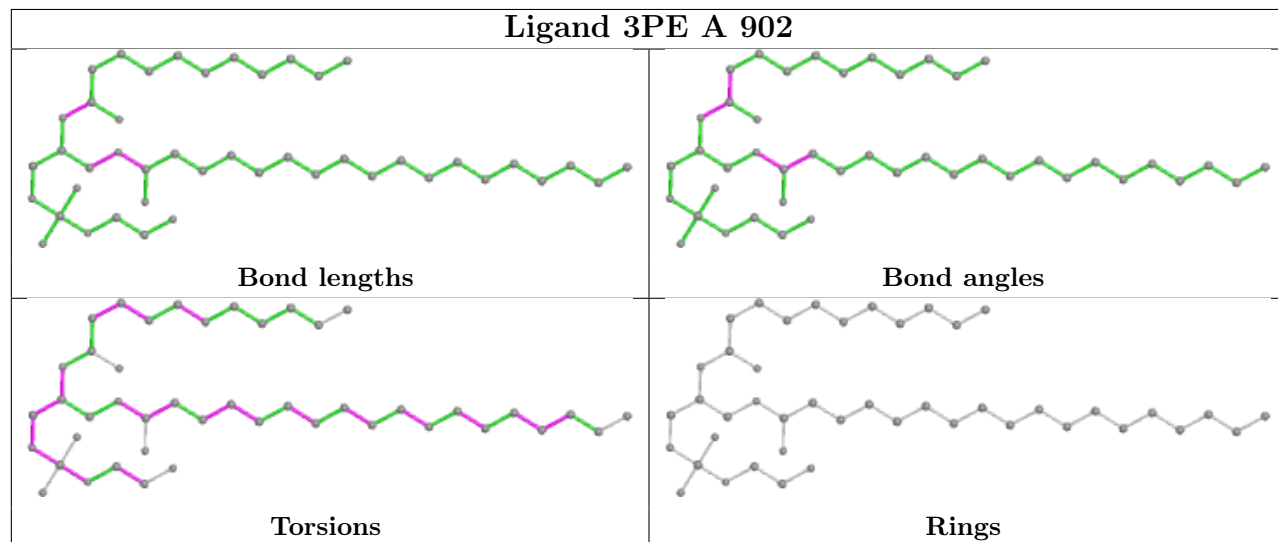
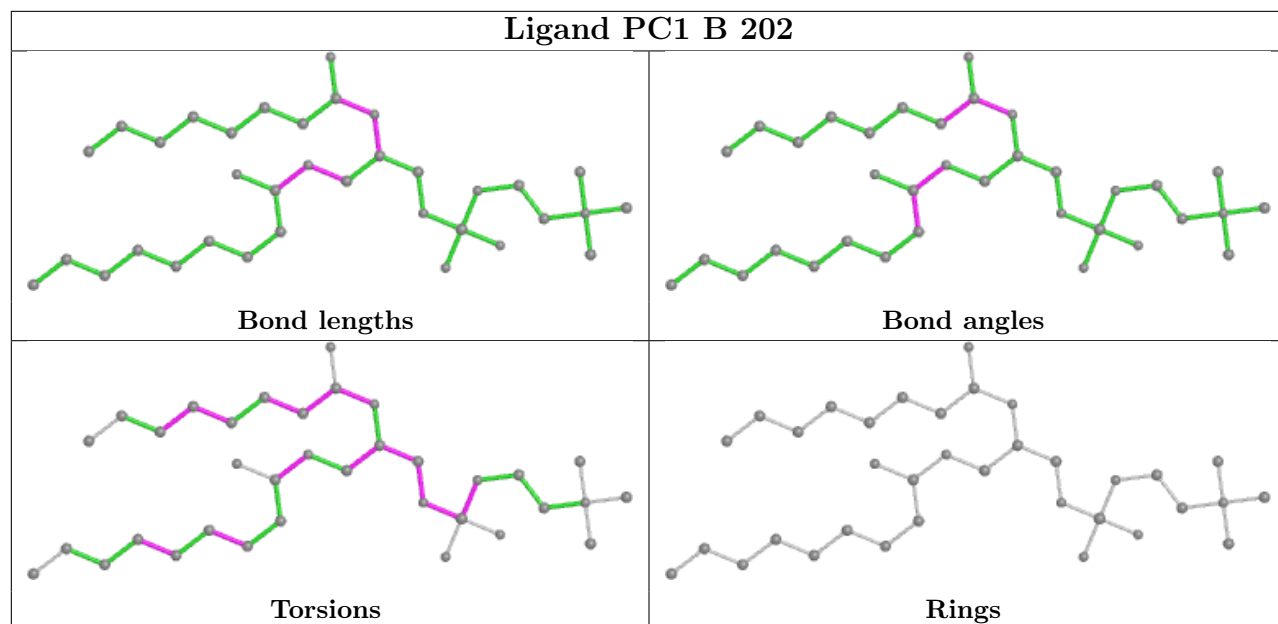


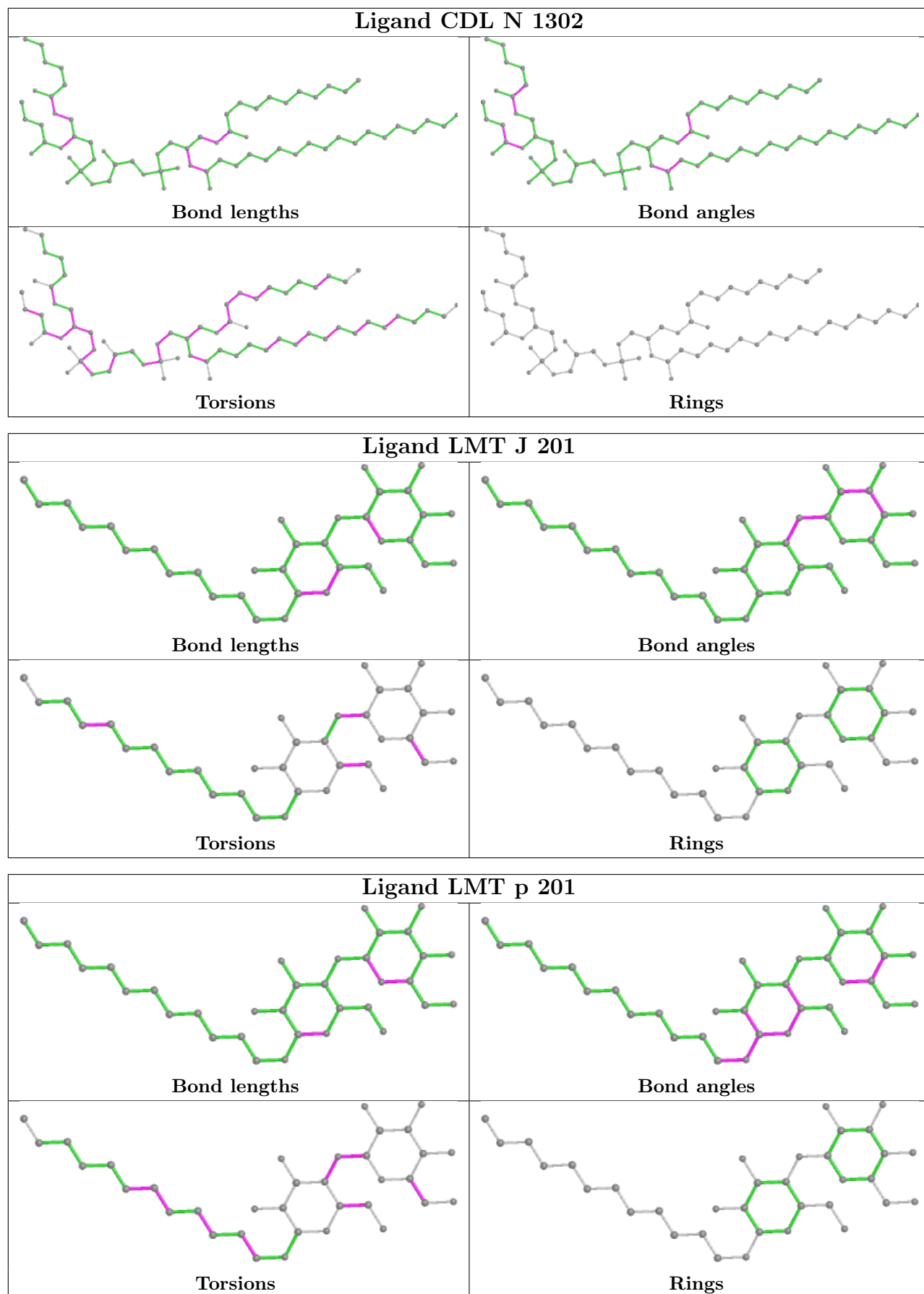


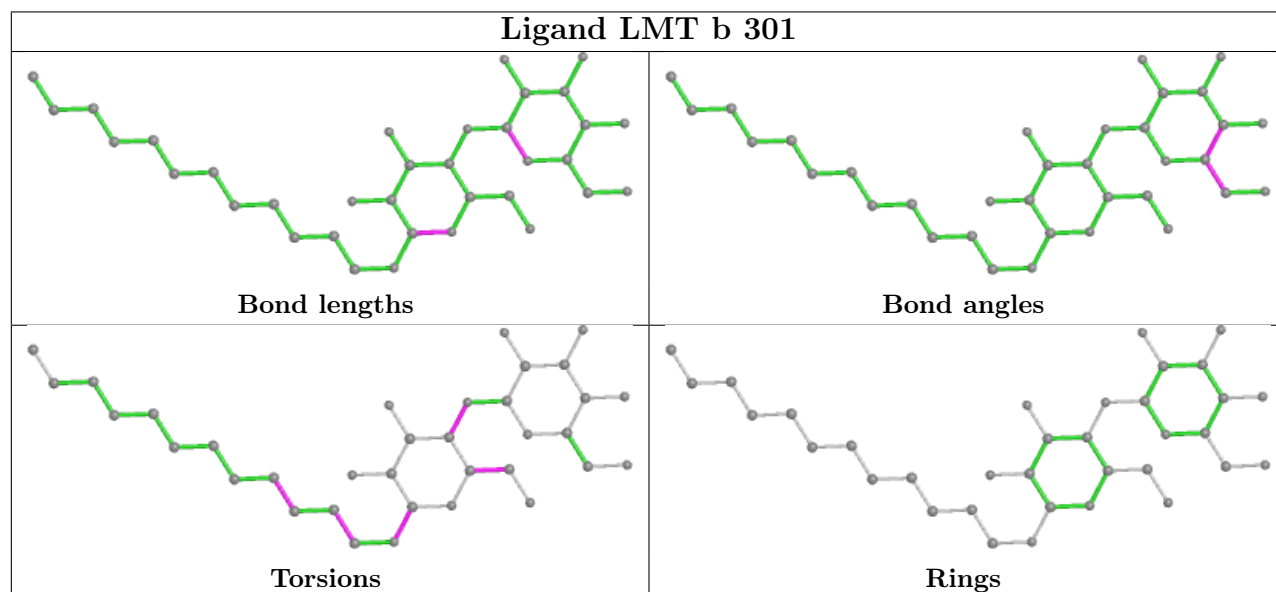
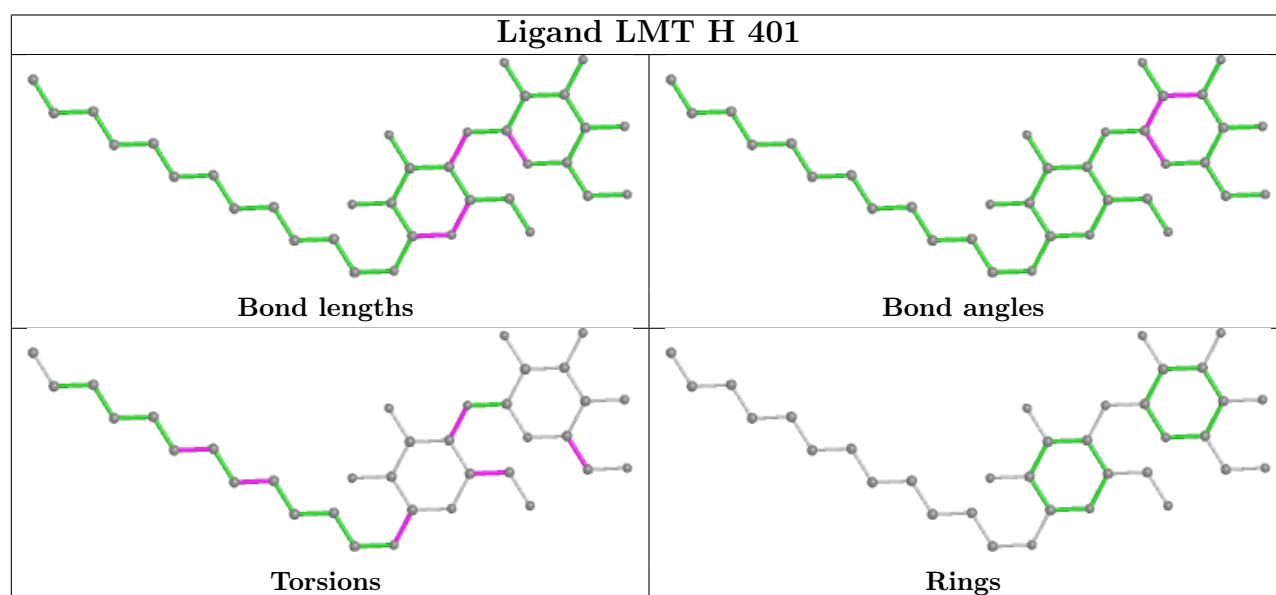
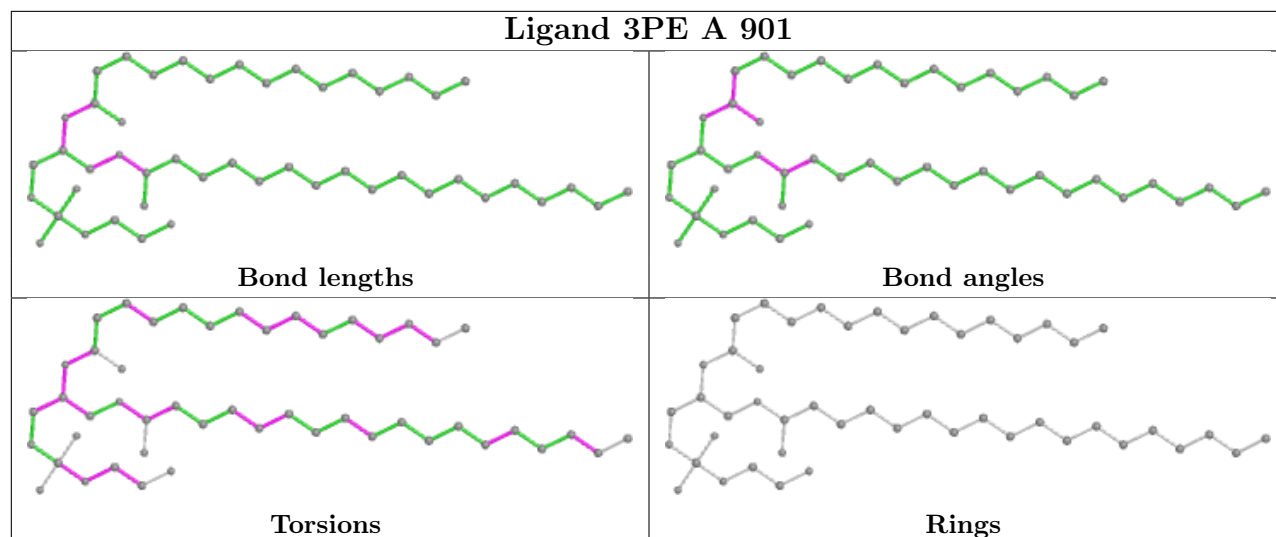


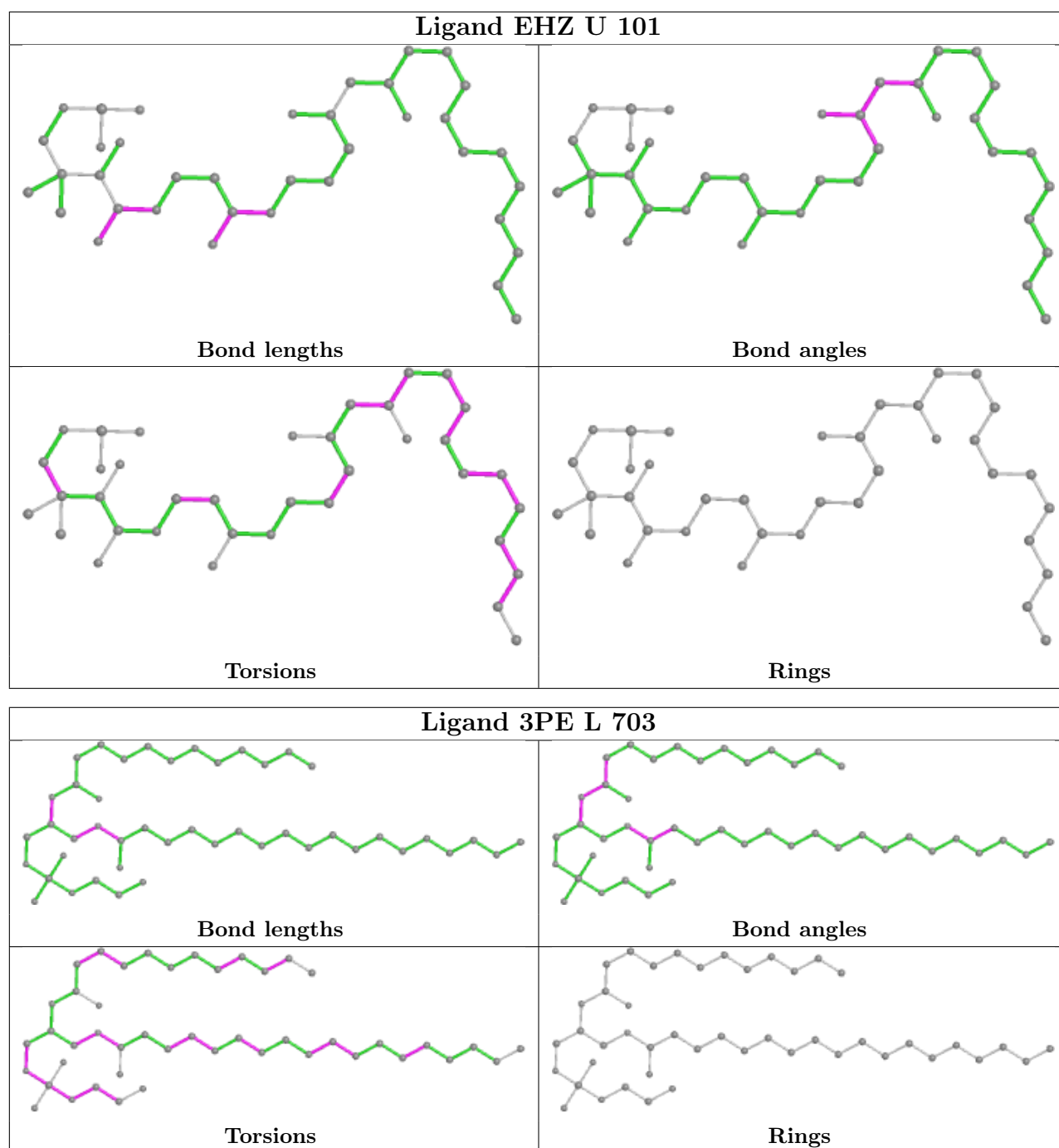












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.



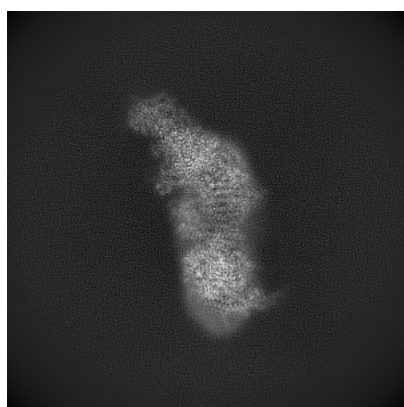
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-14307. These allow visual inspection of the internal detail of the map and identification of artifacts.

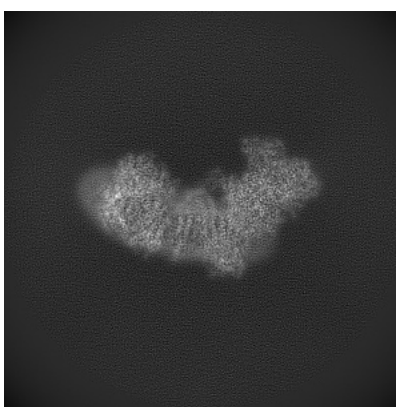
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

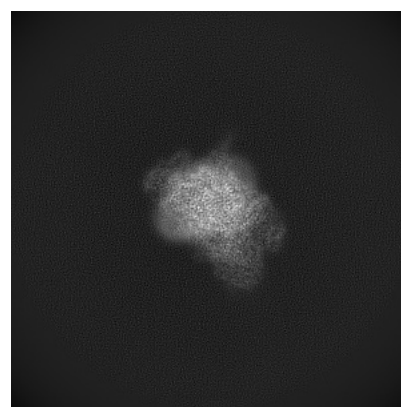
#### 6.1.1 Primary map



X



Y

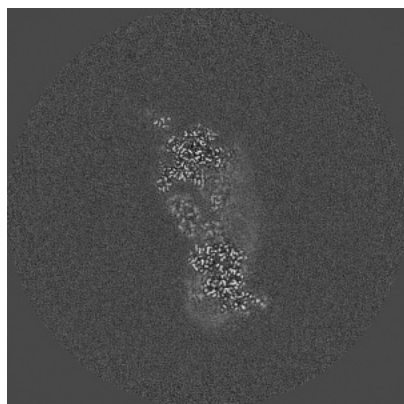


Z

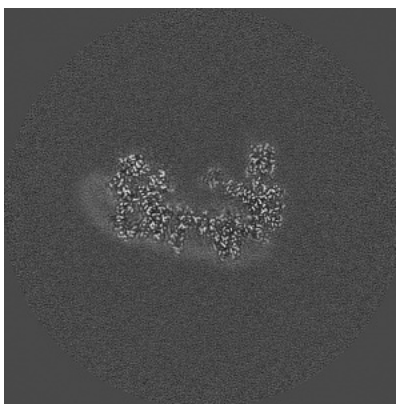
The images above show the map projected in three orthogonal directions.

### 6.2 Central slices [i](#)

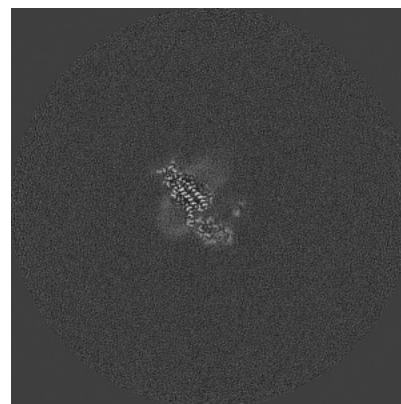
#### 6.2.1 Primary map



X Index: 330



Y Index: 330

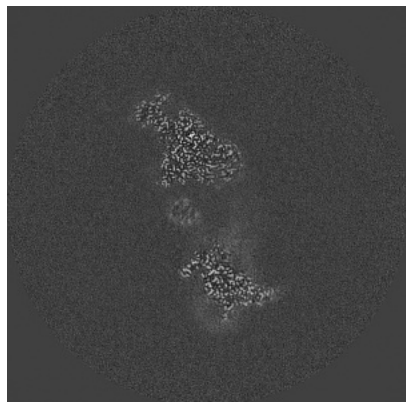


Z Index: 330

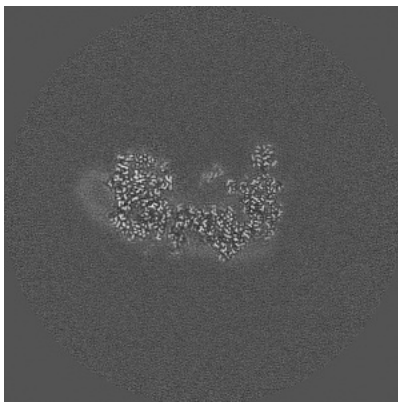
The images above show central slices of the map in three orthogonal directions.

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

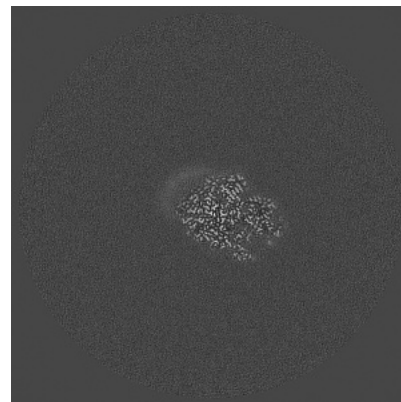
### 6.3.1 Primary map



X Index: 353



Y Index: 337



Z Index: 423

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

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

### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 6.0. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

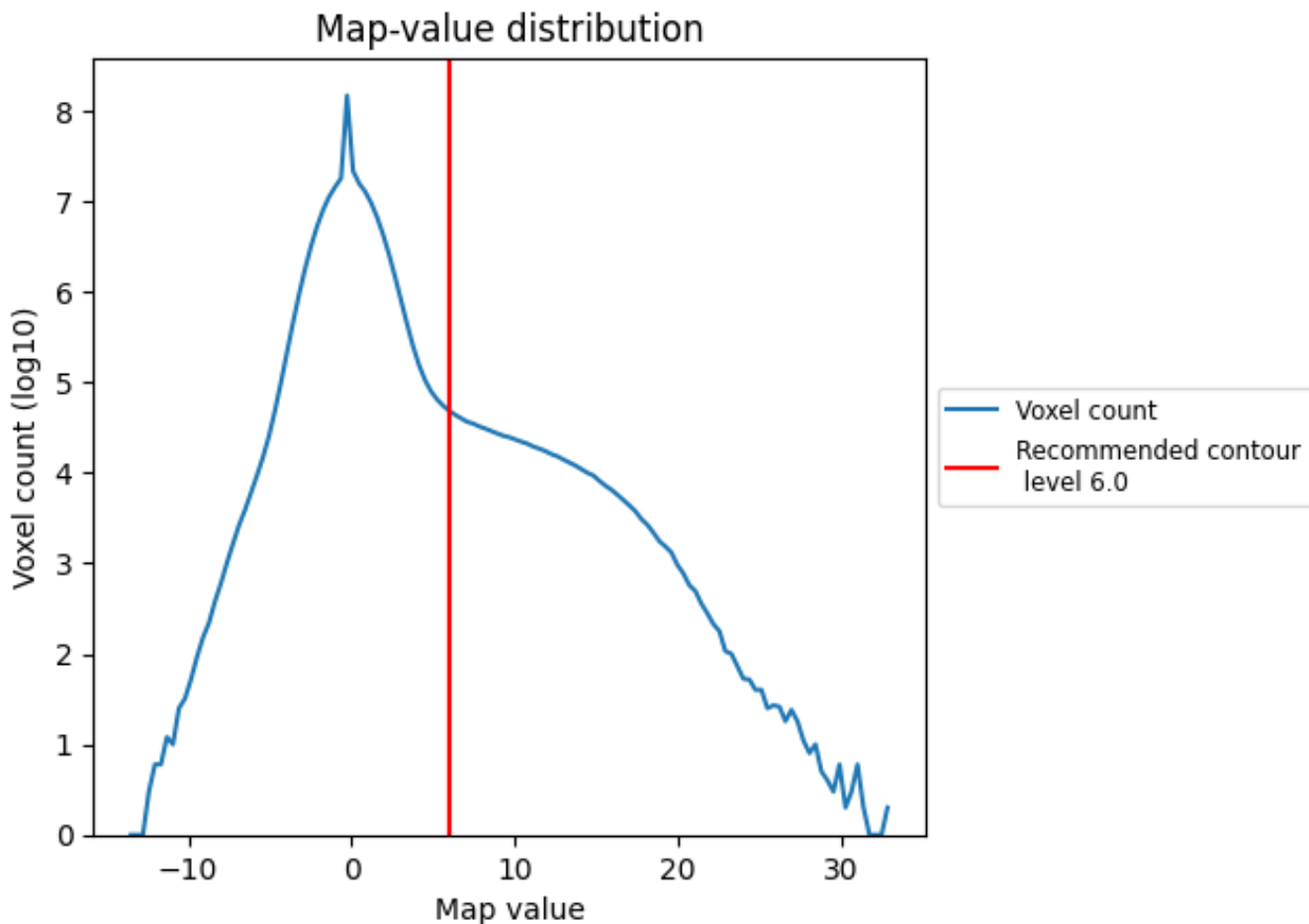
## 6.5 Mask visualisation

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

## 7 Map analysis [i](#)

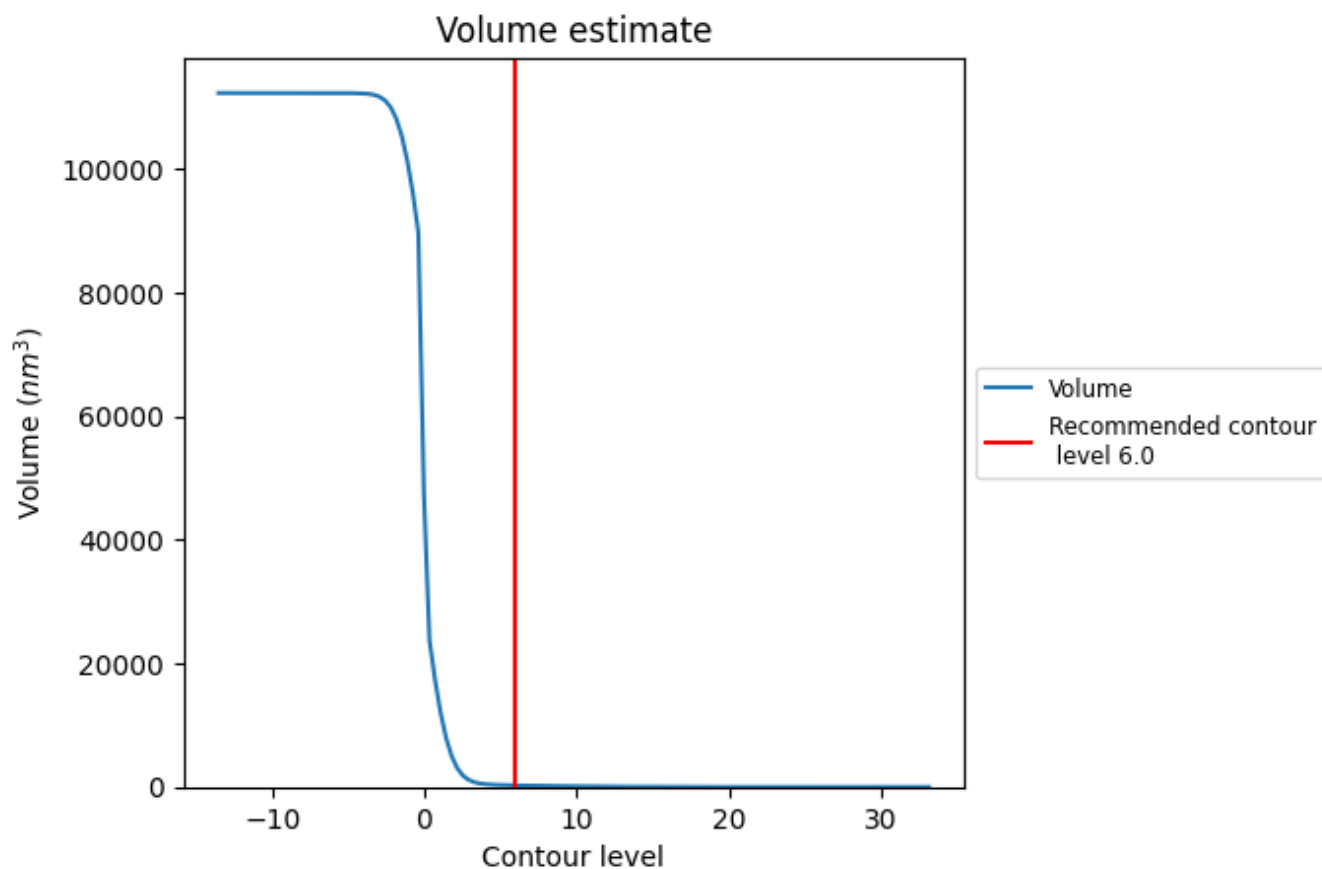
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

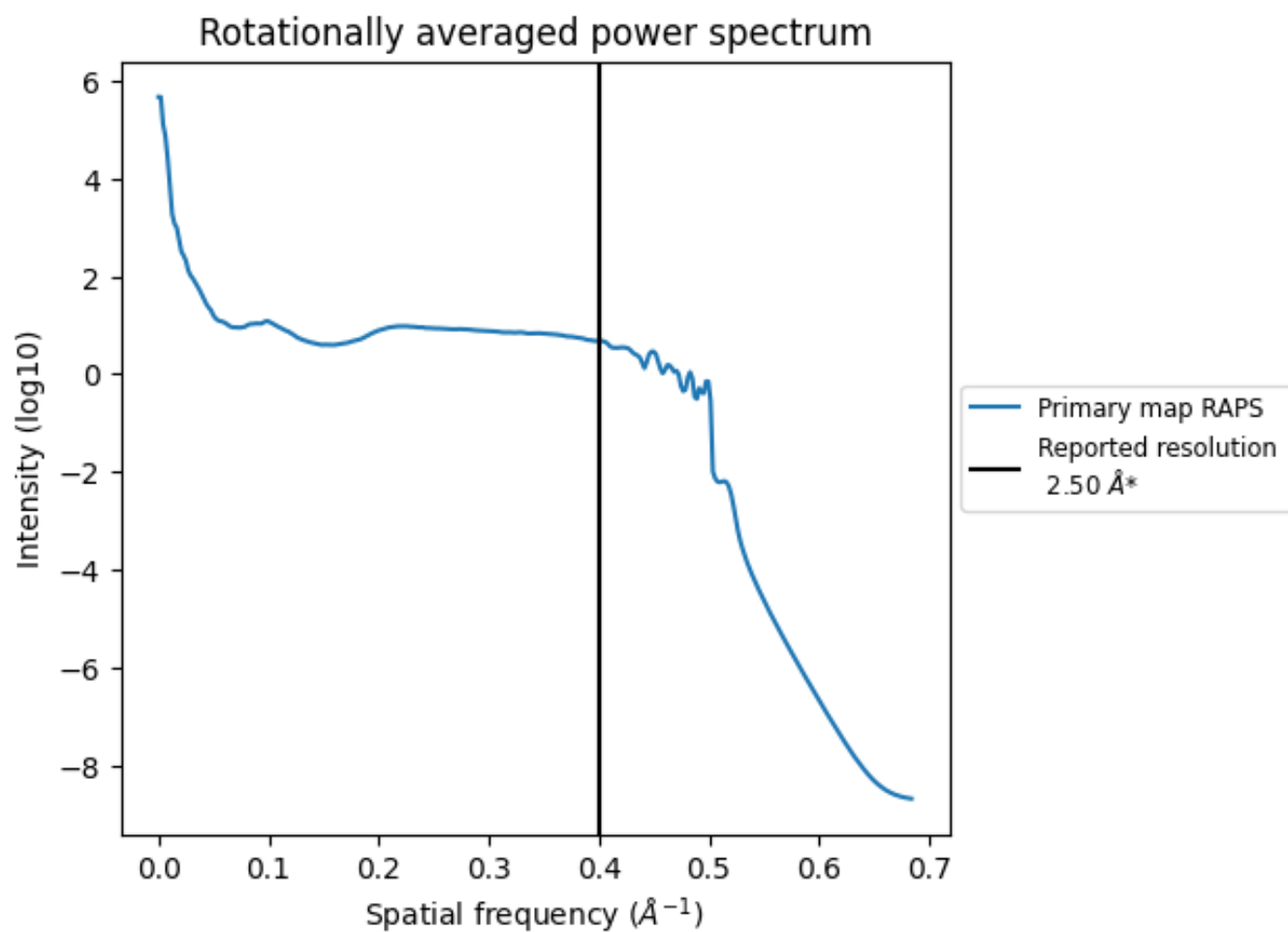
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 253  $\text{nm}^3$ ; this corresponds to an approximate mass of 229 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  $0.400 \text{\AA}^{-1}$

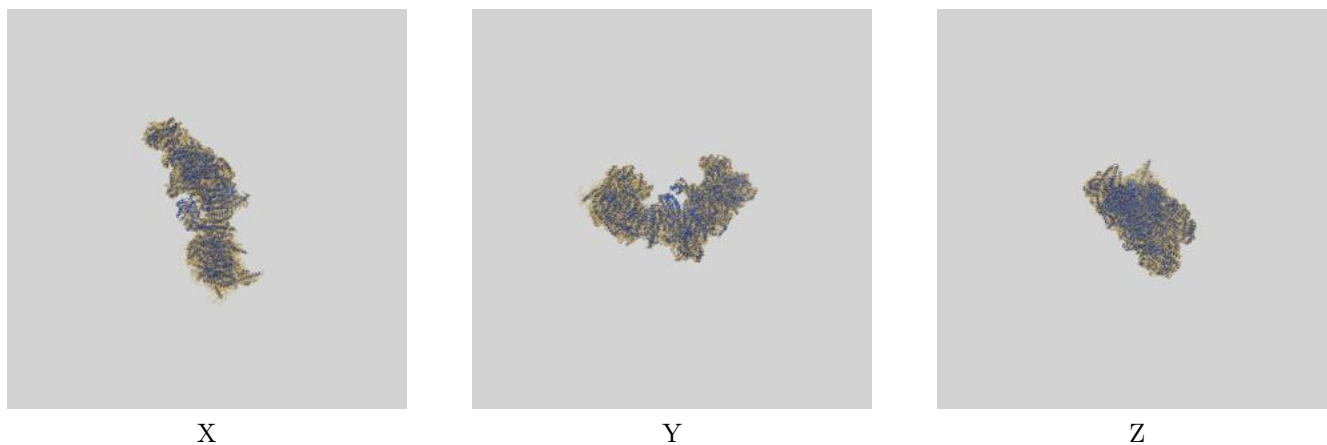
## 8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

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

This section contains information regarding the fit between EMDB map EMD-14307 and PDB model 7R4G. Per-residue inclusion information can be found in section 3 on page 23.

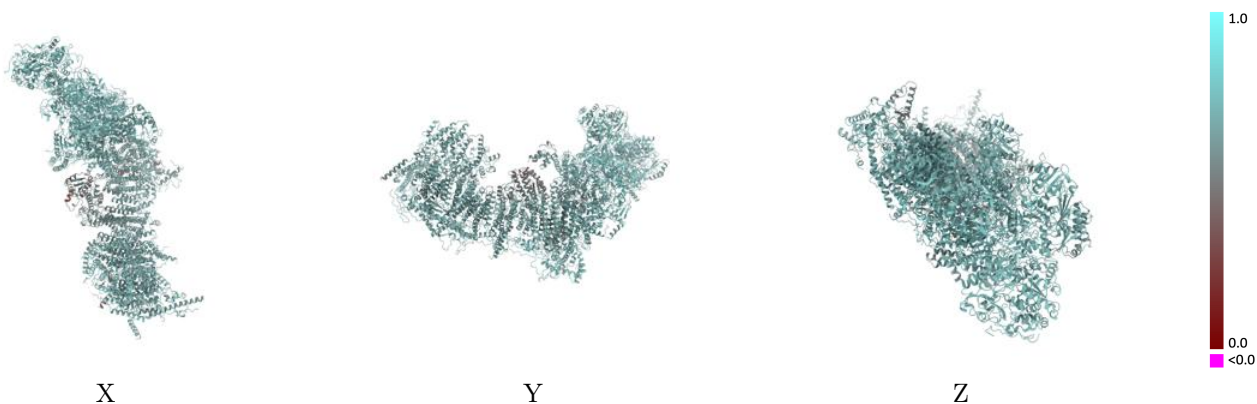
### 9.1 Map-model overlay [i](#)



The images above show the 3D surface view of the map at the recommended contour level 6.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

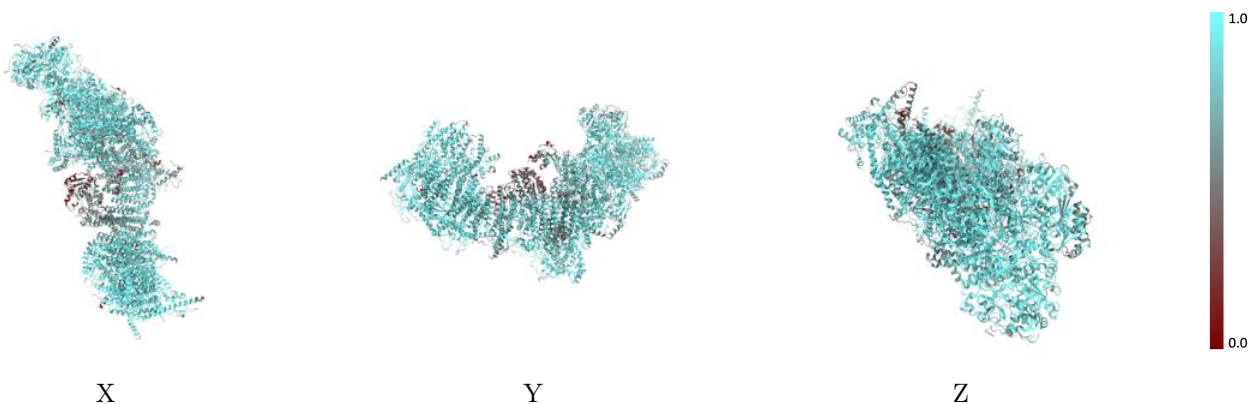


## 9.2 Q-score mapped to coordinate model [i](#)



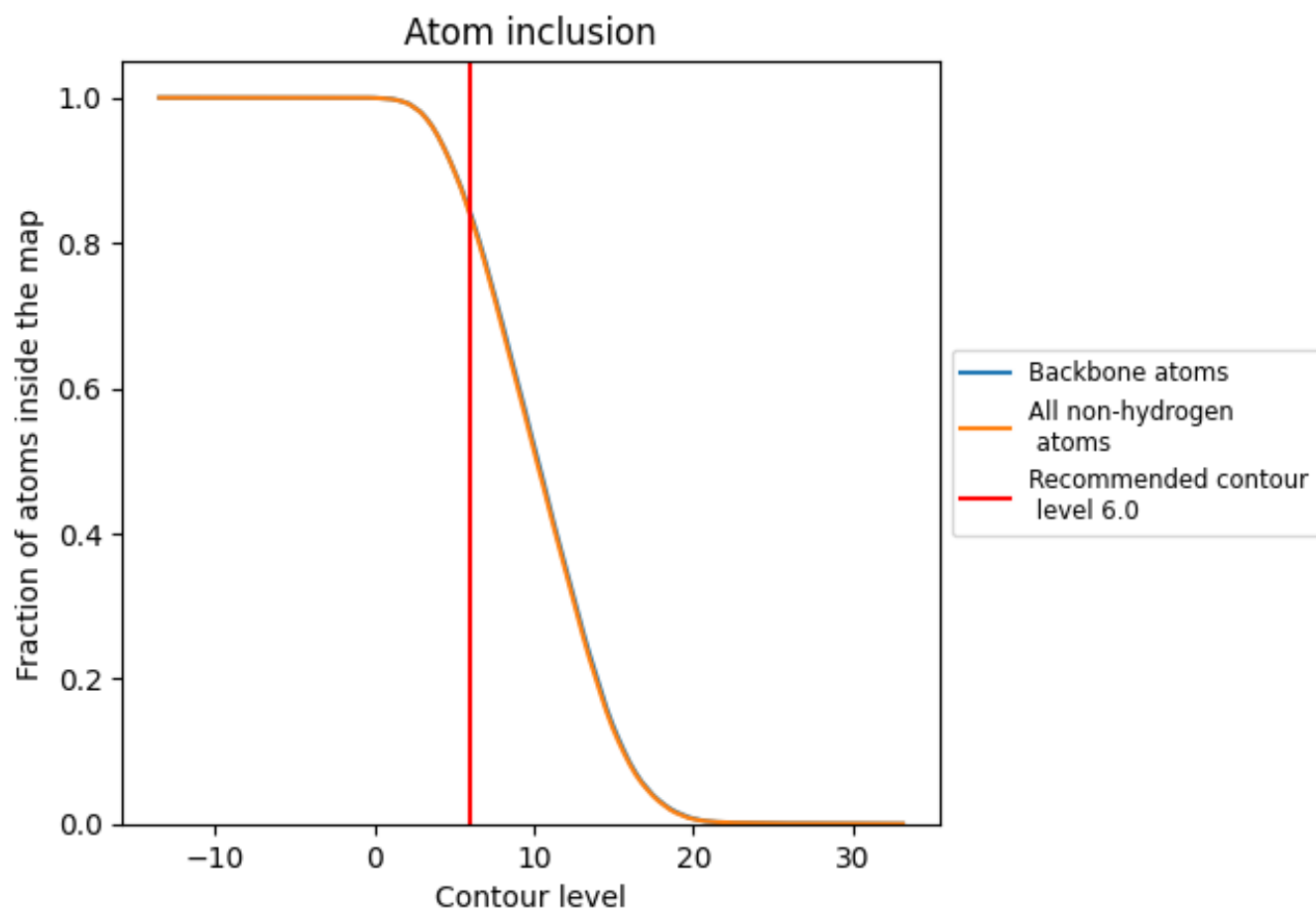
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

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



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (6.0).







































































## 9.4 Atom inclusion [i](#)



At the recommended contour level, 84% of all backbone atoms, 84% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary























The table lists the average atom inclusion at the recommended contour level (6.0) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.8383	 0.6620
A	 0.7557	 0.6400
B	 0.8926	 0.6960
C	 0.9358	 0.7150
D	 0.9321	 0.7110
E	 0.8341	 0.6700
F	 0.8827	 0.6820
G	 0.8802	 0.6920
H	 0.8805	 0.6760
I	 0.9253	 0.7160
J	 0.7598	 0.6340
K	 0.8398	 0.6620
L	 0.9203	 0.6550
M	 0.9167	 0.6680
N	 0.8046	 0.6520
O	 0.4657	 0.5290
P	 0.8154	 0.6640
Q	 0.8802	 0.6990
R	 0.8876	 0.7000
S	 0.7842	 0.6600
T	 0.4876	 0.5850
U	 0.9143	 0.6530
V	 0.8058	 0.6730
W	 0.8089	 0.6770
X	 0.8011	 0.6520
Y	 0.4967	 0.6310
Z	 0.7471	 0.6380
a	 0.8854	 0.6740
b	 0.7693	 0.6390
c	 0.6162	 0.5970
d	 0.7830	 0.6510
e	 0.7668	 0.6460
f	 0.8151	 0.6310
g	 0.8945	 0.6530
h	 0.8751	 0.6620



*Continued on next page...*

*Continued from previous page...*

Chain	Atom inclusion	Q-score
i	 0.8616	 0.6330
j	 0.8850	 0.6330
k	 0.8794	 0.6280
l	 0.8603	 0.6380
m	 0.8542	 0.6430
n	 0.8988	 0.6510
o	 0.8731	 0.6340
p	 0.8806	 0.6510
q	 0.7998	 0.6830
r	 0.8531	 0.6950
s	 0.8197	 0.6780