



## Full wwPDB EM Validation Report ⓘ

Nov 21, 2022 – 10:14 AM EST

PDB ID : 7SSS  
EMDB ID : EMD-25413  
Title : Structure of the NADH-bound human COQ7:COQ9 complex by single-particle electron cryo-microscopy  
Authors : Aydin, H.; Frost, A.  
Deposited on : 2021-11-11  
Resolution : 2.40 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 : 1.8.5 (274361), 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) : 2.31.2

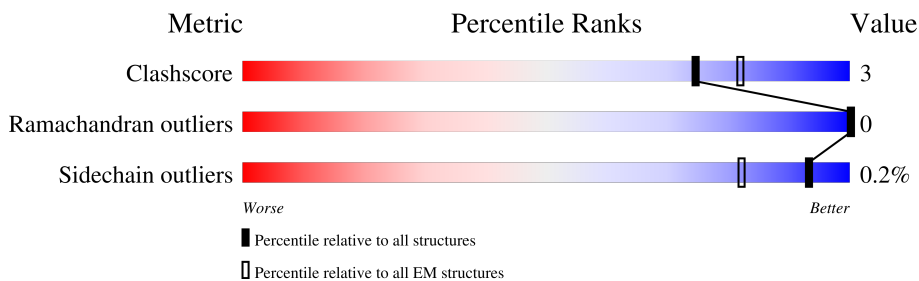
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 2.40 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
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	318	
1	B	318	
1	C	318	
1	D	318	
2	E	217	
2	F	217	
2	G	217	
2	H	217	

## 2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 12190 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.

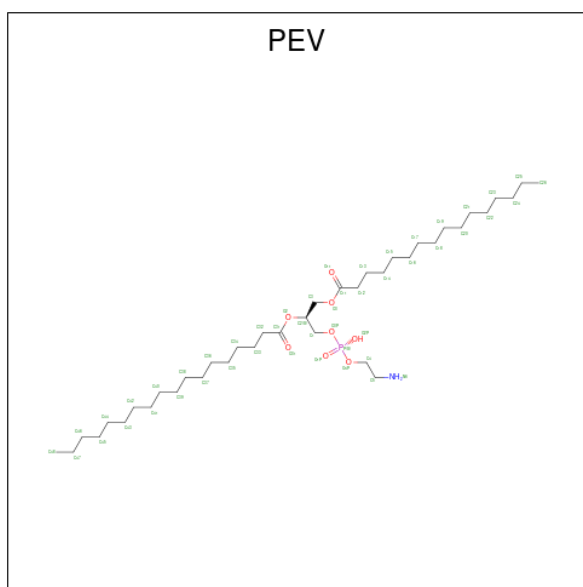
- Molecule 1 is a protein called Ubiquinone biosynthesis protein COQ9, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	181	1446	909	251	276	10	1	0
1	B	181	1461	917	256	278	10	2	0
1	C	181	1449	910	252	277	10	1	0
1	D	181	1457	915	256	276	10	2	0

- Molecule 2 is a protein called 5-demethoxyubiquinone hydroxylase, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	E	173	1350	861	244	237	8	1	0
2	F	173	1354	862	244	240	8	1	0
2	G	173	1354	862	244	240	8	1	0
2	H	173	1354	862	244	240	8	1	0

- Molecule 3 is (1S)-2-[[[(2-AMINOETHOXY)(HYDROXY)PHOSPHORYL]OXY]-1-[(PALMITOYLOXY)METHYL]ETHYL STEARATE (three-letter code: PEV) (formula: C<sub>39</sub>H<sub>78</sub>NO<sub>8</sub>P) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
3	A	1	Total	C	O	P	0	
			43	34	8	1		
3	A	1	Total	C	O	P	0	
			43	34	8	1		
3	A	1	Total	C	O	P	0	
			43	34	8	1		
3	B	1	Total	C	O	P	0	
			31	22	8	1		
3	B	1	Total	C	O	P	0	
			31	22	8	1		
3	C	1	Total	C	N	O	P	0
			96	68	1	24	3	
3	C	1	Total	C	N	O	P	0
			96	68	1	24	3	
3	C	1	Total	C	N	O	P	0
			96	68	1	24	3	
3	C	1	Total	C	N	O	P	0
			96	68	1	24	3	
3	C	1	Total	C	N	O	P	0
			96	68	1	24	3	
3	D	1	Total	C	O	P	0	
			57	48	8	1		
3	D	1	Total	C	O	P	0	
			57	48	8	1		
3	D	1	Total	C	O	P	0	
			57	48	8	1		
3	D	1	Total	C	O	P	0	
			57	48	8	1		

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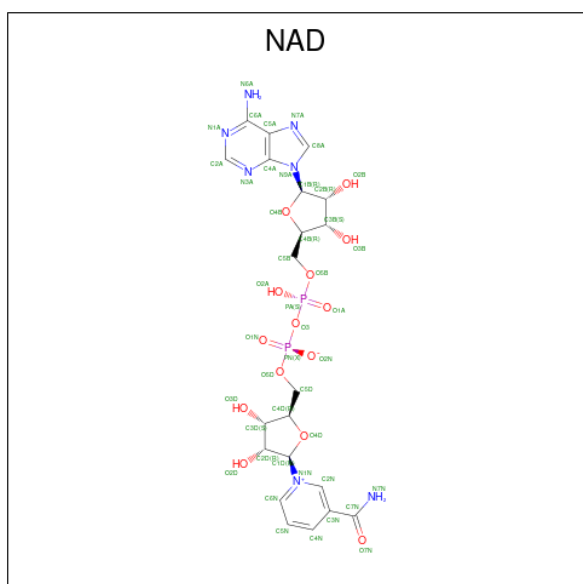
Mol	Chain	Residues	Atoms					AltConf
3	E	1	Total	C	N	O	P	0
			87	59	1	24	3	
3	E	1	Total	C	N	O	P	0
			87	59	1	24	3	
3	E	1	Total	C	N	O	P	0
			87	59	1	24	3	
3	E	1	Total	C	N	O	P	0
			87	59	1	24	3	
3	F	1	Total	C	N	O	P	0
			81	62	1	16	2	
3	F	1	Total	C	N	O	P	0
			81	62	1	16	2	
3	F	1	Total	C	N	O	P	0
			81	62	1	16	2	
3	F	1	Total	C	N	O	P	0
			81	62	1	16	2	
3	F	1	Total	C	N	O	P	0
			81	62	1	16	2	
3	G	1	Total	C	O	P		0
			73	55	16	2		
3	G	1	Total	C	O	P		0
			73	55	16	2		
3	G	1	Total	C	O	P		0
			73	55	16	2		
3	G	1	Total	C	O	P		0
			73	55	16	2		
3	H	1	Total	C	N	O	P	0
			99	71	1	24	3	
3	H	1	Total	C	N	O	P	0
			99	71	1	24	3	
3	H	1	Total	C	N	O	P	0
			99	71	1	24	3	
3	H	1	Total	C	N	O	P	0
			99	71	1	24	3	
3	H	1	Total	C	N	O	P	0
			99	71	1	24	3	

- Molecule 4 is 2-[(2E,6E,10E,14E,18E,22E,26E)-3,7,11,15,19,23,27,31-OCTAMETHYL DOTRIACONTA-2,6,10,14,18,22,26,30-OCTAENYL]PHENOL (three-letter code: 8PP) (formula: C<sub>46</sub>H<sub>70</sub>O) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			AltConf
4	B	1	Total	C	O	0
			37	36	1	
4	E	1	Total	C	O	0
			35	34	1	
4	G	1	Total	C	O	0
			34	33	1	
4	H	1	Total	C	O	0
			34	33	1	

- Molecule 5 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (three-letter code: NAD) (formula:  $C_{21}H_{27}N_7O_{14}P_2$ ).



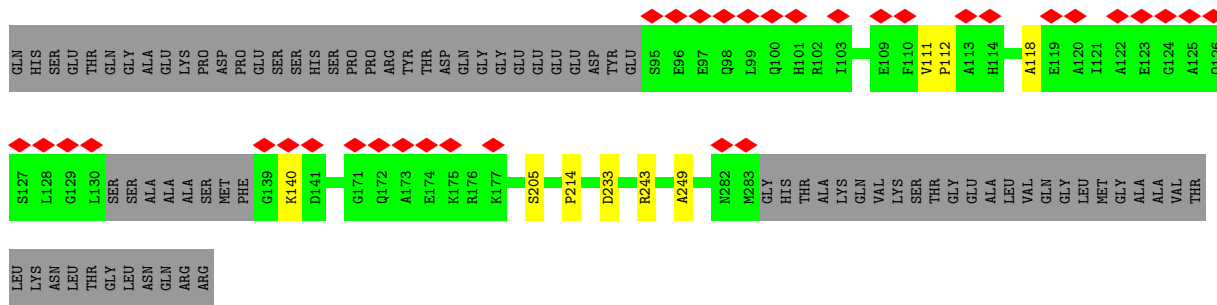
Mol	Chain	Residues	Atoms					AltConf
5	E	1	Total	C	N	O	P	0
			44	21	7	14	2	
5	F	1	Total	C	N	O	P	0
			44	21	7	14	2	

- Molecule 6 is water.

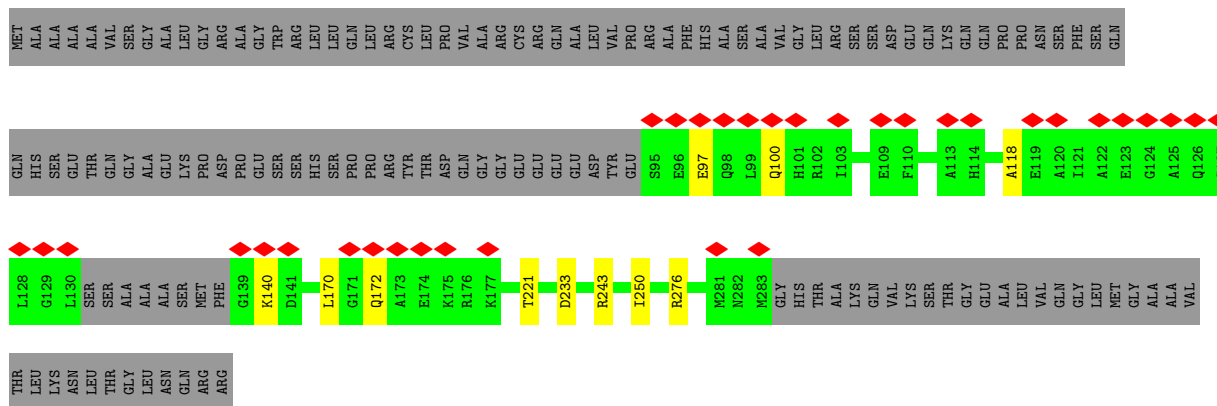
Mol	Chain	Residues	Atoms		AltConf
6	A	26	Total	O	0
			26	26	
6	B	19	Total	O	0
			19	19	
6	C	30	Total	O	0
			30	30	
6	D	31	Total	O	0
			31	31	
6	E	19	Total	O	0
			19	19	
6	F	15	Total	O	0
			15	15	
6	G	14	Total	O	0
			14	14	
6	H	16	Total	O	0
			16	16	



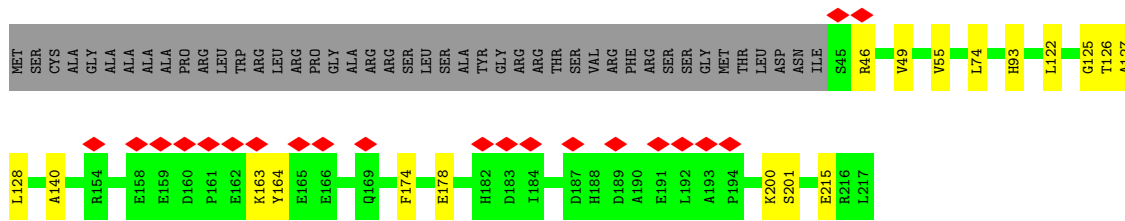




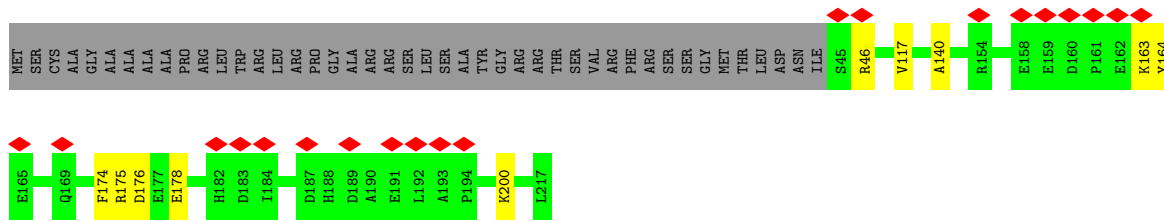
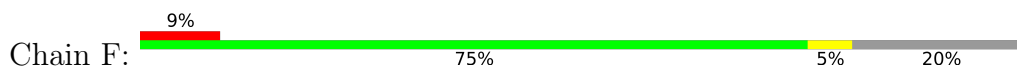
• Molecule 1: Ubiquinone biosynthesis protein COQ9, mitochondrial



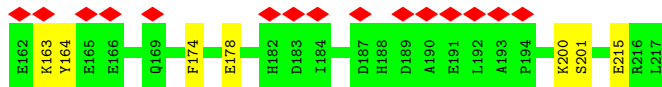
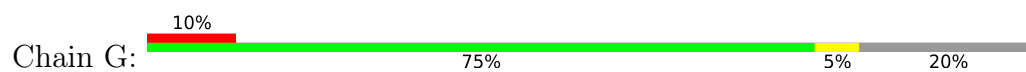
• Molecule 2: 5-demethoxyubiquinone hydroxylase, mitochondrial



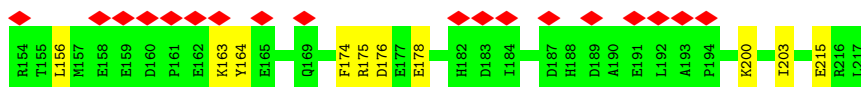
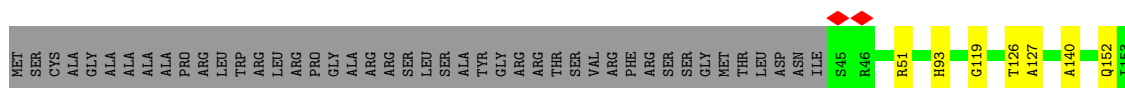
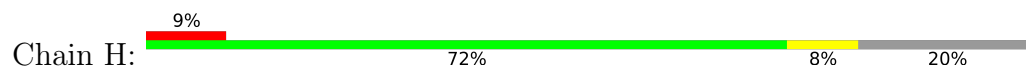
• Molecule 2: 5-demethoxyubiquinone hydroxylase, mitochondrial



• Molecule 2: 5-demethoxyubiquinone hydroxylase, mitochondrial



- Molecule 2: 5-demethoxyubiquinone hydroxylase, mitochondrial



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	372917	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	65	Depositor
Minimum defocus (nm)	300	Depositor
Maximum defocus (nm)	1200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.219	Depositor
Minimum map value	-0.128	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.010	Depositor
Recommended contour level	0.035	Depositor
Map size ( $\text{\AA}$ )	213.248, 213.248, 213.248	wwPDB
Map dimensions	256, 256, 256	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	0.833, 0.833, 0.833	Depositor

## 5 Model quality [i](#)

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

Bond lengths and bond angles in the following residue types are not validated in this section: PEV, 8PP, NAD

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	0.26	0/1476	0.37	0/2004
1	B	0.26	0/1491	0.37	0/2023
1	C	0.25	0/1478	0.38	0/2006
1	D	0.26	0/1487	0.38	0/2018
2	E	0.26	0/1375	0.37	0/1858
2	F	0.26	0/1379	0.37	0/1863
2	G	0.26	0/1379	0.37	0/1863
2	H	0.26	0/1379	0.37	0/1863
All	All	0.26	0/11444	0.37	0/15498

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

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

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1446	0	1378	5	0
1	B	1461	0	1396	8	0
1	C	1449	0	1378	7	0
1	D	1457	0	1392	7	0
2	E	1350	0	1359	11	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	F	1354	0	1364	6	0
2	G	1354	0	1364	6	0
2	H	1354	0	1364	10	0
3	A	43	0	51	1	0
3	B	31	0	31	0	0
3	C	96	0	109	2	0
3	D	57	0	81	2	0
3	E	87	0	89	5	0
3	F	81	0	96	4	0
3	G	73	0	87	1	0
3	H	99	0	109	7	0
4	B	37	0	51	1	0
4	E	35	0	48	2	0
4	G	34	0	46	1	0
4	H	34	0	47	5	0
5	E	44	0	26	1	0
5	F	44	0	26	0	0
6	A	26	0	0	0	0
6	B	19	0	0	0	0
6	C	30	0	0	0	0
6	D	31	0	0	0	0
6	E	19	0	0	0	0
6	F	15	0	0	0	0
6	G	14	0	0	0	0
6	H	16	0	0	0	0
All	All	12190	0	11892	76	0

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

All (76) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:117:VAL:HG22	3:F:302:PEV:H122	1.69	0.74
1:C:214:PRO:HG2	3:C:405:PEV:H32	1.74	0.68
2:E:122:LEU:HD22	4:E:303:8PP:H112	1.84	0.59
1:C:233:ASP:OD1	1:C:243:ARG:NH1	2.37	0.57
1:B:221:THR:HG21	3:H:302:PEV:H31	1.88	0.56
2:H:175:ARG:NH1	2:H:176:ASP:OD1	2.39	0.55
2:F:175:ARG:NH1	2:F:176:ASP:OD1	2.39	0.55
1:A:233:ASP:OD1	1:A:243:ARG:NH1	2.37	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:140:ALA:HB2	2:F:200:LYS:HG3	1.89	0.55
2:G:140:ALA:HB2	2:G:200:LYS:HG3	1.89	0.54
1:D:97:GLU:O	1:D:100:GLN:NE2	2.41	0.53
2:E:140:ALA:HB2	2:E:200:LYS:HG3	1.90	0.53
1:A:118:ALA:HB2	1:A:140:LYS:HA	1.89	0.53
2:H:51:ARG:HG3	2:H:215:GLU:HB2	1.90	0.53
1:D:221:THR:HG21	3:E:302:PEV:H31	1.91	0.53
1:D:250:ILE:HG12	1:D:276[A]:ARG:HG3	1.91	0.53
1:C:249:ALA:HB2	3:E:301:PEV:H122	1.92	0.52
1:C:118:ALA:HB2	1:C:140:LYS:HA	1.90	0.52
2:G:51:ARG:HG3	2:G:215:GLU:HB2	1.91	0.52
2:H:140:ALA:HB2	2:H:200:LYS:HG3	1.90	0.52
1:B:118:ALA:HB2	1:B:140:LYS:HA	1.91	0.51
2:H:203:ILE:HG12	4:H:303:8PP:H18	1.93	0.50
1:D:118:ALA:HB2	1:D:140:LYS:HA	1.94	0.49
1:B:233:ASP:OD1	1:B:243:ARG:NH1	2.42	0.49
4:B:403:8PP:H172	4:B:403:8PP:H151	1.53	0.48
3:A:401:PEV:H161	3:H:305:PEV:H212	1.95	0.48
1:B:211:HIS:ND1	2:E:201:SER:OG	2.32	0.47
4:G:302:8PP:H172	4:G:302:8PP:H151	1.50	0.47
3:D:402:PEV:H122	3:E:302:PEV:H2	1.97	0.47
5:E:306:NAD:H6N	5:E:306:NAD:H2D	1.74	0.47
3:H:306:PEV:H151	3:H:306:PEV:H181	1.50	0.47
2:E:125:GLY:HA3	4:E:303:8PP:H271	1.96	0.47
3:F:302:PEV:H121	3:F:302:PEV:H151	1.51	0.46
3:C:404:PEV:H221	3:C:404:PEV:H251	1.48	0.46
1:A:103:ILE:HG23	1:A:125:ALA:HB2	1.97	0.46
1:A:211:HIS:ND1	2:G:201:SER:OG	2.33	0.46
3:D:404:PEV:H171	3:D:404:PEV:H141	1.74	0.45
4:H:303:8PP:H201	4:H:303:8PP:H222	1.69	0.45
2:E:46:ARG:HA	2:E:49:VAL:HG12	1.99	0.44
2:F:174:PHE:O	2:F:178:GLU:HG2	2.17	0.44
1:B:276[B]:ARG:HD3	1:B:276[B]:ARG:HA	1.78	0.44
2:G:174:PHE:O	2:G:178:GLU:HG2	2.17	0.44
2:H:119:GLY:HA2	4:H:303:8PP:H102	1.99	0.44
3:E:304:PEV:H321	3:E:304:PEV:H352	1.31	0.44
1:C:249:ALA:HB2	3:E:301:PEV:H141	2.00	0.44
3:F:305:PEV:H202	3:F:305:PEV:H172	1.42	0.43
1:C:205:SER:HB3	2:E:128:LEU:HB3	2.01	0.43
4:H:303:8PP:H172	4:H:303:8PP:H151	1.56	0.43
2:E:174:PHE:O	2:E:178:GLU:HG2	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:H:302:PEV:H121	3:H:302:PEV:H151	1.74	0.43
3:H:306:PEV:H182	3:H:306:PEV:H212	1.75	0.43
1:B:111:VAL:N	1:B:112:PRO:HD2	2.34	0.43
1:C:111:VAL:N	1:C:112:PRO:HD2	2.34	0.43
3:H:304:PEV:H351	3:H:304:PEV:H382	1.59	0.42
2:H:174:PHE:O	2:H:178:GLU:HG2	2.18	0.42
1:D:233:ASP:OD1	1:D:243:ARG:NH1	2.42	0.42
1:D:276[B]:ARG:HA	1:D:276[B]:ARG:HD3	1.78	0.42
2:E:74:LEU:HG	2:E:127:ALA:HB1	2.01	0.42
2:E:55:VAL:HB	2:E:215:GLU:HB3	2.01	0.42
2:E:163:LYS:HE3	2:E:164:TYR:CZ	2.55	0.42
2:H:163:LYS:HE3	2:H:164:TYR:CZ	2.55	0.42
1:A:111:VAL:N	1:A:112:PRO:HD2	2.35	0.41
2:H:156:LEU:HD12	2:H:156:LEU:HA	1.93	0.41
2:G:163:LYS:HE3	2:G:164:TYR:CZ	2.55	0.41
2:H:152:GLN:O	2:H:156:LEU:HB2	2.20	0.41
1:B:244:ARG:HB3	3:H:302:PEV:H152	2.02	0.41
2:F:46:ARG:HA	2:F:46:ARG:HD3	1.88	0.41
3:F:303:PEV:H202	3:F:305:PEV:H162	2.03	0.41
3:G:303:PEV:H151	3:G:303:PEV:H121	1.62	0.41
4:H:303:8PP:H322	4:H:303:8PP:H28	1.70	0.40
2:G:126:THR:O	2:G:127:ALA:HB3	2.22	0.40
1:B:195:PRO:HG2	1:B:196:TYR:CE2	2.57	0.40
2:H:126:THR:O	2:H:127:ALA:HB3	2.22	0.40
1:D:170:LEU:HB2	1:D:172:GLN:OE1	2.20	0.40
2:E:126:THR:O	2:E:127:ALA:HB3	2.21	0.40
2:F:163:LYS:HE3	2:F:164:TYR:CZ	2.55	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

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

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	178/318 (56%)	177 (99%)	1 (1%)	0	100	100
1	B	179/318 (56%)	177 (99%)	2 (1%)	0	100	100
1	C	178/318 (56%)	177 (99%)	1 (1%)	0	100	100
1	D	179/318 (56%)	177 (99%)	2 (1%)	0	100	100
2	E	172/217 (79%)	165 (96%)	7 (4%)	0	100	100
2	F	172/217 (79%)	165 (96%)	7 (4%)	0	100	100
2	G	172/217 (79%)	166 (96%)	6 (4%)	0	100	100
2	H	172/217 (79%)	165 (96%)	7 (4%)	0	100	100
All	All	1402/2140 (66%)	1369 (98%)	33 (2%)	0	100	100

There are no Ramachandran outliers to report.

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

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	153/265 (58%)	153 (100%)	0	100	100
1	B	155/265 (58%)	155 (100%)	0	100	100
1	C	153/265 (58%)	153 (100%)	0	100	100
1	D	154/265 (58%)	154 (100%)	0	100	100
2	E	135/175 (77%)	134 (99%)	1 (1%)	84	92
2	F	137/175 (78%)	137 (100%)	0	100	100
2	G	137/175 (78%)	137 (100%)	0	100	100
2	H	137/175 (78%)	136 (99%)	1 (1%)	84	92
All	All	1161/1760 (66%)	1159 (100%)	2 (0%)	93	97

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	E	93	HIS
2	H	93	HIS



Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

38 ligands 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	8PP	B	403	-	37,37,47	0.26	0	45,45,57	0.29	0
3	PEV	F	304	-	12,12,48	0.09	0	11,11,53	0.08	0
5	NAD	F	306	-	42,48,48	0.66	1 (2%)	50,73,73	0.83	3 (6%)
3	PEV	B	401	-	7,7,48	0.10	0	6,6,53	0.10	0
3	PEV	G	305	-	6,6,48	0.11	0	5,5,53	0.11	0
5	NAD	E	306	-	42,48,48	0.63	1 (2%)	50,73,73	0.87	4 (8%)
3	PEV	G	304	-	13,13,48	0.11	0	12,12,53	0.07	0
3	PEV	H	302	-	25,25,48	0.36	0	28,30,53	0.44	0
3	PEV	F	303	-	7,7,48	0.10	0	6,6,53	0.09	0
3	PEV	E	302	-	26,26,48	0.37	0	29,31,53	0.38	0
3	PEV	F	301	-	26,26,48	0.37	0	29,31,53	0.40	0
3	PEV	G	303	-	26,26,48	0.47	0	30,31,53	0.57	1 (3%)
3	PEV	A	402	-	23,23,48	0.50	0	27,28,53	0.64	1 (3%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	PEV	D	404	-	13,13,48	0.12	0	12,12,53	0.09	0
3	PEV	F	302	-	24,24,48	0.49	0	28,29,53	0.63	1 (3%)
3	PEV	H	306	-	12,12,48	0.09	0	11,11,53	0.09	0
3	PEV	D	401	-	7,7,48	0.10	0	6,6,53	0.09	0
3	PEV	H	305	-	6,6,48	0.11	0	5,5,53	0.12	0
3	PEV	E	305	-	7,7,48	0.11	0	6,6,53	0.10	0
3	PEV	A	401	-	8,8,48	0.12	0	7,7,53	0.13	0
3	PEV	A	403	-	9,9,48	0.09	0	8,8,53	0.08	0
3	PEV	C	401	-	25,25,48	0.38	0	28,30,53	0.48	0
4	8PP	G	302	-	34,34,47	0.24	0	41,41,57	0.31	0
4	8PP	E	303	-	35,35,47	0.30	0	42,42,57	0.27	0
3	PEV	H	301	-	24,24,48	0.49	0	28,29,53	0.60	1 (3%)
3	PEV	C	404	-	9,9,48	0.10	0	8,8,53	0.08	0
3	PEV	C	405	-	27,27,48	0.46	0	31,32,53	0.60	1 (3%)
4	8PP	H	303	-	34,34,47	0.24	0	41,41,57	0.28	0
3	PEV	C	402	-	8,8,48	0.12	0	7,7,53	0.10	0
3	PEV	C	403	-	22,22,48	0.51	0	26,27,53	0.64	1 (3%)
3	PEV	E	301	-	23,23,48	0.51	0	27,28,53	0.63	1 (3%)
3	PEV	B	402	-	22,22,48	0.50	0	26,27,53	0.67	1 (3%)
3	PEV	G	301	-	24,24,48	0.49	0	28,29,53	0.68	1 (3%)
3	PEV	E	304	-	27,27,48	0.45	0	31,32,53	0.58	1 (3%)
3	PEV	D	402	-	23,23,48	0.49	0	27,28,53	0.65	1 (3%)
3	PEV	H	304	-	27,27,48	0.47	0	31,32,53	0.58	1 (3%)
3	PEV	F	305	-	7,7,48	0.11	0	6,6,53	0.09	0
3	PEV	D	403	-	10,10,48	0.09	0	9,9,53	0.08	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	8PP	B	403	-	-	19/35/35/47	0/1/1/1
3	PEV	F	304	-	-	3/10/10/52	-
5	NAD	F	306	-	-	8/26/62/62	0/5/5/5
3	PEV	B	401	-	-	2/5/5/52	-
3	PEV	G	305	-	-	4/4/4/52	-
5	NAD	E	306	-	-	12/26/62/62	0/5/5/5
3	PEV	G	304	-	-	8/11/11/52	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	PEV	H	302	-	-	13/29/29/52	-
3	PEV	F	303	-	-	2/5/5/52	-
3	PEV	E	302	-	-	15/30/30/52	-
3	PEV	F	301	-	-	11/30/30/52	-
3	PEV	G	303	-	-	13/28/28/52	-
3	PEV	A	402	-	-	16/25/25/52	-
3	PEV	D	404	-	-	5/11/11/52	-
3	PEV	F	302	-	-	13/26/26/52	-
3	PEV	H	306	-	-	7/10/10/52	-
3	PEV	D	401	-	-	2/5/5/52	-
3	PEV	H	305	-	-	3/4/4/52	-
3	PEV	E	305	-	-	3/5/5/52	-
3	PEV	A	401	-	-	4/6/6/52	-
3	PEV	A	403	-	-	5/7/7/52	-
3	PEV	C	401	-	-	22/29/29/52	-
4	8PP	G	302	-	-	16/32/32/47	0/1/1/1
4	8PP	E	303	-	-	17/33/33/47	0/1/1/1
3	PEV	H	301	-	-	15/26/26/52	-
3	PEV	C	404	-	-	6/7/7/52	-
3	PEV	C	405	-	-	16/29/29/52	-
4	8PP	H	303	-	-	14/32/32/47	0/1/1/1
3	PEV	C	402	-	-	6/6/6/52	-
3	PEV	C	403	-	-	13/24/24/52	-
3	PEV	E	301	-	-	12/25/25/52	-
3	PEV	B	402	-	-	15/24/24/52	-
3	PEV	G	301	-	-	8/26/26/52	-
3	PEV	E	304	-	-	14/29/29/52	-
3	PEV	D	402	-	-	16/25/25/52	-
3	PEV	H	304	-	-	12/29/29/52	-
3	PEV	F	305	-	-	4/5/5/52	-
3	PEV	D	403	-	-	4/8/8/52	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	F	306	NAD	C2N-N1N	2.30	1.37	1.35
5	E	306	NAD	C2N-N1N	2.23	1.37	1.35

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	F	306	NAD	C3D-C2D-C1D	3.12	105.67	100.98
5	E	306	NAD	C3D-C2D-C1D	2.89	105.33	100.98
5	E	306	NAD	C6N-N1N-C2N	-2.72	119.50	121.97
5	F	306	NAD	C6N-N1N-C2N	-2.63	119.58	121.97
3	F	302	PEV	O2P-P-O1P	2.44	120.24	110.68
3	E	301	PEV	O2P-P-O1P	2.43	120.21	110.68
3	H	301	PEV	O2P-P-O1P	2.42	120.14	110.68
3	E	304	PEV	O2P-P-O1P	2.41	120.13	110.68
3	D	402	PEV	O2P-P-O1P	2.40	120.10	110.68
3	C	403	PEV	O2P-P-O1P	2.40	120.06	110.68
3	B	402	PEV	O2P-P-O1P	2.39	120.05	110.68
3	C	405	PEV	O2P-P-O1P	2.37	119.95	110.68
3	A	402	PEV	O2P-P-O1P	2.36	119.93	110.68
3	G	301	PEV	O2P-P-O1P	2.36	119.93	110.68
3	H	304	PEV	O2P-P-O1P	2.35	119.87	110.68
3	G	303	PEV	O2P-P-O1P	2.35	119.86	110.68
5	F	306	NAD	C5A-C6A-N6A	2.25	123.77	120.35
5	E	306	NAD	O4D-C1D-C2D	-2.21	103.70	106.93
5	E	306	NAD	C5A-C6A-N6A	2.19	123.69	120.35

There are no chirality outliers.

All (378) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	402	PEV	O31-C31-O2-C2
3	A	402	PEV	C1-O3P-P-O1P
3	A	402	PEV	C1-O3P-P-O2P
3	A	402	PEV	C1-O3P-P-O4P
3	B	402	PEV	C32-C31-O2-C2
3	B	402	PEV	O3P-C1-C2-O2
3	B	402	PEV	C1-O3P-P-O1P
3	B	402	PEV	C1-O3P-P-O2P
3	B	402	PEV	C1-O3P-P-O4P
3	C	401	PEV	C4-O4P-P-O3P
3	C	401	PEV	C4-O4P-P-O1P
3	C	401	PEV	C4-O4P-P-O2P

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Mol	Chain	Res	Type	Atoms
3	C	401	PEV	O4P-C4-C5-N6
3	C	403	PEV	C1-O3P-P-O1P
3	C	403	PEV	C1-O3P-P-O2P
3	D	402	PEV	C32-C31-O2-C2
3	D	402	PEV	C1-O3P-P-O1P
3	D	402	PEV	C1-O3P-P-O2P
3	D	402	PEV	C1-O3P-P-O4P
3	E	301	PEV	C1-O3P-P-O1P
3	E	301	PEV	C1-O3P-P-O2P
3	E	301	PEV	C1-O3P-P-O4P
3	E	302	PEV	C4-O4P-P-O1P
3	E	302	PEV	C4-O4P-P-O2P
3	E	304	PEV	C1-O3P-P-O1P
3	F	301	PEV	C1-O3P-P-O1P
3	F	301	PEV	C1-O3P-P-O2P
3	F	301	PEV	C1-O3P-P-O4P
3	F	302	PEV	C1-O3P-P-O1P
3	F	302	PEV	C1-O3P-P-O2P
3	F	302	PEV	C1-O3P-P-O4P
3	G	301	PEV	O11-C11-O3-C3
3	G	301	PEV	C12-C11-O3-C3
3	G	303	PEV	C32-C31-O2-C2
3	G	303	PEV	C1-O3P-P-O2P
3	G	303	PEV	C1-O3P-P-O4P
3	G	303	PEV	C12-C11-O3-C3
3	H	301	PEV	C32-C31-O2-C2
3	H	301	PEV	C1-O3P-P-O1P
3	H	301	PEV	C1-O3P-P-O2P
3	H	301	PEV	C1-O3P-P-O4P
3	H	301	PEV	O11-C11-O3-C3
3	H	301	PEV	C12-C11-O3-C3
3	H	302	PEV	O4P-C4-C5-N6
3	H	304	PEV	C1-O3P-P-O2P
3	H	304	PEV	C1-O3P-P-O4P
4	B	403	8PP	C7-C8-C9-C10
4	B	403	8PP	C7-C8-C9-C11
4	B	403	8PP	C9-C11-C12-C13
4	B	403	8PP	C13-C14-C16-C17
4	B	403	8PP	C15-C14-C16-C17
4	B	403	8PP	C17-C18-C19-C20
4	B	403	8PP	C18-C19-C21-C22
4	B	403	8PP	C20-C19-C21-C22

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Mol	Chain	Res	Type	Atoms
4	B	403	8PP	C27-C28-C29-C30
4	B	403	8PP	C27-C28-C29-C31
4	B	403	8PP	C32-C33-C34-C36
4	E	303	8PP	C12-C13-C14-C15
4	E	303	8PP	C12-C13-C14-C16
4	E	303	8PP	C13-C14-C16-C17
4	E	303	8PP	C15-C14-C16-C17
4	E	303	8PP	C22-C23-C24-C25
4	E	303	8PP	C22-C23-C24-C26
4	E	303	8PP	C24-C26-C27-C28
4	E	303	8PP	C27-C28-C29-C30
4	E	303	8PP	C27-C28-C29-C31
4	E	303	8PP	C29-C31-C32-C33
4	G	302	8PP	C7-C8-C9-C10
4	G	302	8PP	C7-C8-C9-C11
4	G	302	8PP	C9-C11-C12-C13
4	G	302	8PP	C13-C14-C16-C17
4	G	302	8PP	C15-C14-C16-C17
4	G	302	8PP	C17-C18-C19-C20
4	G	302	8PP	C17-C18-C19-C21
4	G	302	8PP	C18-C19-C21-C22
4	G	302	8PP	C20-C19-C21-C22
4	G	302	8PP	C22-C23-C24-C25
4	G	302	8PP	C22-C23-C24-C26
4	G	302	8PP	C27-C28-C29-C30
4	G	302	8PP	C27-C28-C29-C31
4	H	303	8PP	C7-C8-C9-C10
4	H	303	8PP	C7-C8-C9-C11
4	H	303	8PP	C20-C19-C21-C22
4	H	303	8PP	C19-C21-C22-C23
5	E	306	NAD	C5B-O5B-PA-O3
5	E	306	NAD	O4D-C1D-N1N-C2N
5	E	306	NAD	O4D-C1D-N1N-C6N
5	E	306	NAD	C2D-C1D-N1N-C2N
5	E	306	NAD	C2N-C3N-C7N-O7N
5	E	306	NAD	C2N-C3N-C7N-N7N
5	F	306	NAD	C5B-O5B-PA-O1A
5	F	306	NAD	C5B-O5B-PA-O2A
5	F	306	NAD	O4D-C4D-C5D-O5D
3	C	401	PEV	O11-C11-O3-C3
3	F	302	PEV	O11-C11-O3-C3
3	G	303	PEV	O11-C11-O3-C3

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Mol	Chain	Res	Type	Atoms
5	E	306	NAD	C4N-C3N-C7N-O7N
5	E	306	NAD	C4N-C3N-C7N-N7N
3	C	401	PEV	C12-C11-O3-C3
3	F	302	PEV	C12-C11-O3-C3
4	B	403	8PP	C32-C33-C34-C35
3	B	402	PEV	O11-C11-O3-C3
3	C	403	PEV	O11-C11-O3-C3
3	H	302	PEV	O11-C11-O3-C3
3	B	402	PEV	O31-C31-O2-C2
3	D	402	PEV	O31-C31-O2-C2
3	G	303	PEV	O31-C31-O2-C2
3	H	301	PEV	O31-C31-O2-C2
3	B	402	PEV	C12-C11-O3-C3
3	H	302	PEV	C12-C11-O3-C3
3	A	402	PEV	C32-C31-O2-C2
4	H	303	8PP	C18-C19-C21-C22
3	H	306	PEV	C15-C16-C17-C18
3	C	403	PEV	C12-C11-O3-C3
3	D	404	PEV	C16-C17-C18-C19
3	G	304	PEV	C21-C22-C23-C24
4	B	403	8PP	C22-C23-C24-C25
4	H	303	8PP	C22-C23-C24-C25
3	E	301	PEV	O31-C31-O2-C2
4	B	403	8PP	C17-C18-C19-C21
4	B	403	8PP	C22-C23-C24-C26
4	H	303	8PP	C22-C23-C24-C26
3	D	402	PEV	O11-C11-O3-C3
3	A	402	PEV	C12-C11-O3-C3
3	E	302	PEV	C12-C11-O3-C3
3	E	304	PEV	C32-C33-C34-C35
3	F	305	PEV	C17-C18-C19-C20
3	E	301	PEV	C32-C31-O2-C2
3	G	301	PEV	C32-C31-O2-C2
3	H	302	PEV	C32-C31-O2-C2
3	C	404	PEV	C22-C23-C24-C25
3	C	405	PEV	C34-C35-C36-C37
3	D	403	PEV	C21-C22-C23-C24
3	D	404	PEV	C14-C15-C16-C17
3	F	304	PEV	C16-C17-C18-C19
3	G	303	PEV	C12-C13-C14-C15
3	H	306	PEV	C18-C19-C20-C21
3	D	402	PEV	C12-C11-O3-C3

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Mol	Chain	Res	Type	Atoms
3	F	302	PEV	C12-C13-C14-C15
3	A	402	PEV	O11-C11-O3-C3
3	G	304	PEV	C18-C19-C20-C21
4	H	303	8PP	C15-C14-C16-C17
4	H	303	8PP	C13-C14-C16-C17
3	E	302	PEV	O11-C11-O3-C3
4	H	303	8PP	C24-C26-C27-C28
3	A	402	PEV	C32-C33-C34-C35
3	C	403	PEV	C32-C33-C34-C35
3	E	305	PEV	C17-C18-C19-C20
3	G	301	PEV	O31-C31-O2-C2
3	H	302	PEV	O31-C31-O2-C2
3	C	405	PEV	C12-C11-O3-C3
4	H	303	8PP	C29-C31-C32-C33
3	B	402	PEV	C11-C12-C13-C14
3	D	402	PEV	C31-C32-C33-C34
3	H	302	PEV	C31-C32-C33-C34
3	G	303	PEV	C11-C12-C13-C14
3	H	304	PEV	C35-C36-C37-C38
5	F	306	NAD	C3D-C4D-C5D-O5D
3	C	401	PEV	C11-C12-C13-C14
3	C	405	PEV	C31-C32-C33-C34
3	E	302	PEV	C11-C12-C13-C14
3	E	304	PEV	C31-C32-C33-C34
3	F	302	PEV	C32-C31-O2-C2
3	A	403	PEV	C19-C20-C21-C22
4	B	403	8PP	C29-C31-C32-C33
4	G	302	8PP	C24-C26-C27-C28
3	G	301	PEV	C12-C13-C14-C15
3	C	405	PEV	O11-C11-O3-C3
3	E	302	PEV	C4-O4P-P-O3P
3	F	302	PEV	O31-C31-O2-C2
3	F	301	PEV	C11-C12-C13-C14
3	H	304	PEV	C31-C32-C33-C34
3	G	305	PEV	C19-C20-C21-C22
3	H	301	PEV	C32-C33-C34-C35
3	F	301	PEV	C31-C32-C33-C34
3	H	306	PEV	C19-C20-C21-C22
3	B	402	PEV	C12-C13-C14-C15
3	G	304	PEV	C20-C21-C22-C23
3	F	303	PEV	C15-C16-C17-C18
3	G	304	PEV	C15-C16-C17-C18

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Mol	Chain	Res	Type	Atoms
3	C	405	PEV	C11-C12-C13-C14
3	F	304	PEV	C19-C20-C21-C22
3	G	303	PEV	C32-C33-C34-C35
3	F	302	PEV	C32-C33-C34-C35
3	B	401	PEV	C18-C19-C20-C21
3	C	402	PEV	C19-C20-C21-C22
3	C	401	PEV	C31-C32-C33-C34
3	D	402	PEV	C11-C12-C13-C14
3	E	304	PEV	C12-C13-C14-C15
3	G	304	PEV	C17-C18-C19-C20
3	A	402	PEV	C12-C13-C14-C15
3	C	402	PEV	C20-C21-C22-C23
3	E	302	PEV	C32-C33-C34-C35
4	E	303	8PP	C30-C29-C31-C32
4	E	303	8PP	C28-C29-C31-C32
3	H	304	PEV	C32-C31-O2-C2
3	B	401	PEV	C16-C17-C18-C19
3	F	301	PEV	C33-C34-C35-C36
3	H	304	PEV	O31-C31-O2-C2
3	E	304	PEV	C36-C37-C38-C39
3	F	304	PEV	C13-C14-C15-C16
3	C	401	PEV	C32-C33-C34-C35
3	E	302	PEV	C33-C34-C35-C36
3	A	401	PEV	C16-C17-C18-C19
3	F	303	PEV	C18-C19-C20-C21
3	C	403	PEV	C12-C13-C14-C15
3	F	301	PEV	O31-C31-O2-C2
3	E	304	PEV	C33-C34-C35-C36
3	G	303	PEV	C14-C15-C16-C17
3	H	306	PEV	C13-C14-C15-C16
3	F	302	PEV	C33-C34-C35-C36
3	C	403	PEV	C31-C32-C33-C34
3	F	305	PEV	C15-C16-C17-C18
4	G	302	8PP	C19-C21-C22-C23
3	C	401	PEV	C32-C31-O2-C2
3	C	405	PEV	C32-C31-O2-C2
3	E	304	PEV	C32-C31-O2-C2
3	F	301	PEV	C32-C31-O2-C2
3	A	401	PEV	C13-C14-C15-C16
3	C	401	PEV	O31-C31-O2-C2
3	C	405	PEV	O31-C31-O2-C2
3	E	304	PEV	O31-C31-O2-C2

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Mol	Chain	Res	Type	Atoms
3	C	402	PEV	C23-C24-C25-C26
3	B	402	PEV	O3P-C1-C2-C3
3	C	403	PEV	O3P-C1-C2-C3
3	C	405	PEV	O3P-C1-C2-C3
3	G	303	PEV	O3P-C1-C2-C3
3	H	304	PEV	C12-C13-C14-C15
3	H	301	PEV	C13-C14-C15-C16
3	B	402	PEV	C1-C2-C3-O3
3	C	403	PEV	C1-C2-C3-O3
3	H	305	PEV	C19-C20-C21-C22
3	C	405	PEV	C13-C14-C15-C16
3	C	402	PEV	C21-C22-C23-C24
3	D	402	PEV	C33-C34-C35-C36
3	D	401	PEV	C20-C21-C22-C23
4	E	303	8PP	C20-C19-C21-C22
3	E	305	PEV	C19-C20-C21-C22
3	E	302	PEV	C31-C32-C33-C34
3	C	404	PEV	C21-C22-C23-C24
3	F	302	PEV	C13-C14-C15-C16
3	H	304	PEV	C14-C15-C16-C17
3	D	401	PEV	C17-C18-C19-C20
3	C	405	PEV	C1-O3P-P-O1P
3	H	304	PEV	C1-O3P-P-O1P
3	A	402	PEV	O3P-C1-C2-O2
3	H	302	PEV	C13-C14-C15-C16
3	A	401	PEV	C12-C13-C14-C15
3	G	305	PEV	C21-C22-C23-C24
3	H	304	PEV	O2-C2-C3-O3
3	C	405	PEV	C36-C37-C38-C39
3	D	402	PEV	C32-C33-C34-C35
3	C	405	PEV	C33-C34-C35-C36
3	A	402	PEV	C13-C14-C15-C16
3	E	302	PEV	C32-C31-O2-C2
3	A	403	PEV	C21-C22-C23-C24
3	D	403	PEV	C23-C24-C25-C26
3	H	301	PEV	O3P-C1-C2-C3
3	H	304	PEV	C34-C35-C36-C37
3	D	403	PEV	C19-C20-C21-C22
3	F	305	PEV	C16-C17-C18-C19
3	E	301	PEV	C12-C11-O3-C3
3	C	405	PEV	C12-C13-C14-C15
3	A	401	PEV	C11-C12-C13-C14

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Mol	Chain	Res	Type	Atoms
4	E	303	8PP	C18-C19-C21-C22
3	H	305	PEV	C17-C18-C19-C20
3	C	405	PEV	O3P-C1-C2-O2
3	E	302	PEV	O3P-C1-C2-O2
3	G	303	PEV	O3P-C1-C2-O2
3	H	302	PEV	O3P-C1-C2-O2
3	B	402	PEV	O2-C2-C3-O3
3	C	404	PEV	C20-C21-C22-C23
3	H	306	PEV	C14-C15-C16-C17
3	B	402	PEV	C2-C1-O3P-P
5	F	306	NAD	C4B-C5B-O5B-PA
3	E	302	PEV	O31-C31-O2-C2
3	D	403	PEV	C18-C19-C20-C21
3	D	402	PEV	O3P-C1-C2-C3
3	E	301	PEV	C12-C13-C14-C15
3	C	405	PEV	C1-O3P-P-O4P
3	E	304	PEV	C1-O3P-P-O4P
3	G	301	PEV	C3-C2-O2-C31
3	F	305	PEV	C18-C19-C20-C21
3	C	401	PEV	C12-C13-C14-C15
5	E	306	NAD	C4B-C5B-O5B-PA
3	C	401	PEV	O3P-C1-C2-O2
3	D	402	PEV	O3P-C1-C2-O2
3	H	301	PEV	O3P-C1-C2-O2
3	C	404	PEV	C17-C18-C19-C20
3	E	301	PEV	O11-C11-O3-C3
3	D	402	PEV	O2-C2-C3-O3
3	E	304	PEV	O2-C2-C3-O3
3	H	302	PEV	O2-C2-C3-O3
3	H	305	PEV	C18-C19-C20-C21
3	H	302	PEV	C12-C13-C14-C15
4	E	303	8PP	C2-C7-C8-C9
5	E	306	NAD	C4D-C5D-O5D-PN
3	G	304	PEV	C19-C20-C21-C22
5	E	306	NAD	C5B-O5B-PA-O1A
3	A	402	PEV	O3P-C1-C2-C3
3	C	401	PEV	O3P-C1-C2-C3
3	E	302	PEV	O3P-C1-C2-C3
3	F	301	PEV	O3P-C1-C2-C3
3	E	304	PEV	C13-C14-C15-C16
3	F	301	PEV	O4P-C4-C5-N6
3	E	301	PEV	C32-C33-C34-C35

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Mol	Chain	Res	Type	Atoms
3	G	303	PEV	C33-C34-C35-C36
3	A	403	PEV	C18-C19-C20-C21
4	E	303	8PP	C25-C24-C26-C27
3	C	403	PEV	O3P-C1-C2-O2
3	F	301	PEV	O3P-C1-C2-O2
3	G	304	PEV	C16-C17-C18-C19
3	D	402	PEV	C1-C2-C3-O3
3	H	301	PEV	C1-C2-C3-O3
3	H	304	PEV	C1-C2-C3-O3
3	C	401	PEV	O2-C2-C3-O3
3	F	302	PEV	O2-C2-C3-O3
3	H	301	PEV	O2-C2-C3-O3
3	H	306	PEV	C12-C13-C14-C15
3	E	305	PEV	C18-C19-C20-C21
3	D	404	PEV	C13-C14-C15-C16
3	D	404	PEV	C22-C23-C24-C25
4	B	403	8PP	C25-C24-C26-C27
3	G	305	PEV	C18-C19-C20-C21
4	H	303	8PP	C9-C11-C12-C13
3	A	403	PEV	C16-C17-C18-C19
3	E	302	PEV	C1-O3P-P-O4P
3	H	302	PEV	C4-O4P-P-O3P
3	C	401	PEV	C1-C2-C3-O3
3	F	302	PEV	C1-C2-C3-O3
3	G	301	PEV	C1-C2-C3-O3
3	H	302	PEV	C1-C2-C3-O3
5	F	306	NAD	PA-O3-PN-O1N
5	F	306	NAD	PA-O3-PN-O2N
3	C	401	PEV	C2-C1-O3P-P
4	B	403	8PP	C2-C7-C8-C9
4	G	302	8PP	C2-C7-C8-C9
3	H	301	PEV	C31-C32-C33-C34
3	C	402	PEV	C22-C23-C24-C25
3	H	301	PEV	C11-C12-C13-C14
3	E	302	PEV	C12-C13-C14-C15
3	H	306	PEV	C16-C17-C18-C19
3	C	404	PEV	C19-C20-C21-C22
3	G	304	PEV	C23-C24-C25-C26
3	D	404	PEV	C19-C20-C21-C22
4	B	403	8PP	C23-C24-C26-C27
4	H	303	8PP	C28-C29-C31-C32
3	G	305	PEV	C20-C21-C22-C23

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Mol	Chain	Res	Type	Atoms
3	H	302	PEV	O3P-C1-C2-C3
3	A	403	PEV	C20-C21-C22-C23
3	C	403	PEV	O2-C2-C3-O3
3	C	403	PEV	C1-O3P-P-O4P
3	C	401	PEV	O3-C11-C12-C13
3	C	405	PEV	C14-C15-C16-C17
4	H	303	8PP	C30-C29-C31-C32
3	C	404	PEV	C23-C24-C25-C26
3	C	401	PEV	O2-C31-C32-C33
3	E	304	PEV	O2-C31-C32-C33
3	E	304	PEV	O3P-C1-C2-C3
3	A	402	PEV	O2-C2-C3-O3
5	E	306	NAD	C2D-C1D-N1N-C6N
5	F	306	NAD	C5B-O5B-PA-O3
3	E	301	PEV	O3-C11-C12-C13
3	B	402	PEV	C32-C33-C34-C35
4	E	303	8PP	C23-C24-C26-C27
3	C	402	PEV	C18-C19-C20-C21
3	C	401	PEV	C33-C34-C35-C36
3	A	402	PEV	C1-C2-C3-O3
3	E	304	PEV	C1-C2-C3-O3
3	C	401	PEV	O11-C11-C12-C13
3	C	401	PEV	O31-C31-C32-C33
3	E	301	PEV	O11-C11-C12-C13
3	D	402	PEV	C2-C3-O3-C11
3	E	301	PEV	O2-C31-C32-C33
3	G	301	PEV	C33-C34-C35-C36
3	A	402	PEV	O2-C31-C32-C33
3	C	403	PEV	O2-C31-C32-C33
3	A	402	PEV	O3-C11-C12-C13

There are no ring outliers.

21 monomers are involved in 30 short contacts:

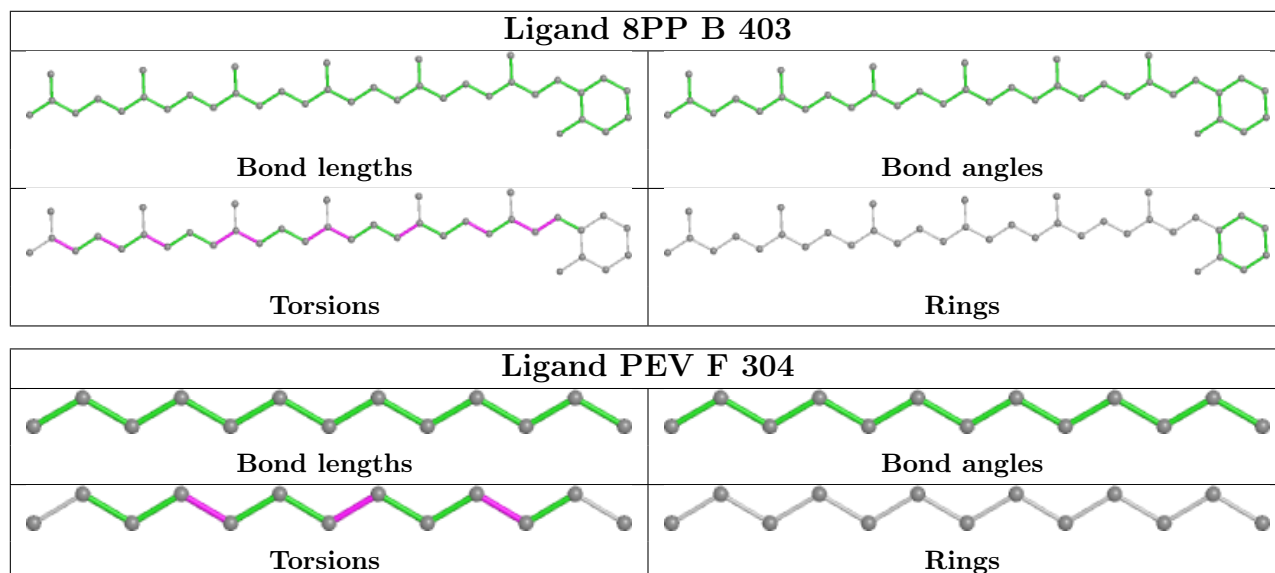
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	403	8PP	1	0
5	E	306	NAD	1	0
3	H	302	PEV	3	0
3	F	303	PEV	1	0
3	E	302	PEV	2	0
3	G	303	PEV	1	0
3	D	404	PEV	1	0

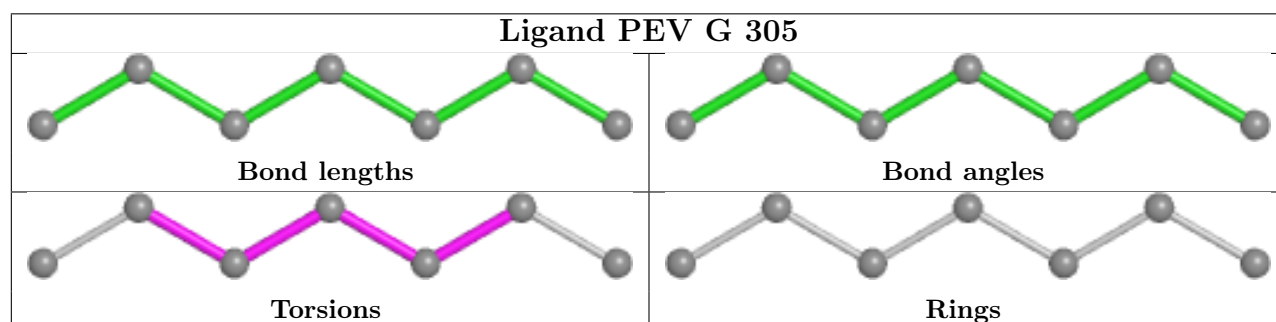
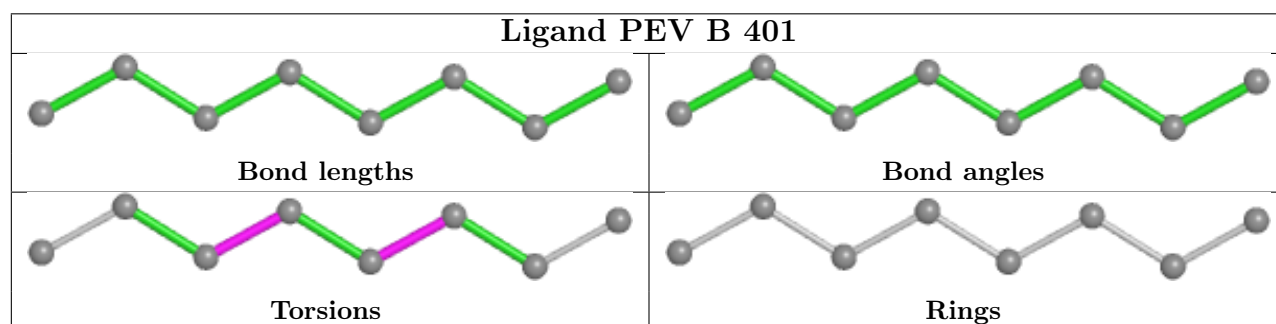
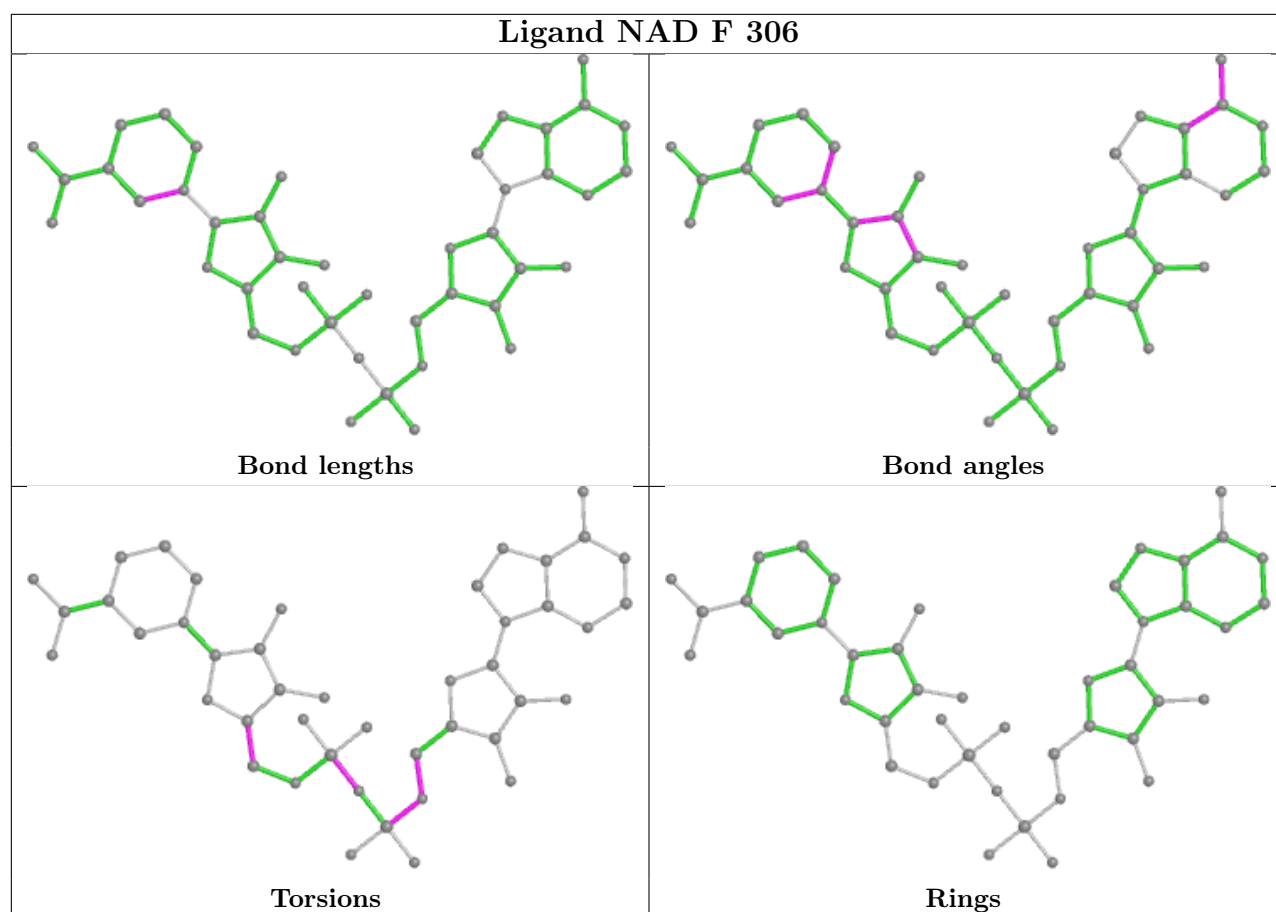
*Continued on next page...*

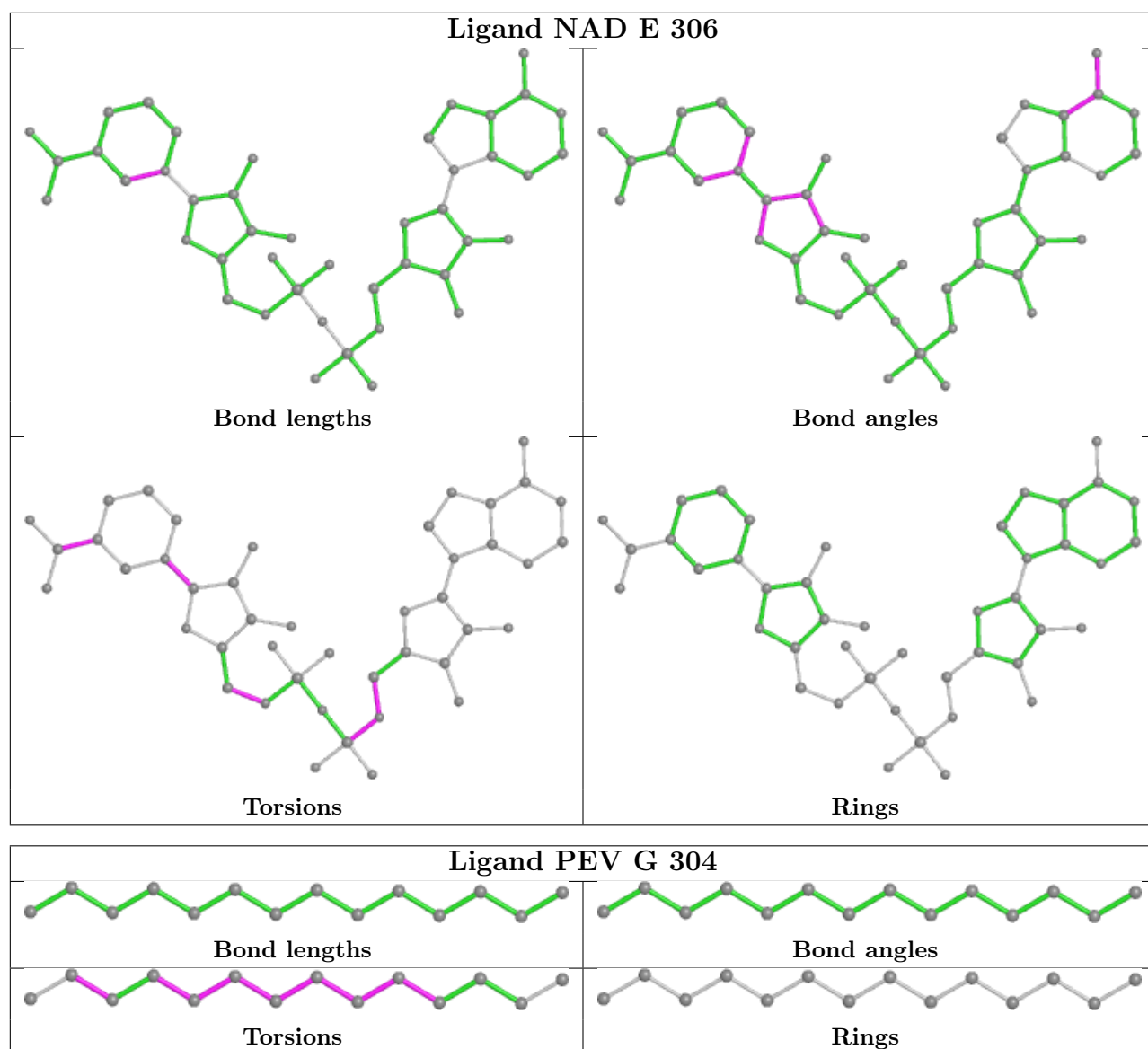
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Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	F	302	PEV	2	0
3	H	306	PEV	2	0
3	H	305	PEV	1	0
3	A	401	PEV	1	0
4	G	302	8PP	1	0
4	E	303	8PP	2	0
3	C	404	PEV	1	0
3	C	405	PEV	1	0
4	H	303	8PP	5	0
3	E	301	PEV	2	0
3	E	304	PEV	1	0
3	D	402	PEV	1	0
3	H	304	PEV	1	0
3	F	305	PEV	2	0

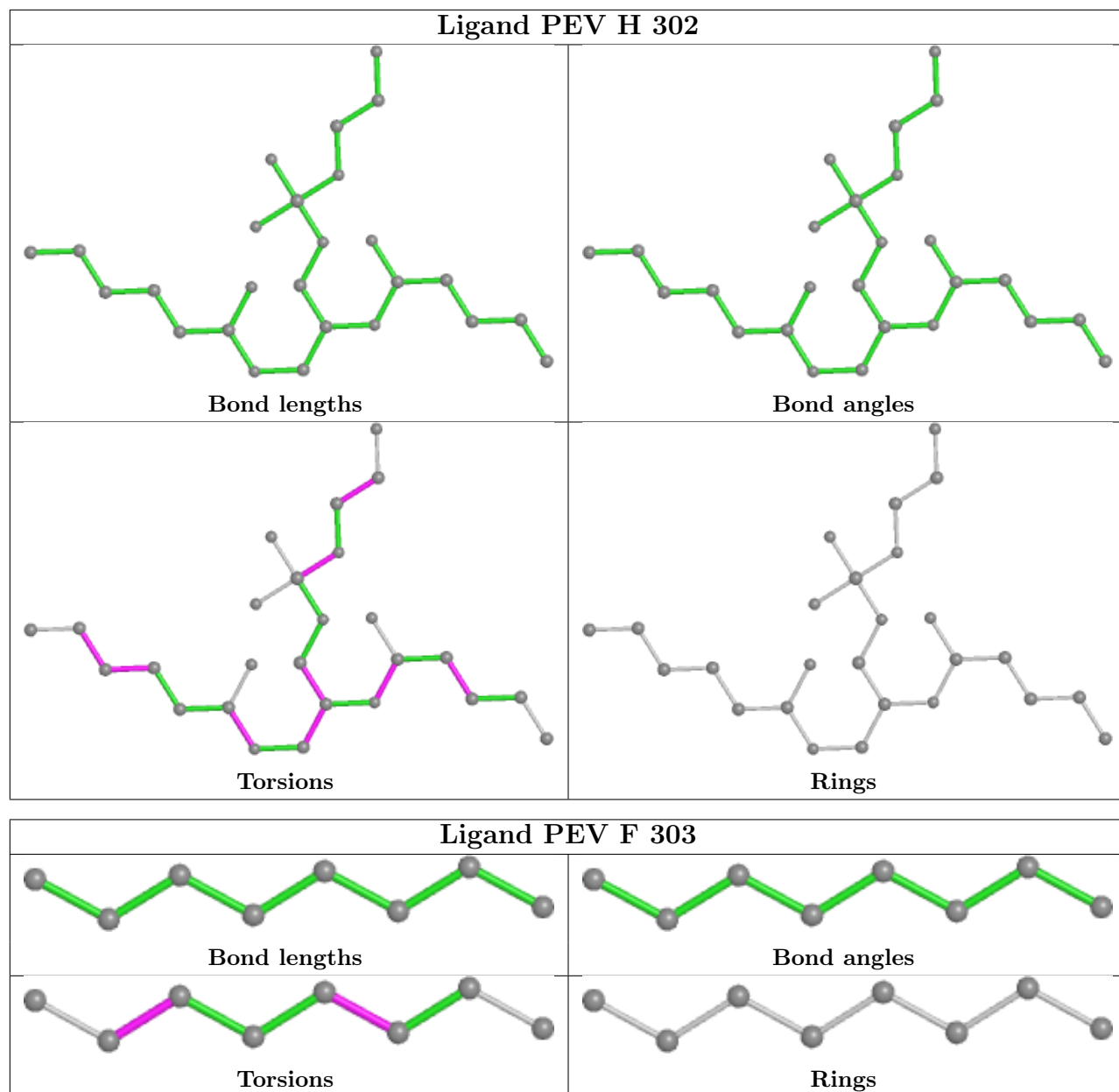
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

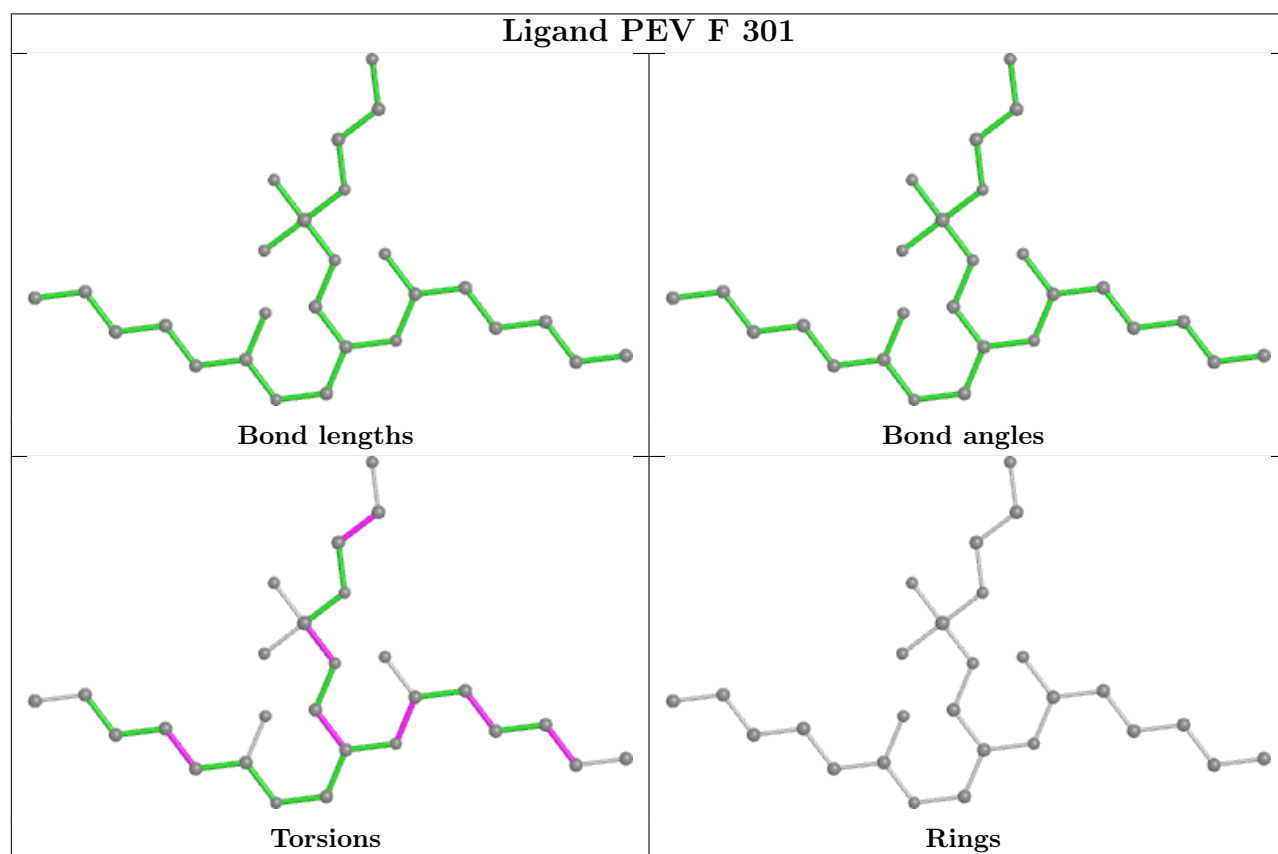
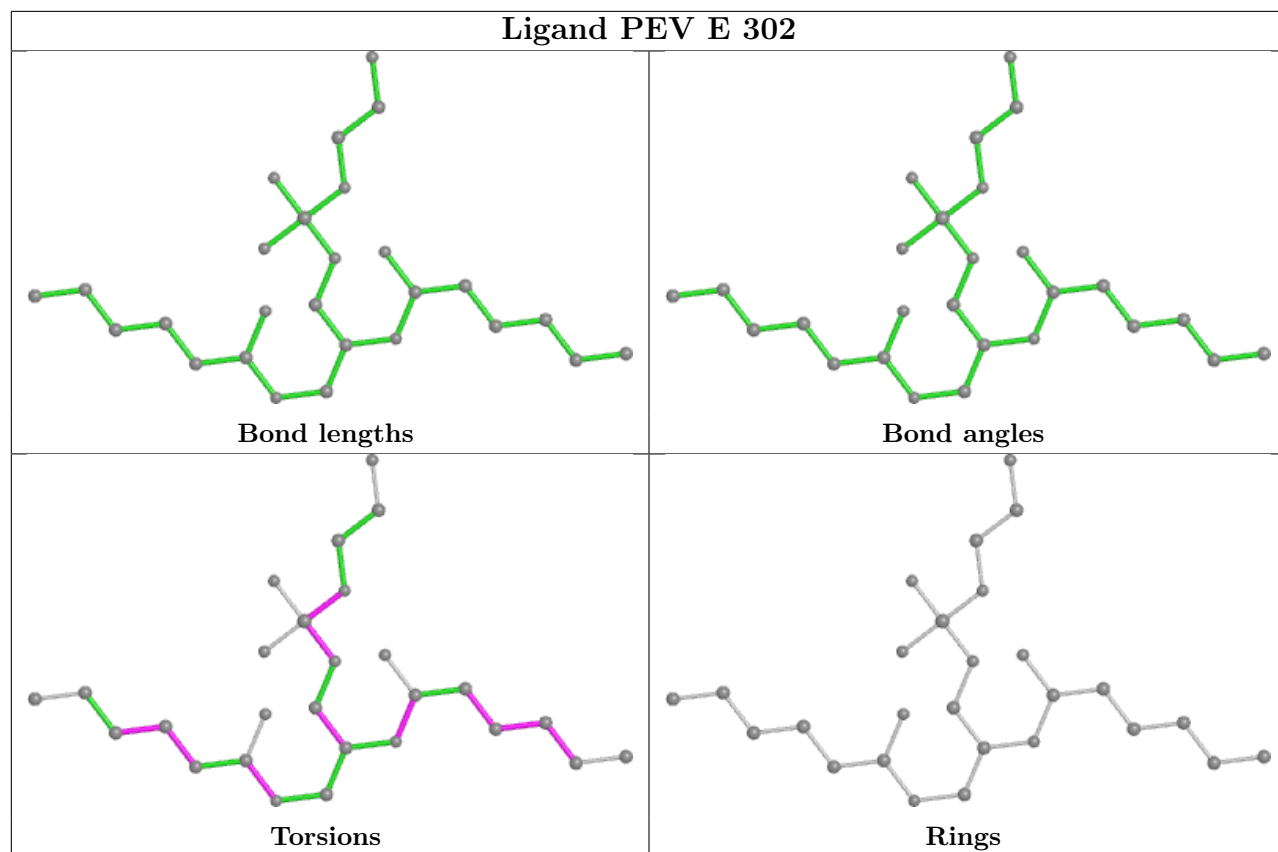


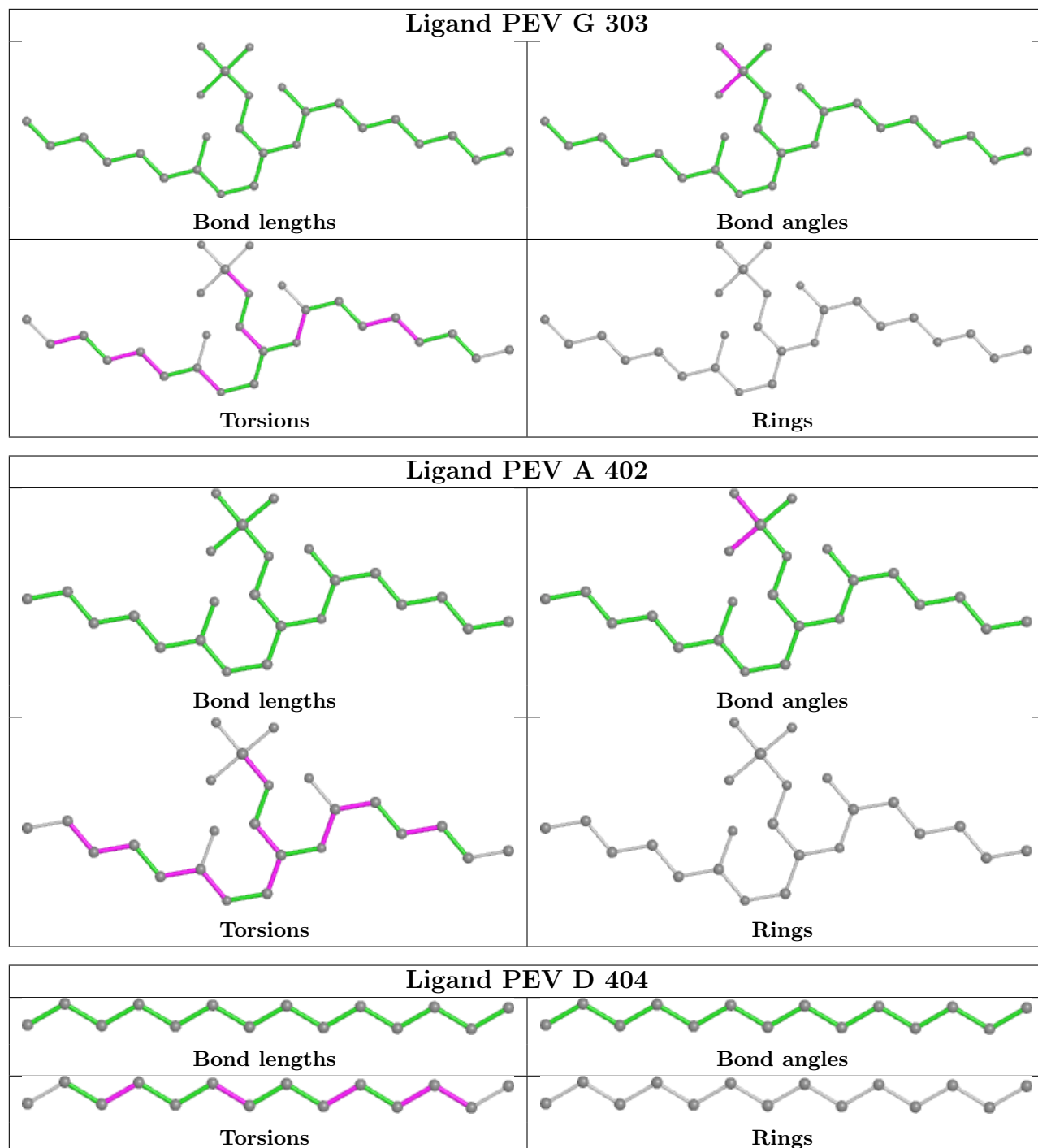


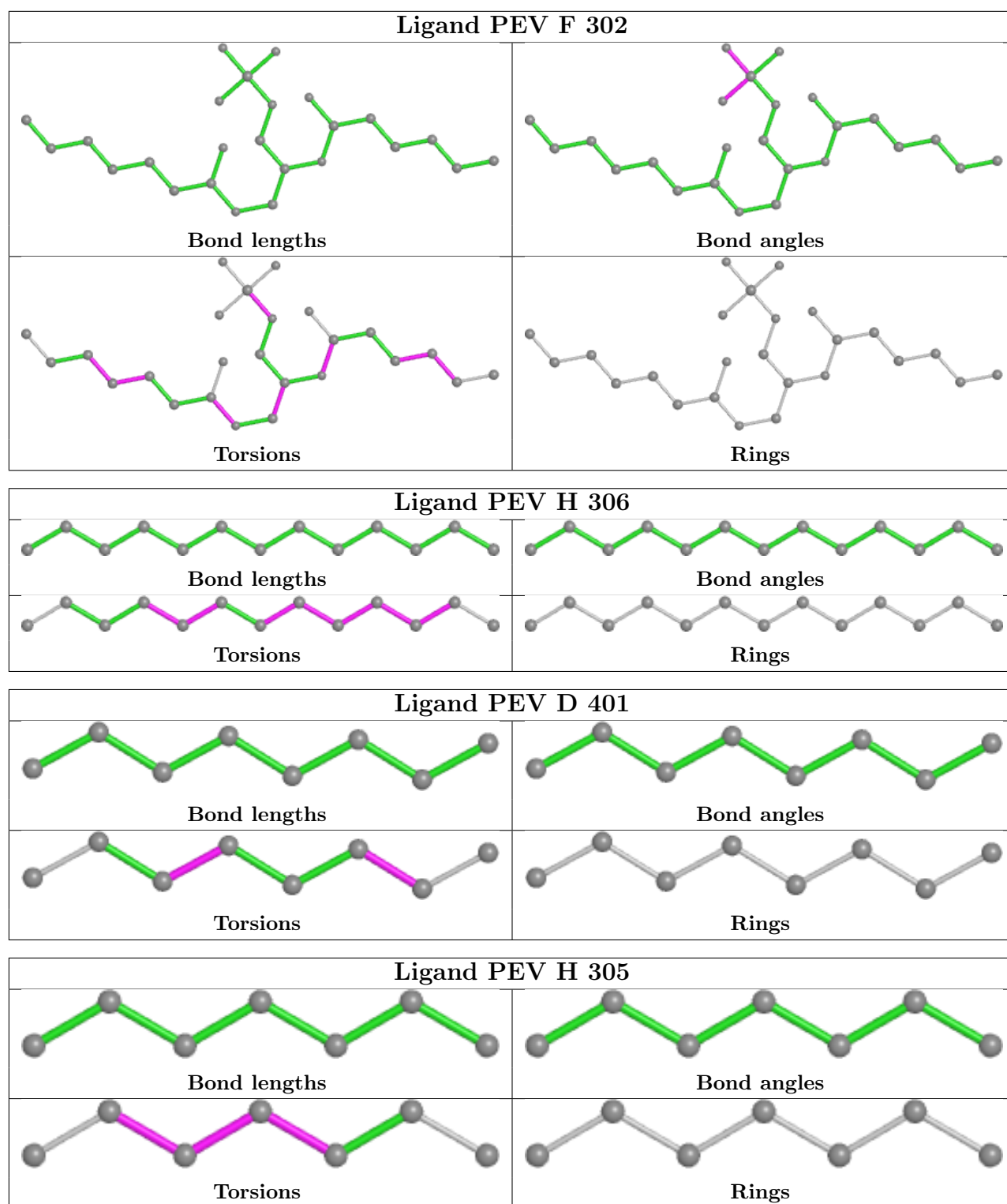


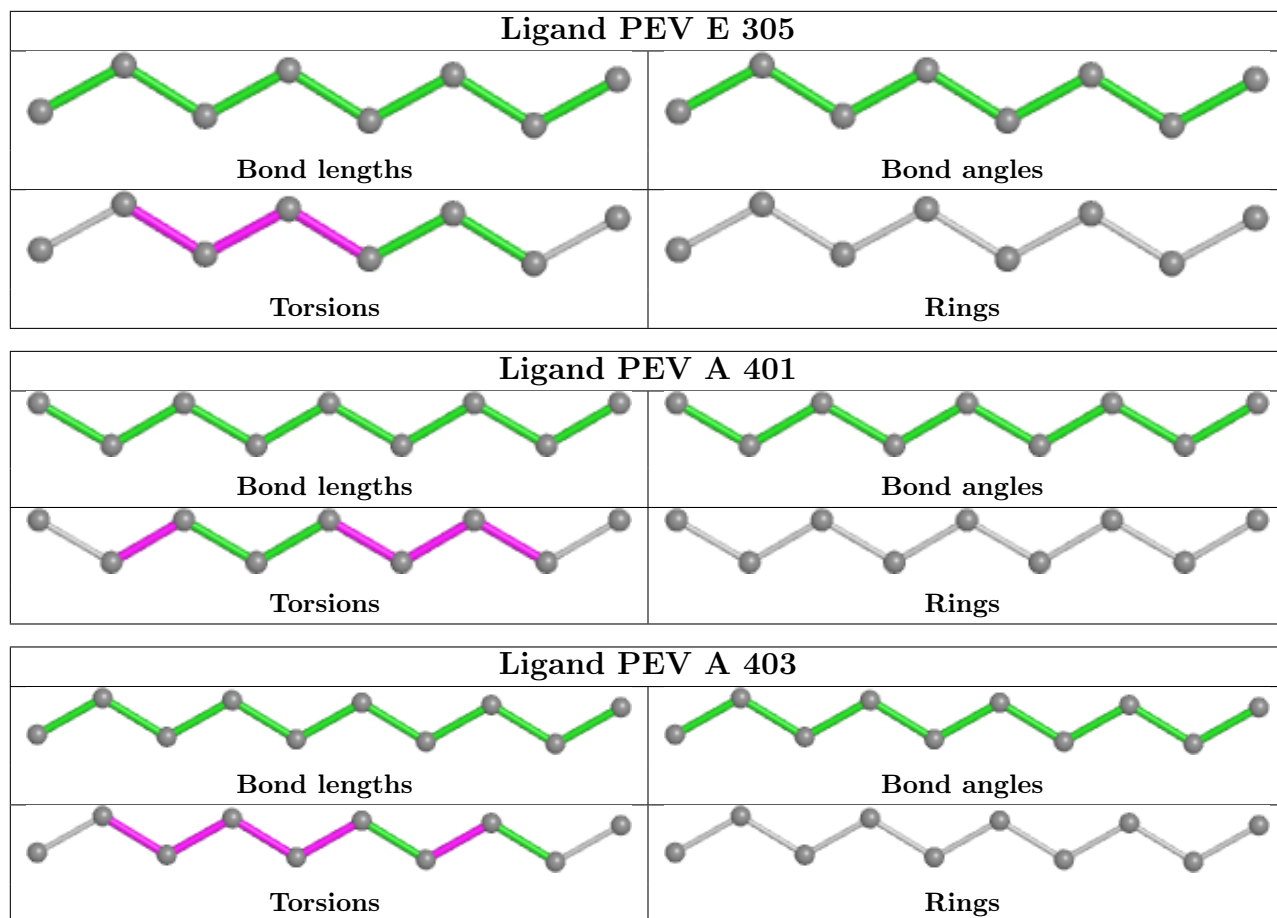


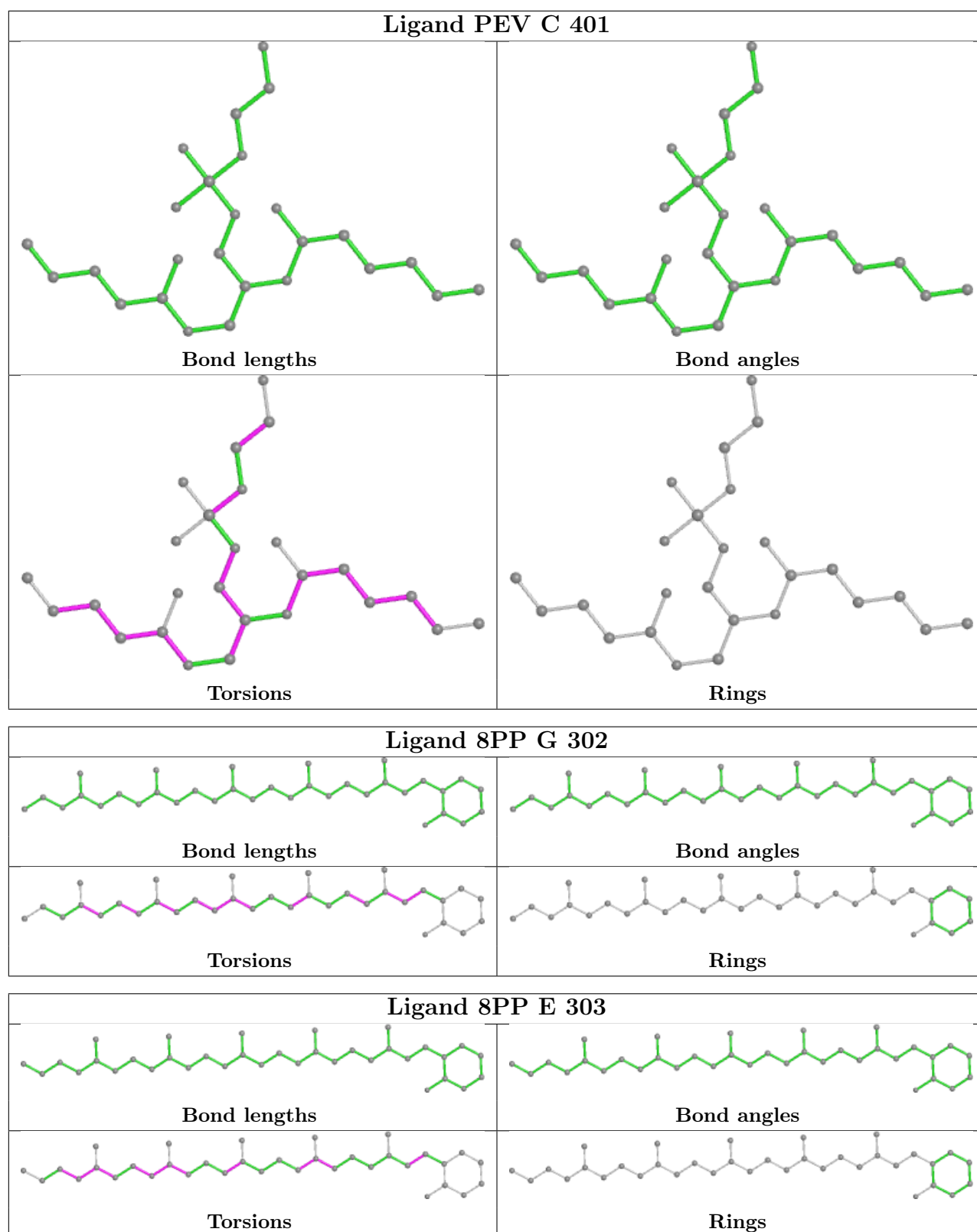


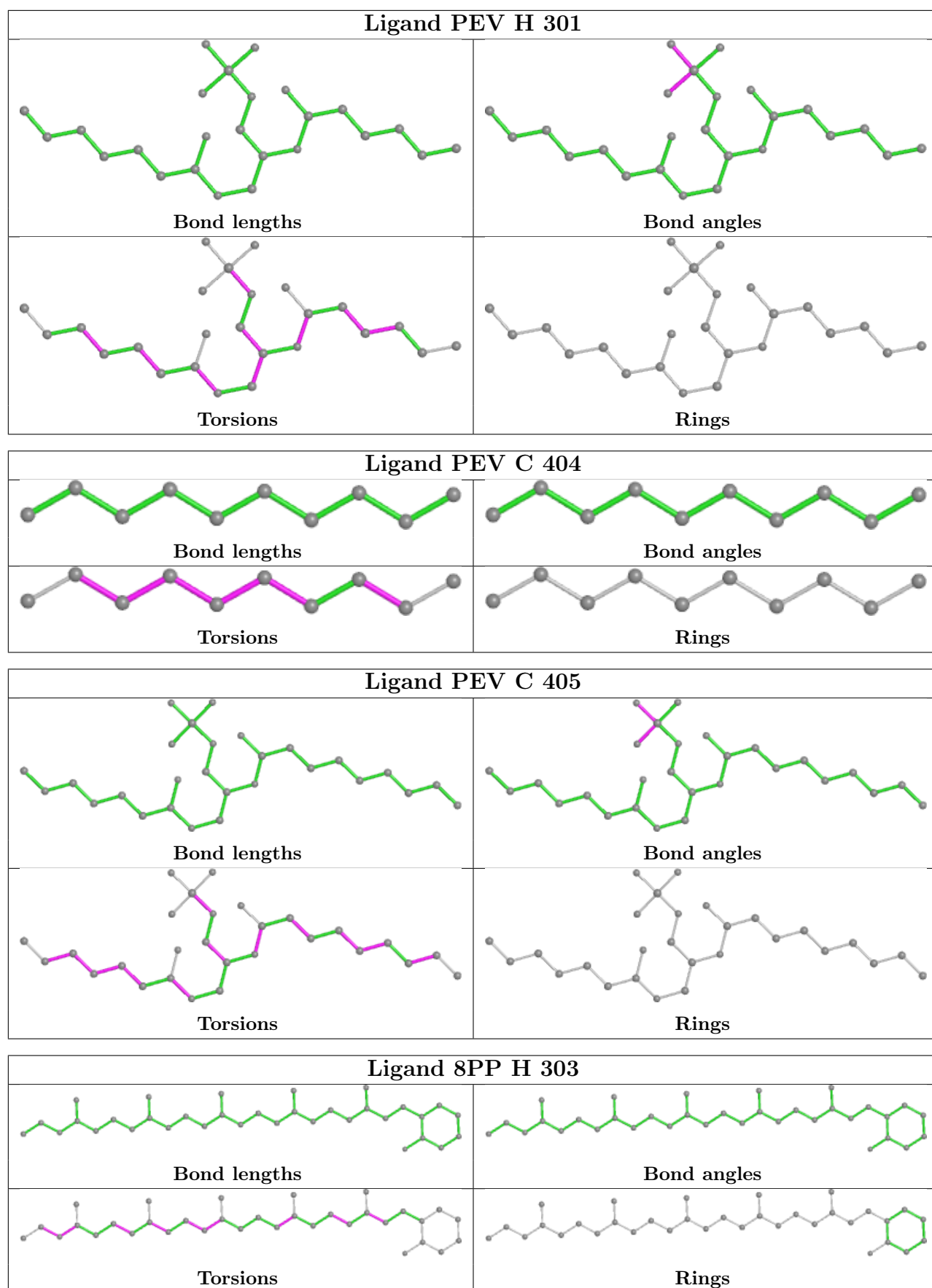


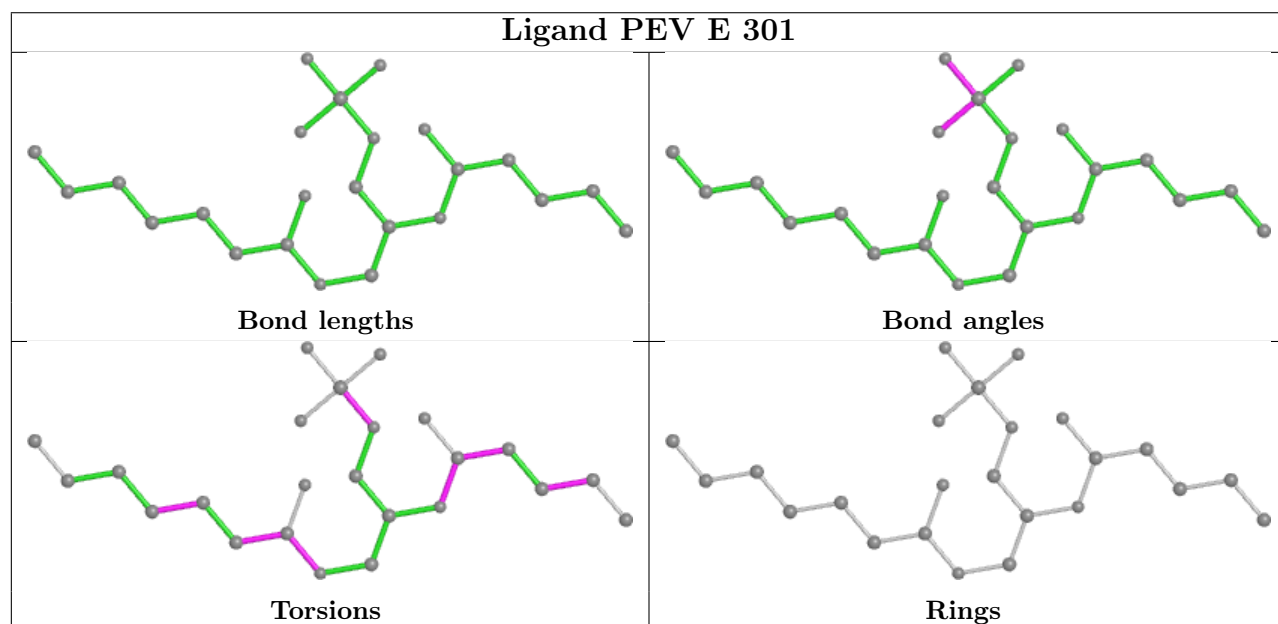
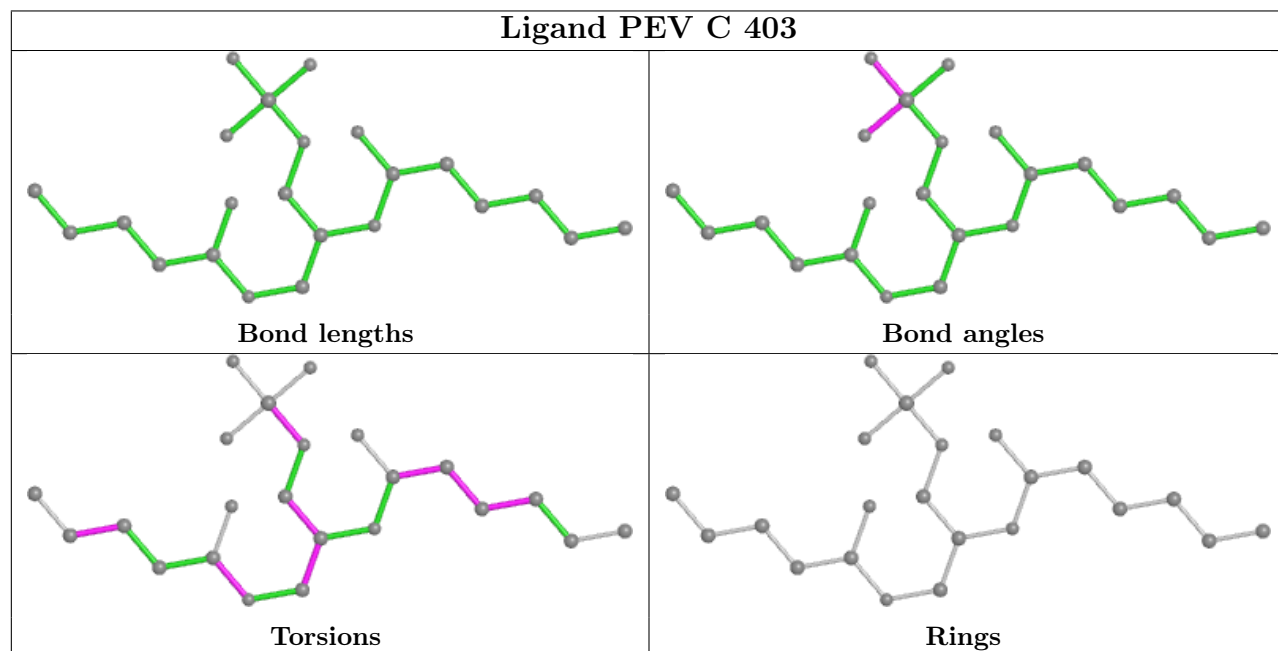
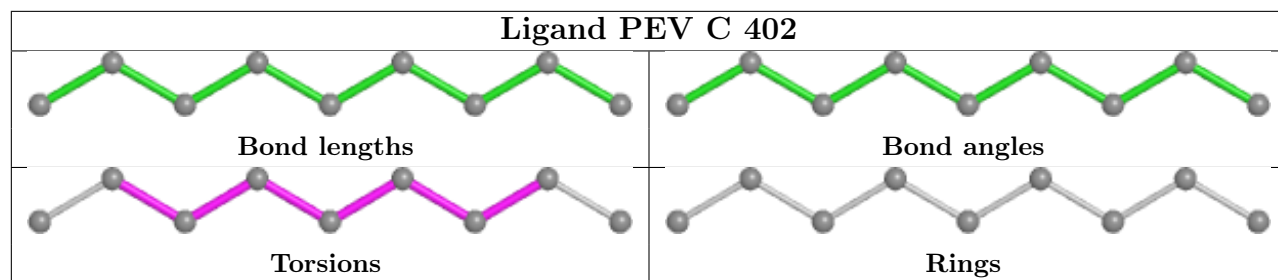




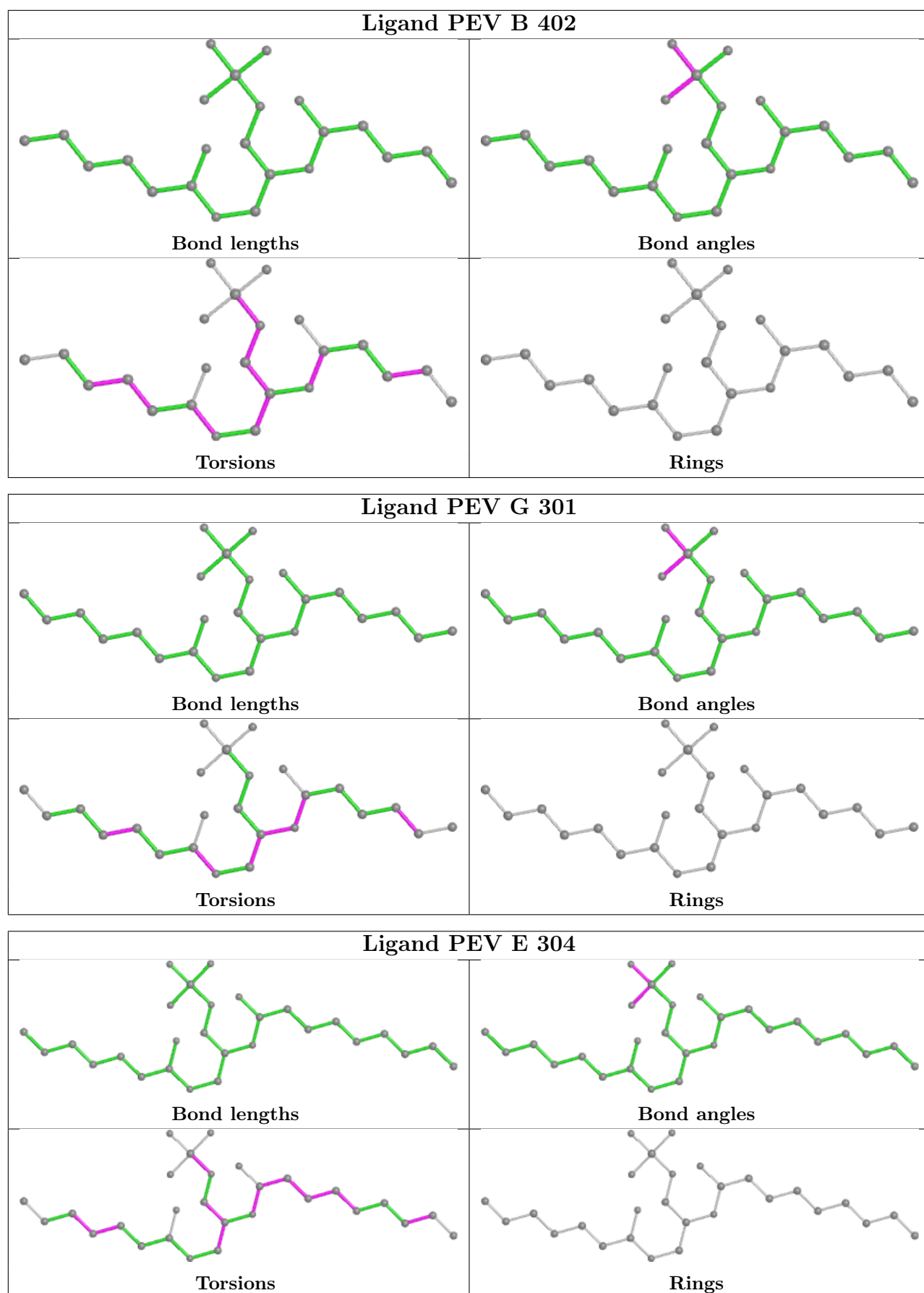


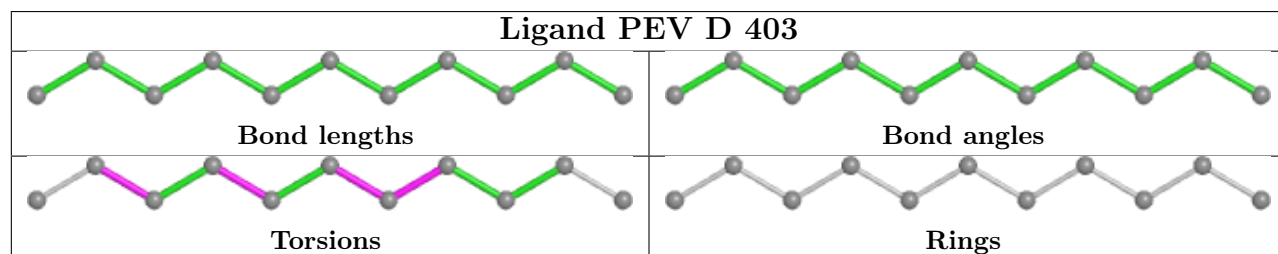
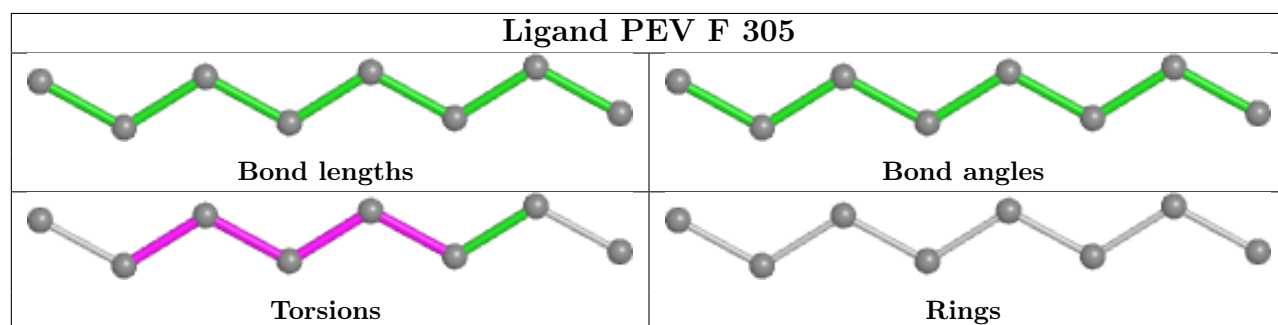
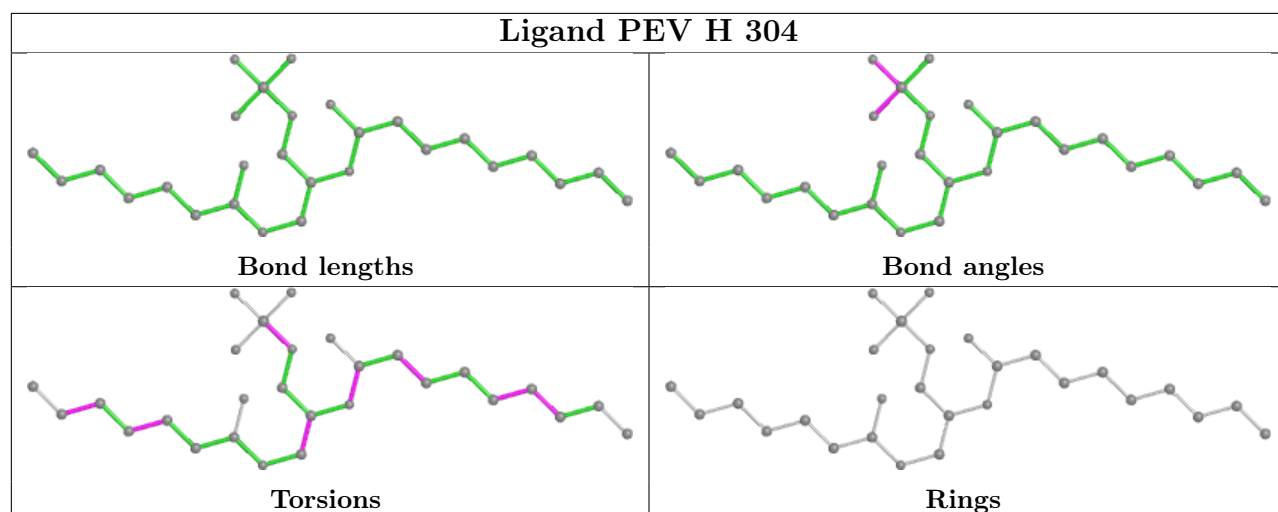
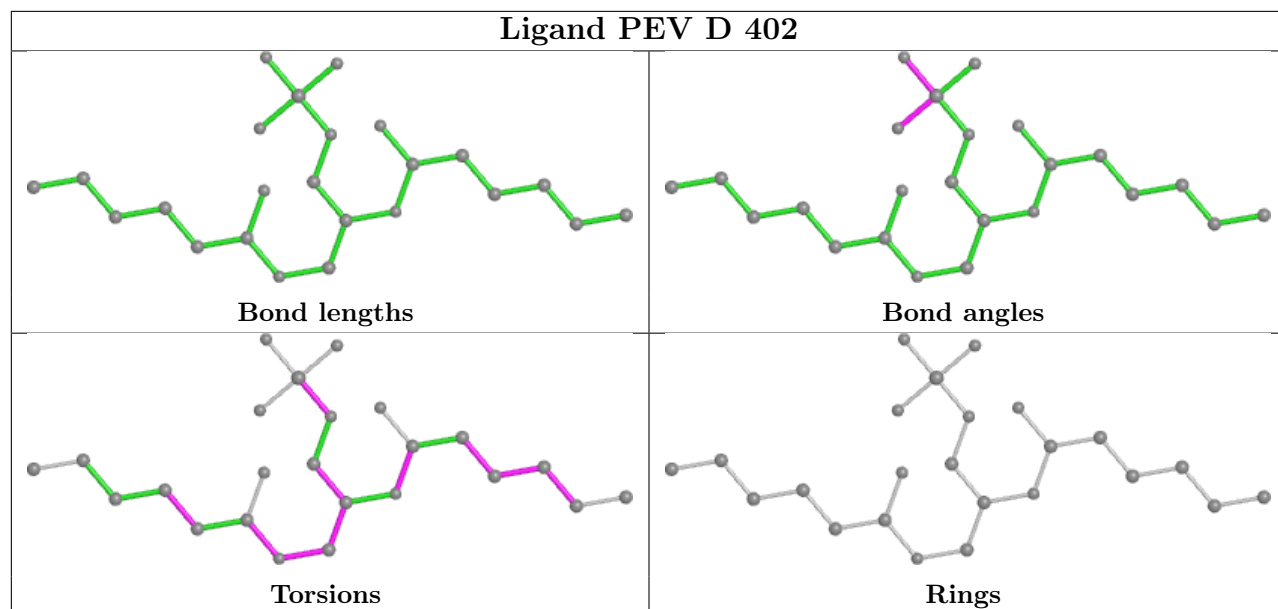












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

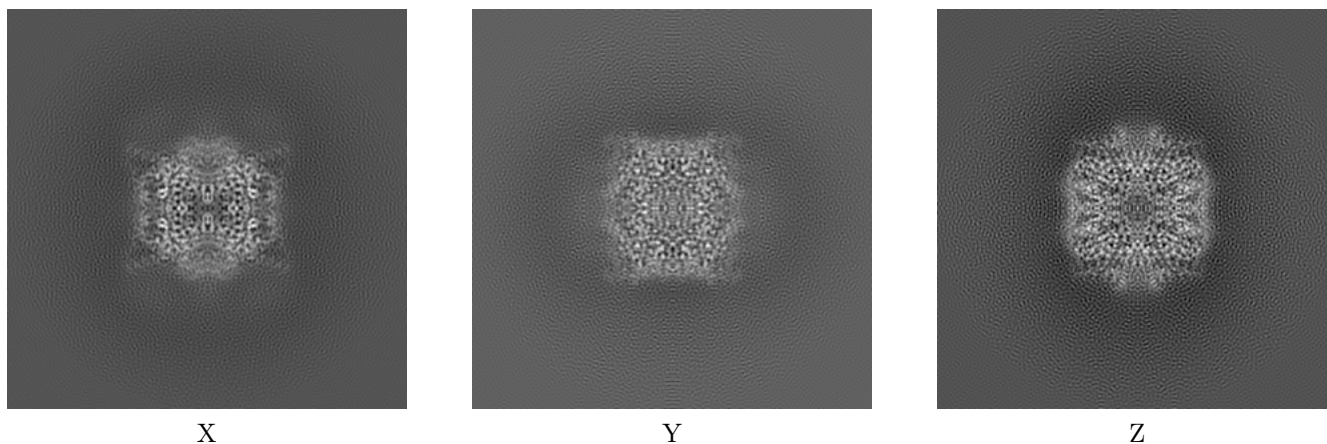
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-25413. These allow visual inspection of the internal detail of the map and identification of artifacts.

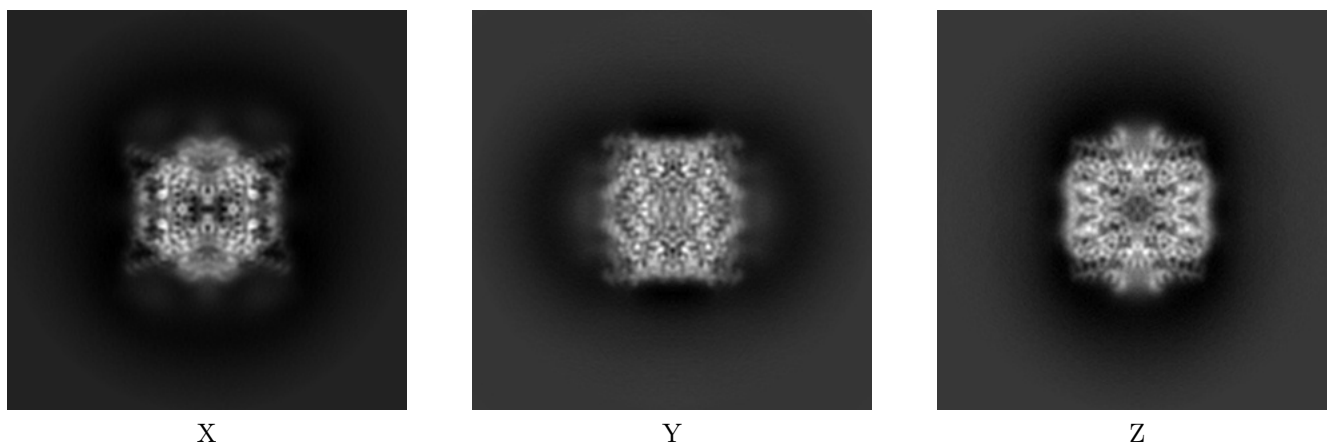
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

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

#### 6.1.1 Primary map



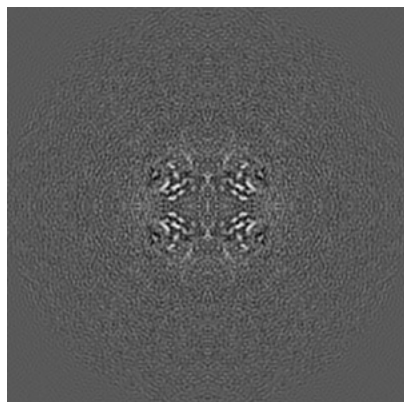
#### 6.1.2 Raw map



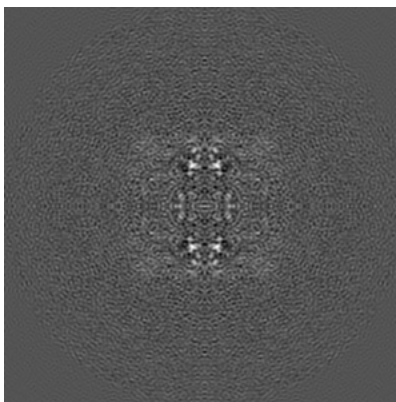
The images above show the map projected in three orthogonal directions.

## 6.2 Central slices [i](#)

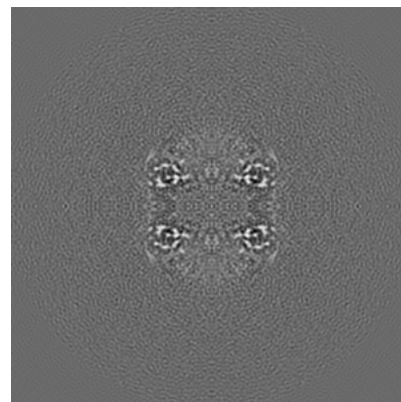
### 6.2.1 Primary map



X Index: 128

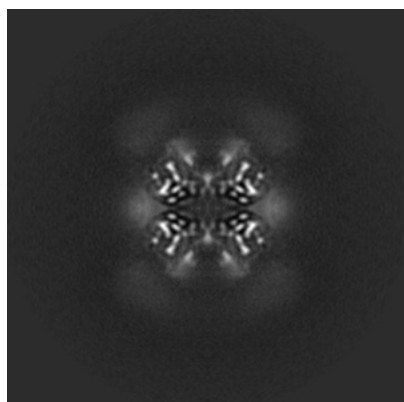


Y Index: 128

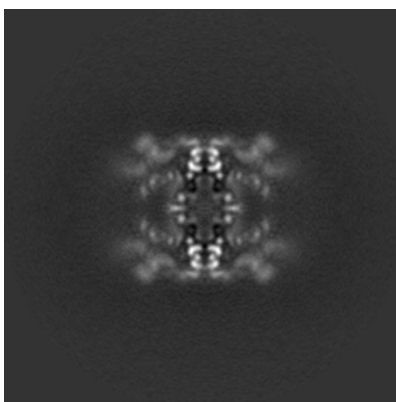


Z Index: 128

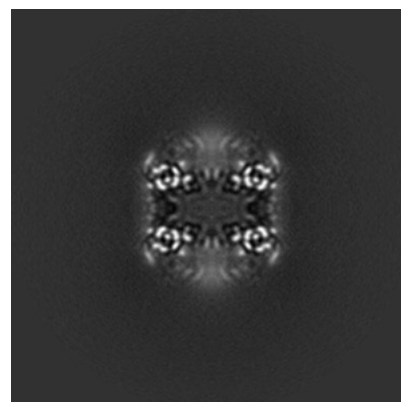
### 6.2.2 Raw map



X Index: 128



Y Index: 128

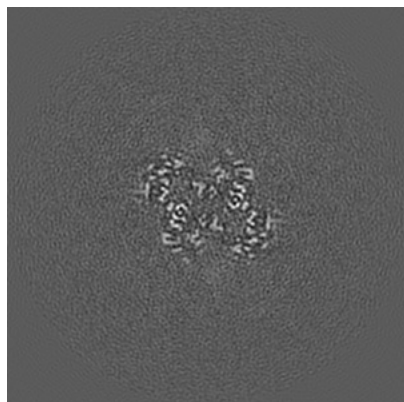


Z Index: 128

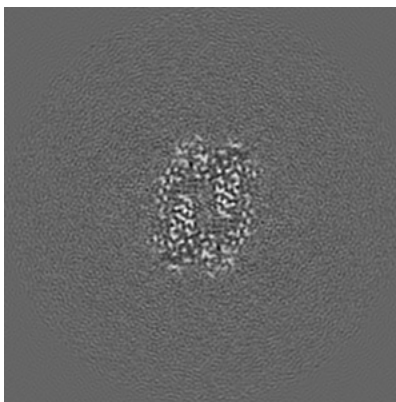
The images above show central slices of the map in three orthogonal directions.

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

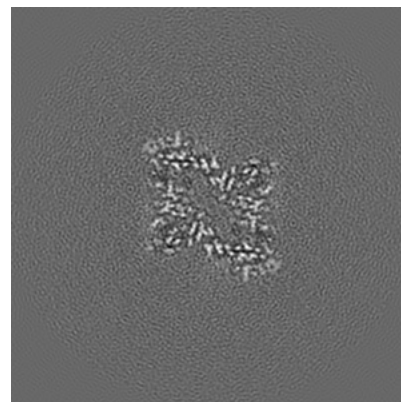
### 6.3.1 Primary map



X Index: 105

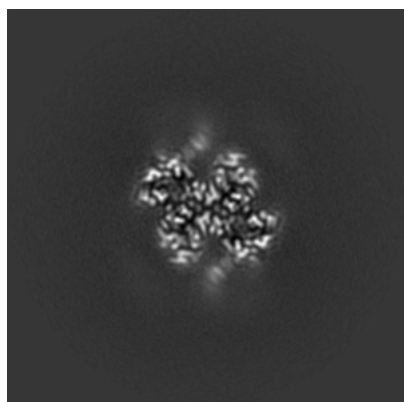


Y Index: 154

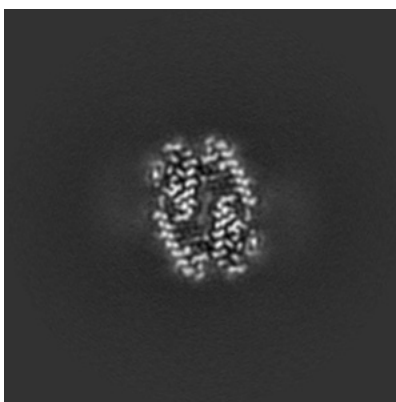


Z Index: 119

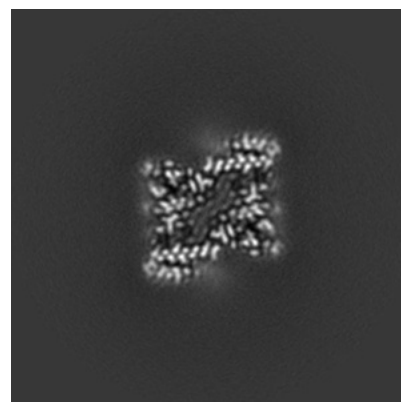
### 6.3.2 Raw map



X Index: 103



Y Index: 101

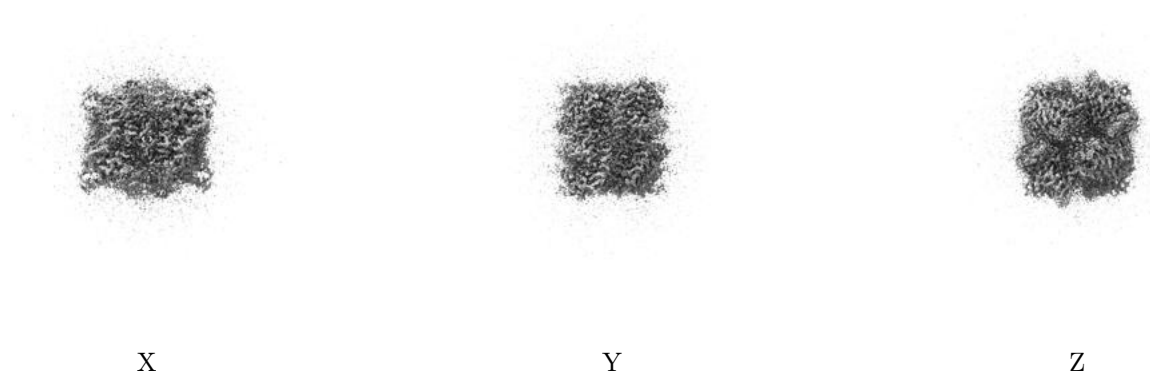


Z Index: 137

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

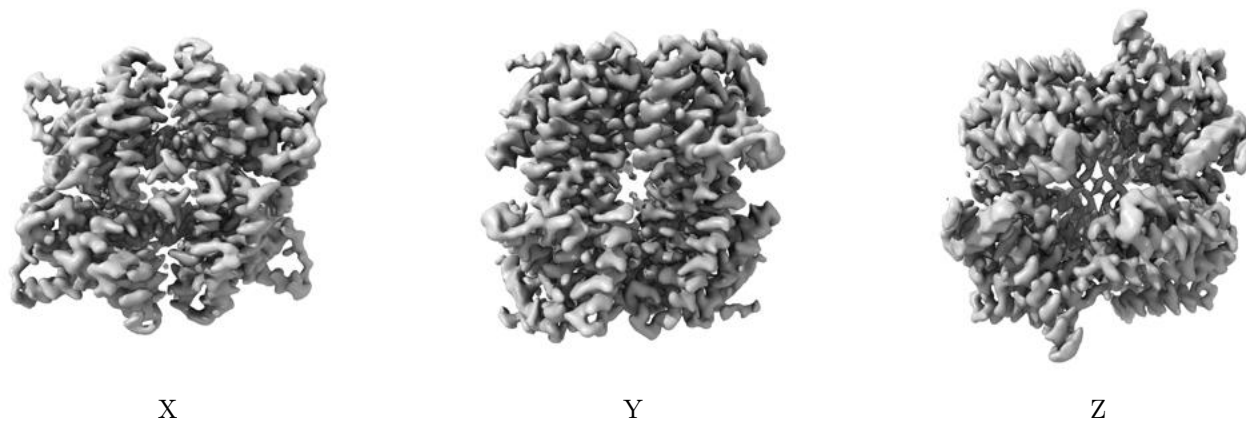
## 6.4 Orthogonal surface views [i](#)

### 6.4.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.035. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

### 6.4.2 Raw map



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

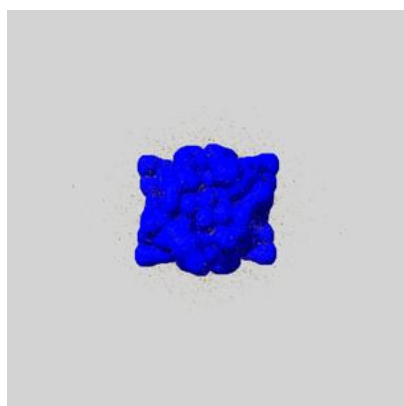
## 6.5 Mask visualisation [i](#)

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

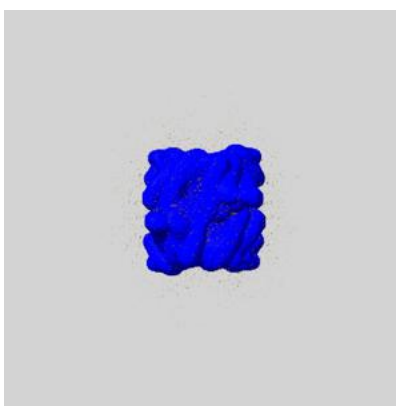
A mask typically either:

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

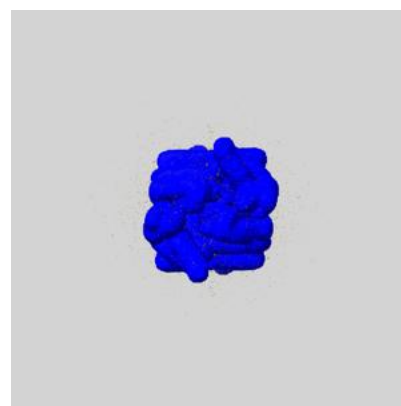
### 6.5.1 emd\_25413\_msk\_1.map [i](#)



X



Y



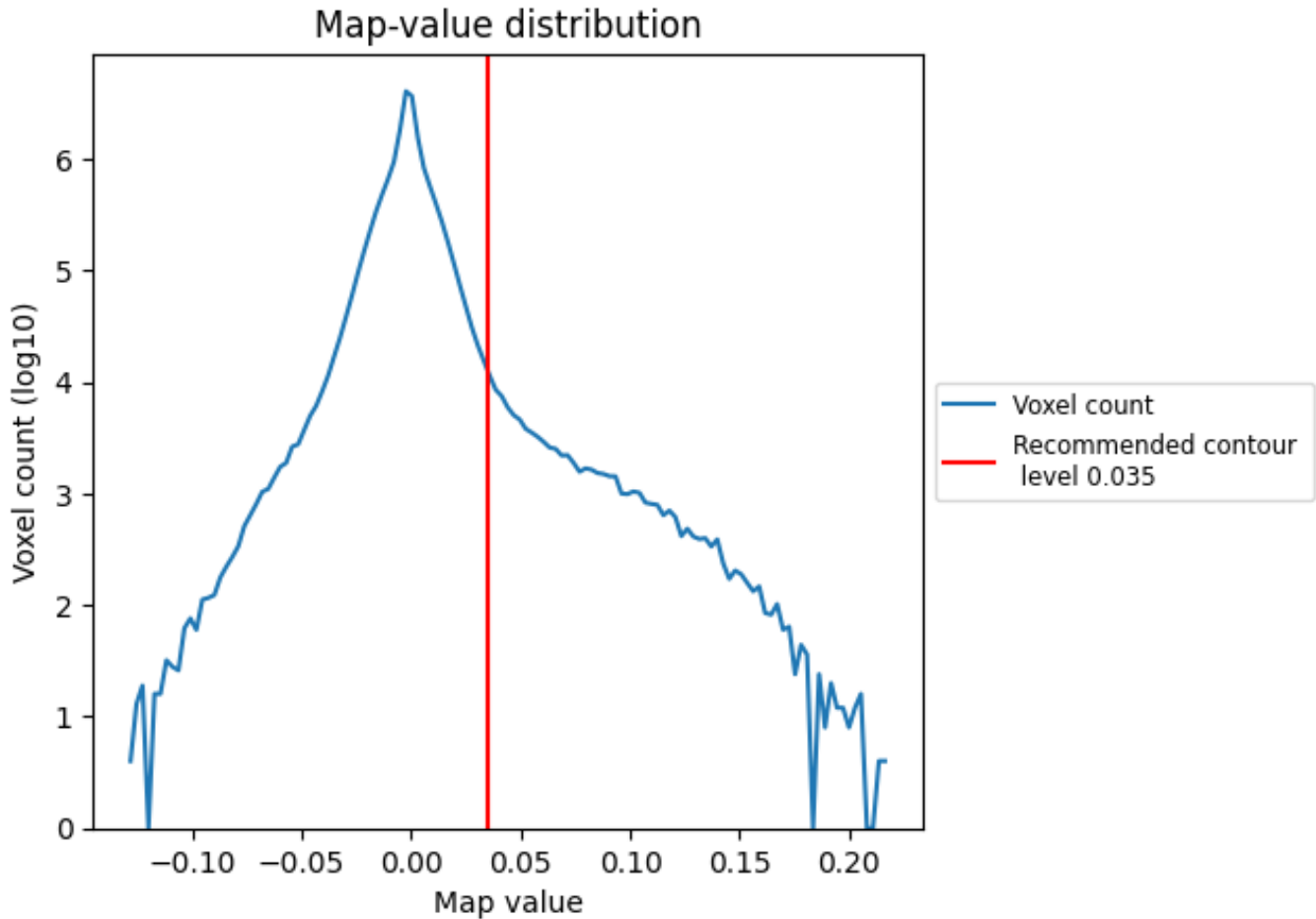
Z



## 7 Map analysis [i](#)

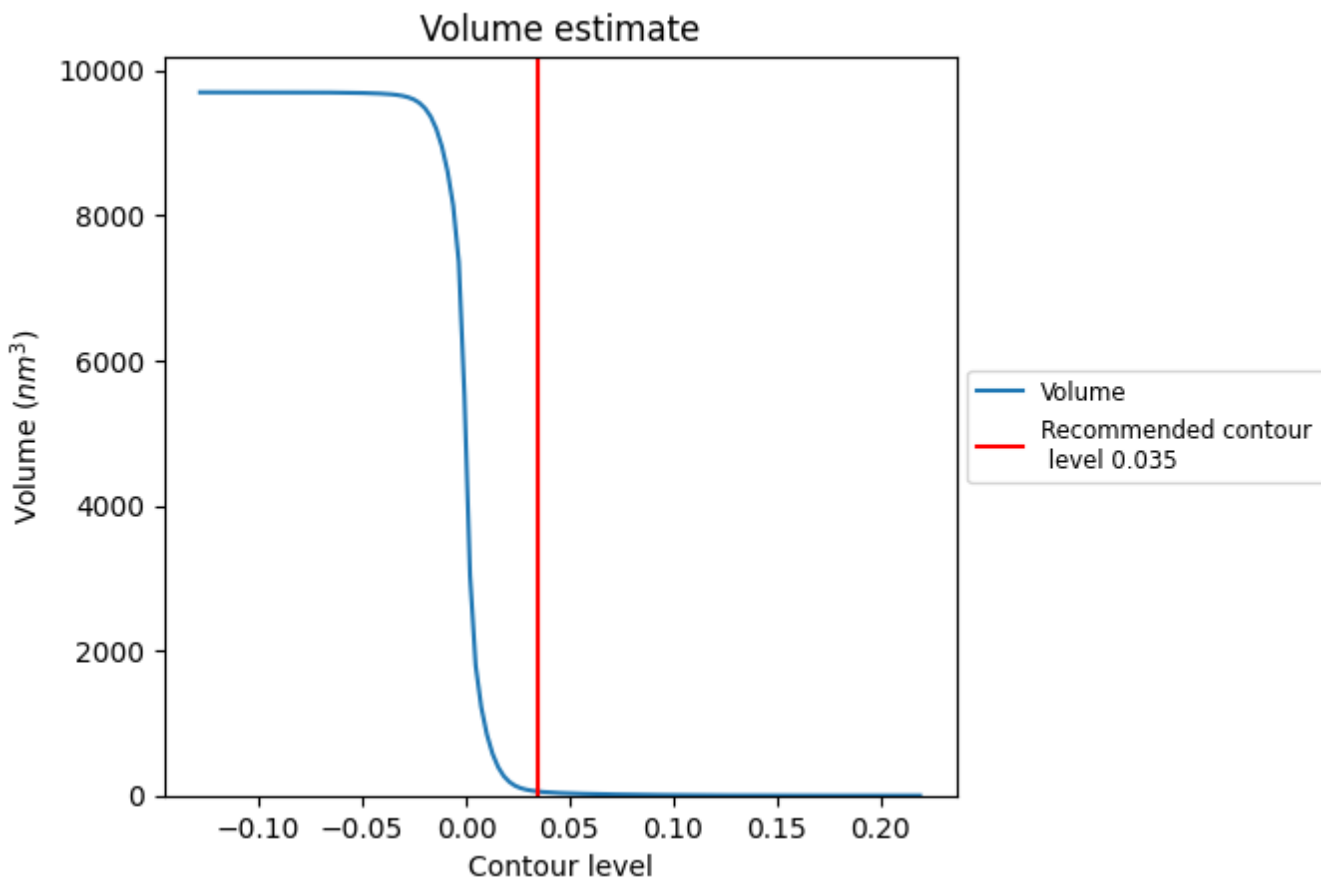
This section contains the results of statistical analysis of the map.

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



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

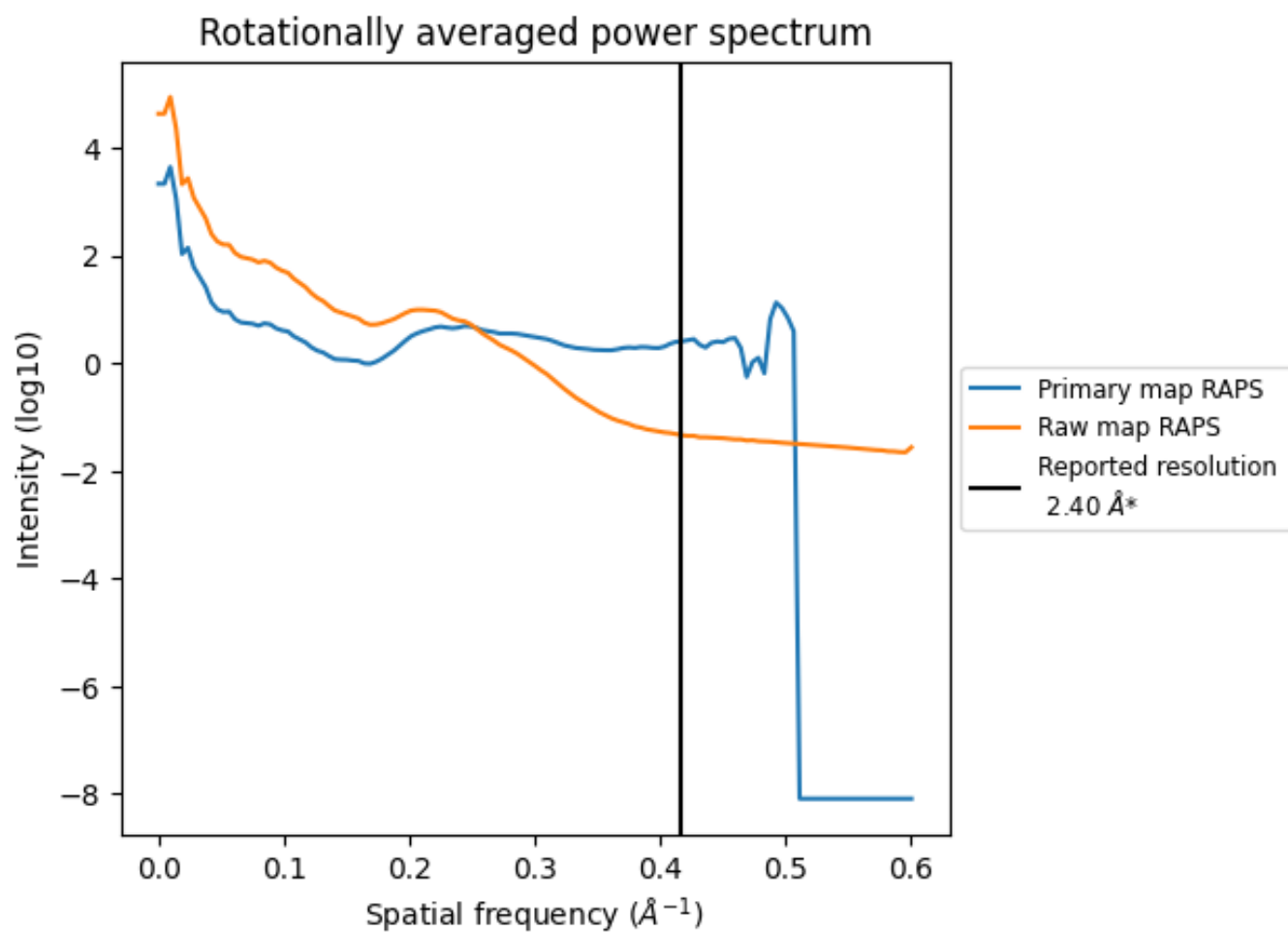
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 56 nm<sup>3</sup>; this corresponds to an approximate mass of 50 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

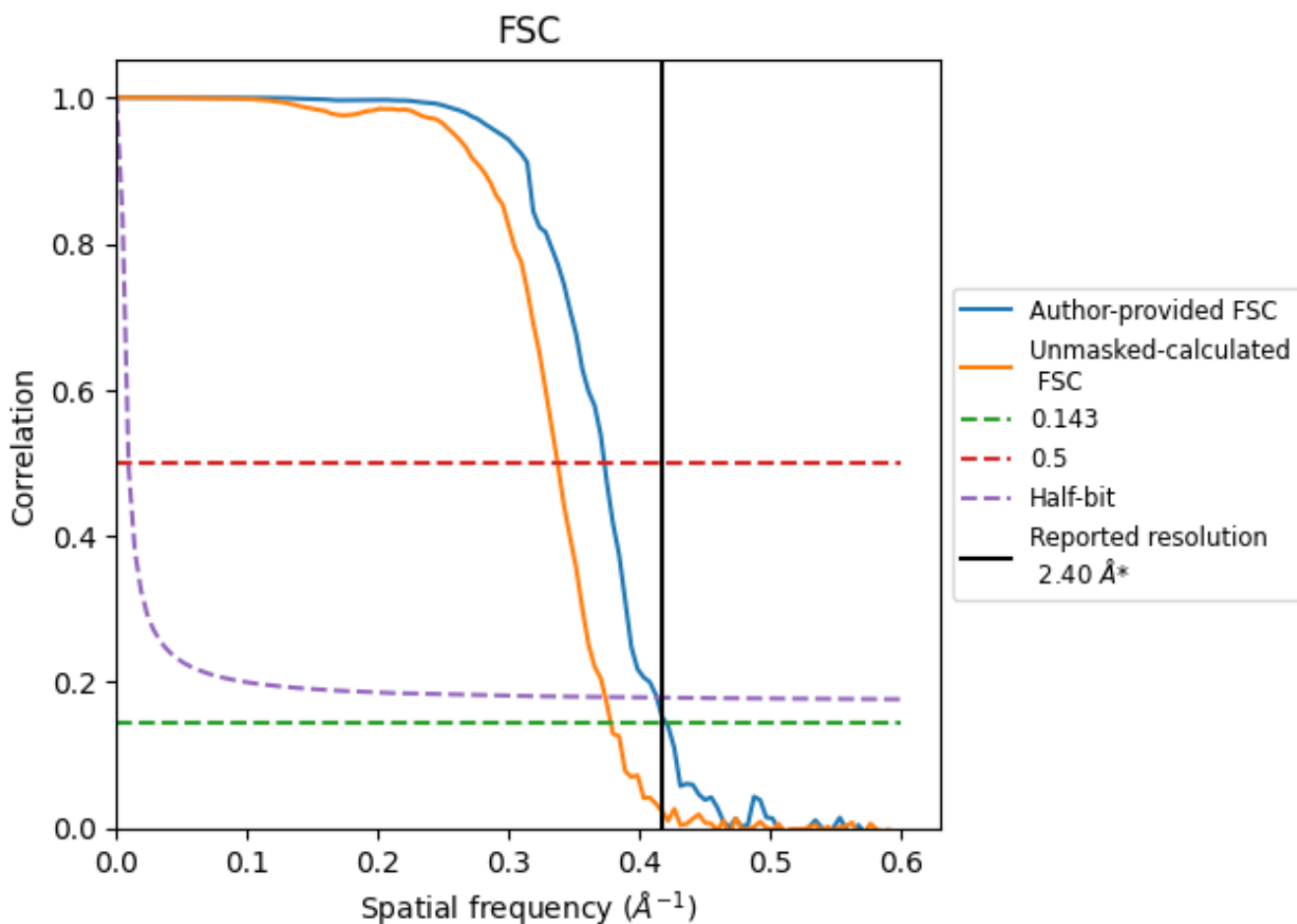


\*Reported resolution corresponds to spatial frequency of 0.417 Å<sup>-1</sup>

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

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

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of 0.417 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

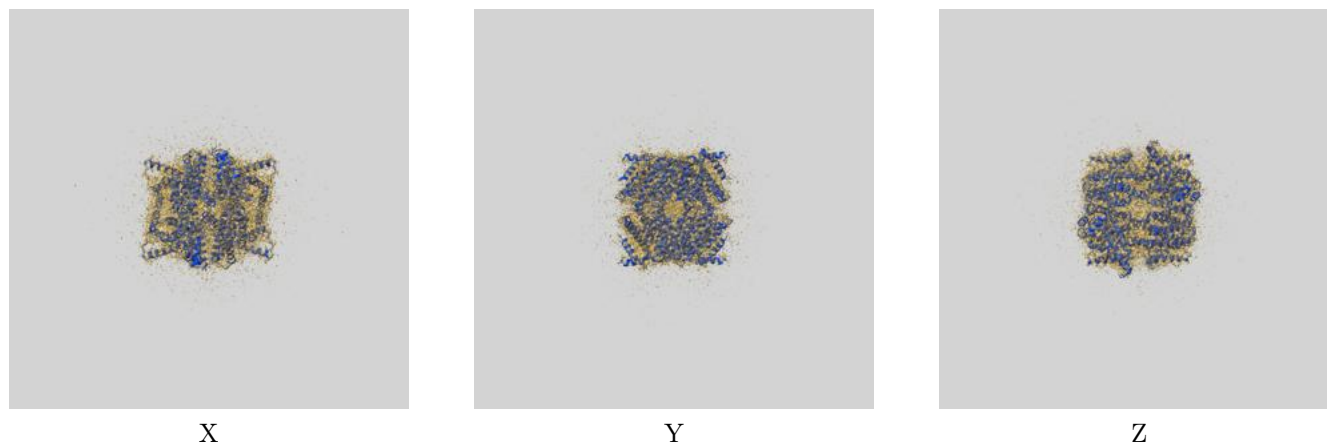
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.40	-	-
Author-provided FSC curve	2.38	2.68	2.42
Unmasked-calculated*	2.64	2.96	2.67

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 2.64 differs from the reported value 2.4 by more than 10 %

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

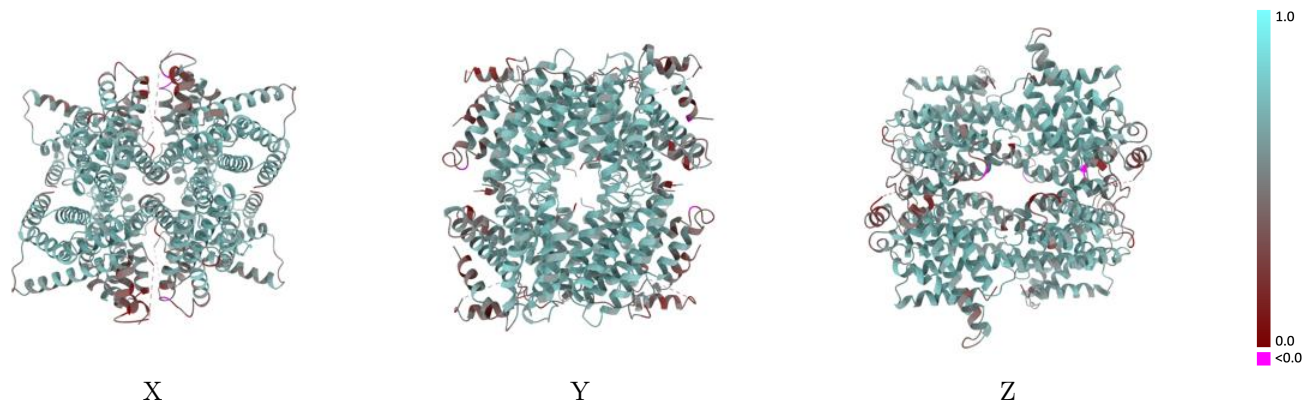
This section contains information regarding the fit between EMDB map EMD-25413 and PDB model 7SSS. Per-residue inclusion information can be found in section 3 on page 8.

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



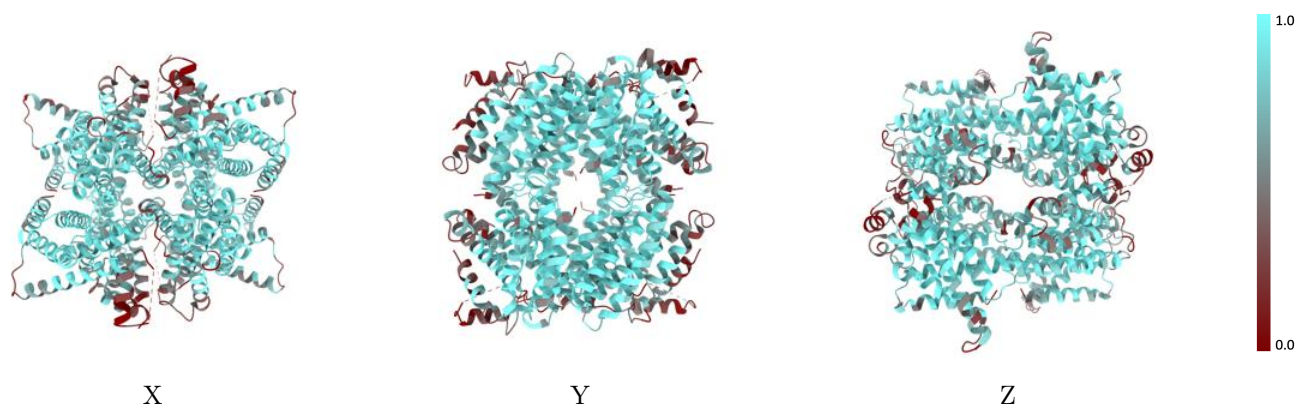
The images above show the 3D surface view of the map at the recommended contour level 0.035 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



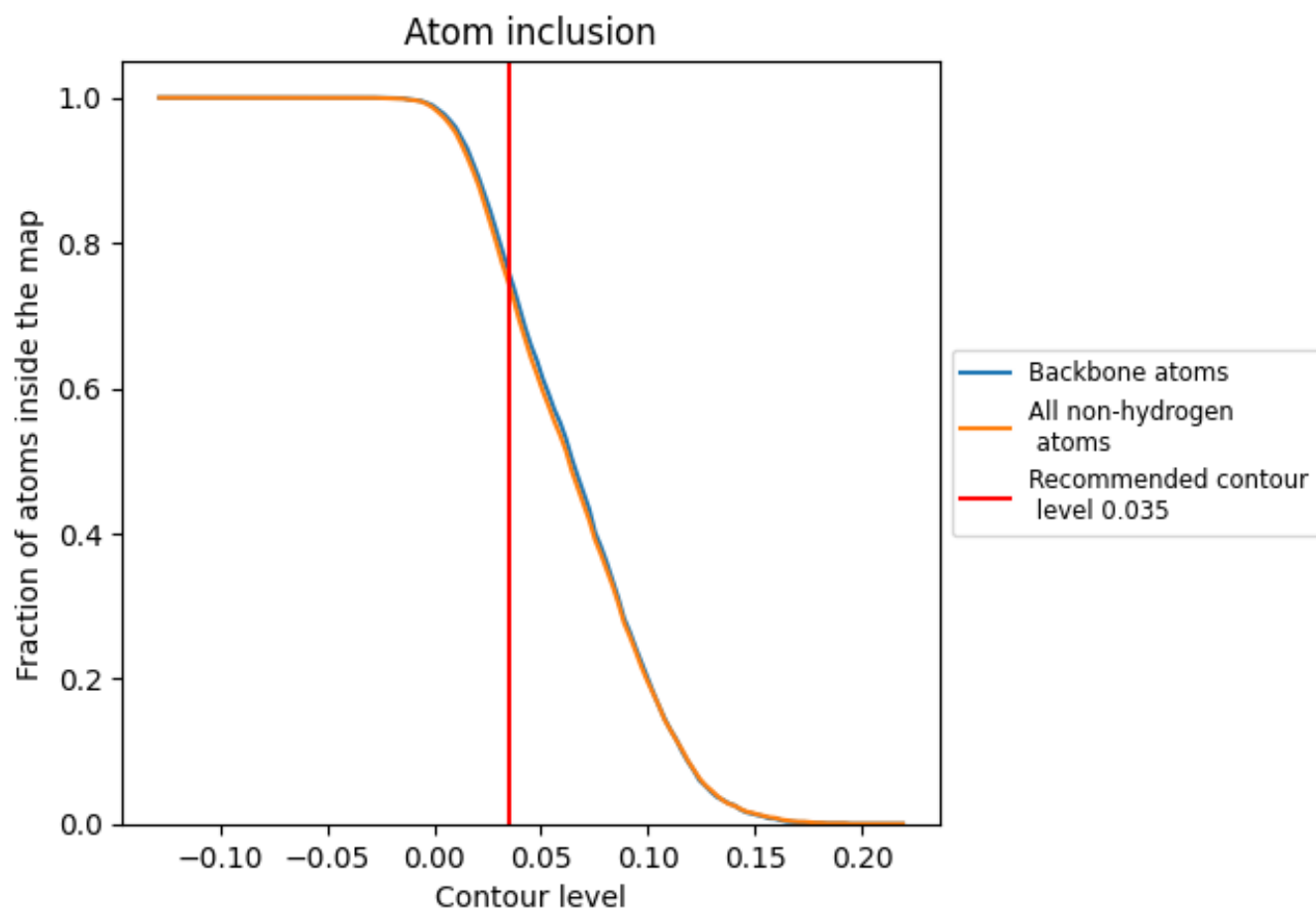
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

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



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.035).

## 9.4 Atom inclusion [i](#)





















At the recommended contour level, 76% of all backbone atoms, 74% of all non-hydrogen atoms, are inside the map.



## 9.5 Map-model fit summary [i](#)

The table lists the average atom inclusion at the recommended contour level (0.035) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7434	 0.5990
A	 0.7502	 0.6040
B	 0.7388	 0.6000
C	 0.7316	 0.5970
D	 0.7471	 0.6050
E	 0.7387	 0.5880
F	 0.7493	 0.5920
G	 0.7602	 0.6030
H	 0.7548	 0.6020

