



wwPDB EM Validation Summary Report ⓘ

May 11, 2023 – 10:28 AM EDT

PDB ID : 8SI5
EMDB ID : EMD-40499
Title : Cryo-EM structure of TRPM7 in MSP2N2 nanodisc in complex with agonist naltriben in open state
Authors : Nadezhdin, K.D.; Neuberger, A.; Sobolevsky, A.I.
Deposited on : 2023-04-14
Resolution : 2.17 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.dev50
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) : 2.32.2

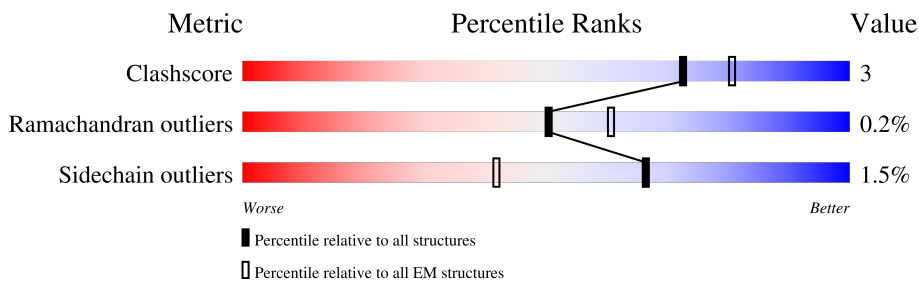
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.17 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 ≥ 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	1279	
1	B	1279	
1	C	1279	
1	D	1279	

2 Entry composition [i](#)

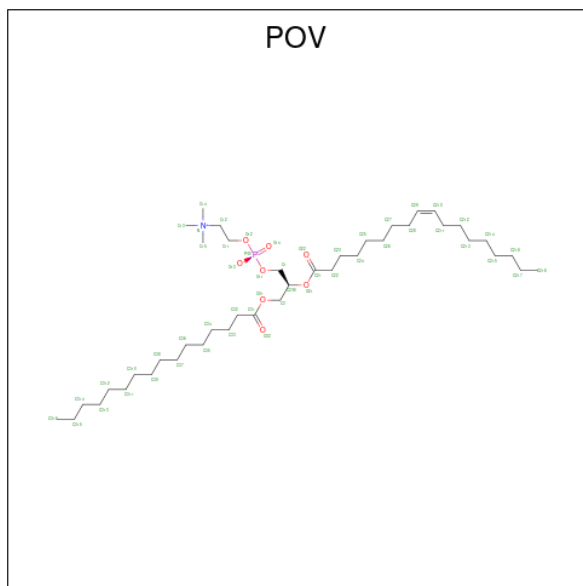
There are 7 unique types of molecules in this entry. The entry contains 79625 atoms, of which 40676 are hydrogens and 0 are deuteriums.

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 Transient receptor potential cation channel subfamily M member 7.

Mol	Chain	Residues	Atoms						AltConf	Trace
			Total	C	H	N	O	S		
1	A	1097	17843	5764	8979	1478	1564	58	0	0
1	B	1097	17843	5764	8979	1478	1564	58	0	0
1	C	1097	17843	5764	8979	1478	1564	58	0	0
1	D	1097	17843	5764	8979	1478	1564	58	0	0

- Molecule 2 is (2S)-3-(hexadecanoyloxy)-2-[(9Z)-octadec-9-enoyloxy]propyl 2-(trimethylammnio)ethyl phosphate (three-letter code: POV) (formula: C₄₂H₈₂NO₈P).



Mol	Chain	Residues	Atoms						AltConf
			Total	C	H	N	O	P	
2	A	1	134	42	82	1	8	1	0
2	A	1	134	42	82	1	8	1	0

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Mol	Chain	Residues	Atoms					AltConf	
			Total	C	H	N	O		P
2	A	1	134	42	82	1	8	1	0
2	A	1	134	42	82	1	8	1	0
2	A	1	134	42	82	1	8	1	0
2	A	1	134	42	82	1	8	1	0
2	A	1	134	42	82	1	8	1	0
2	A	1	134	42	82	1	8	1	0
2	A	1	134	42	82	1	8	1	0
2	A	1	134	42	82	1	8	1	0
2	A	1	134	42	82	1	8	1	0
2	A	1	134	42	82	1	8	1	0
2	A	1	134	42	82	1	8	1	0
2	A	1	134	42	82	1	8	1	0
2	A	1	134	42	82	1	8	1	0
2	A	1	134	42	82	1	8	1	0
2	B	1	134	42	82	1	8	1	0
2	B	1	134	42	82	1	8	1	0
2	B	1	134	42	82	1	8	1	0
2	B	1	134	42	82	1	8	1	0
2	B	1	134	42	82	1	8	1	0
2	B	1	134	42	82	1	8	1	0
2	B	1	134	42	82	1	8	1	0
2	B	1	134	42	82	1	8	1	0

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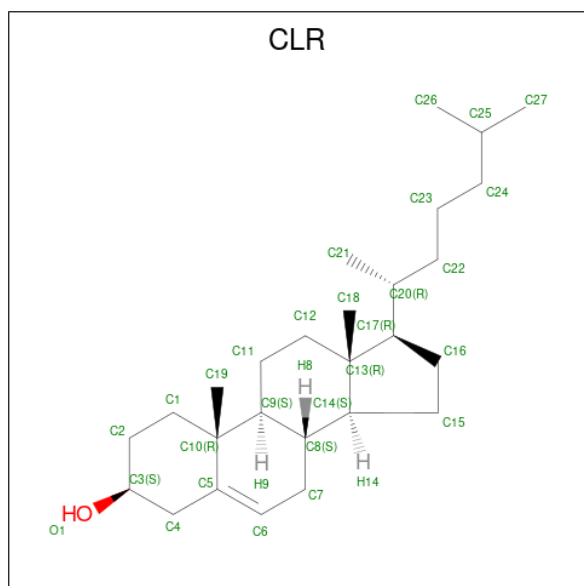
Mol	Chain	Residues	Atoms					AltConf	
			Total	C	H	N	O		P
2	B	1	134	42	82	1	8	1	0
2	B	1	134	42	82	1	8	1	0
2	B	1	134	42	82	1	8	1	0
2	B	1	134	42	82	1	8	1	0
2	C	1	134	42	82	1	8	1	0
2	C	1	134	42	82	1	8	1	0
2	C	1	134	42	82	1	8	1	0
2	C	1	134	42	82	1	8	1	0
2	C	1	134	42	82	1	8	1	0
2	C	1	134	42	82	1	8	1	0
2	C	1	134	42	82	1	8	1	0
2	C	1	134	42	82	1	8	1	0
2	C	1	134	42	82	1	8	1	0
2	C	1	134	42	82	1	8	1	0
2	C	1	134	42	82	1	8	1	0
2	C	1	134	42	82	1	8	1	0
2	C	1	134	42	82	1	8	1	0
2	D	1	134	42	82	1	8	1	0
2	D	1	134	42	82	1	8	1	0
2	D	1	134	42	82	1	8	1	0
2	D	1	134	42	82	1	8	1	0

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Mol	Chain	Residues	Atoms					AltConf	
2	D	1	Total	C	H	N	O	P	0
			134	42	82	1	8	1	
2	D	1	Total	C	H	N	O	P	0
			134	42	82	1	8	1	
2	D	1	Total	C	H	N	O	P	0
			134	42	82	1	8	1	
2	D	1	Total	C	H	N	O	P	0
			134	42	82	1	8	1	
2	D	1	Total	C	H	N	O	P	0
			134	42	82	1	8	1	
2	D	1	Total	C	H	N	O	P	0
			134	42	82	1	8	1	
2	D	1	Total	C	H	N	O	P	0
			134	42	82	1	8	1	

- Molecule 3 is CHOLESTEROL (three-letter code: CLR) (formula: $C_{27}H_{46}O$).



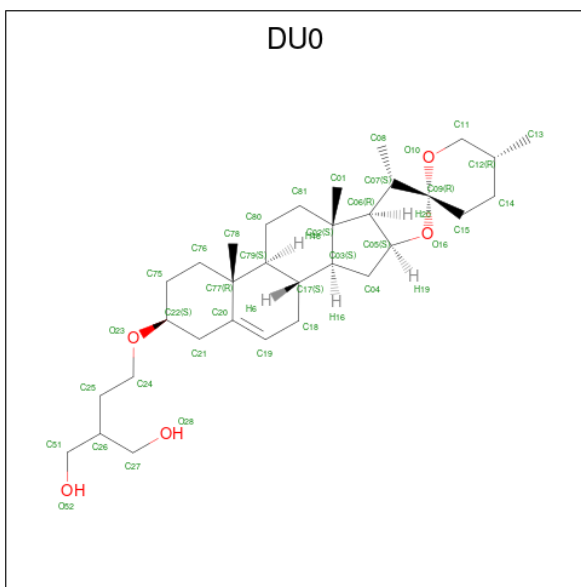
Mol	Chain	Residues	Atoms				AltConf
3	A	1	Total	C	H	O	0
			74	27	46	1	
3	B	1	Total	C	H	O	0
			74	27	46	1	
3	C	1	Total	C	H	O	0
			74	27	46	1	

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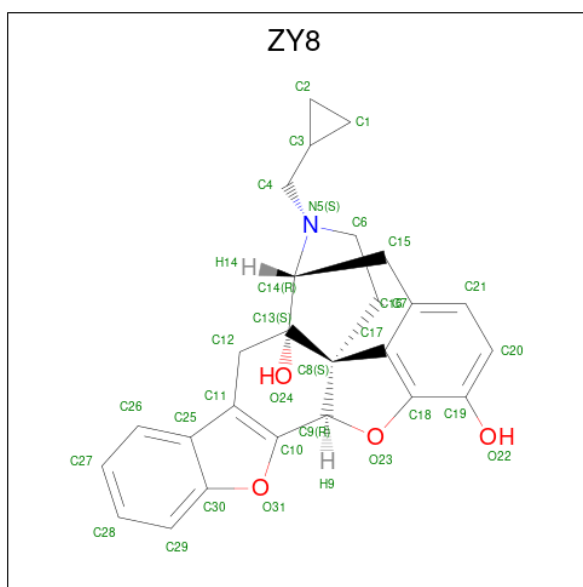
Mol	Chain	Residues	Atoms				AltConf
			Total	C	H	O	
3	D	1	74	27	46	1	0

- Molecule 4 is 2-[2-[(1 {S},2 {S},4 {S},5' {R},6 {R},7 {S},8 {R},9 {S},12 {S},13 {R},16 {S})-5',7,9,13-tetramethylspiro[5-oxapentacyclo[10.8.0.0^{2,9}.0^{4,8}.0^{13,18}]]icos-18-ene-6,2'-oxane]-16-yl]oxyethyl]propane-1,3-diol (three-letter code: DU0) (formula: C₃₂H₅₂O₅).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	H	O	
4	A	1	89	32	52	5	0
4	A	1	89	32	52	5	0
4	B	1	89	32	52	5	0
4	D	1	89	32	52	5	0

- Molecule 5 is (4bS,8R,8aS,14bR)-7-(cyclopropylmethyl)-5,6,7,8,9,14b-hexahydro-8aH-4,8-methanobis[1]benzofuro[3,2-e:2',3'-g]isoquinoline-1,8a-diol (three-letter code: ZY8) (formula: C₂₆H₂₅NO₄) (labeled as "Ligand of Interest" by depositor).



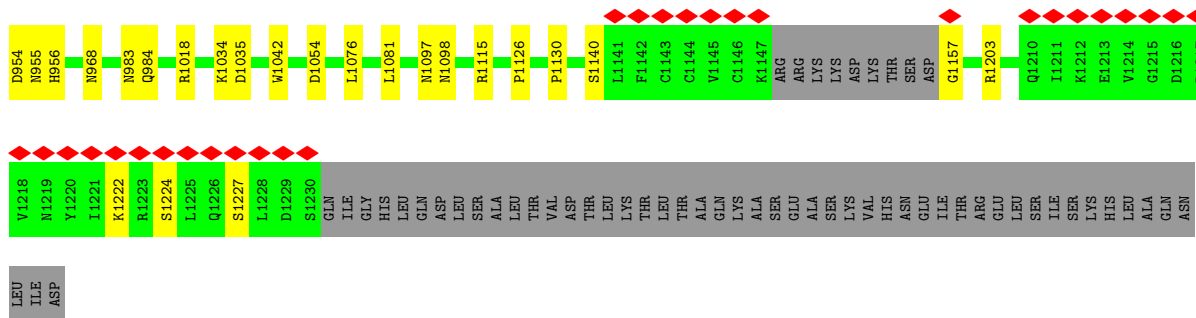
Mol	Chain	Residues	Atoms				AltConf	
			Total	C	H	N		O
5	A	1	57	26	26	1	4	0
5	B	1	57	26	26	1	4	0
5	C	1	57	26	26	1	4	0
5	D	1	57	26	26	1	4	0

- Molecule 6 is CALCIUM ION (three-letter code: CA) (formula: Ca).

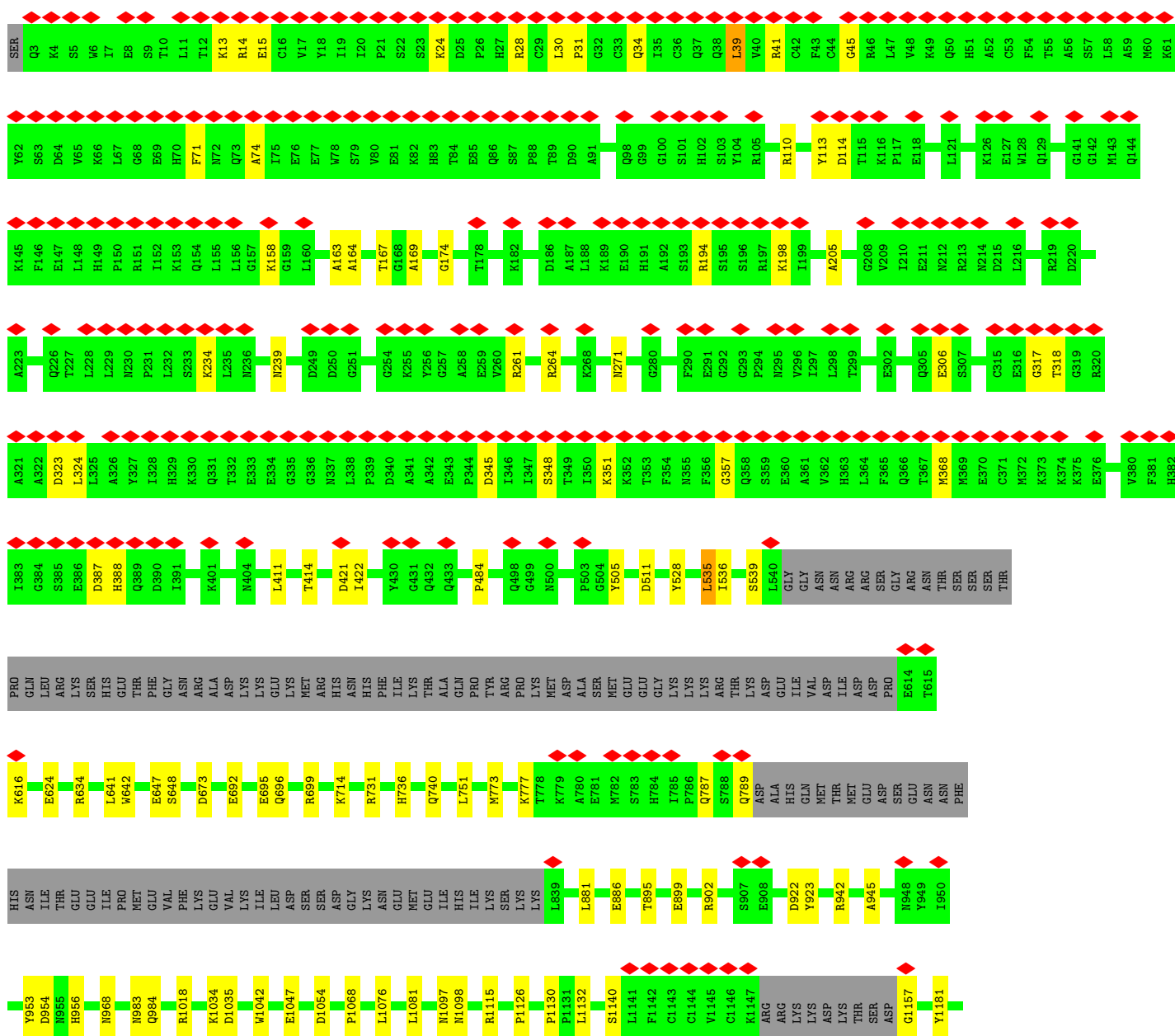
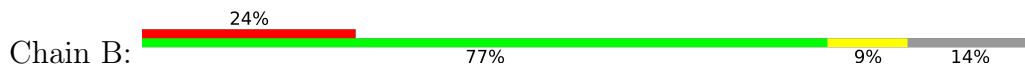
Mol	Chain	Residues	Atoms		AltConf
			Total	Ca	
6	A	1	1	1	0

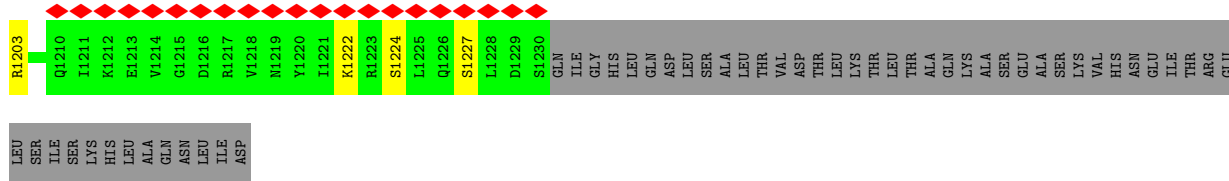
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		AltConf
			Total	O	
7	A	101	101	101	0
7	B	101	101	101	0
7	C	101	101	101	0
7	D	101	101	101	0

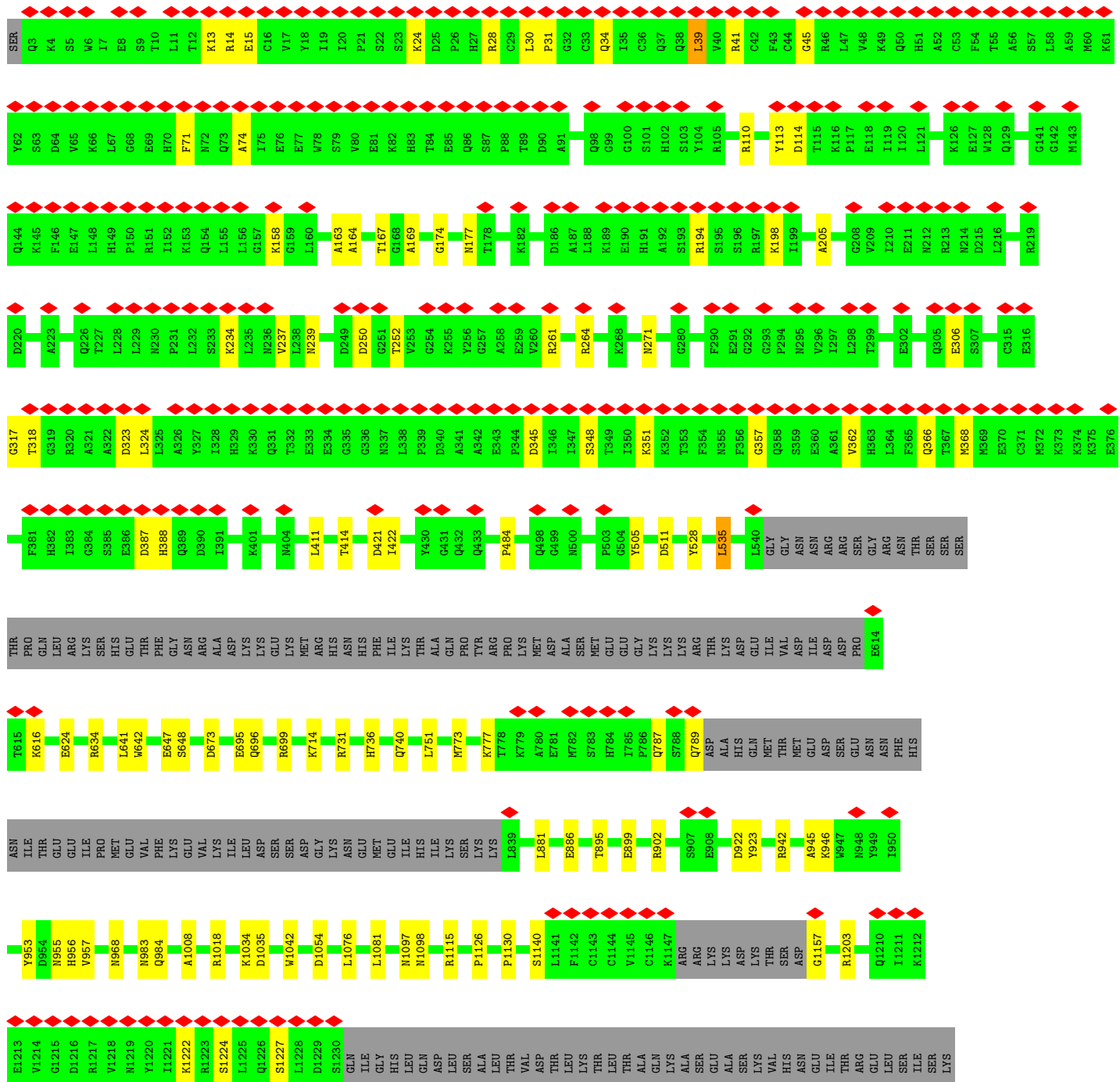
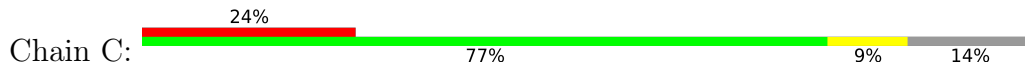


● Molecule 1: Transient receptor potential cation channel subfamily M member 7



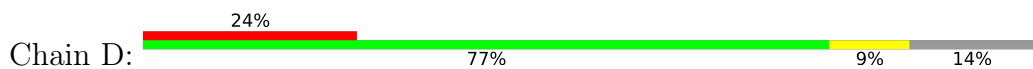


• Molecule 1: Transient receptor potential cation channel subfamily M member 7



HIS
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Molecule 1: Transient receptor potential cation channel subfamily M member 7



SER	Q3	K4	S5	W6	I7	E8	S9	T10	L11	T12	K13	R14	E15	C16	V17	Y18	I19	I20	P21	S22	S23	K24	D25	P26	H27	R28	C29	L30	P31	G32	C33	Q34	I35	C36	Q37	Q38	L39	V40	R41	C42	F43	C44	C45	R46	L47	V48	R49	Q50	H51	A52	C53	F54	T55	A56	S57	L58	A59	M60	K61
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Y62	S63	D64	V65	R66	L67	G68	E69	F70	F71	M72	Q73	A74	I75	E76	E77	S78	W79	F80	F81	R82	H83	T84	E85	Q86	S87	P88	T89	D90	A91	Q98	G99	G100	S101	H102	S103	Y104	R105	R110	Y113	D114	T115	K116	P117	E118	L121	K126	E127	W128	Q129	G141	G142	M143	Q144
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K145	F146	E147	L148	H149	P150	R151	I152	K153	Q154	L155	L156	G157	K158	G159	L160	A163	G164	T167	G168	A169	G174	T178	K182	D186	A187	L188	K189	E190	H191	A192	S193	R194	S196	R197	K198	I199	A205	G208	V209	P117	E118	L121	K126	E127	W128	Q129	G141	G142	M143	Q144
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A223	Q226	T227	L228	L229	N230	P231	Y237	L232	S233	K234	L235	N236	N239	D249	D250	N251	Y253	G254	K255	Y256	G257	A258	E259	V260	R261	R264	K268	N271	G280	F290	E291	G292	G293	P294	N295	V296	I297	L298	T299	E302	Q305	E306	S307	C315	E316	G317	T318	G319
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R320	A321	A322	D323	L324	L325	A326	Y327	I328	H329	K330	Q331	T332	E333	E334	G335	G336	N337	L338	P339	D340	A341	A342	E343	P344	D345	I346	I347	S348	T349	L350	K351	K352	T353	F354	N355	F356	G357	Q358	S359	E360	A361	Y362	H363	L364	F365	Q366	T367	M368	M369	E370	C371	M372	K373	K374	E376	F381	H382
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I383	G384	S385	E386	D387	H388	Q389	D390	I391	K401	M404	L411	T414	D421	I422	Y430	G431	Q432	Q433	P484	Q498	G499	N500	P503	G504	Y505	D511	Y528	L535	L540	GLY	GLY	ASN	ASN	ASN	ARG	ARG	ARG	ARG	GLY	GLY	ASN	ASN	THR	THR	SER	SER	SER	THR	PRO	GLN
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LEU	ARG	LYS	SER	HIS	PRO	THR	PHE	GLY	ASN	ARG	ALA	ASP	LYS	LYS	GLU	GLU	LYS	MET	ARG	HIS	ASN	HIS	PHE	LYS	ILE	LYS	THR	ALA	GLN	PRO	TYR	ARG	PRO	LYS	THR	LYS	THR	ASP	ASP	PRO	E614	T815	K616
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E624	R634	L641	W642	E647	S648	D673	E692	E696	Q696	R699	K714	R731	H736	Q740	L751	M773	K777	I778	K779	A780	E781	M782	S783	H784	I785	P786	Q787	S788	Q789	ASP	ALA	HIS	GLN	MET	THR	THR	THR	THR	ASP	ASP	SER	SER	GLU	GLU	ASN	ASN	ASN	PHE	HIS	ASN
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ILE	THR	GLU	GLY	ILE	PRO	MET	GLU	VAL	PHE	LYS	VAL	LYS	LYS	ILE	LEU	LEU	ASP	SER	ASP	GLY	LYS	ASN	GLU	MET	GLU	ILE	ILE	HIS	LYS	LYS	SER	LYS	L339	L881	E886	T895	E899	R902	S907	E908	D922	Y923	R942	A945	K946	W947	N948	Y949	I950
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Y953	D954	N955	H956	V957	N968	N983	Q984	A1008	R1018	K1034	D1035	W1042	D1054	P1068	L1076	L1081	N1097	M1098	R1115	P1126	P1130	S1140	L1141	F1142	C1143	C1144	V1145	C1146	K1147	ARG	ARG	GLN	LYS	LYS	LYS	ASP	THR	THR	THR	ASP	ASP	G1157	Y1181	R1203
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Q1210	I1211	K1212	E1213	V1214	G1215	D1216	R1217	V1218	M1219	Y1220	I1221	K1222	R1223	S1224	L1225	Q1226	S1227	L1228	D1229	S1230	GLN	ILE	GLY	HIS	LEU	LEU	GLN	ASP	LEU	SER	ALA	LEU	THR	VAL	ASP	THR	THR	LYS	THR	THR	THR	ALA	GLN	LYS	ALA	SER	GLY	THR	THR	THR	THR	ARG	LEU	SER
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4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	134039	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	58	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	1500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	2.361	Depositor
Minimum map value	-1.345	Depositor
Average map value	0.009	Depositor
Map value standard deviation	0.085	Depositor
Recommended contour level	0.281	Depositor
Map size (\AA)	249.0, 249.0, 249.0	wwPDB
Map dimensions	300, 300, 300	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	0.83, 0.83, 0.83	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: CA, POV, CLR, ZY8, DU0

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	0.61	0/9079	0.65	5/12300 (0.0%)
1	B	0.61	0/9079	0.65	5/12300 (0.0%)
1	C	0.61	0/9079	0.65	5/12300 (0.0%)
1	D	0.61	0/9079	0.65	5/12300 (0.0%)
All	All	0.61	0/36316	0.65	20/49200 (0.0%)

There are no bond length outliers.

The worst 5 of 20 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	731	ARG	NE-CZ-NH1	-7.48	116.56	120.30
1	A	731	ARG	NE-CZ-NH1	-7.41	116.60	120.30
1	D	731	ARG	NE-CZ-NH1	-7.41	116.60	120.30
1	C	731	ARG	NE-CZ-NH1	-7.33	116.64	120.30
1	B	535	LEU	CA-CB-CG	6.81	130.96	115.30

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	8864	8979	8975	59	0
1	B	8864	8979	8975	60	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	8864	8979	8975	60	0
1	D	8864	8979	8975	62	0
2	A	780	1230	1230	19	0
2	B	624	984	984	13	0
2	C	676	1066	1066	13	0
2	D	624	984	984	15	0
3	A	28	46	46	2	0
3	B	28	46	46	2	0
3	C	28	46	46	2	0
3	D	28	46	46	2	0
4	A	74	104	0	0	0
4	B	37	52	0	0	0
4	D	37	52	0	0	0
5	A	31	26	0	0	0
5	B	31	26	0	0	0
5	C	31	26	0	0	0
5	D	31	26	0	0	0
6	A	1	0	0	0	0
7	A	101	0	0	9	0
7	B	101	0	0	10	0
7	C	101	0	0	9	0
7	D	101	0	0	9	0
All	All	38949	40676	40348	265	0

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

The worst 5 of 265 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:113:TYR:O	1:C:261:ARG:NH2	2.16	0.79
1:D:113:TYR:O	1:D:261:ARG:NH2	2.16	0.79
1:D:505:TYR:OH	1:D:511:ASP:OD2	2.00	0.79
1:D:953:TYR:OH	7:D:1401:HOH:O	2.02	0.79
1:B:113:TYR:O	1:B:261:ARG:NH2	2.16	0.78

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	1089/1279 (85%)	1003 (92%)	84 (8%)	2 (0%)	47	52
1	B	1089/1279 (85%)	1003 (92%)	84 (8%)	2 (0%)	47	52
1	C	1089/1279 (85%)	1003 (92%)	84 (8%)	2 (0%)	47	52
1	D	1089/1279 (85%)	1004 (92%)	83 (8%)	2 (0%)	47	52
All	All	4356/5116 (85%)	4013 (92%)	335 (8%)	8 (0%)	50	52

5 of 8 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	28	ARG
1	B	28	ARG
1	C	28	ARG
1	D	28	ARG
1	A	30	LEU

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	972/1138 (85%)	957 (98%)	15 (2%)	65	76
1	B	972/1138 (85%)	957 (98%)	15 (2%)	65	76
1	C	972/1138 (85%)	957 (98%)	15 (2%)	65	76
1	D	972/1138 (85%)	957 (98%)	15 (2%)	65	76
All	All	3888/4552 (85%)	3828 (98%)	60 (2%)	66	76

5 of 60 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	1098	ASN
1	D	773	MET
1	C	239	ASN
1	D	714	LYS
1	D	1222	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 16 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	239	ASN
1	D	34	GLN
1	C	3	GLN
1	D	3	GLN
1	B	1084	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 65 ligands modelled in this entry, 1 is monoatomic - leaving 64 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
2	POV	B	1308	-	51,51,51	0.33	0	57,59,59	0.44	0
2	POV	C	1308	-	51,51,51	0.36	0	57,59,59	0.38	0
2	POV	A	1308	-	51,51,51	0.35	0	57,59,59	0.38	0
2	POV	D	1310	-	51,51,51	0.33	0	57,59,59	0.43	0
2	POV	A	1319	-	51,51,51	0.32	0	57,59,59	0.40	0
2	POV	A	1302	-	51,51,51	0.36	0	57,59,59	0.54	1 (1%)
2	POV	A	1307	-	51,51,51	0.34	0	57,59,59	0.33	0
2	POV	C	1302	-	51,51,51	0.40	0	57,59,59	0.56	1 (1%)
4	DU0	D	1314	-	42,42,42	0.20	0	66,66,66	0.55	1 (1%)
2	POV	A	1306	-	51,51,51	0.32	0	57,59,59	0.37	0
2	POV	D	1311	-	51,51,51	0.34	0	57,59,59	0.51	1 (1%)
3	CLR	A	1304	-	31,31,31	0.21	0	48,48,48	0.39	0
2	POV	B	1302	-	51,51,51	0.35	0	57,59,59	0.54	1 (1%)
4	DU0	A	1313	-	42,42,42	0.22	0	66,66,66	0.63	1 (1%)
2	POV	B	1303	-	51,51,51	0.35	0	57,59,59	0.55	1 (1%)
2	POV	A	1310	-	51,51,51	0.34	0	57,59,59	0.52	1 (1%)
2	POV	B	1307	-	51,51,51	0.36	0	57,59,59	0.39	0
3	CLR	D	1307	-	31,31,31	0.22	0	48,48,48	0.38	0
2	POV	D	1303	-	51,51,51	0.34	0	57,59,59	0.58	0
2	POV	C	1314	-	51,51,51	0.34	0	57,59,59	0.34	0
2	POV	B	1310	-	51,51,51	0.36	0	57,59,59	0.54	1 (1%)
5	ZY8	A	1314	-	32,38,38	1.12	3 (9%)	47,63,63	1.25	6 (12%)
2	POV	A	1318	-	51,51,51	0.35	0	57,59,59	0.56	0
2	POV	B	1311	-	51,51,51	0.32	0	57,59,59	0.36	0
2	POV	C	1307	-	51,51,51	0.34	0	57,59,59	0.33	0
2	POV	A	1301	-	51,51,51	0.39	0	57,59,59	0.56	1 (1%)
2	POV	A	1305	-	51,51,51	0.37	0	57,59,59	0.62	1 (1%)
2	POV	C	1304	-	51,51,51	0.35	0	57,59,59	0.55	1 (1%)
2	POV	D	1304	-	51,51,51	0.40	0	57,59,59	0.56	1 (1%)
2	POV	D	1309	-	51,51,51	0.36	0	57,59,59	0.39	0
3	CLR	B	1304	-	31,31,31	0.21	0	48,48,48	0.39	0
2	POV	C	1301	-	51,51,51	0.32	0	57,59,59	0.43	0
2	POV	A	1316	-	51,51,51	0.32	0	57,59,59	0.54	1 (1%)
2	POV	C	1303	-	51,51,51	0.36	0	57,59,59	0.53	1 (1%)
2	POV	A	1303	-	51,51,51	0.35	0	57,59,59	0.55	1 (1%)
2	POV	D	1313	-	51,51,51	0.32	0	57,59,59	0.36	0
2	POV	C	1309	-	51,51,51	0.33	0	57,59,59	0.43	0
2	POV	D	1306	-	51,51,51	0.35	0	57,59,59	0.54	1 (1%)
2	POV	D	1308	-	51,51,51	0.33	0	57,59,59	0.32	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	ZY8	C	1313	-	32,38,38	1.12	3 (9%)	47,63,63	1.26	5 (10%)
5	ZY8	D	1315	-	32,38,38	1.12	3 (9%)	47,63,63	1.25	5 (10%)
2	POV	D	1301	-	51,51,51	0.35	0	57,59,59	0.35	0
2	POV	A	1315	-	51,51,51	0.34	0	57,59,59	0.34	0
2	POV	D	1305	-	51,51,51	0.36	0	57,59,59	0.53	1 (1%)
2	POV	C	1315	-	51,51,51	0.33	0	57,59,59	0.53	1 (1%)
2	POV	A	1309	-	51,51,51	0.33	0	57,59,59	0.43	0
3	CLR	C	1305	-	31,31,31	0.21	0	48,48,48	0.40	0
2	POV	C	1310	-	51,51,51	0.34	0	57,59,59	0.52	1 (1%)
2	POV	C	1311	-	51,51,51	0.34	0	57,59,59	0.56	1 (1%)
5	ZY8	B	1312	-	32,38,38	1.13	3 (9%)	47,63,63	1.26	5 (10%)
2	POV	C	1312	-	51,51,51	0.32	0	57,59,59	0.37	0
2	POV	A	1312	-	51,51,51	0.32	0	57,59,59	0.37	0
2	POV	D	1302	-	51,51,51	0.32	0	57,59,59	0.53	1 (1%)
2	POV	B	1306	-	51,51,51	0.33	0	57,59,59	0.35	0
2	POV	C	1306	-	51,51,51	0.32	0	57,59,59	0.38	0
2	POV	B	1309	-	51,51,51	0.33	0	57,59,59	0.52	1 (1%)
2	POV	B	1313	-	51,51,51	0.34	0	57,59,59	0.33	0
4	DU0	A	1317	-	42,42,42	0.20	0	66,66,66	0.56	1 (1%)
2	POV	D	1312	-	51,51,51	0.36	0	57,59,59	0.54	1 (1%)
4	DU0	B	1315	-	42,42,42	0.21	0	66,66,66	0.56	1 (1%)
2	POV	B	1305	-	51,51,51	0.36	0	57,59,59	0.56	0
2	POV	B	1301	-	51,51,51	0.40	0	57,59,59	0.56	1 (1%)
2	POV	A	1311	-	51,51,51	0.35	0	57,59,59	0.55	1 (1%)
2	POV	B	1314	-	51,51,51	0.32	0	57,59,59	0.53	1 (1%)

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
2	POV	B	1308	-	-	23/55/55/55	-
2	POV	C	1308	-	-	29/55/55/55	-
2	POV	A	1308	-	-	28/55/55/55	-
2	POV	D	1310	-	-	22/55/55/55	-
2	POV	A	1319	-	-	28/55/55/55	-
2	POV	A	1302	-	-	19/55/55/55	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	POV	A	1307	-	-	21/55/55/55	-
2	POV	C	1302	-	-	27/55/55/55	-
4	DU0	D	1314	-	-	4/10/98/98	0/6/6/6
2	POV	A	1306	-	-	29/55/55/55	-
2	POV	D	1311	-	-	23/55/55/55	-
3	CLR	A	1304	-	-	8/10/68/68	0/4/4/4
2	POV	B	1302	-	-	20/55/55/55	-
4	DU0	A	1313	-	-	3/10/98/98	0/6/6/6
2	POV	B	1303	-	-	17/55/55/55	-
2	POV	A	1310	-	-	21/55/55/55	-
2	POV	B	1307	-	-	29/55/55/55	-
3	CLR	D	1307	-	-	5/10/68/68	0/4/4/4
2	POV	D	1303	-	-	23/55/55/55	-
2	POV	C	1314	-	-	20/55/55/55	-
2	POV	B	1310	-	-	23/55/55/55	-
5	ZY8	A	1314	-	-	1/4/60/60	0/1/8/8
2	POV	A	1318	-	-	25/55/55/55	-
2	POV	B	1311	-	-	18/55/55/55	-
2	POV	C	1307	-	-	20/55/55/55	-
2	POV	A	1301	-	-	27/55/55/55	-
2	POV	A	1305	-	-	27/55/55/55	-
2	POV	C	1304	-	-	17/55/55/55	-
2	POV	D	1304	-	-	27/55/55/55	-
2	POV	D	1309	-	-	29/55/55/55	-
3	CLR	B	1304	-	-	6/10/68/68	0/4/4/4
2	POV	C	1301	-	-	30/55/55/55	-
2	POV	A	1316	-	-	22/55/55/55	-
2	POV	C	1303	-	-	16/55/55/55	-
2	POV	A	1303	-	-	17/55/55/55	-
2	POV	D	1313	-	-	18/55/55/55	-
2	POV	C	1309	-	-	21/55/55/55	-
2	POV	D	1306	-	-	17/55/55/55	-
2	POV	D	1308	-	-	20/55/55/55	-
5	ZY8	C	1313	-	-	2/4/60/60	0/1/8/8

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	ZY8	D	1315	-	-	2/4/60/60	0/1/8/8
2	POV	D	1301	-	-	19/55/55/55	-
2	POV	A	1315	-	-	20/55/55/55	-
2	POV	D	1305	-	-	20/55/55/55	-
2	POV	C	1315	-	-	21/55/55/55	-
2	POV	A	1309	-	-	22/55/55/55	-
3	CLR	C	1305	-	-	6/10/68/68	0/4/4/4
2	POV	C	1310	-	-	21/55/55/55	-
2	POV	C	1311	-	-	28/55/55/55	-
5	ZY8	B	1312	-	-	2/4/60/60	0/1/8/8
2	POV	C	1312	-	-	17/55/55/55	-
2	POV	A	1312	-	-	17/55/55/55	-
2	POV	D	1302	-	-	22/55/55/55	-
2	POV	B	1306	-	-	19/55/55/55	-
2	POV	C	1306	-	-	30/55/55/55	-
2	POV	B	1309	-	-	23/55/55/55	-
2	POV	B	1313	-	-	19/55/55/55	-
4	DU0	A	1317	-	-	3/10/98/98	0/6/6/6
2	POV	D	1312	-	-	29/55/55/55	-
4	DU0	B	1315	-	-	3/10/98/98	0/6/6/6
2	POV	B	1305	-	-	25/55/55/55	-
2	POV	B	1301	-	-	27/55/55/55	-
2	POV	A	1311	-	-	27/55/55/55	-
2	POV	B	1314	-	-	22/55/55/55	-

The worst 5 of 12 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	B	1312	ZY8	C14-N5	4.18	1.52	1.48
5	C	1313	ZY8	C14-N5	4.17	1.52	1.48
5	D	1315	ZY8	C14-N5	4.12	1.52	1.48
5	A	1314	ZY8	C14-N5	4.11	1.52	1.48
5	C	1313	ZY8	C25-C30	-2.21	1.38	1.43

The worst 5 of 50 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	1312	ZY8	C15-C14-N5	-3.63	111.76	115.63
5	C	1313	ZY8	C15-C14-N5	-3.62	111.77	115.63
5	D	1315	ZY8	C15-C14-N5	-3.60	111.79	115.63
4	A	1313	DU0	C24-C25-C26	3.54	118.36	113.88
5	A	1314	ZY8	C15-C14-N5	-3.46	111.94	115.63

There are no chirality outliers.

5 of 1226 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1301	POV	C1-O11-P-O14
2	A	1301	POV	C22-C21-O21-C2
2	A	1301	POV	O22-C21-O21-C2
2	A	1302	POV	C22-C21-O21-C2
2	A	1302	POV	O22-C21-O21-C2

There are no ring outliers.

43 monomers are involved in 64 short contacts:

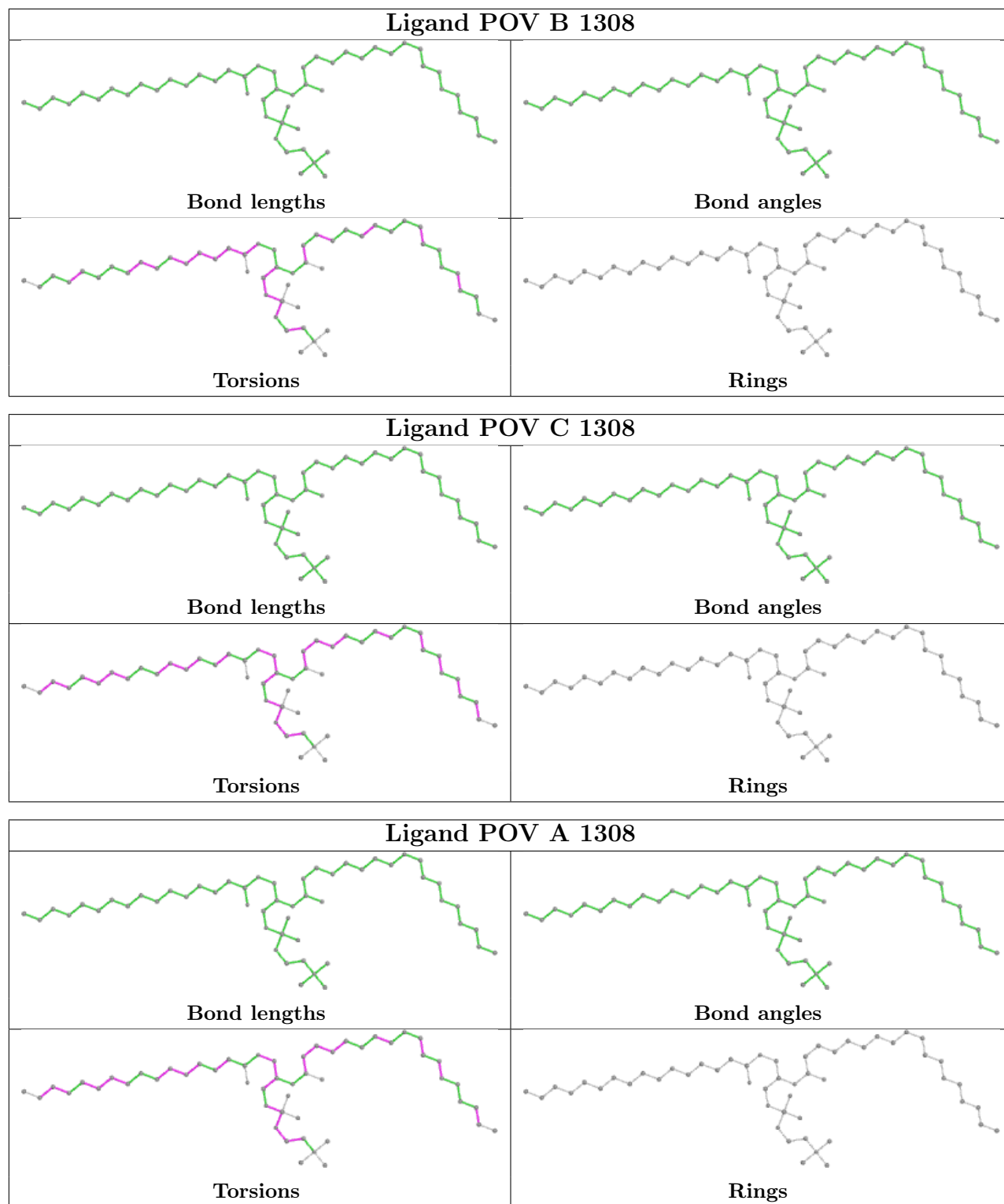
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	1308	POV	1	0
2	A	1308	POV	2	0
2	D	1310	POV	2	0
2	A	1319	POV	2	0
2	A	1302	POV	2	0
2	A	1307	POV	2	0
2	C	1302	POV	2	0
2	A	1306	POV	2	0
2	D	1311	POV	2	0
3	A	1304	CLR	2	0
2	B	1302	POV	2	0
2	B	1303	POV	2	0
2	A	1310	POV	2	0
2	B	1307	POV	2	0
3	D	1307	CLR	2	0
2	D	1303	POV	1	0
2	B	1310	POV	2	0
2	A	1318	POV	2	0
2	C	1307	POV	2	0
2	A	1301	POV	2	0
2	A	1305	POV	3	0
2	C	1304	POV	1	0

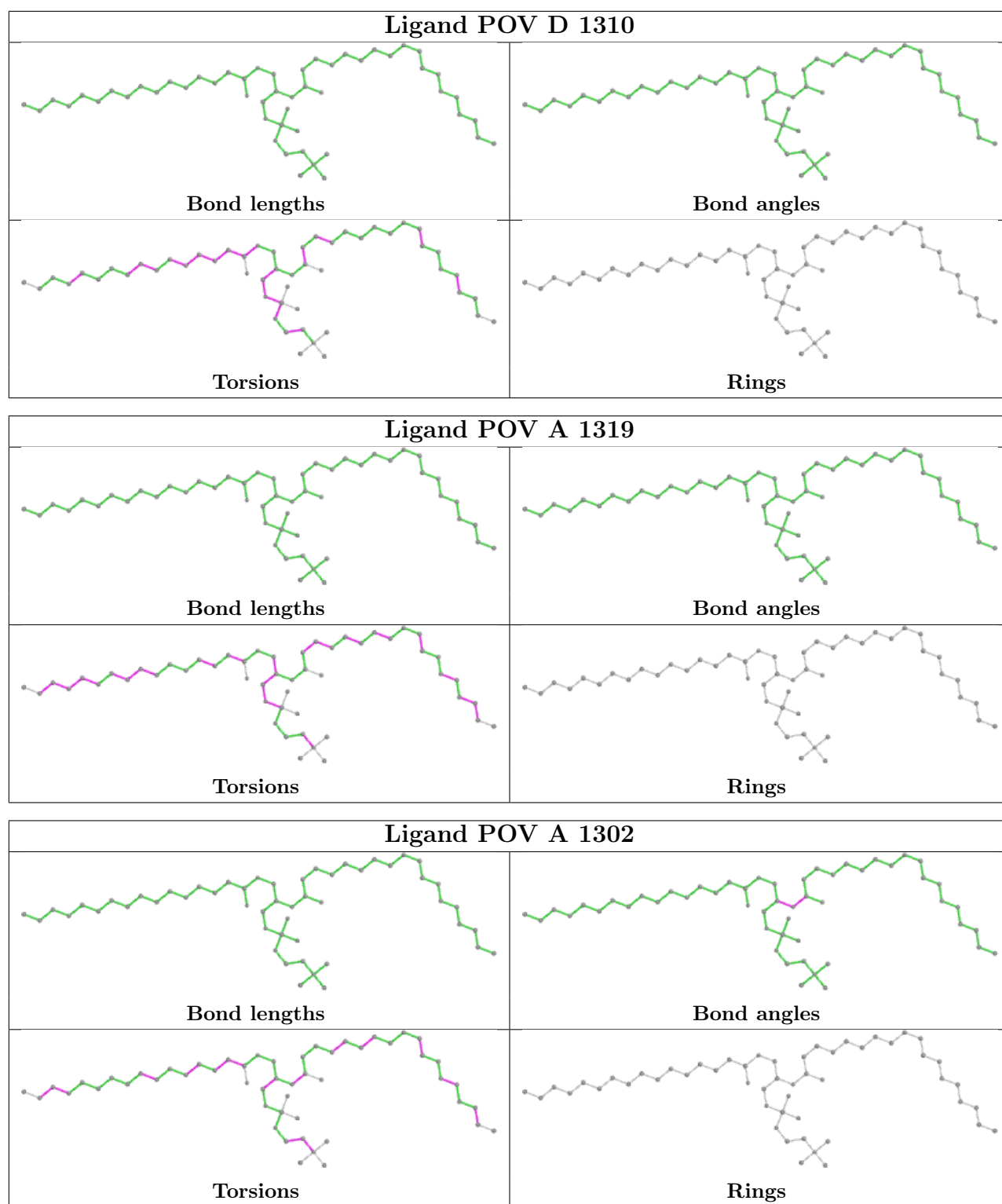
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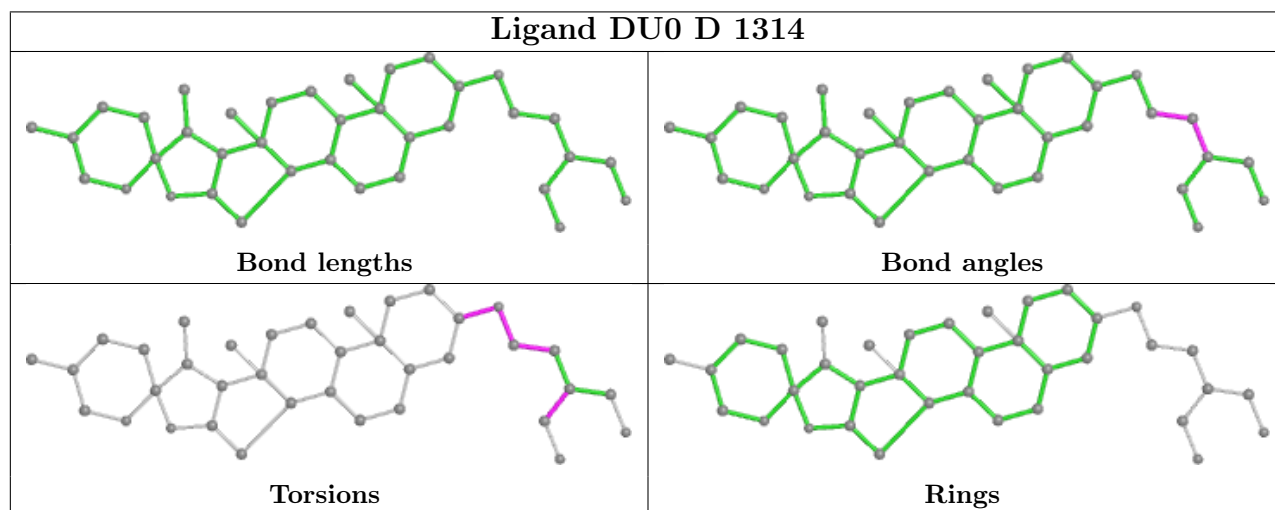
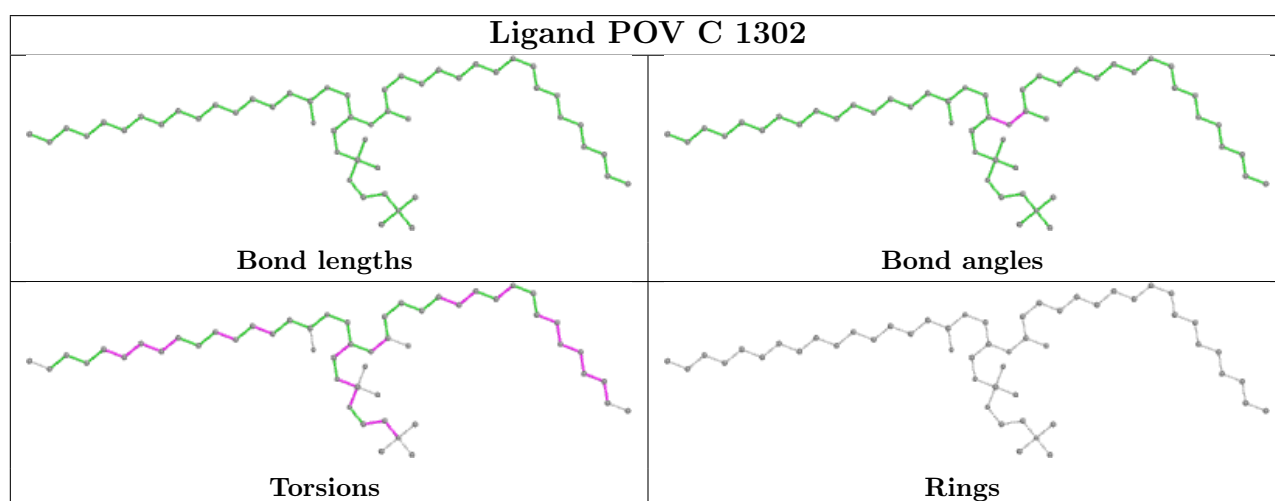
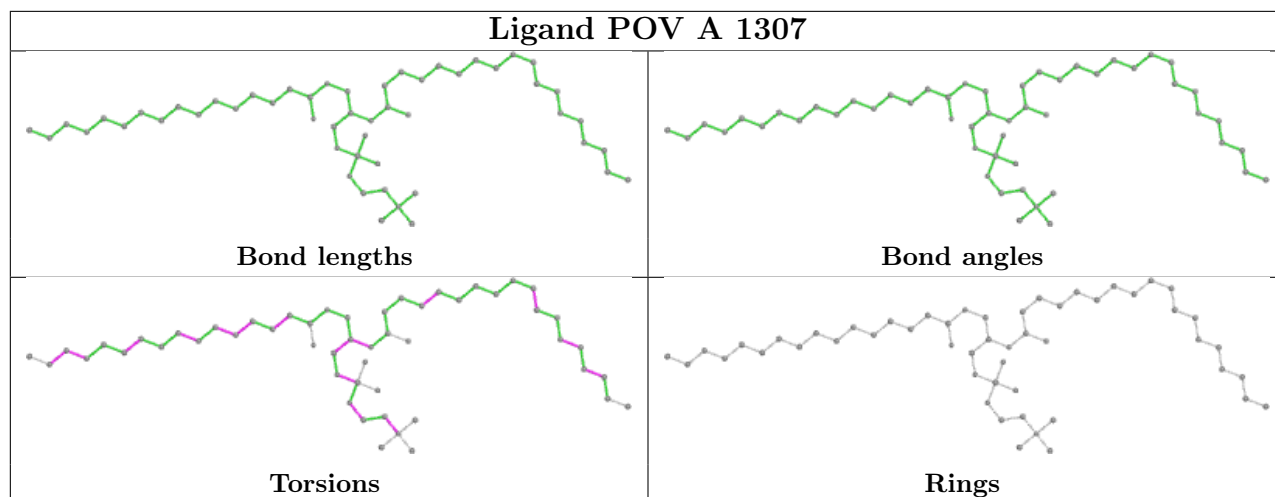
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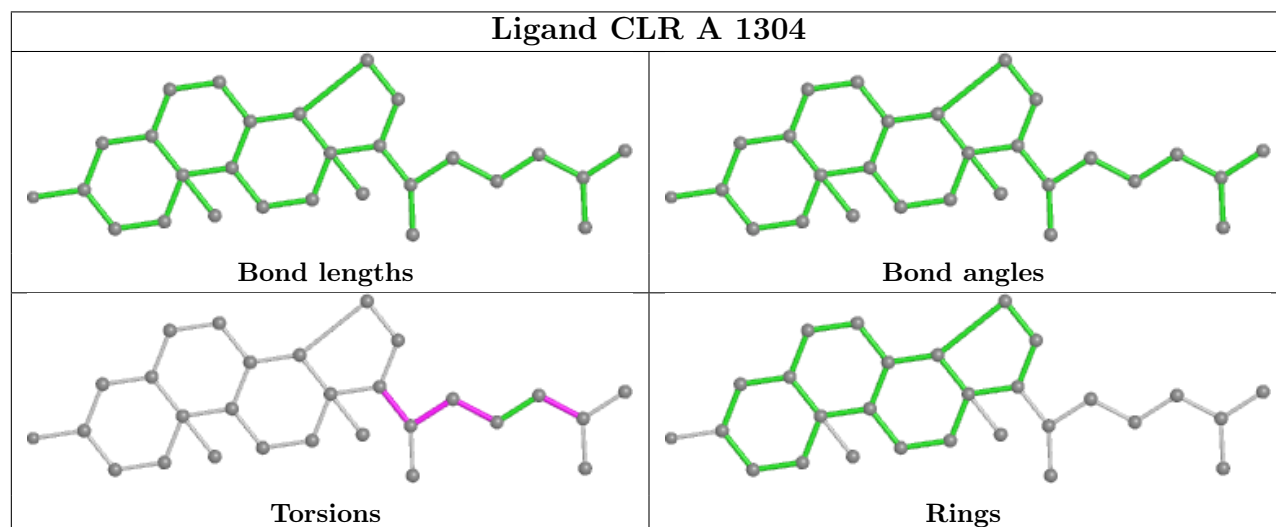
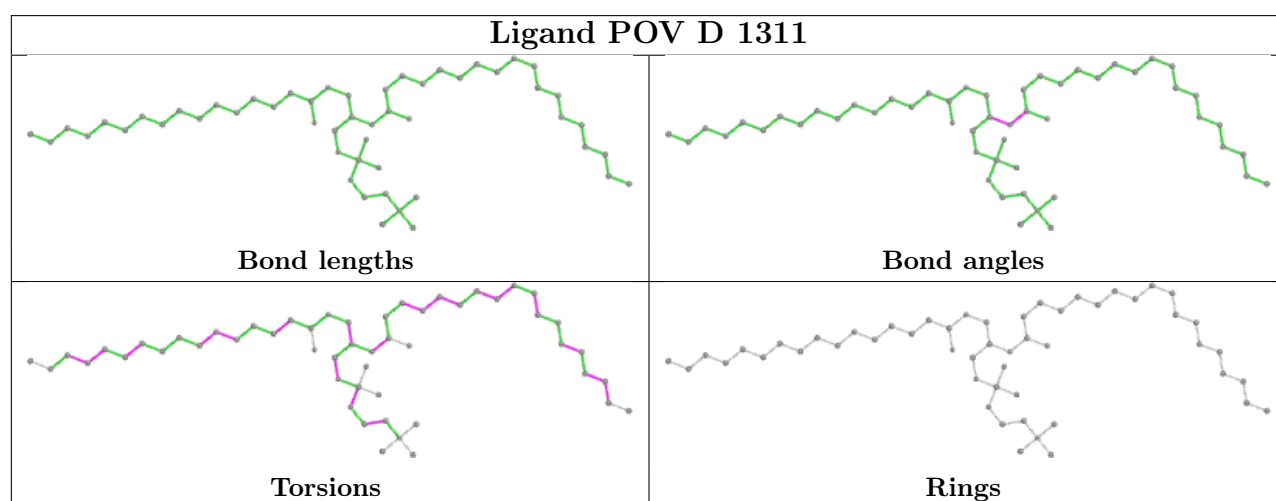
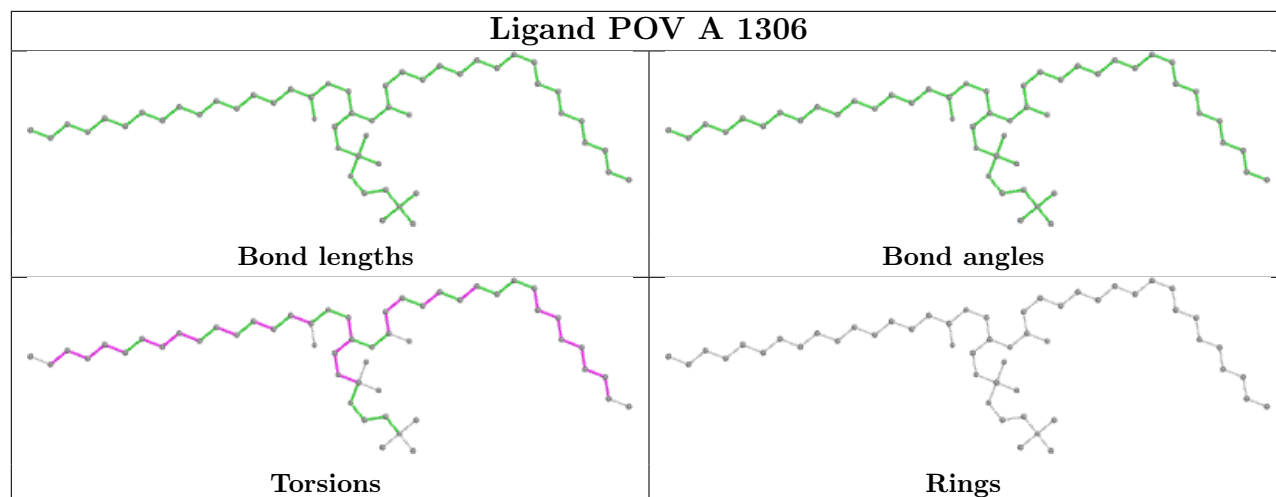
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	1304	POV	3	0
2	D	1309	POV	2	0
3	B	1304	CLR	2	0
2	C	1301	POV	2	0
2	C	1303	POV	3	0
2	A	1303	POV	2	0
2	C	1309	POV	2	0
2	D	1306	POV	2	0
2	D	1308	POV	2	0
2	D	1305	POV	3	0
2	A	1309	POV	1	0
3	C	1305	CLR	2	0
2	C	1310	POV	1	0
2	C	1311	POV	1	0
2	B	1306	POV	1	0
2	C	1306	POV	2	0
2	B	1309	POV	3	0
2	D	1312	POV	1	0
2	B	1305	POV	2	0
2	B	1301	POV	2	0
2	A	1311	POV	2	0

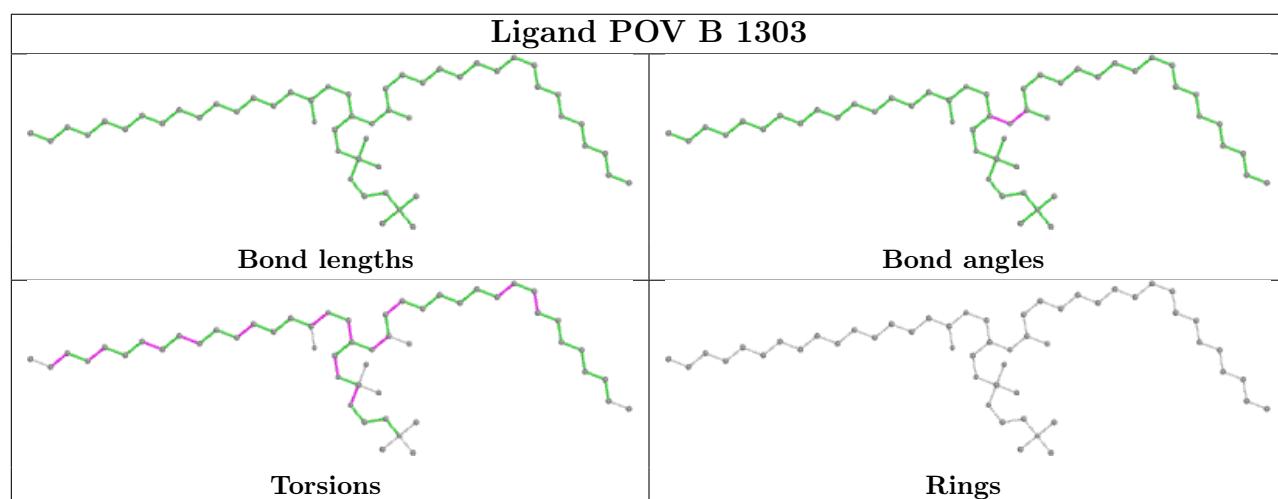
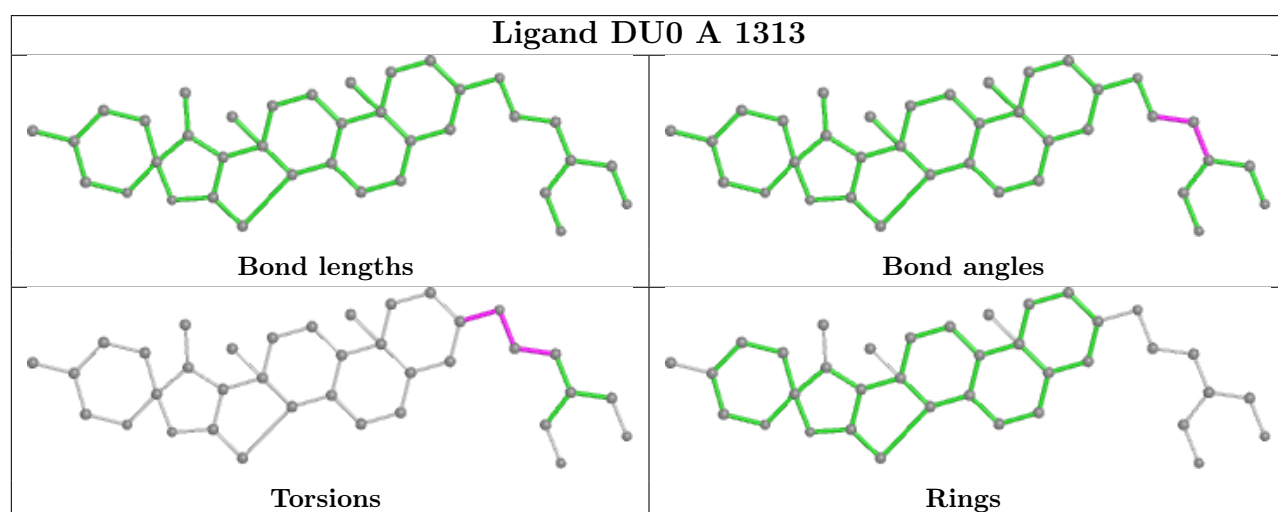
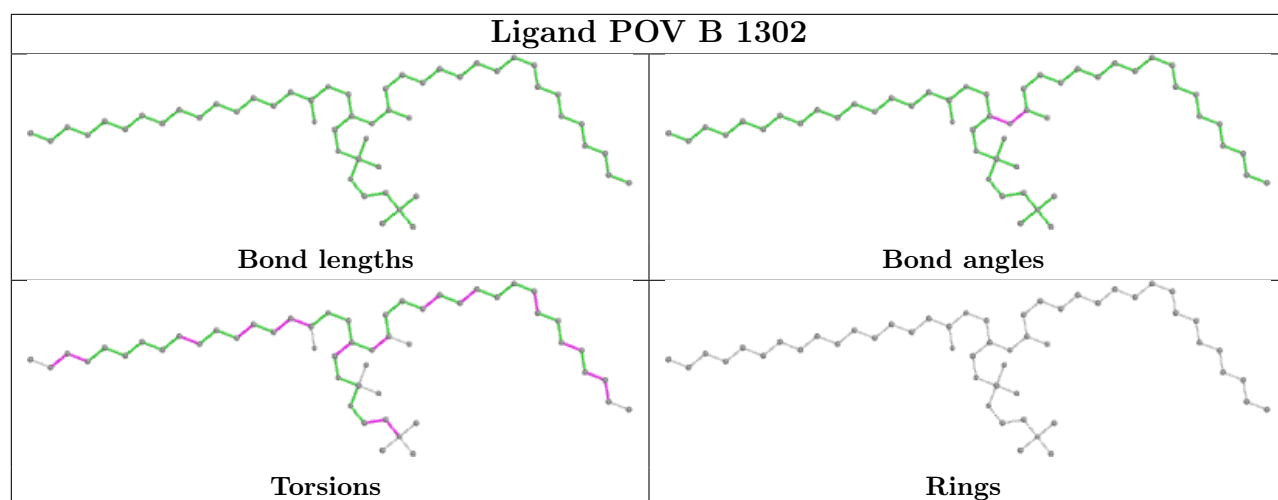
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

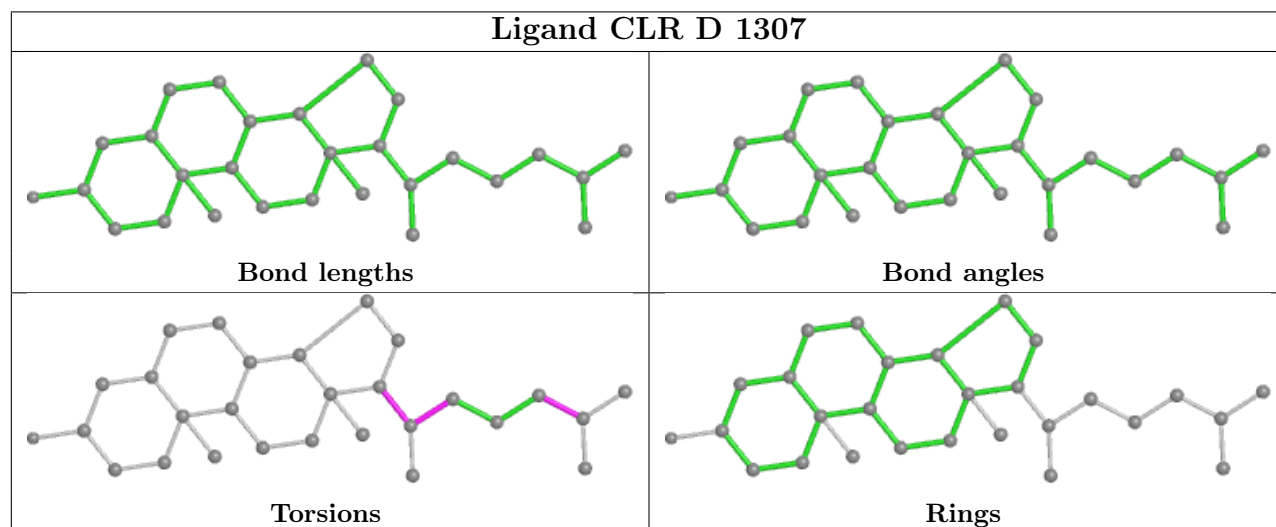
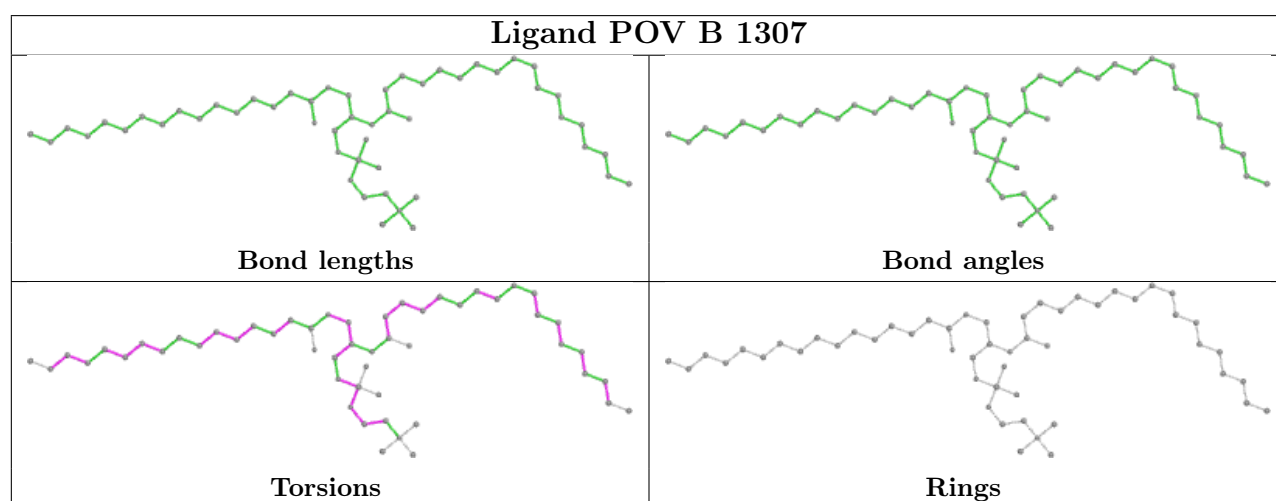
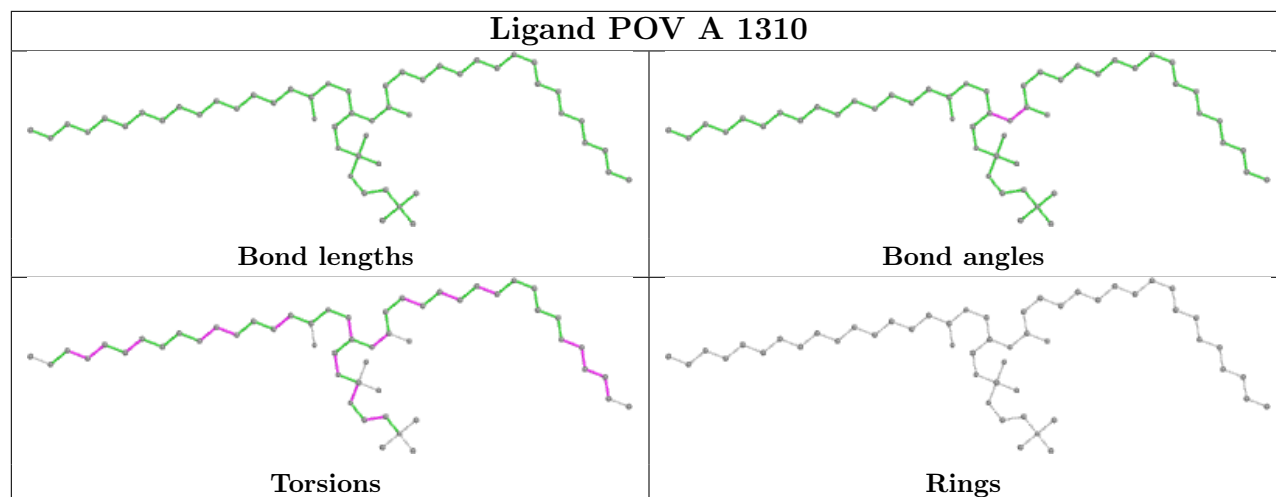


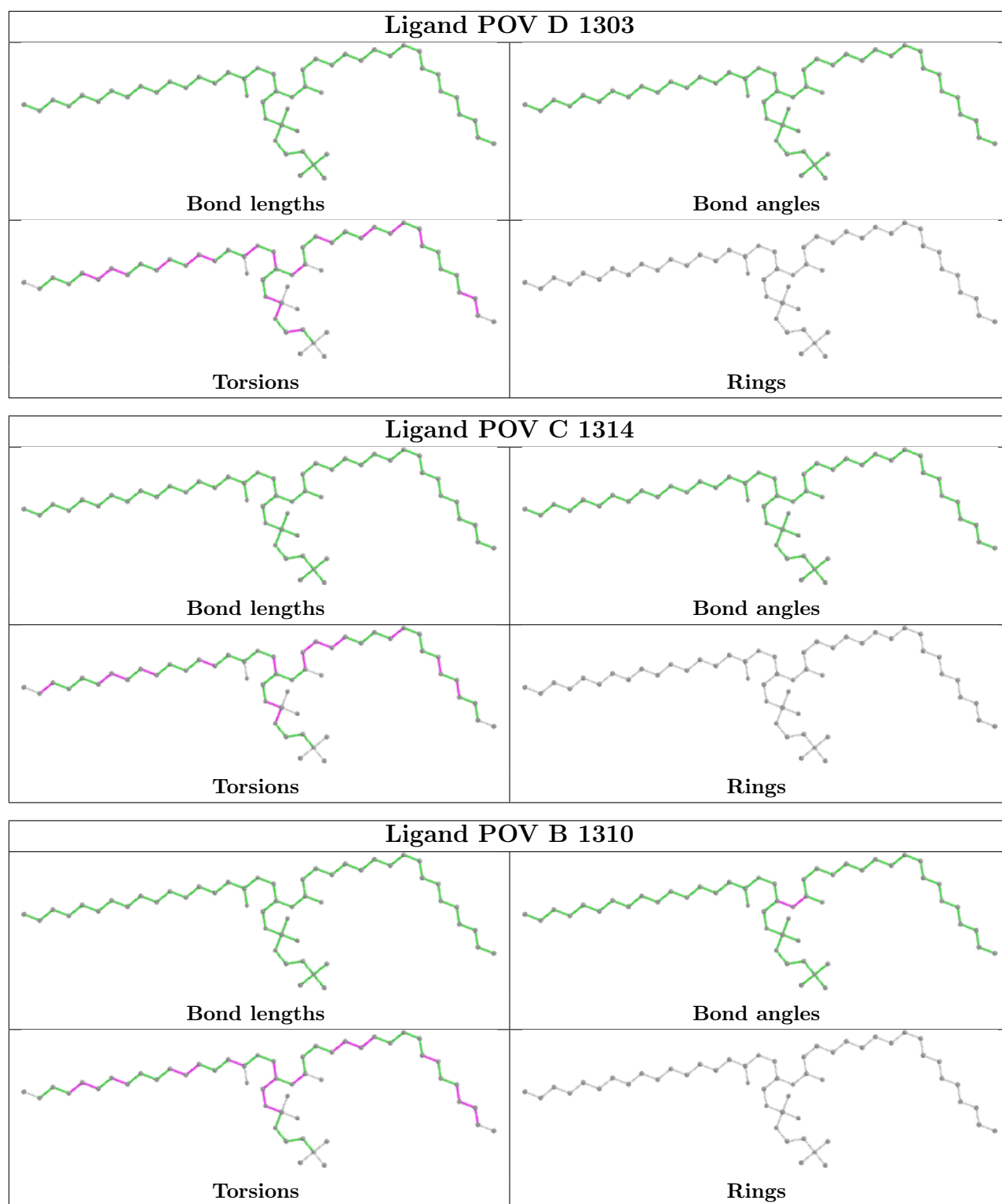


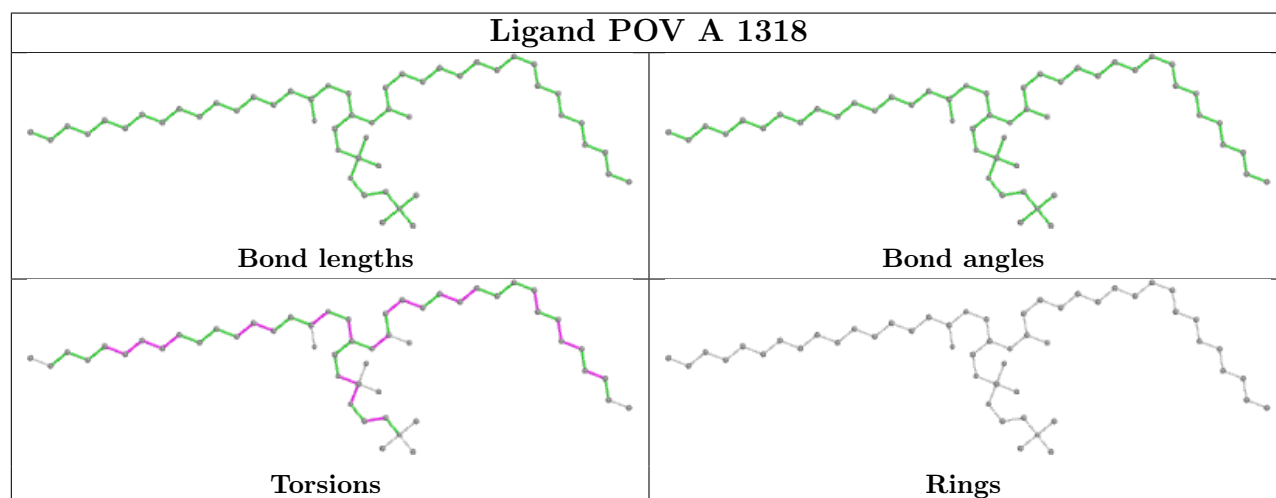
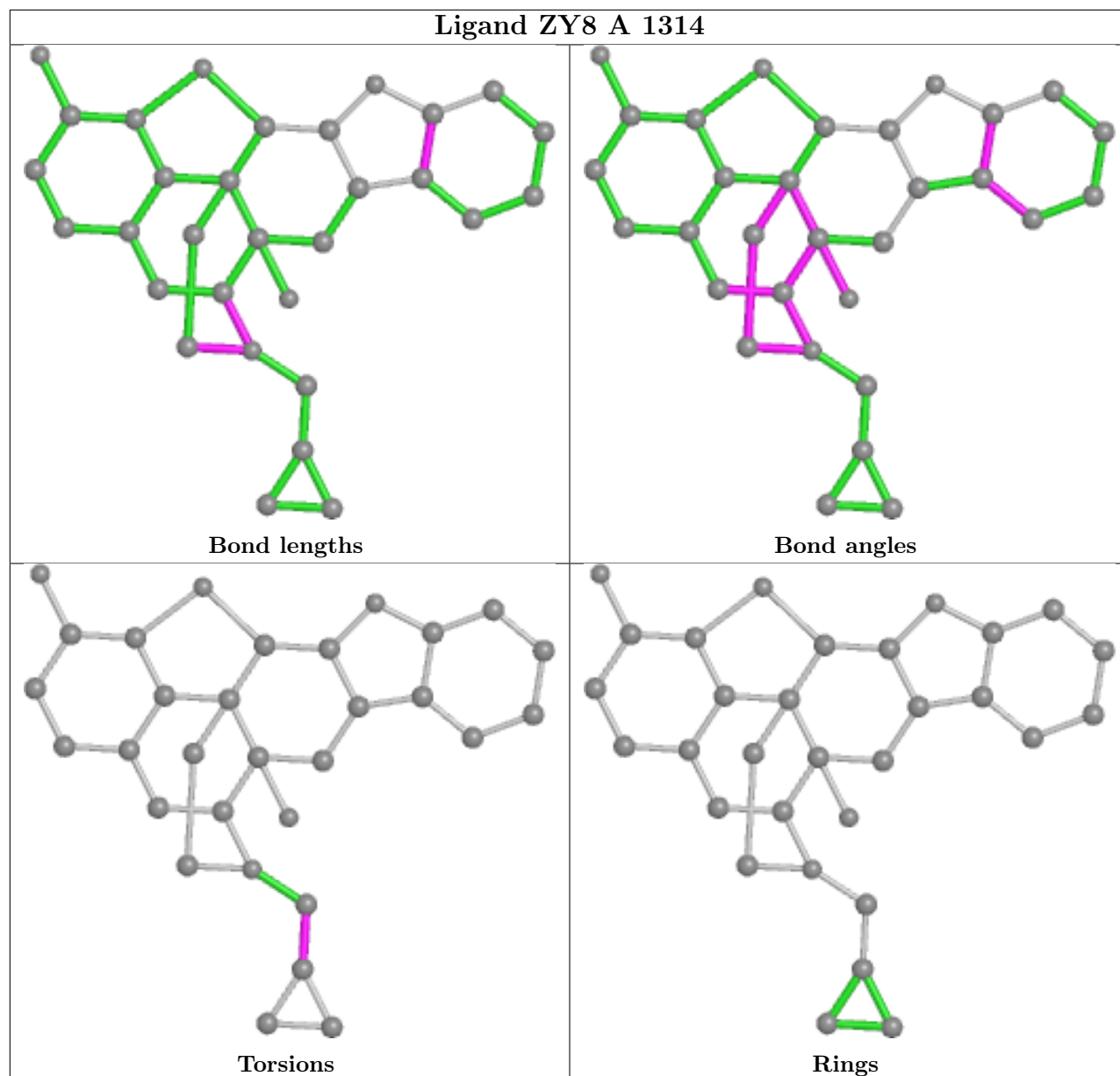


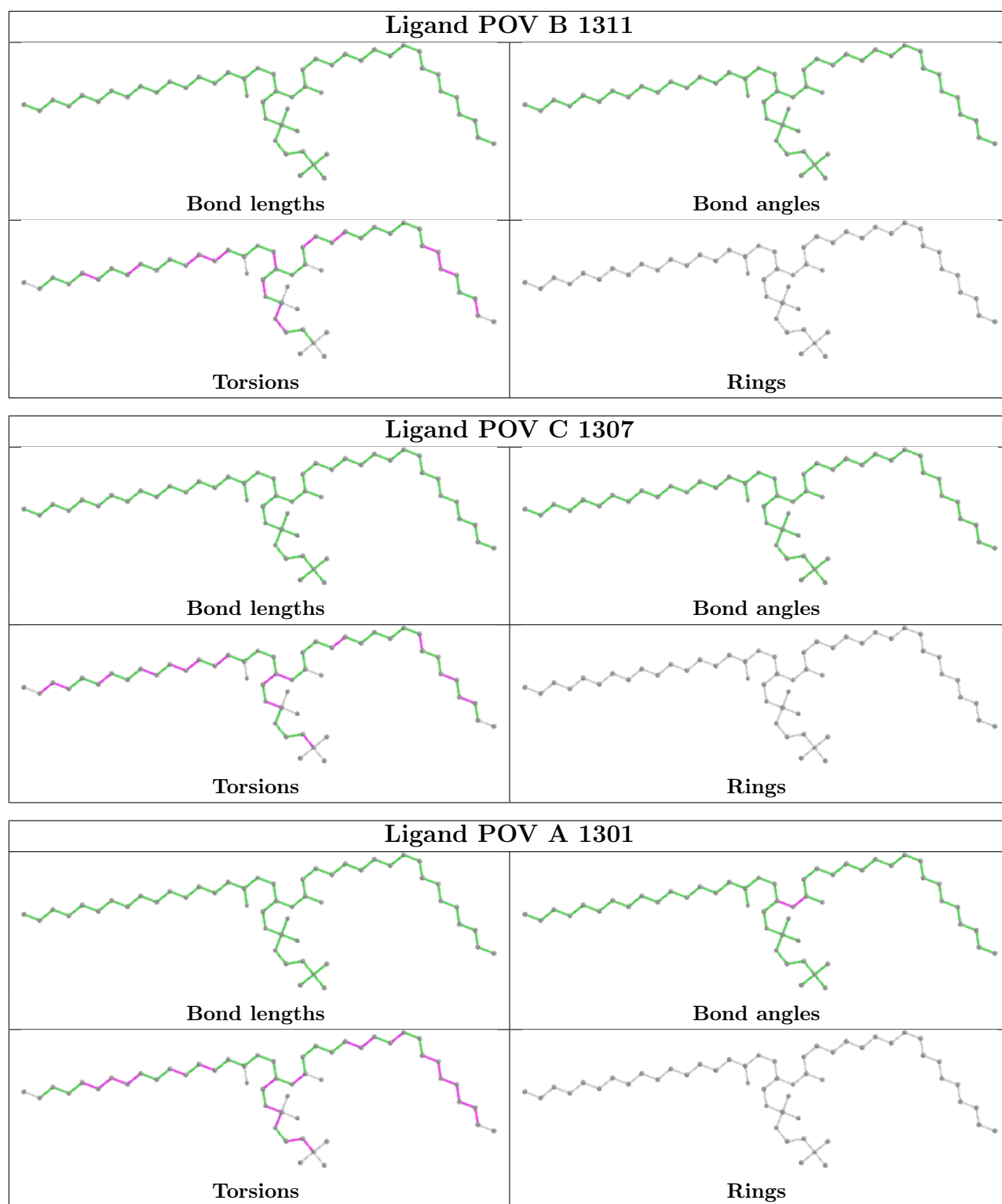


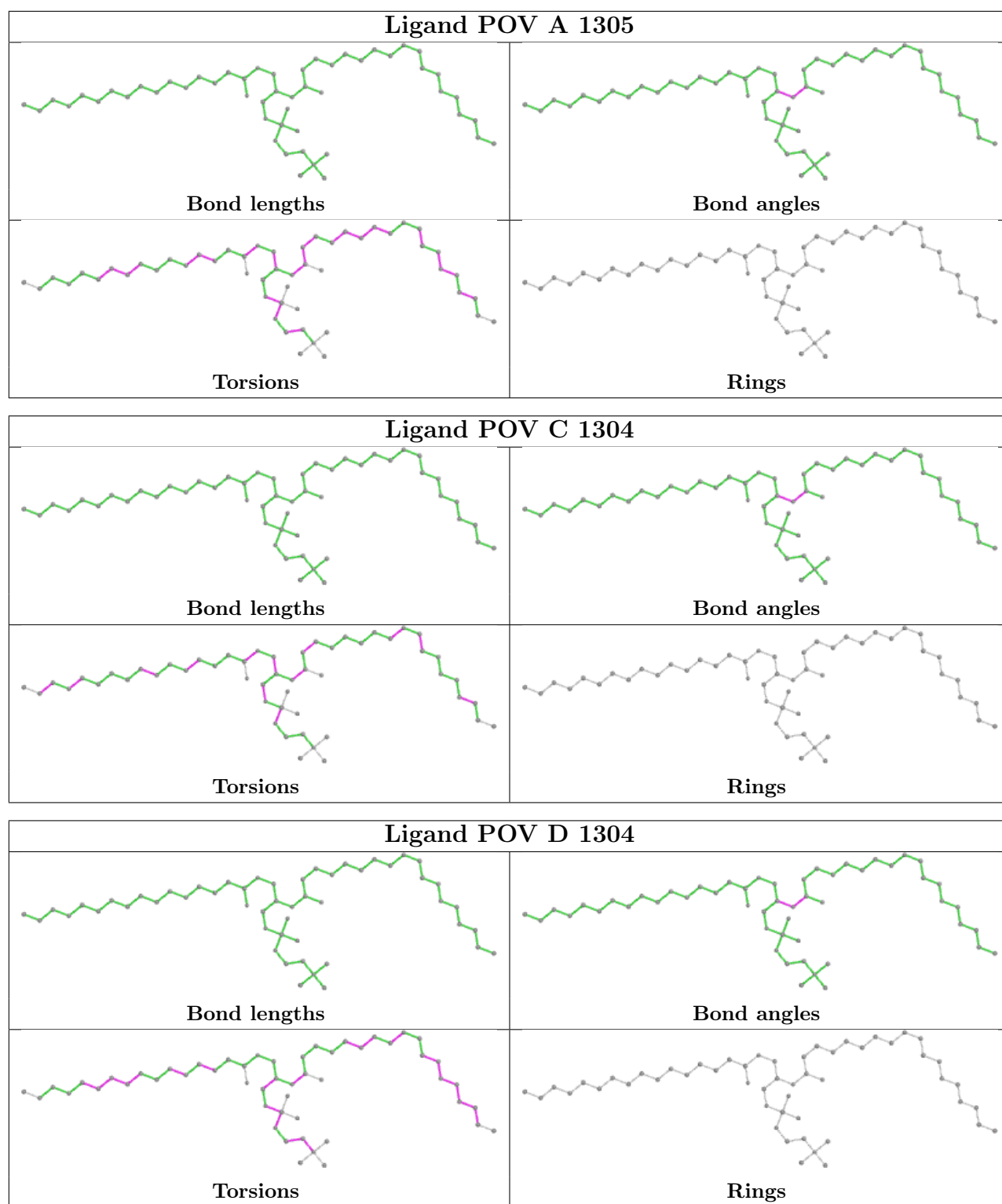


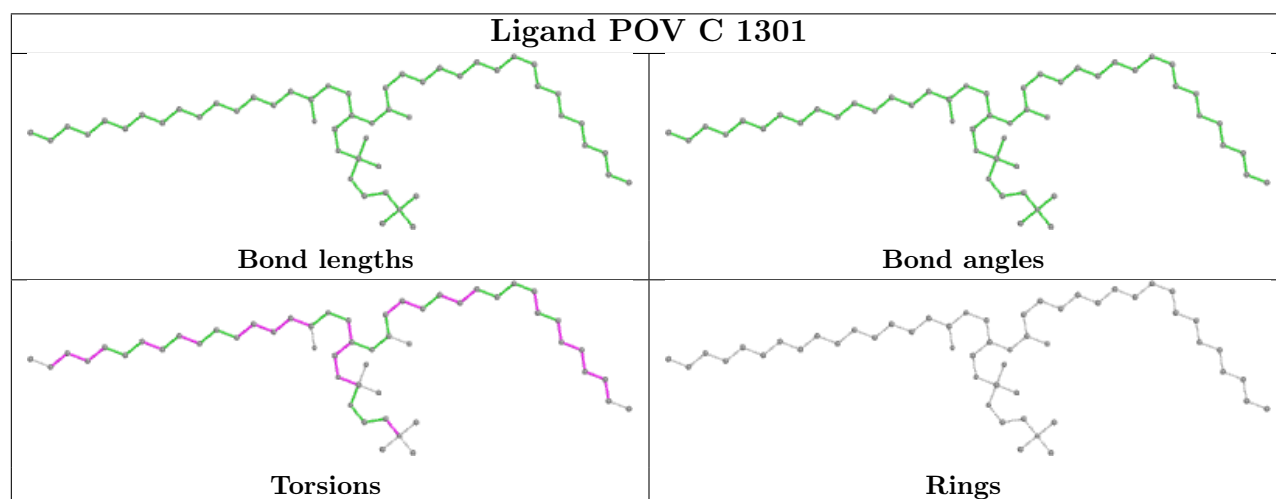
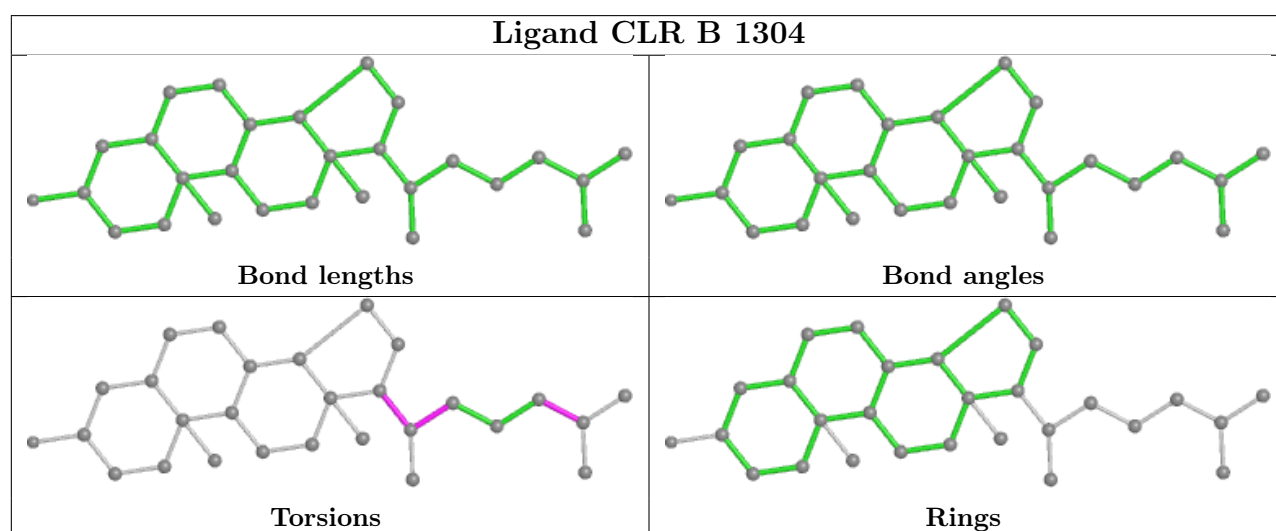
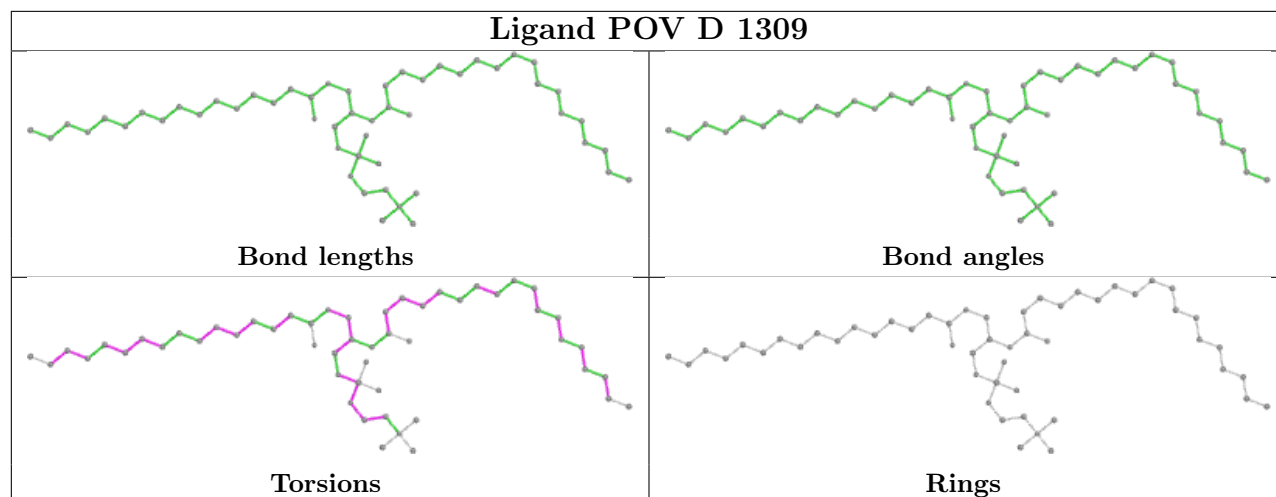


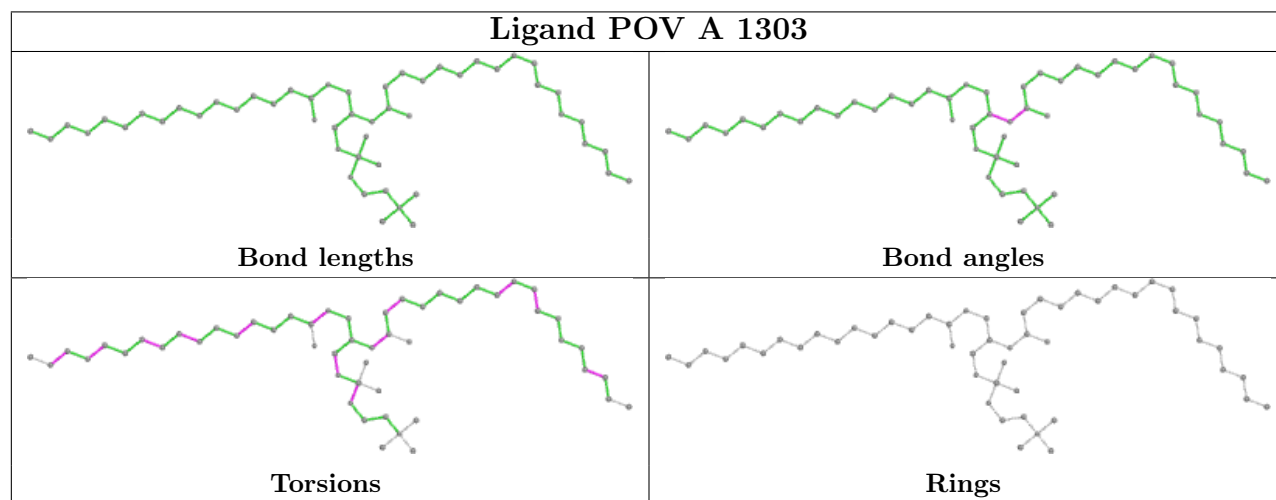
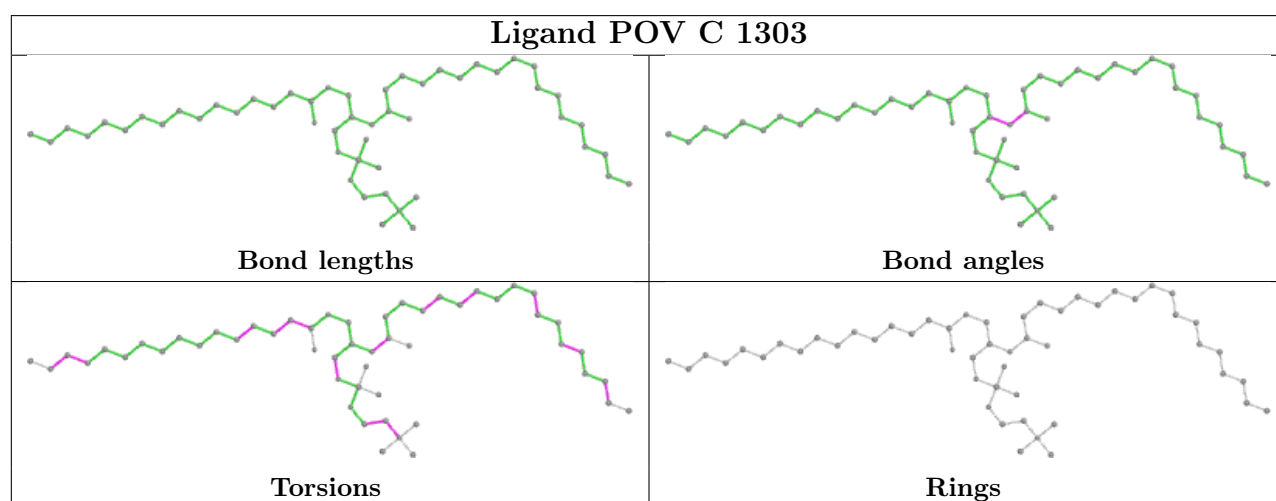
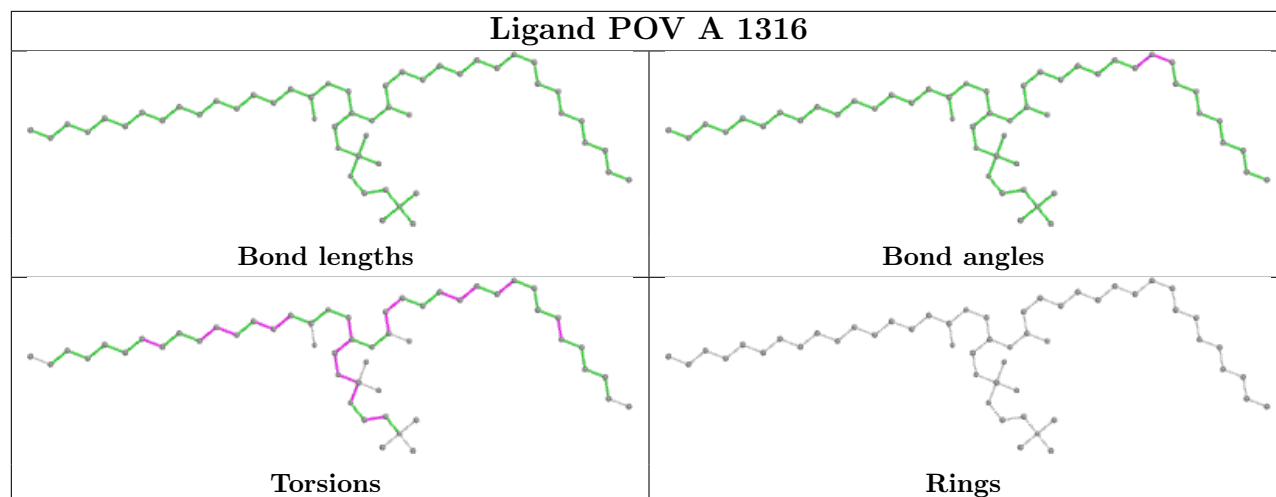


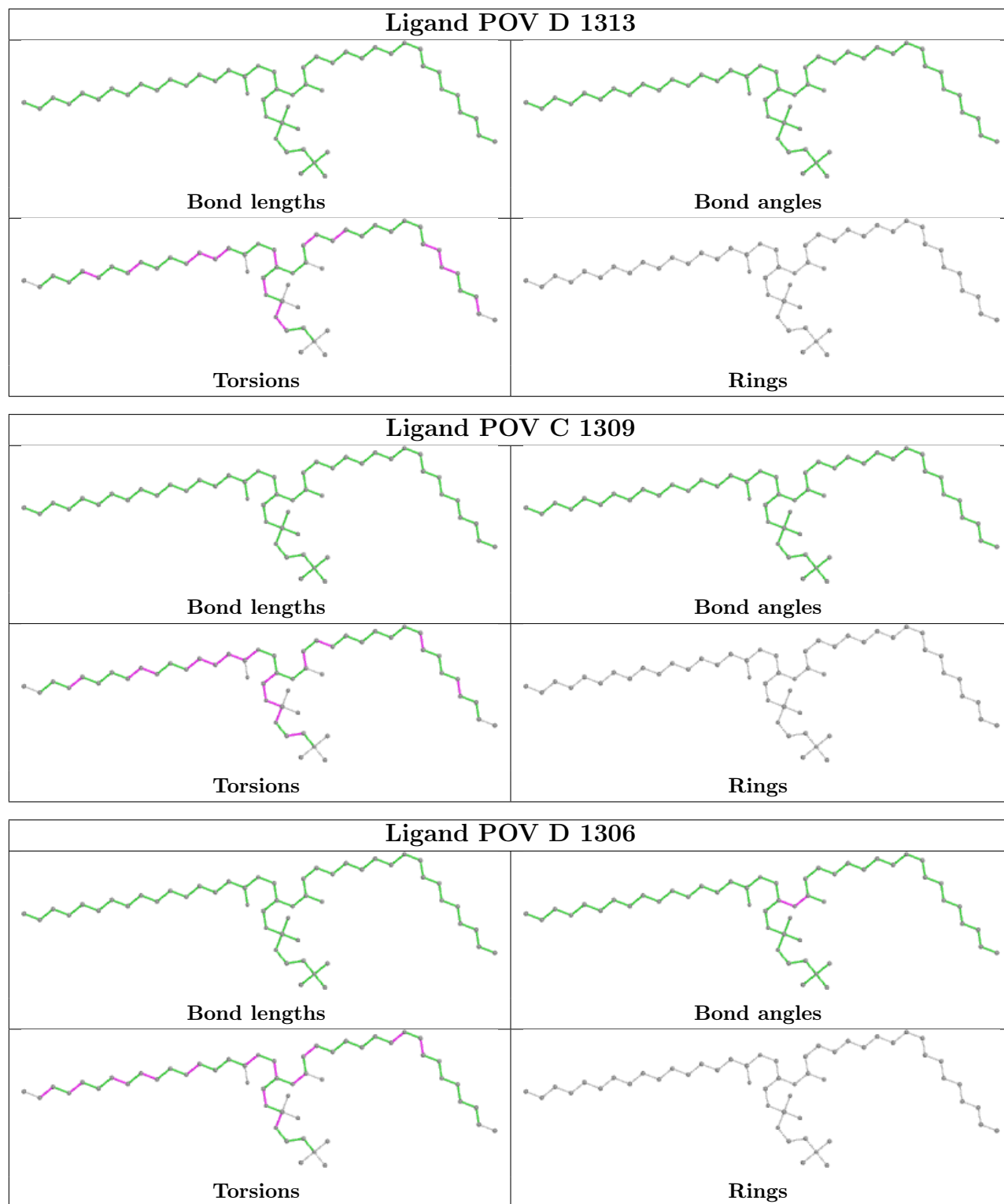


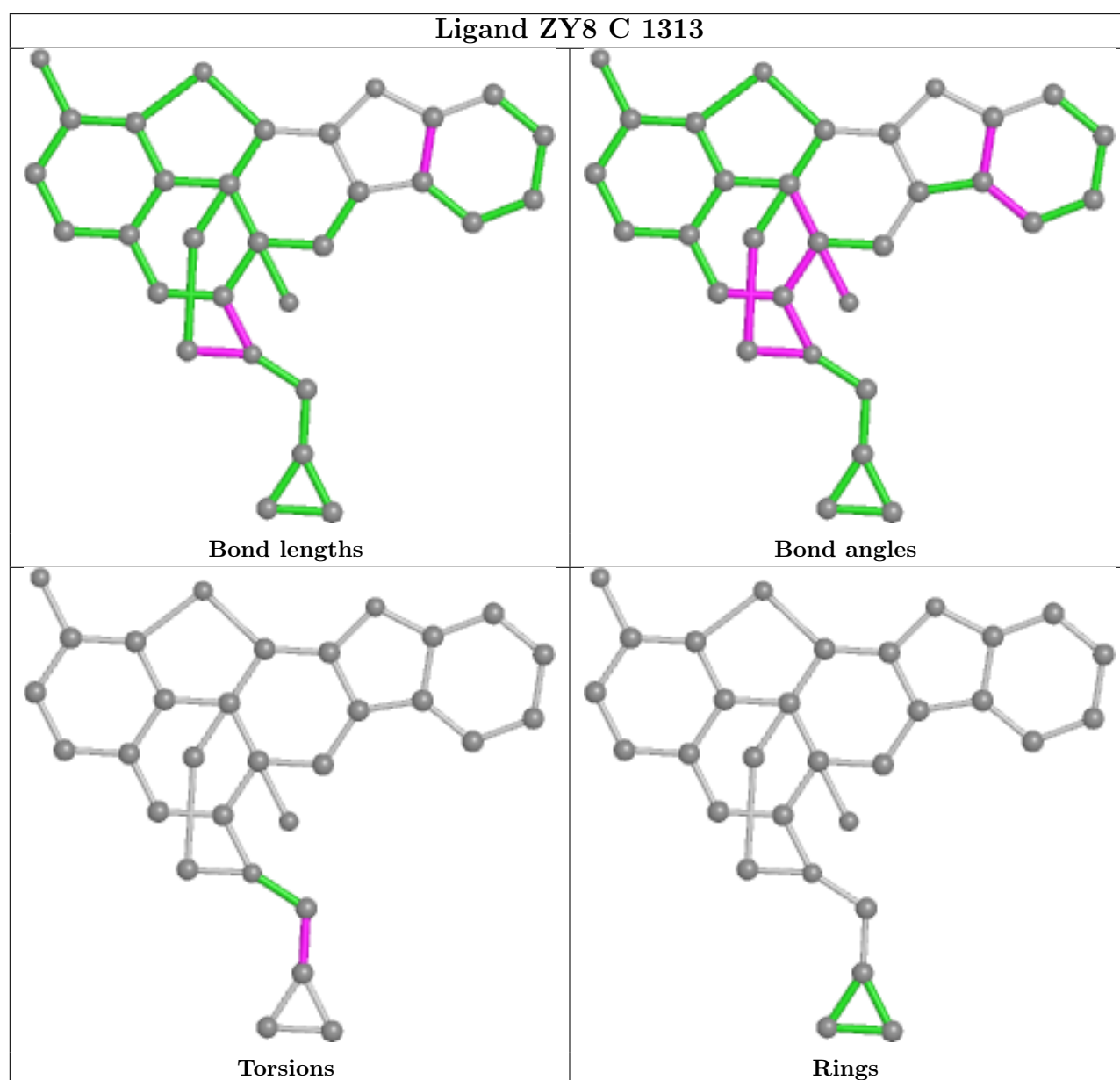
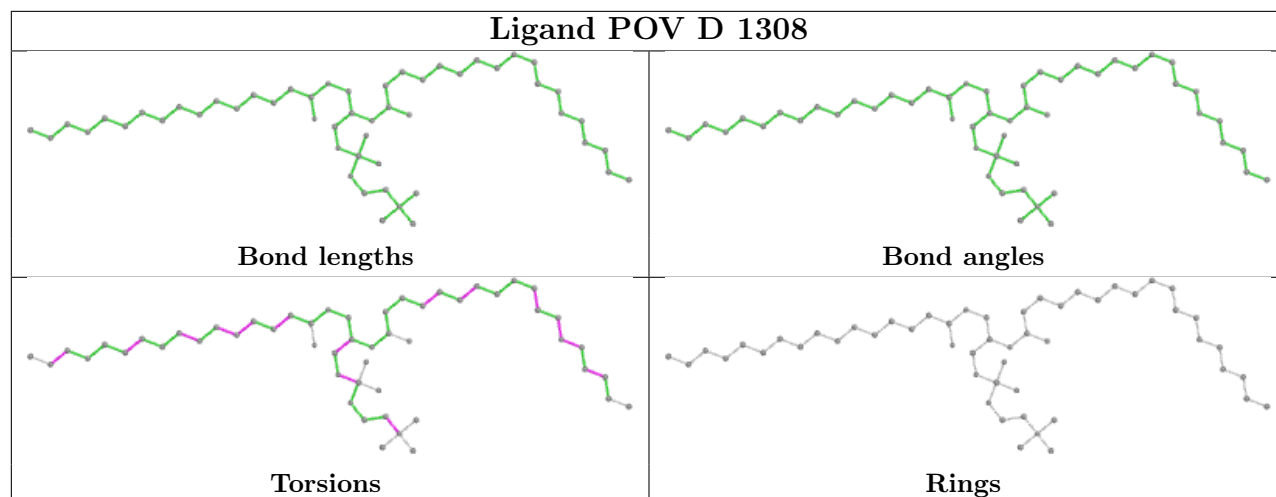


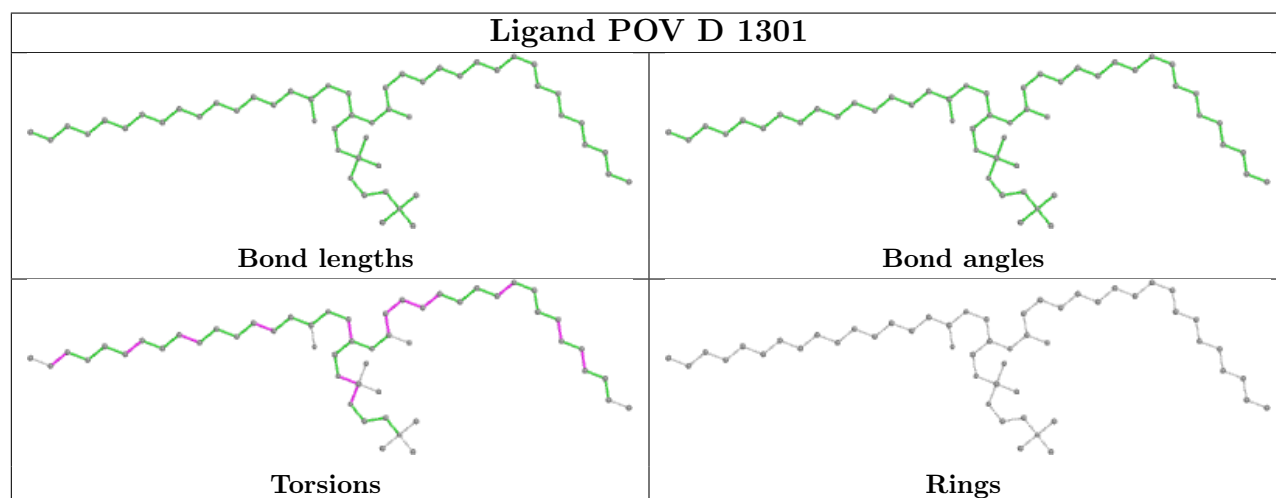
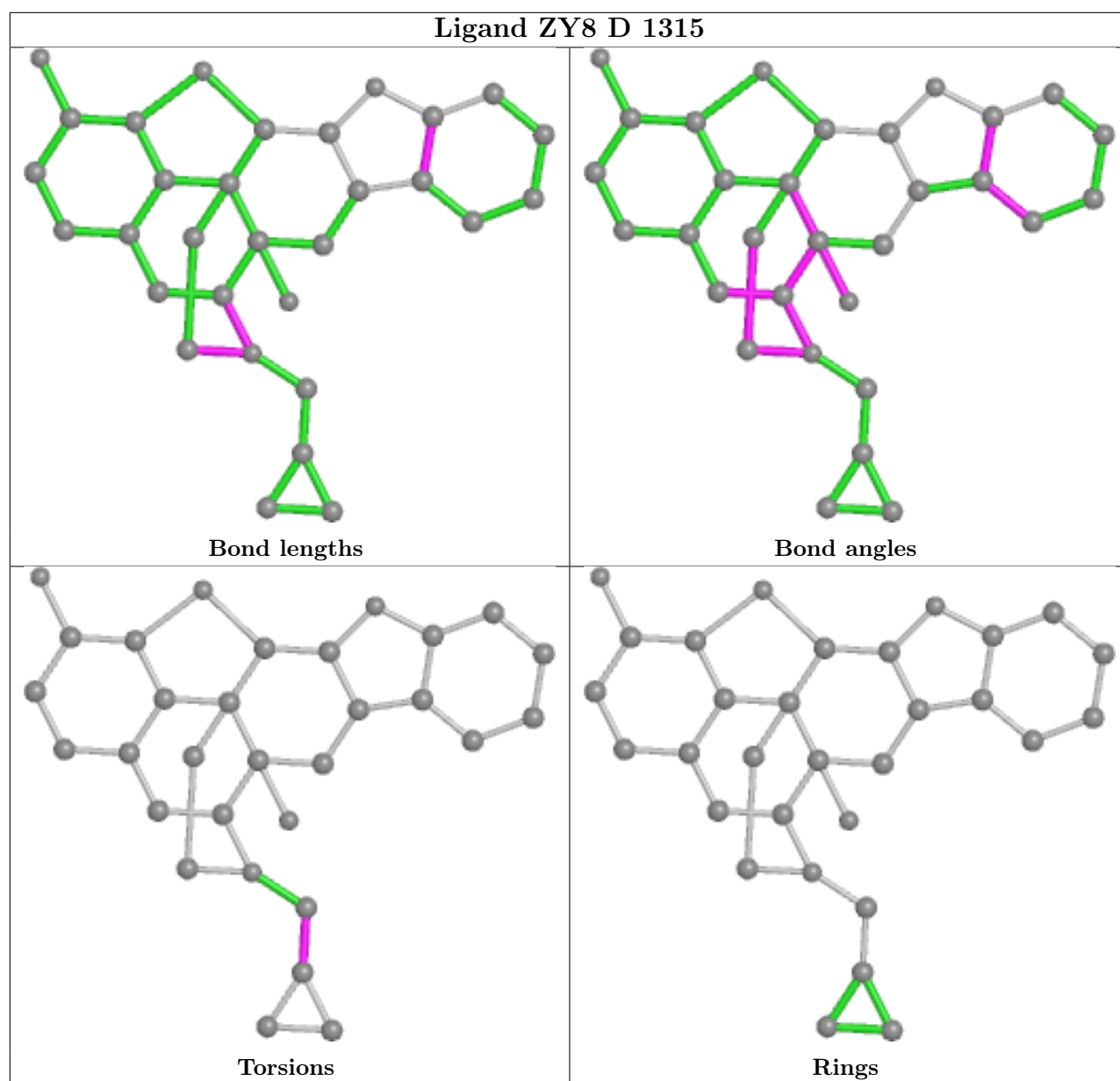


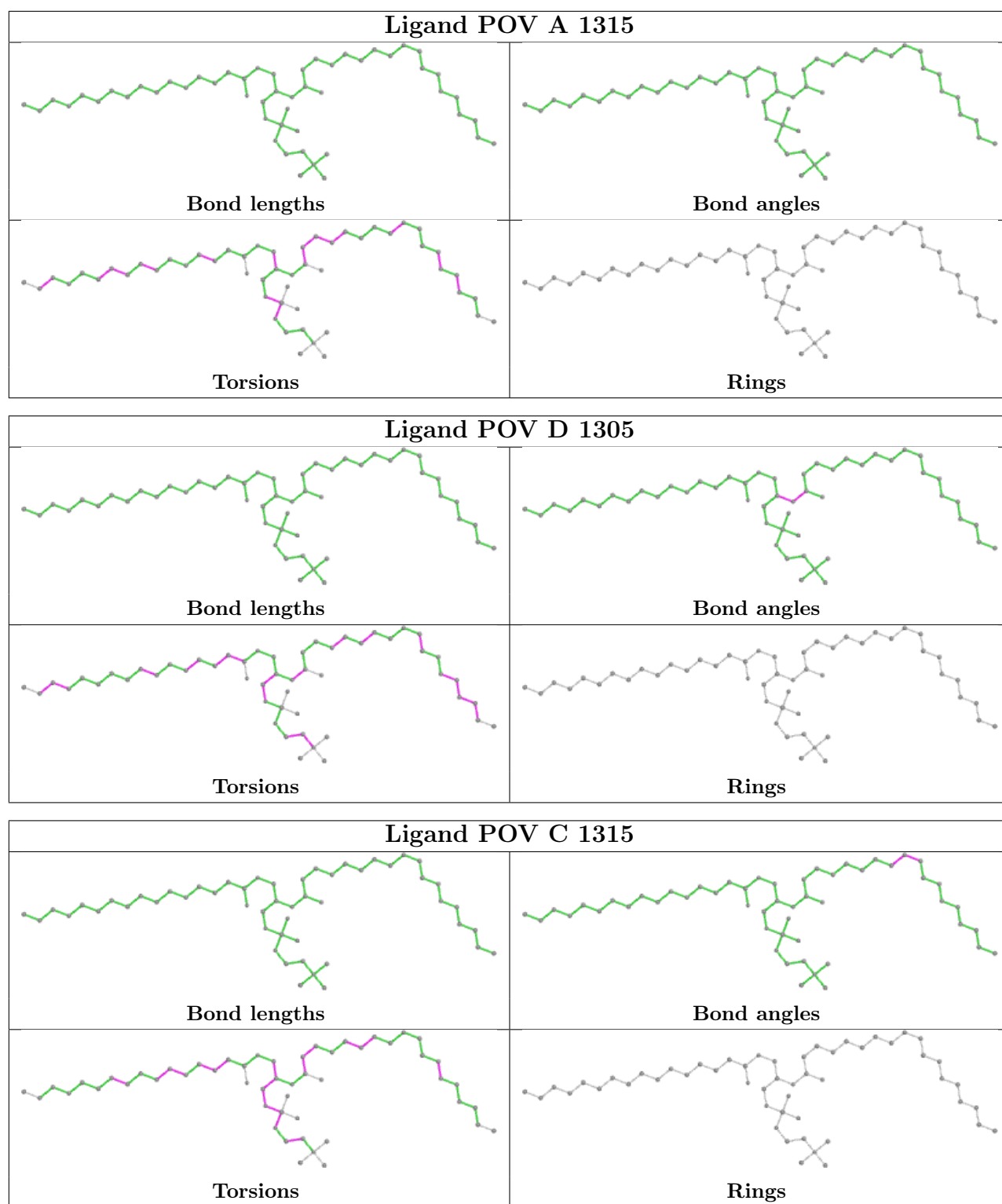


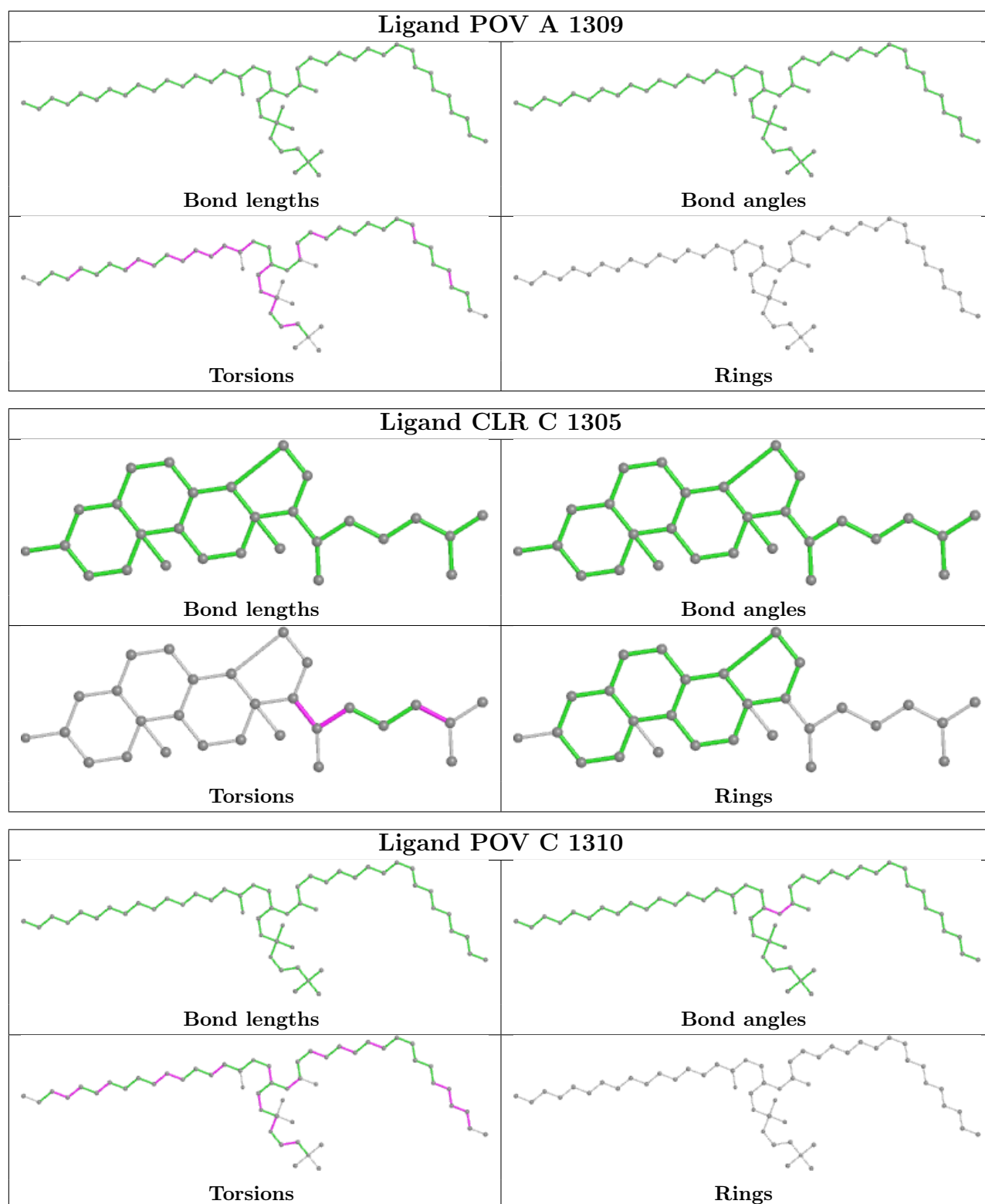


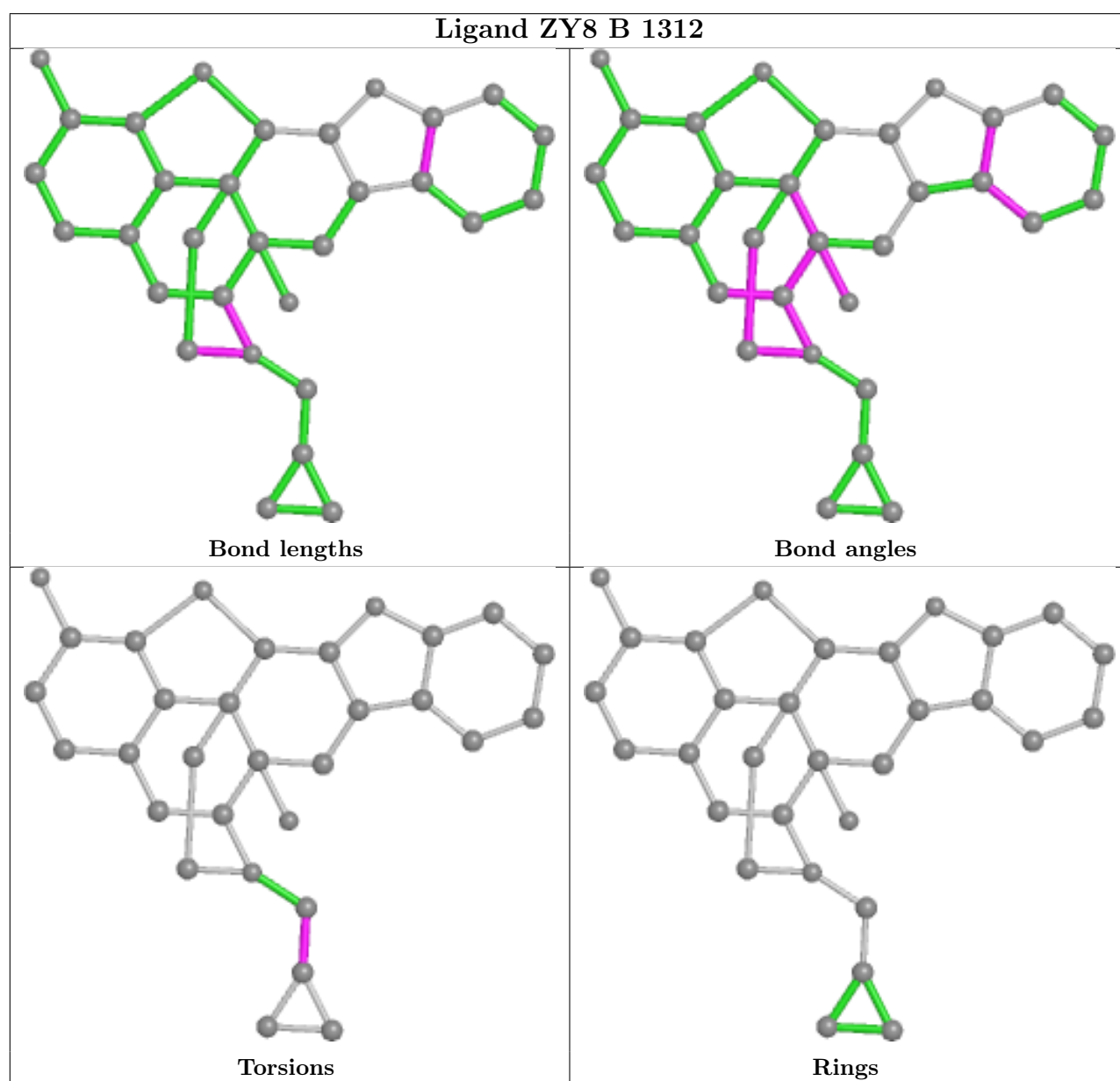
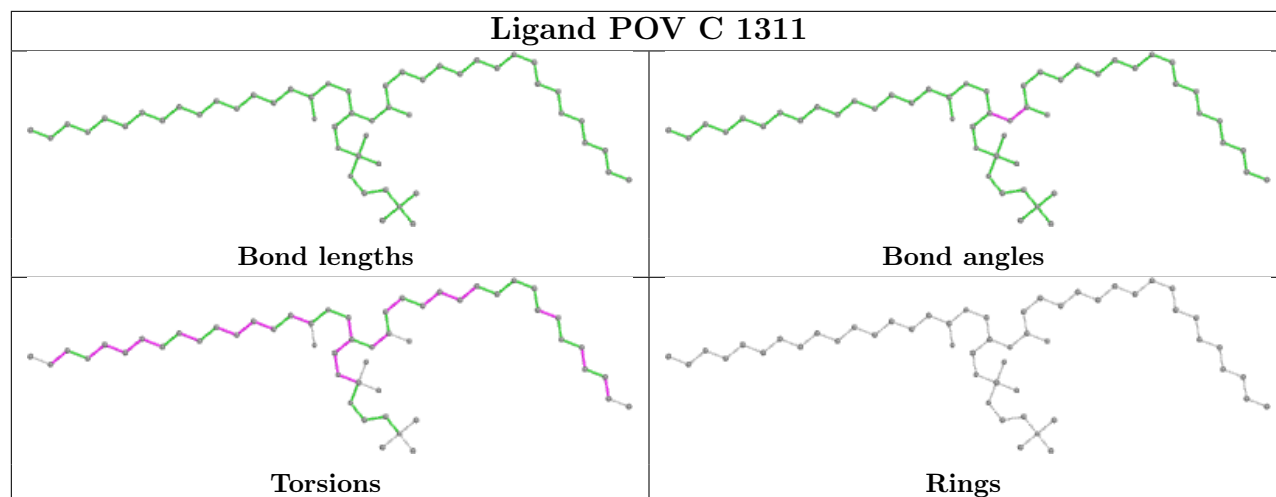


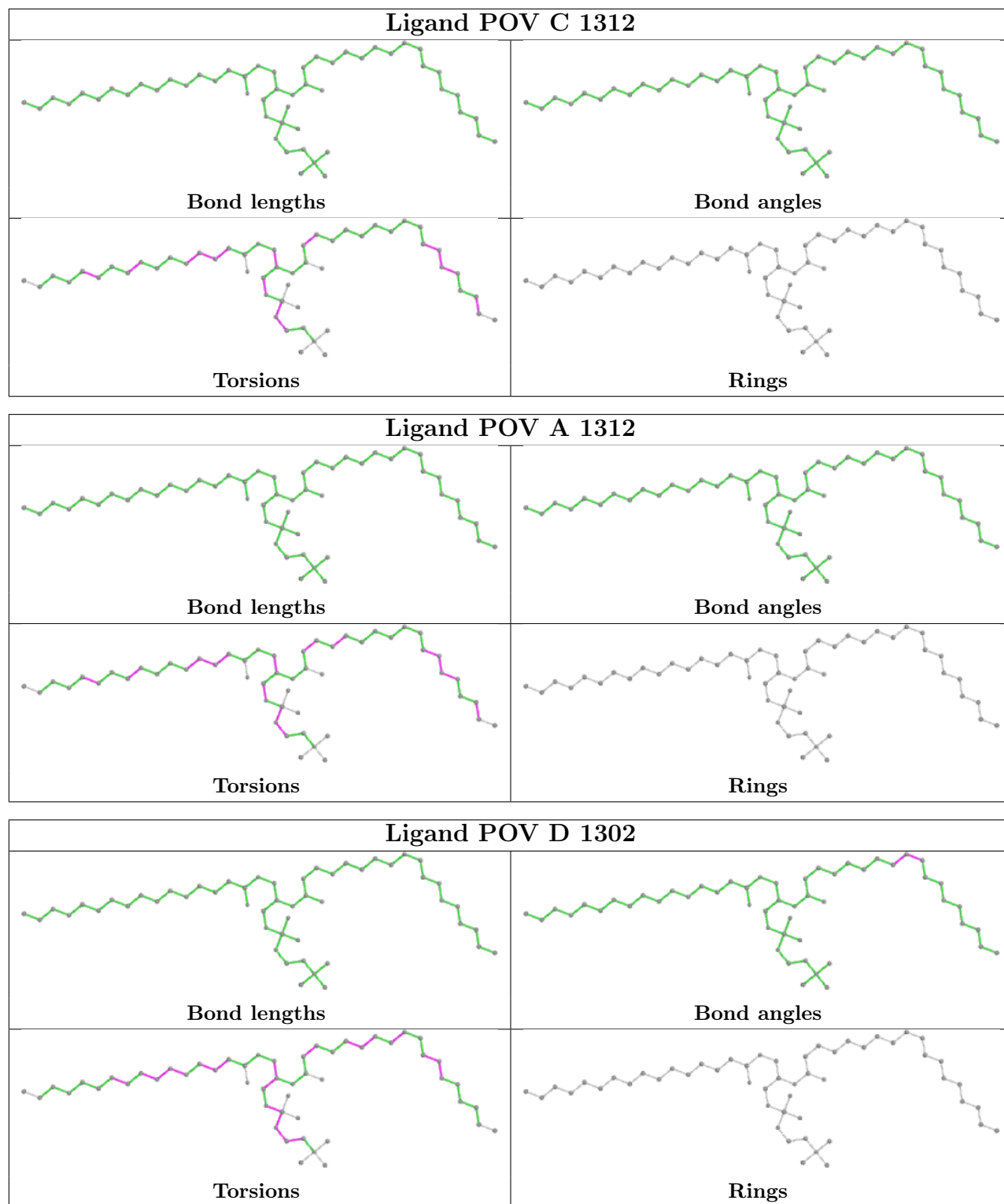


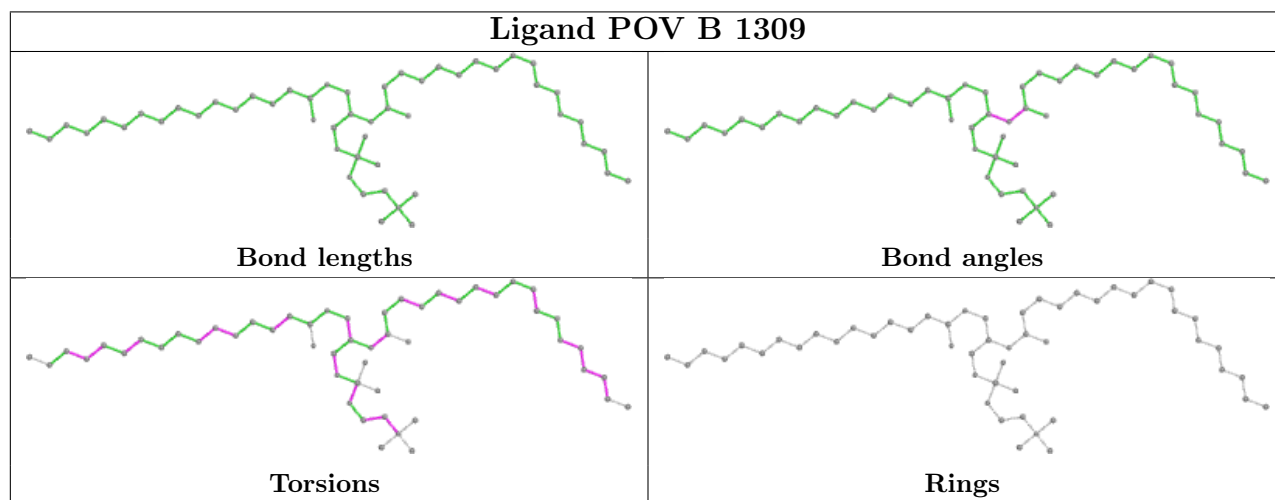
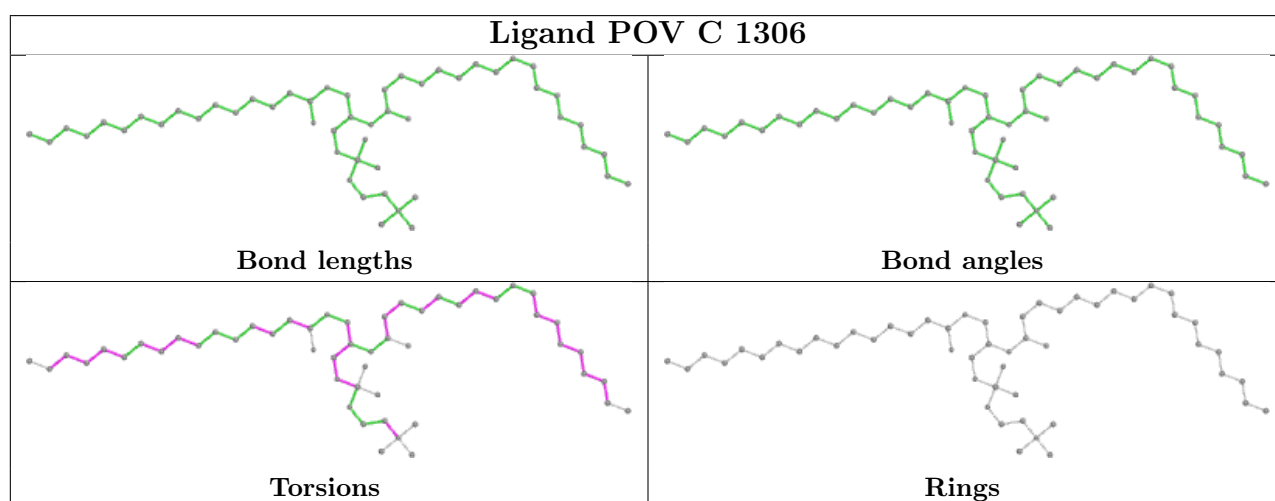
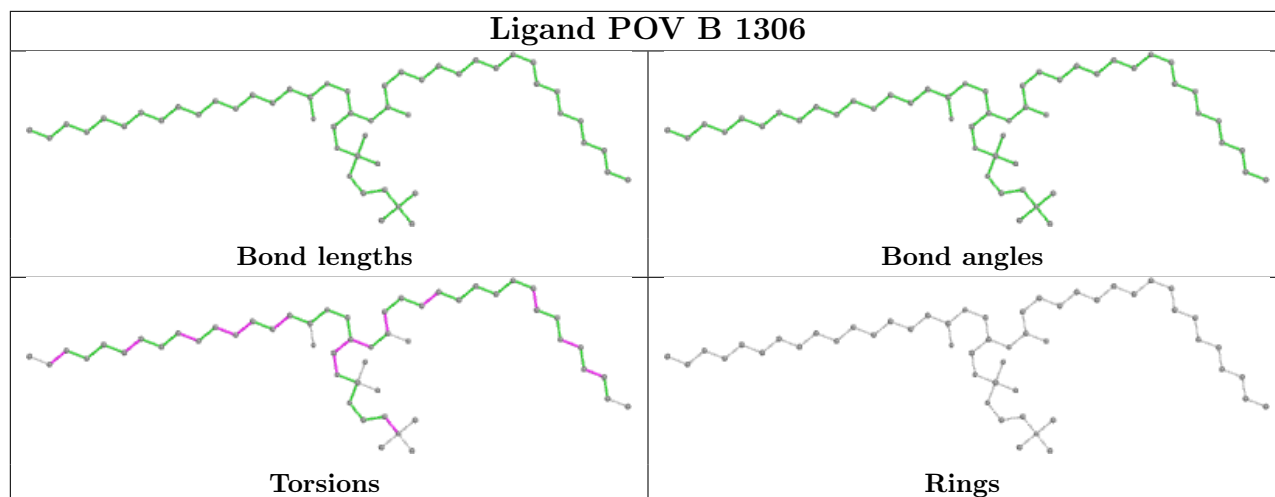


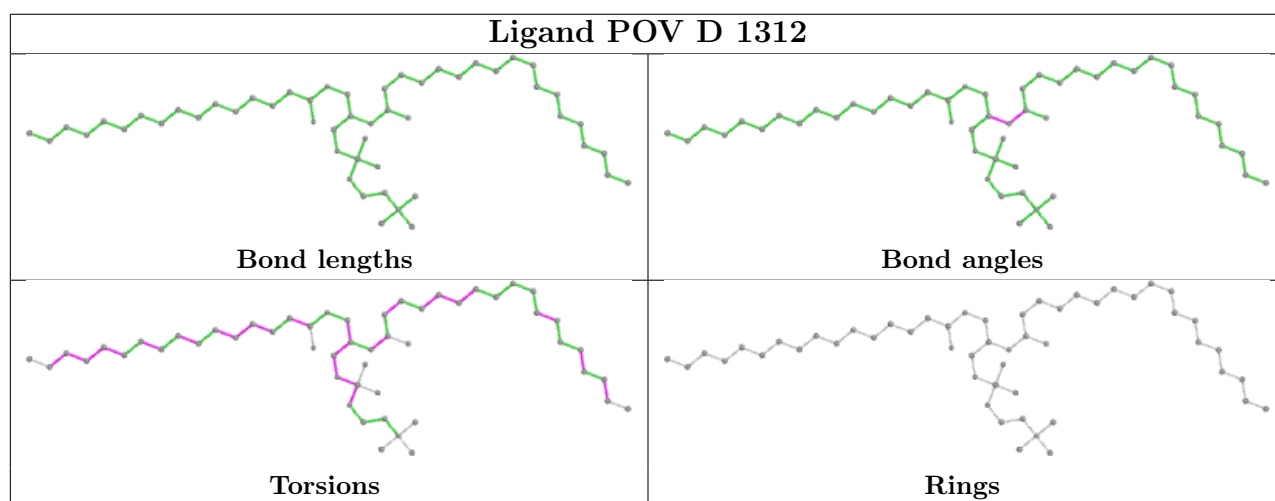
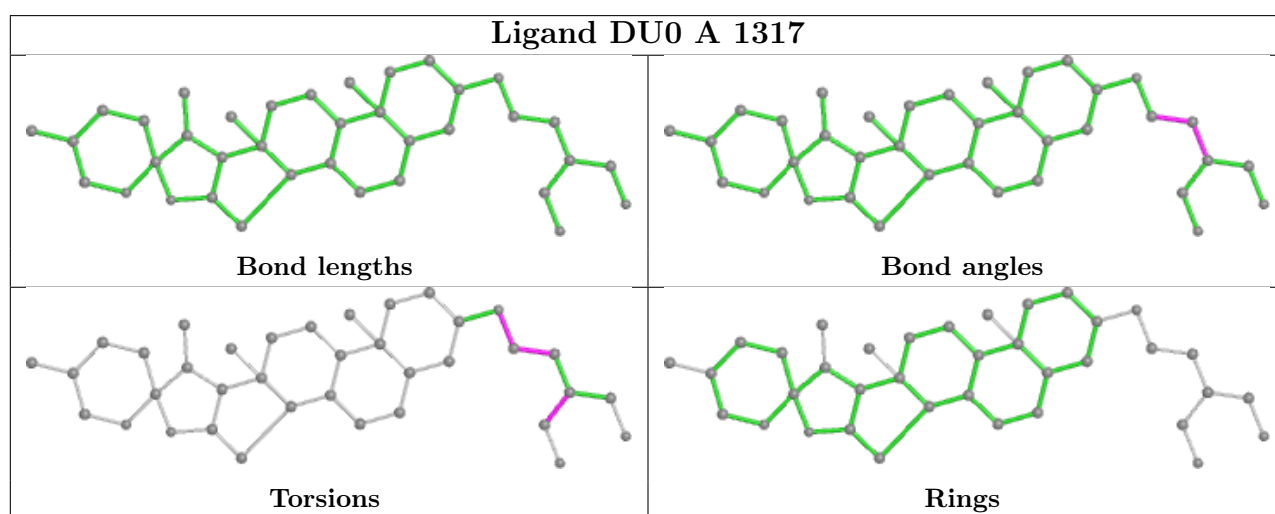
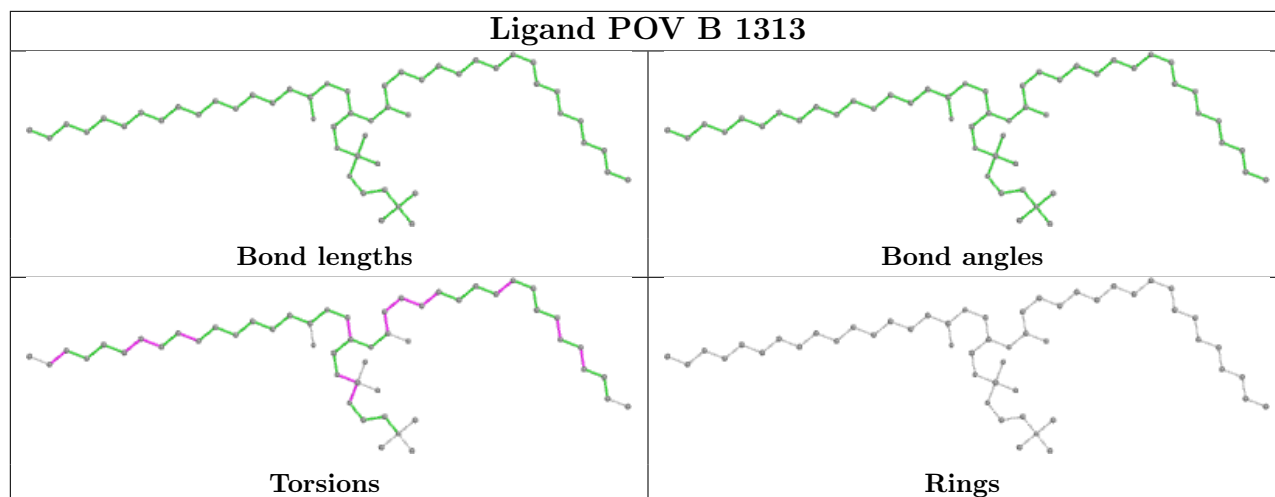


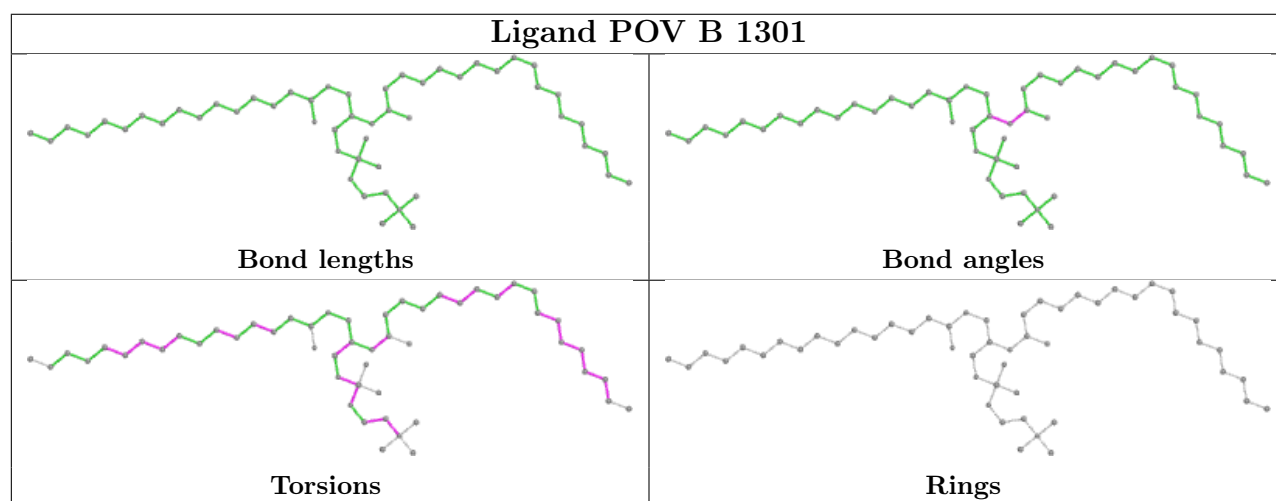
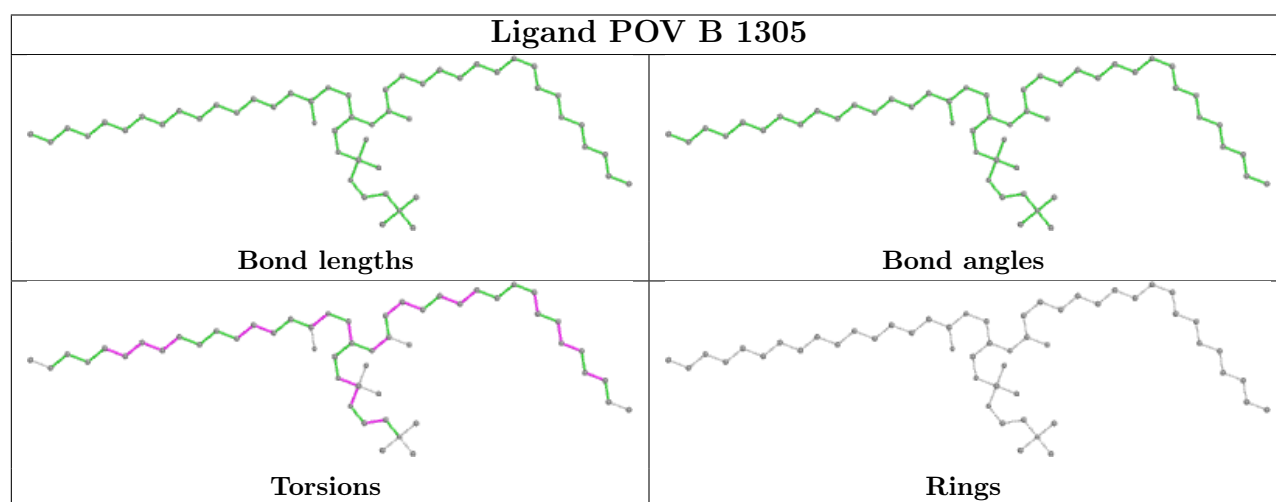
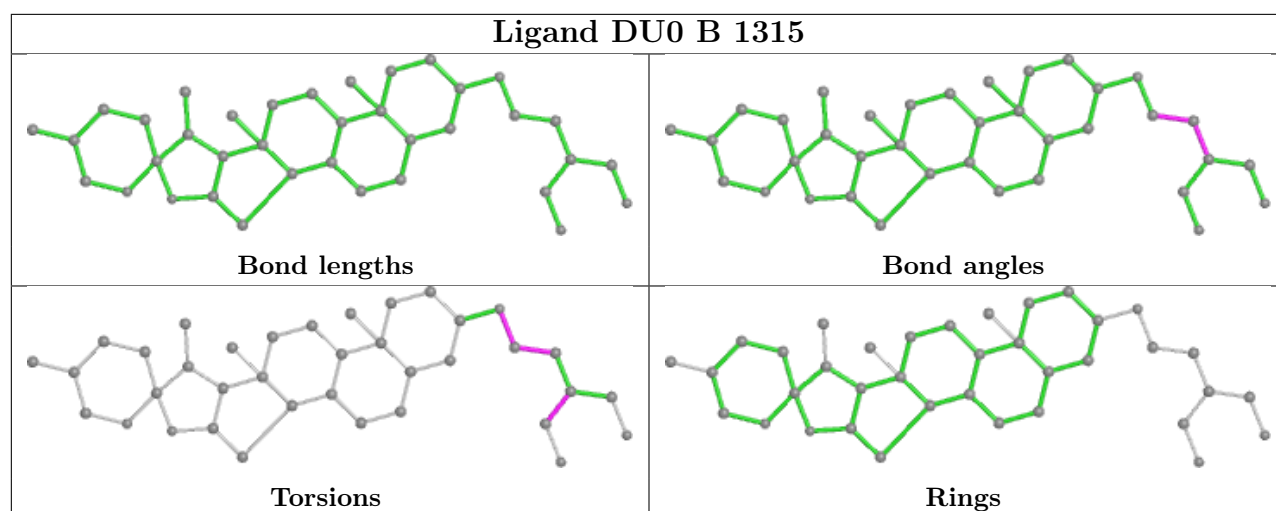


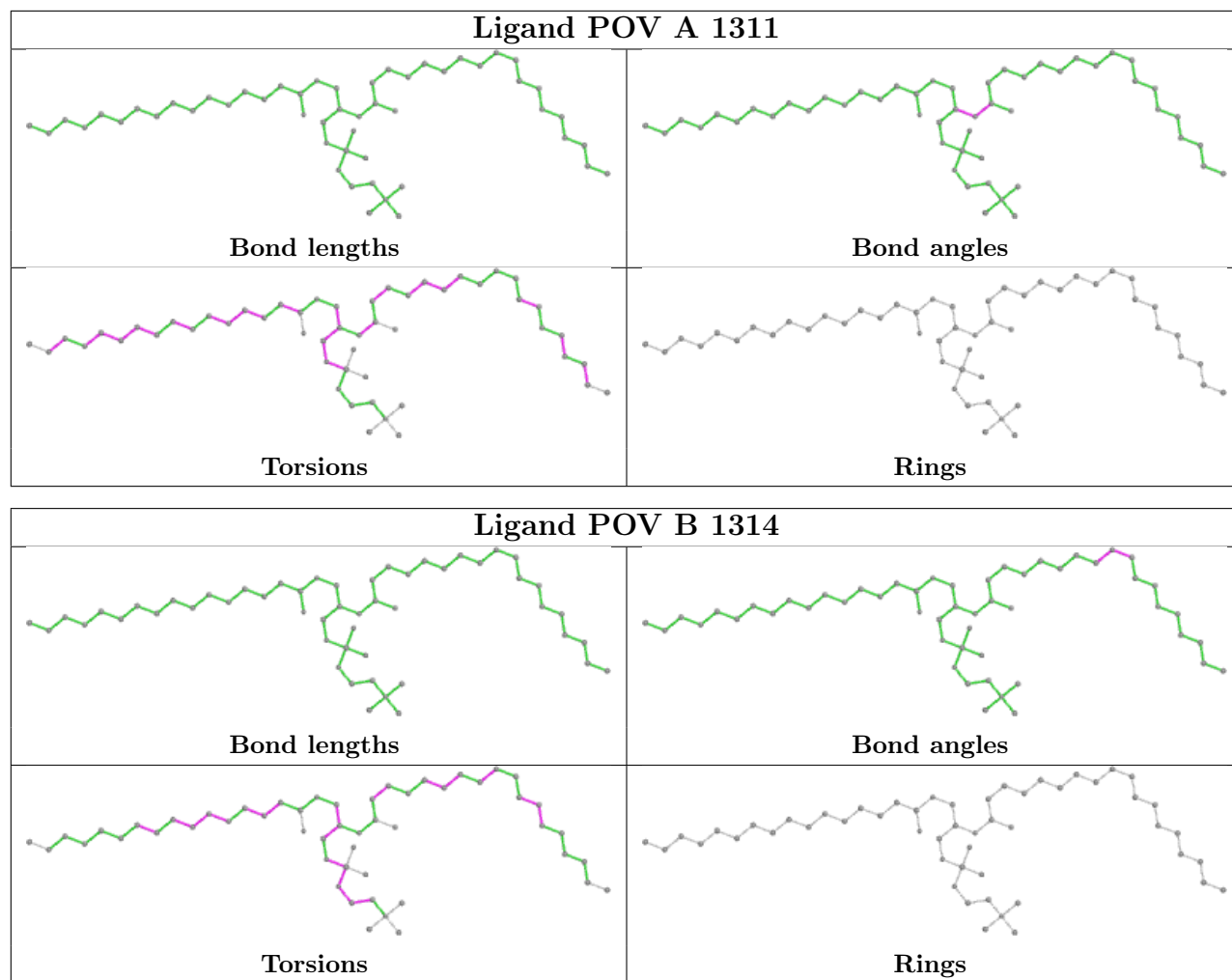












5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

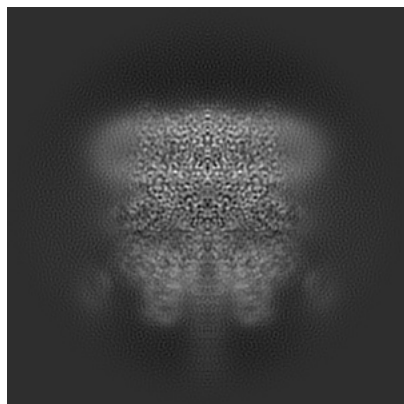
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-40499. These allow visual inspection of the internal detail of the map and identification of artifacts.

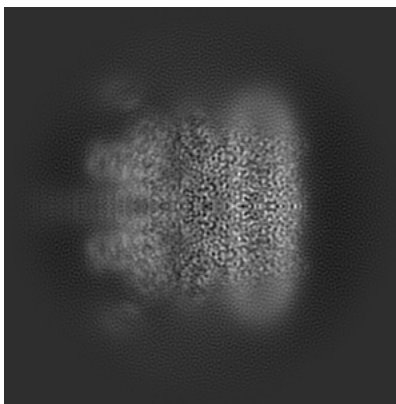
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

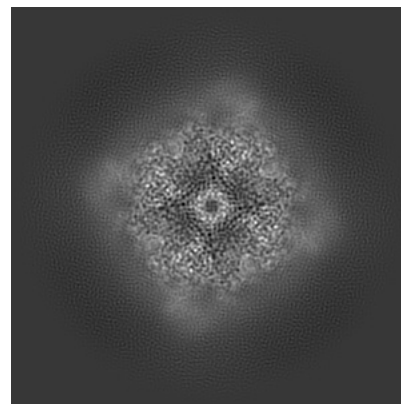
6.1.1 Primary map



X

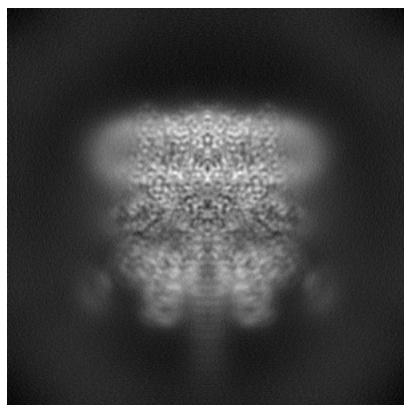


Y

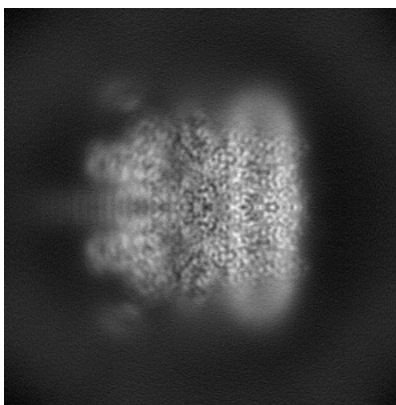


Z

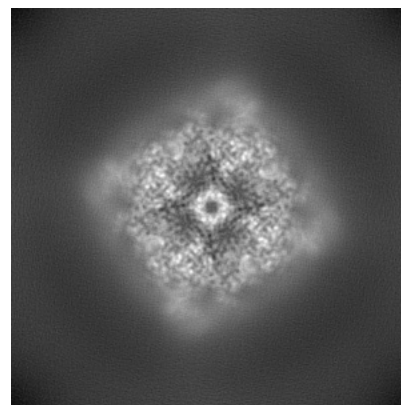
6.1.2 Raw map



X



Y

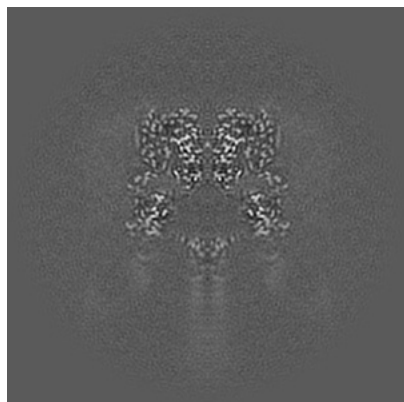


Z

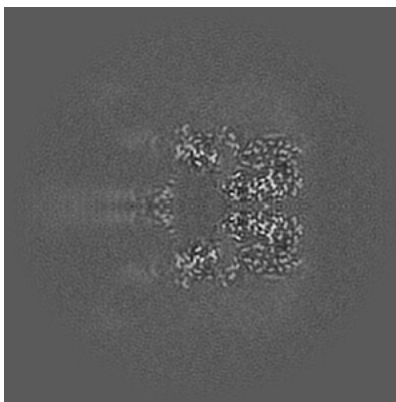
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

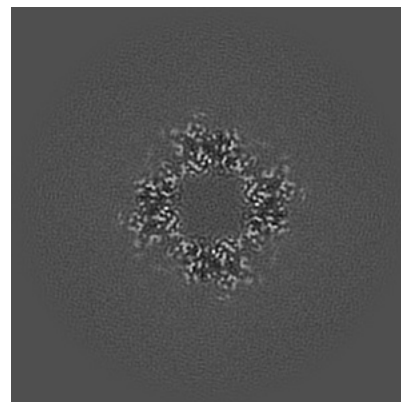
6.2.1 Primary map



X Index: 150

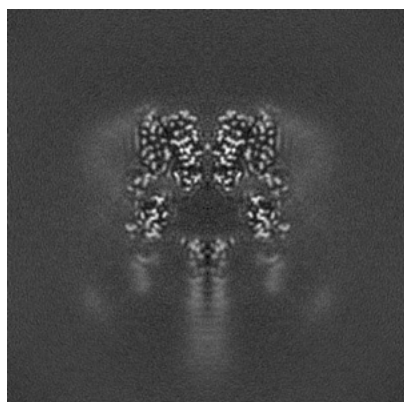


Y Index: 150

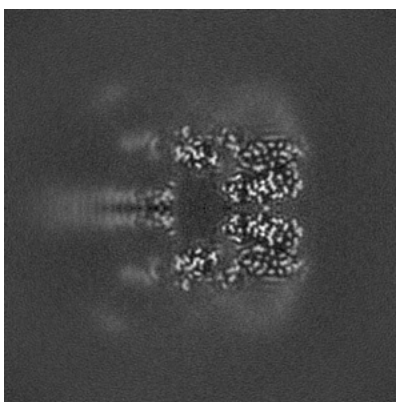


Z Index: 150

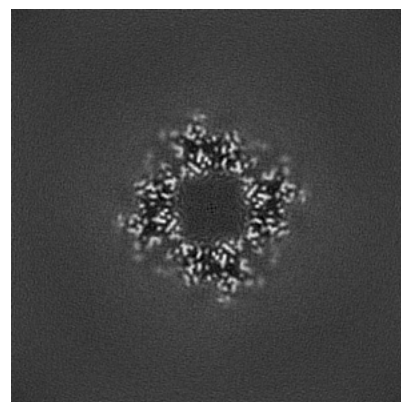
6.2.2 Raw map



X Index: 150



Y Index: 150

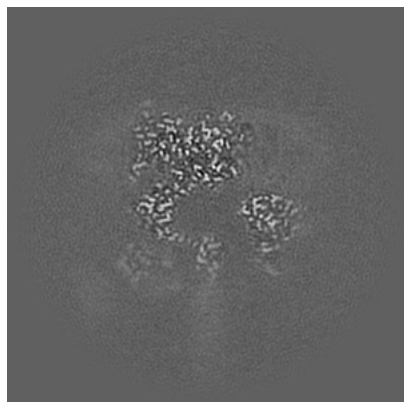


Z Index: 150

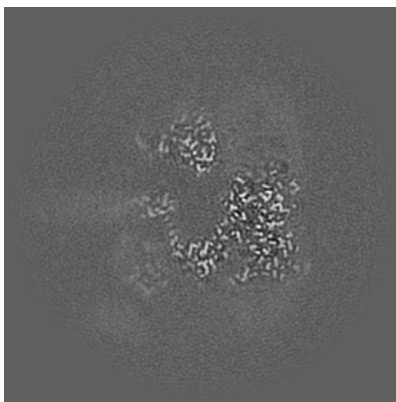
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

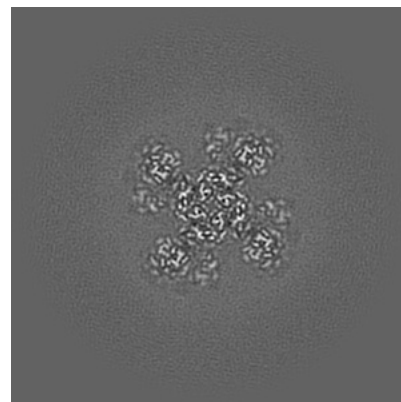
6.3.1 Primary map



X Index: 141

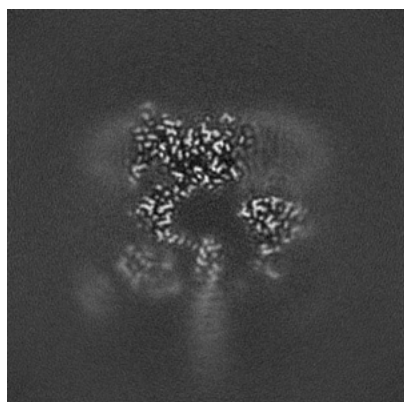


Y Index: 159

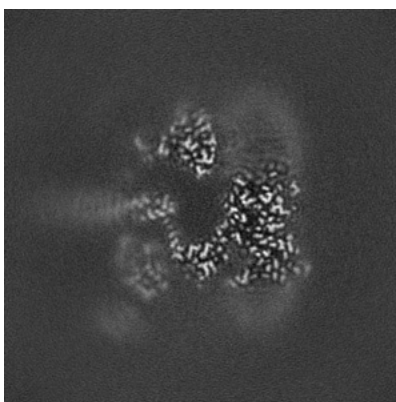


Z Index: 175

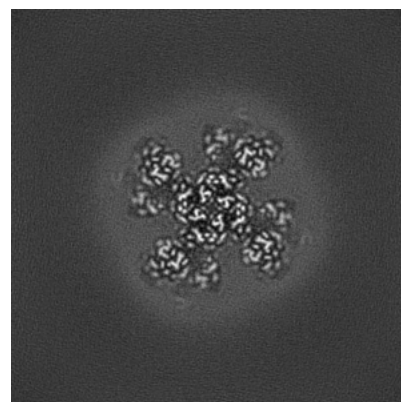
6.3.2 Raw map



X Index: 141



Y Index: 159

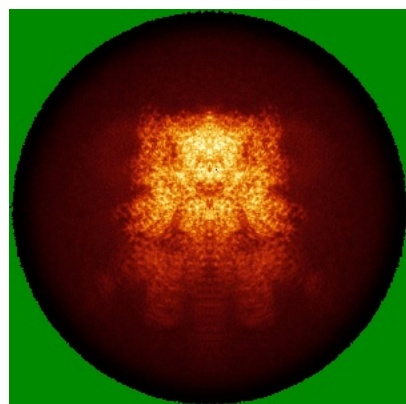


Z Index: 175

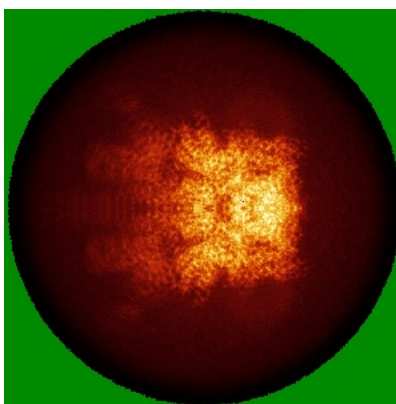
The images above show the largest variance slices of the map in three orthogonal directions.

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

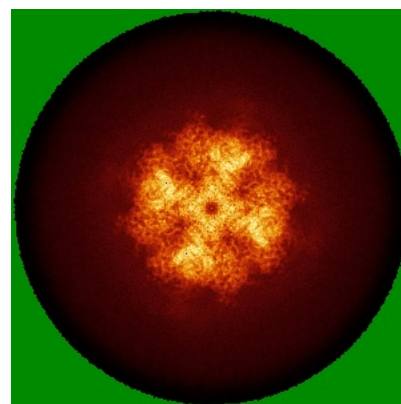
6.4.1 Primary map



X

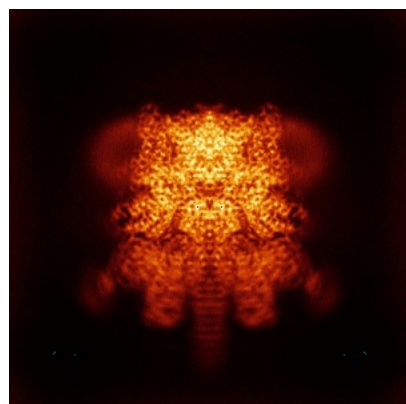


Y

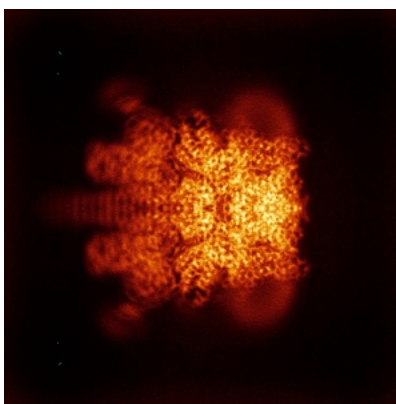


Z

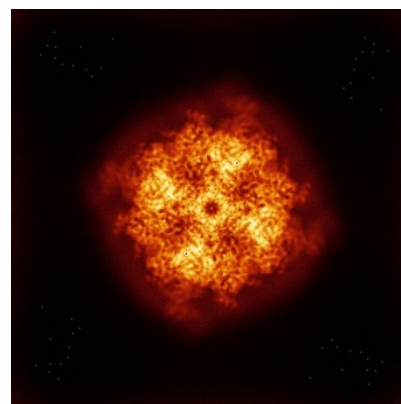
6.4.2 Raw map



X



Y

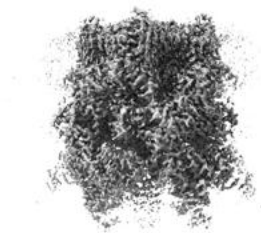


Z

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

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



X



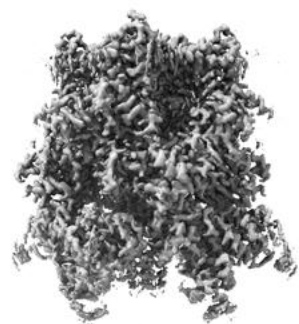
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.281. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

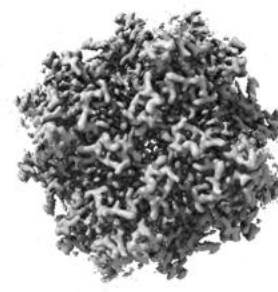
6.5.2 Raw map



X



Y



Z

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

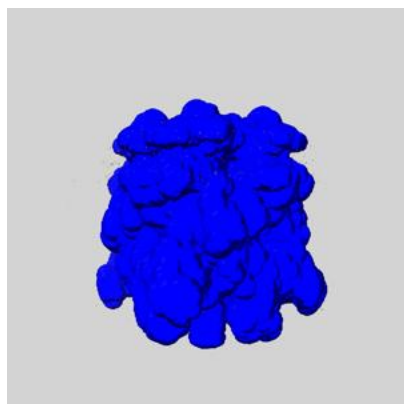
6.6 Mask visualisation [i](#)

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

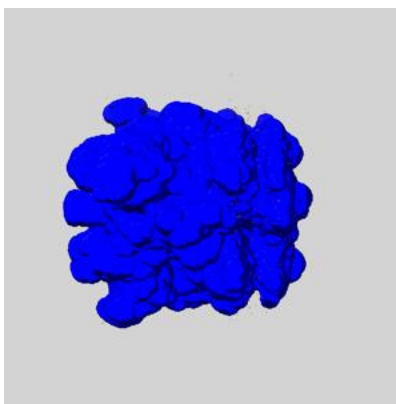
A mask typically either:

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

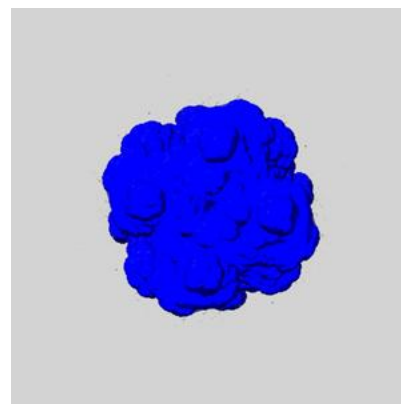
6.6.1 emd_40499_msk_1.map [i](#)



X



Y

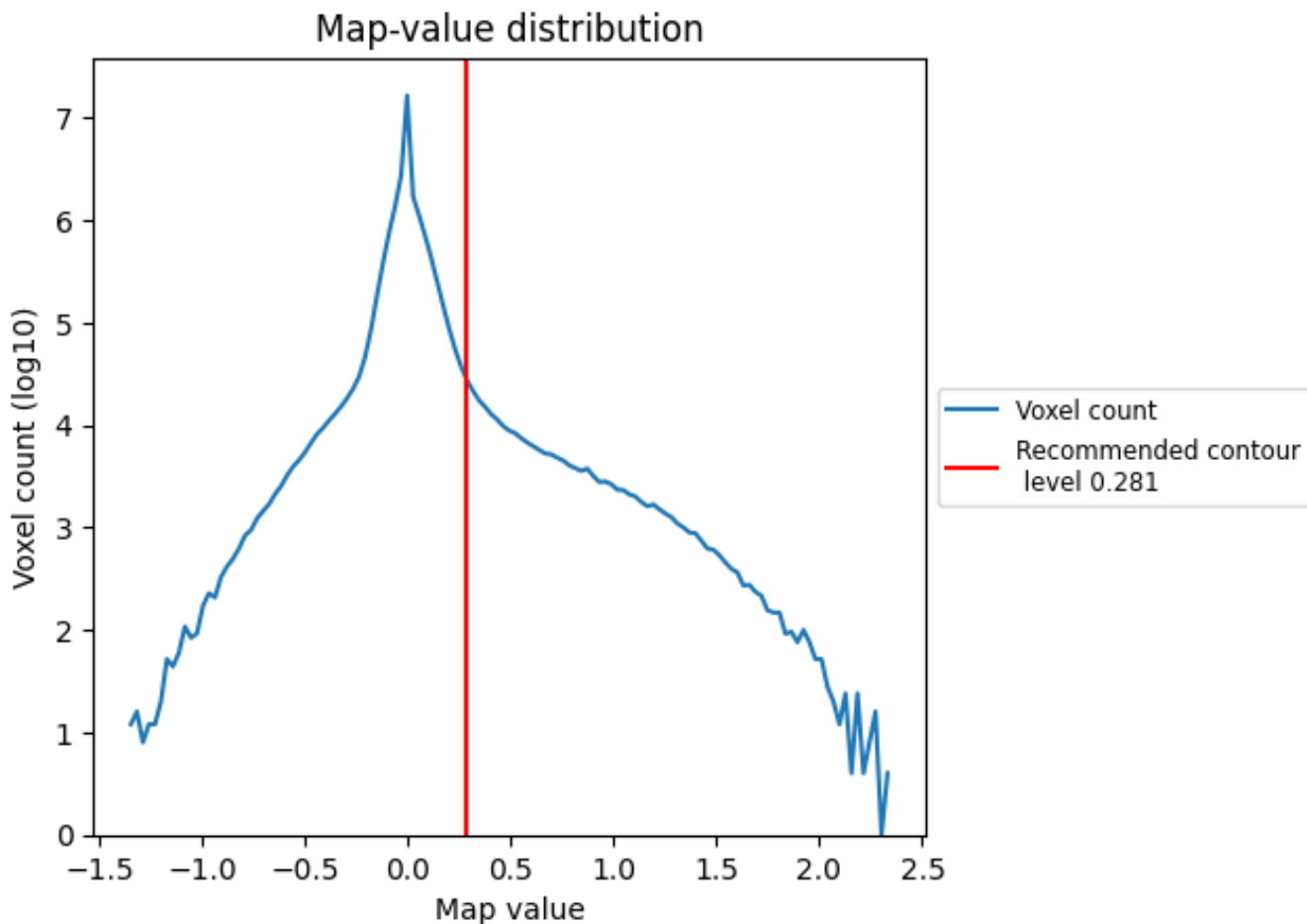


Z

7 Map analysis [i](#)

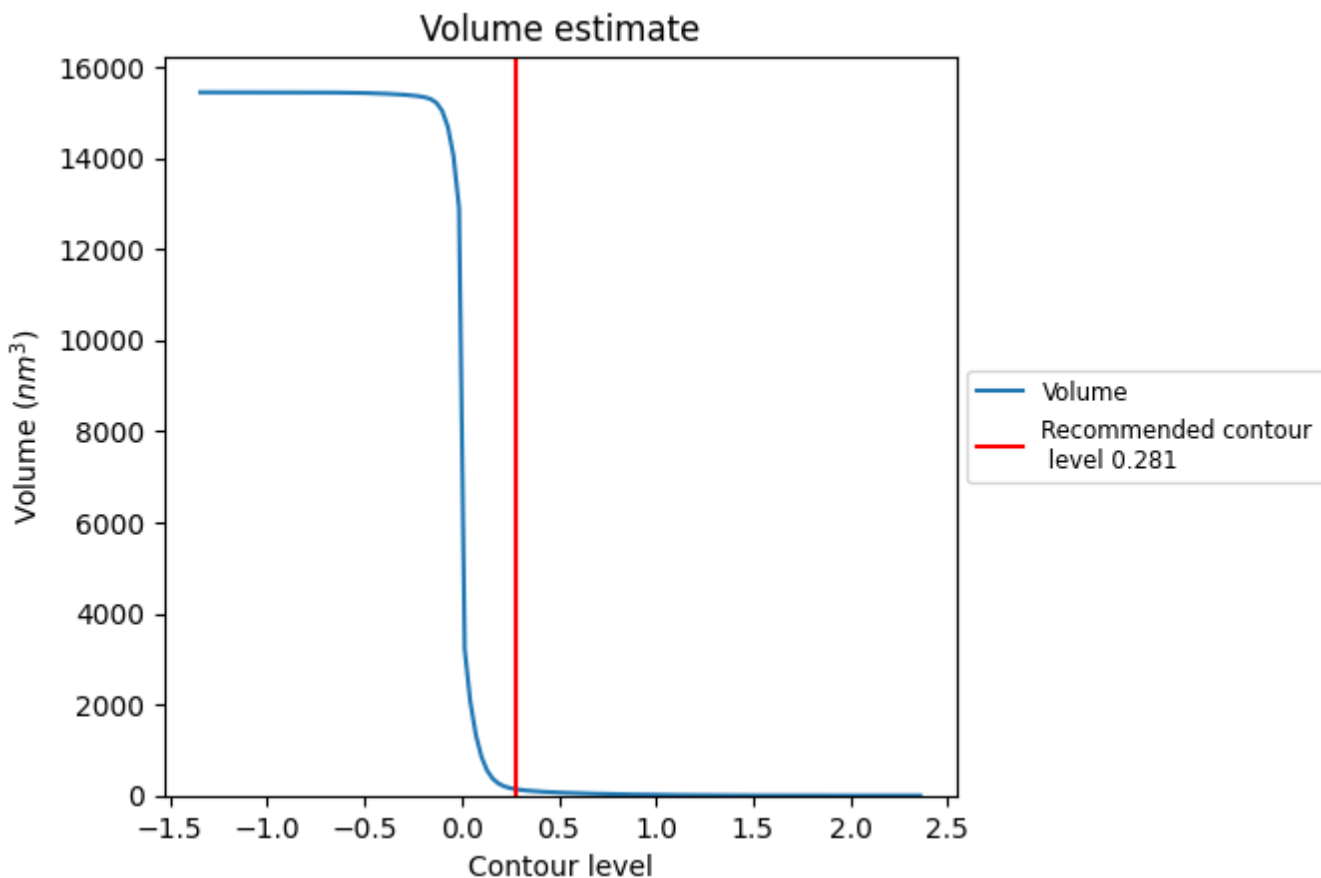
This section contains the results of statistical analysis of the map.

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.

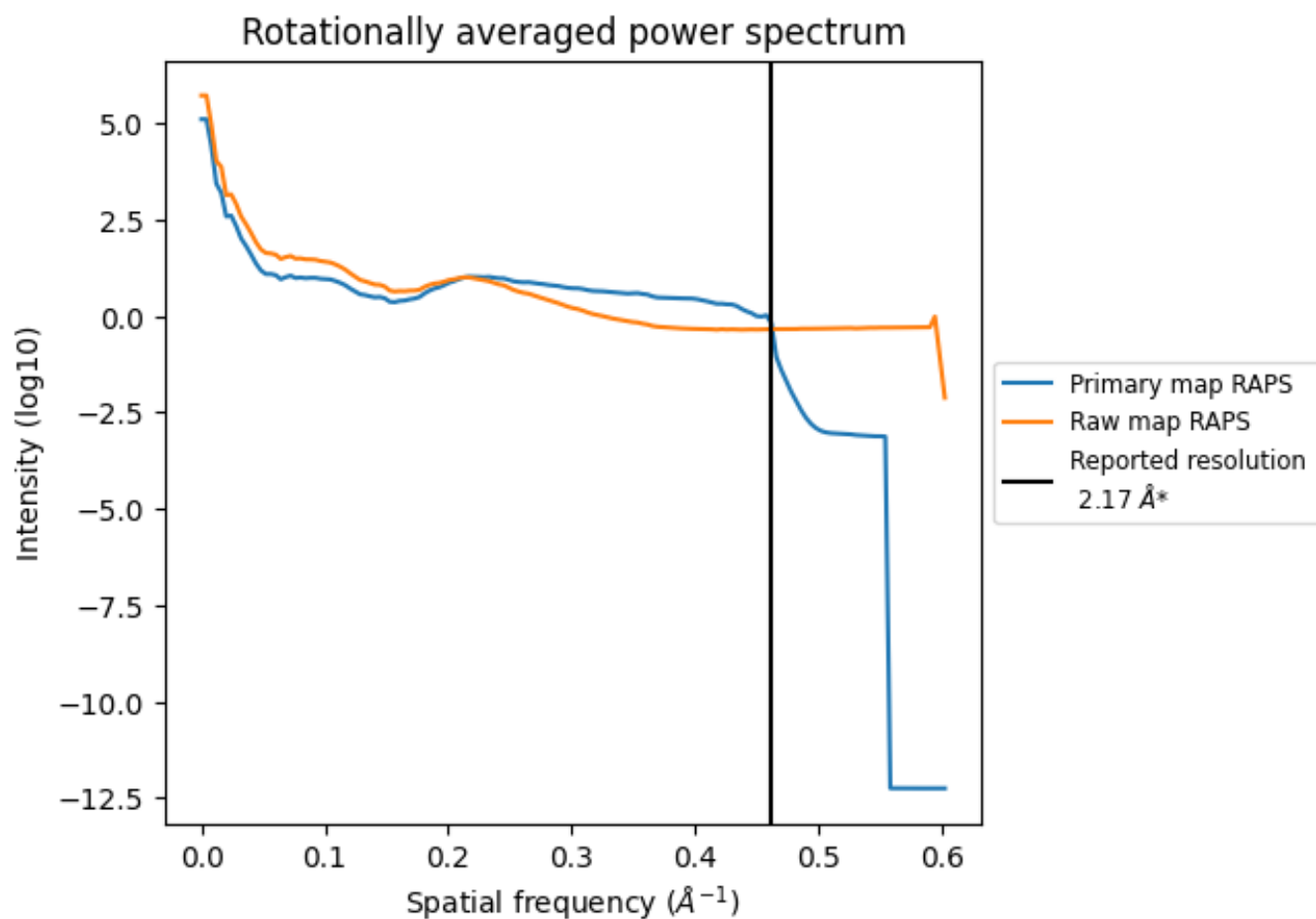
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 138 nm³; this corresponds to an approximate mass of 125 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](#)

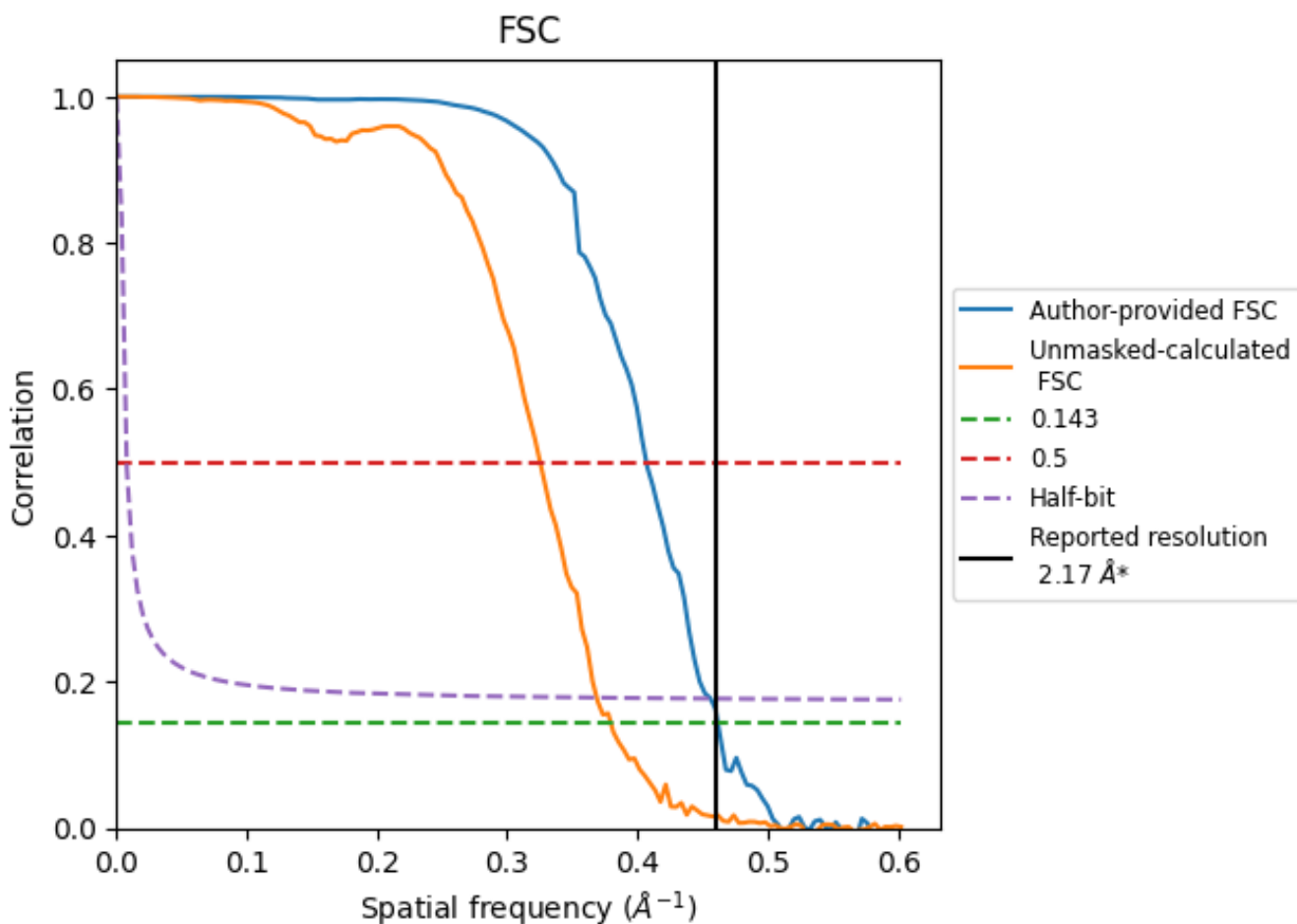


*Reported resolution corresponds to spatial frequency of 0.461 Å⁻¹

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 0.461 \AA^{-1}

8.2 Resolution estimates

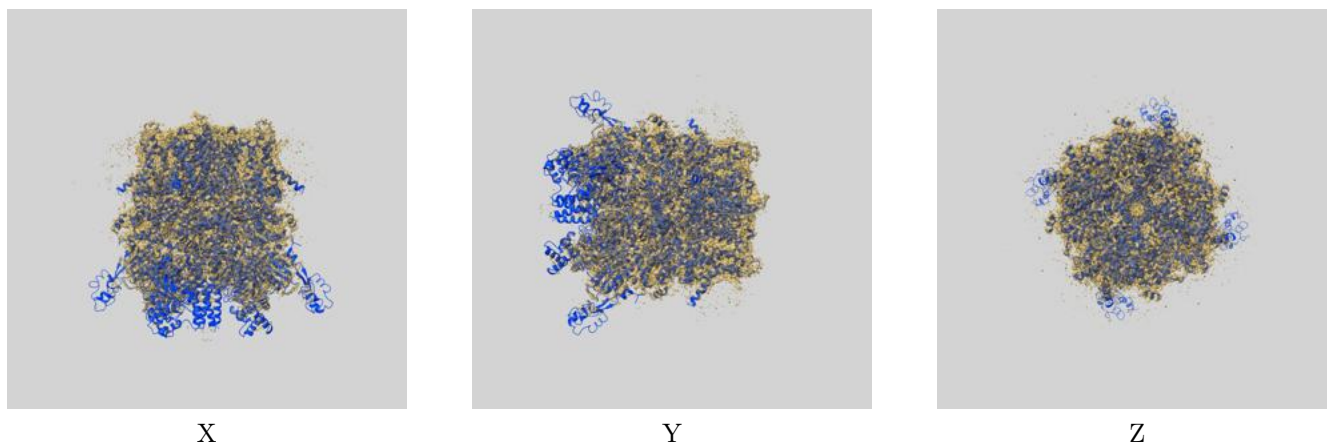
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.17	-	-
Author-provided FSC curve	2.17	2.46	2.19
Unmasked-calculated*	2.63	3.07	2.71

*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 2.63 differs from the reported value 2.17 by more than 10 %

9 Map-model fit [i](#)

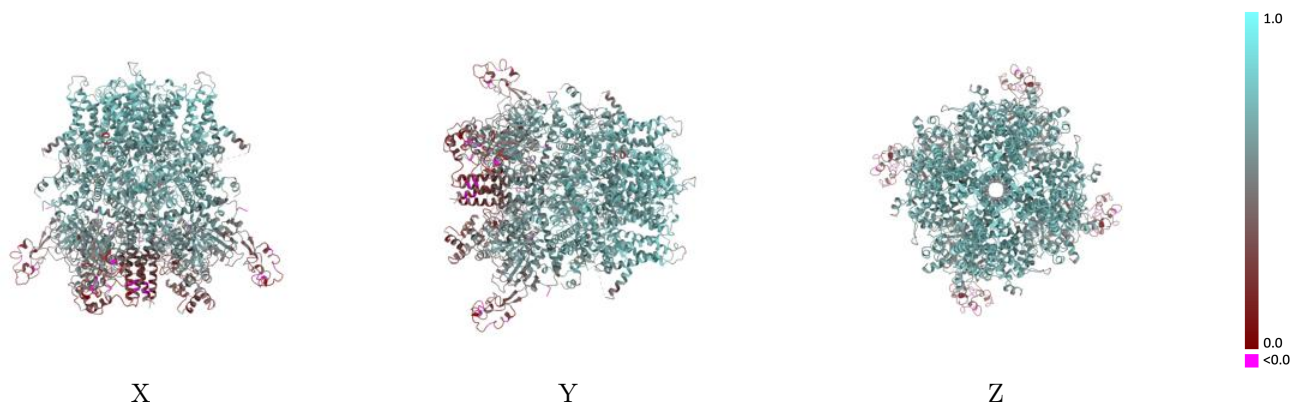
This section contains information regarding the fit between EMDB map EMD-40499 and PDB model 8SI5. Per-residue inclusion information can be found in section [3](#) on page [9](#).

9.1 Map-model overlay [i](#)



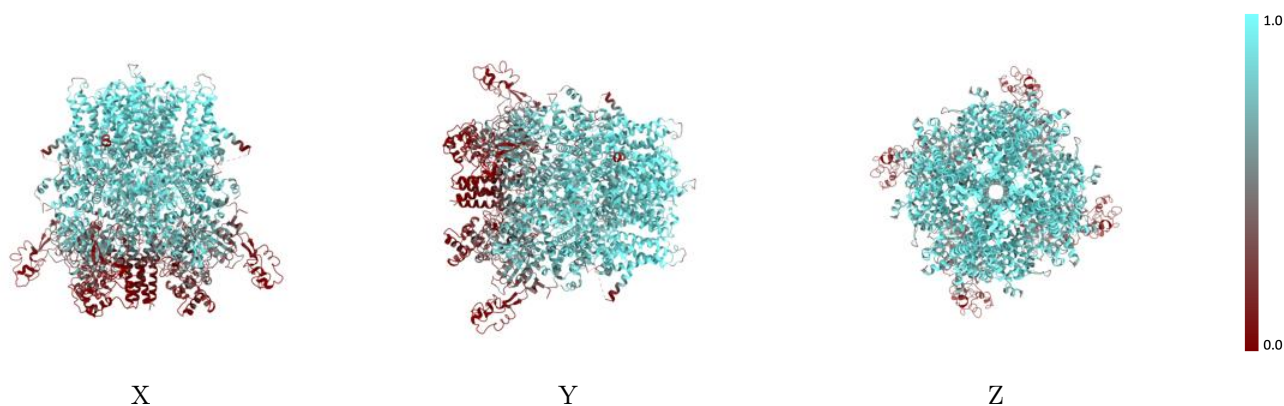
The images above show the 3D surface view of the map at the recommended contour level 0.281 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



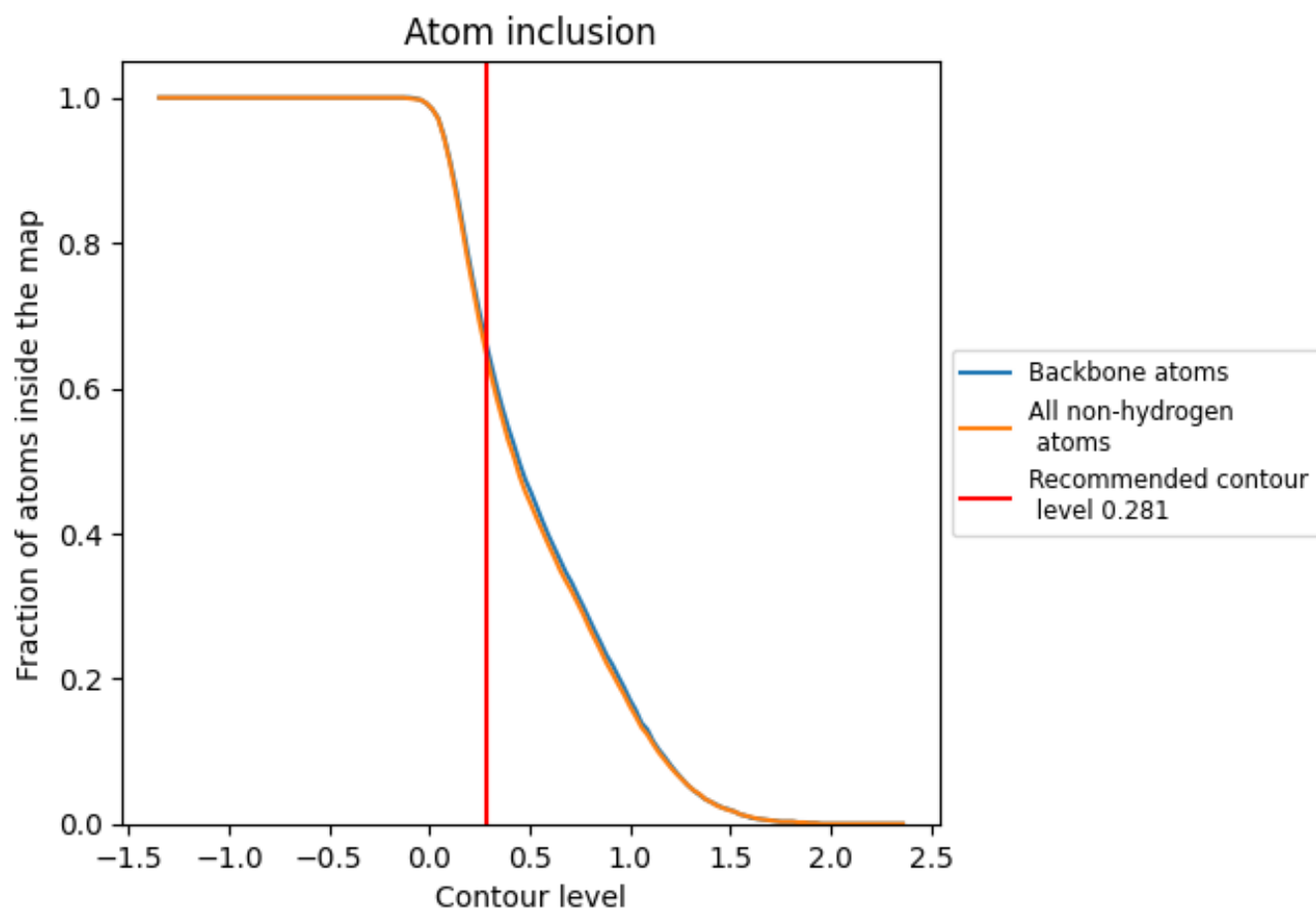
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.281).











9.4 Atom inclusion [i](#)



At the recommended contour level, 66% of all backbone atoms, 65% 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 (0.281) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6510	 0.5660
A	 0.6460	 0.5640
B	 0.6510	 0.5670
C	 0.6480	 0.5660
D	 0.6510	 0.5660

