



wwPDB EM Validation Summary Report ⓘ

Jul 13, 2026 – 02:15 PM EDT

PDB ID : 9PIM / pdb_00009pim
EMDB ID : EMD-71672
Title : Outer Curvature of Thick Flagellar Filament from T.denticola
Authors : Troman, L.A.; Paul, B.; Ghosal, D.
Deposited on : 2025-07-10
Resolution : 2.70 Å(reported)
Based on initial model : .

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:

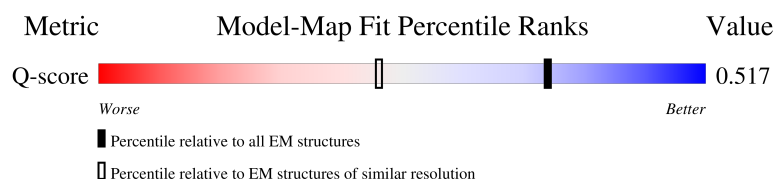
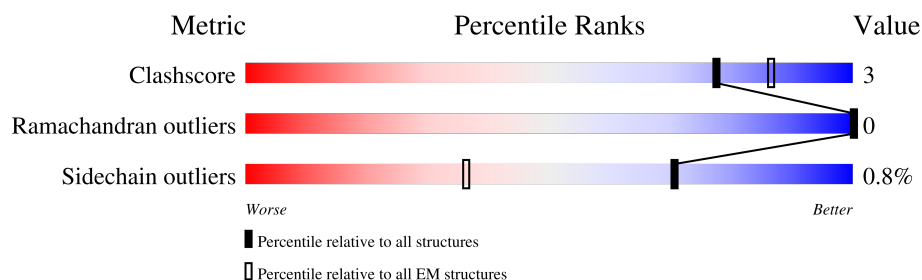
EMDB validation analysis : 0.0.1.dev133
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data in the EMDb archive up until May 2025)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.50

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 2.70 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.



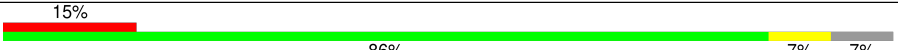
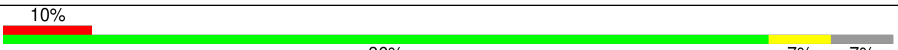
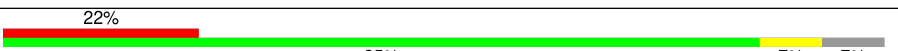
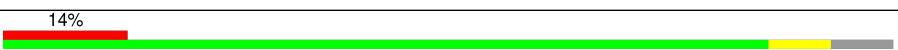
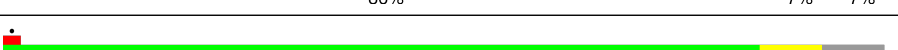
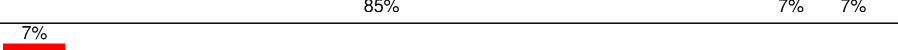
Metric	Whole archive (#Entries)	EM structures (#Entries)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	10327 (2.20 - 3.20)

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	CJ	286	
1	CK	286	
1	CL	286	
1	CM	286	

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Mol	Chain	Length	Quality of chain
1	CN	286	
1	CO	286	
1	CP	286	
1	CQ	286	
1	CR	286	
2	BR	349	
2	BS	349	
2	BT	349	
2	BU	349	
2	BV	349	
2	BW	349	
2	BX	349	
2	BY	349	
2	BZ	349	

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 44298 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 Flagellin.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	CJ	286	Total	C	N	O	S	0	0
			2206	1349	407	436	14		
1	CK	286	Total	C	N	O	S	0	0
			2206	1349	407	436	14		
1	CL	286	Total	C	N	O	S	0	0
			2206	1349	407	436	14		
1	CM	286	Total	C	N	O	S	0	0
			2206	1349	407	436	14		
1	CN	286	Total	C	N	O	S	0	0
			2206	1349	407	436	14		
1	CO	286	Total	C	N	O	S	0	0
			2206	1349	407	436	14		
1	CP	286	Total	C	N	O	S	0	0
			2206	1349	407	436	14		
1	CQ	286	Total	C	N	O	S	0	0
			2206	1349	407	436	14		
1	CR	286	Total	C	N	O	S	0	0
			2206	1349	407	436	14		

- Molecule 2 is a protein called Flagellar filament outer layer protein.

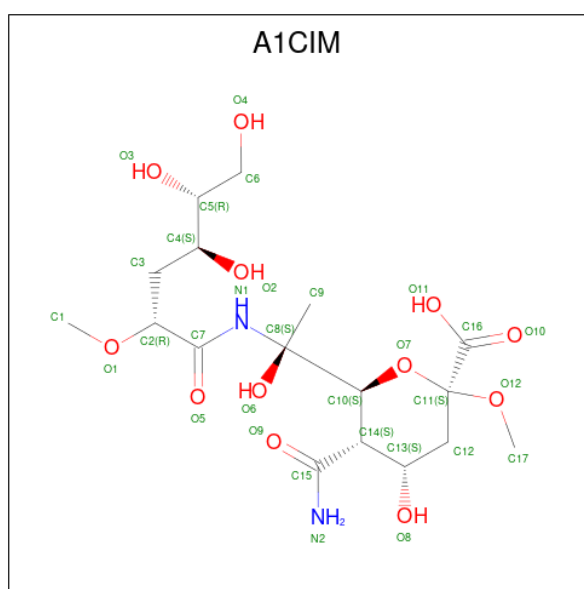
Mol	Chain	Residues	Atoms					AltConf	Trace
2	BR	323	Total	C	N	O	S	0	0
			2571	1633	438	492	8		
2	BS	323	Total	C	N	O	S	0	0
			2571	1633	438	492	8		
2	BT	323	Total	C	N	O	S	0	0
			2571	1633	438	492	8		
2	BU	323	Total	C	N	O	S	0	0
			2571	1633	438	492	8		
2	BV	323	Total	C	N	O	S	0	0
			2571	1633	438	492	8		
2	BW	323	Total	C	N	O	S	0	0
			2571	1633	438	492	8		

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Mol	Chain	Residues	Atoms					AltConf	Trace
2	BX	323	Total	C	N	O	S	0	0
			2571	1633	438	492	8		
2	BY	323	Total	C	N	O	S	0	0
			2571	1633	438	492	8		
2	BZ	323	Total	C	N	O	S	0	0
			2571	1633	438	492	8		

- Molecule 3 is (2S,4S,5S,6S)-5-carbamoyl-4-hydroxy-6-{(1S)-1-hydroxy-1-[(2R,4S,5R)-4,5,6-trihydroxy-2-methoxyhexanamido]ethyl}-2-methoxyoxane-2-carboxylic acid (CCD ID: A1CIM) (formula: C₁₇H₃₀N₂O₁₂) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				AltConf
3	CJ	1	Total	C	N	O	0
			29	16	2	11	
3	CJ	1	Total	C	N	O	0
			29	16	2	11	
3	CJ	1	Total	C	N	O	0
			29	16	2	11	
3	CJ	1	Total	C	N	O	0
			29	16	2	11	
3	CJ	1	Total	C	N	O	0
			29	16	2	11	
3	CK	1	Total	C	N	O	0
			29	16	2	11	
3	CK	1	Total	C	N	O	0
			29	16	2	11	

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Mol	Chain	Residues	Atoms				AltConf
3	CK	1	Total	C	N	O	0
			29	16	2	11	
3	CK	1	Total	C	N	O	0
			29	16	2	11	
3	CK	1	Total	C	N	O	0
			29	16	2	11	
3	CL	1	Total	C	N	O	0
			29	16	2	11	
3	CL	1	Total	C	N	O	0
			29	16	2	11	
3	CL	1	Total	C	N	O	0
			29	16	2	11	
3	CL	1	Total	C	N	O	0
			29	16	2	11	
3	CL	1	Total	C	N	O	0
			29	16	2	11	
3	CM	1	Total	C	N	O	0
			29	16	2	11	
3	CM	1	Total	C	N	O	0
			29	16	2	11	
3	CM	1	Total	C	N	O	0
			29	16	2	11	
3	CM	1	Total	C	N	O	0
			29	16	2	11	
3	CM	1	Total	C	N	O	0
			29	16	2	11	
3	CN	1	Total	C	N	O	0
			29	16	2	11	
3	CN	1	Total	C	N	O	0
			29	16	2	11	
3	CN	1	Total	C	N	O	0
			29	16	2	11	
3	CN	1	Total	C	N	O	0
			29	16	2	11	
3	CN	1	Total	C	N	O	0
			29	16	2	11	
3	CO	1	Total	C	N	O	0
			29	16	2	11	
3	CO	1	Total	C	N	O	0
			29	16	2	11	
3	CO	1	Total	C	N	O	0
			29	16	2	11	

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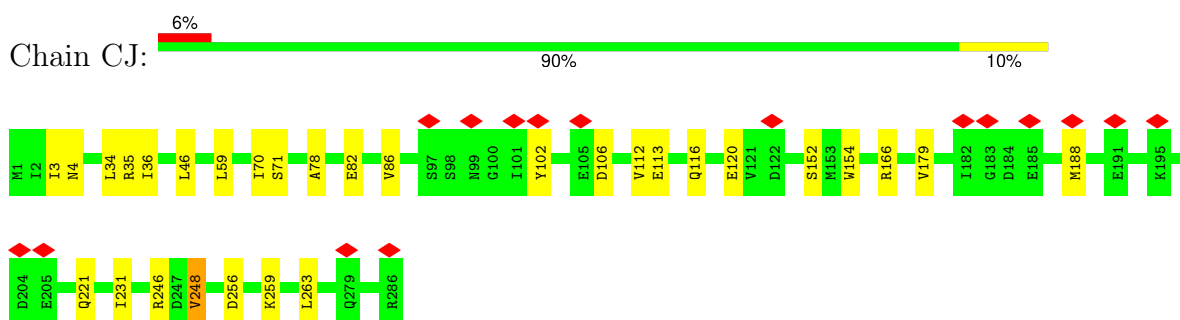
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Mol	Chain	Residues	Atoms				AltConf
3	CO	1	Total	C	N	O	0
			29	16	2	11	
3	CO	1	Total	C	N	O	0
			29	16	2	11	
3	CP	1	Total	C	N	O	0
			29	16	2	11	
3	CP	1	Total	C	N	O	0
			29	16	2	11	
3	CP	1	Total	C	N	O	0
			29	16	2	11	
3	CP	1	Total	C	N	O	0
			29	16	2	11	
3	CP	1	Total	C	N	O	0
			29	16	2	11	
3	CQ	1	Total	C	N	O	0
			29	16	2	11	
3	CQ	1	Total	C	N	O	0
			29	16	2	11	
3	CQ	1	Total	C	N	O	0
			29	16	2	11	
3	CQ	1	Total	C	N	O	0
			29	16	2	11	
3	CQ	1	Total	C	N	O	0
			29	16	2	11	
3	CR	1	Total	C	N	O	0
			29	16	2	11	
3	CR	1	Total	C	N	O	0
			29	16	2	11	
3	CR	1	Total	C	N	O	0
			29	16	2	11	
3	CR	1	Total	C	N	O	0
			29	16	2	11	
3	CR	1	Total	C	N	O	0
			29	16	2	11	

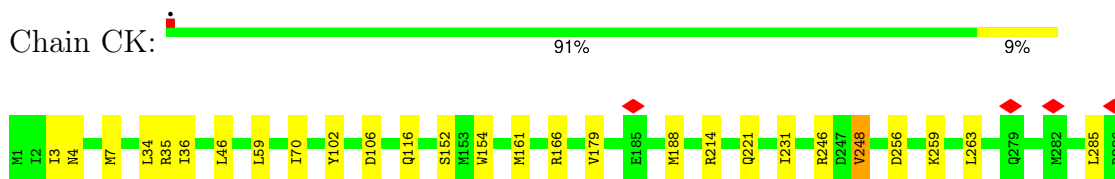
3 Residue-property plots [i](#)

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

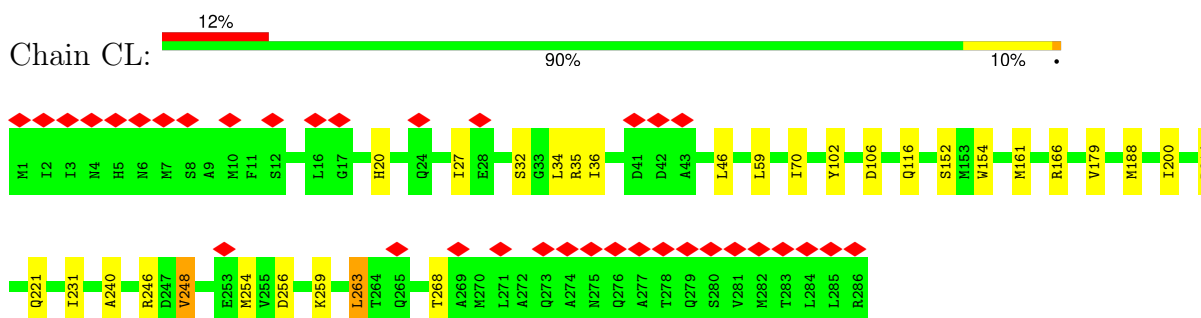
- Molecule 1: Flagellin



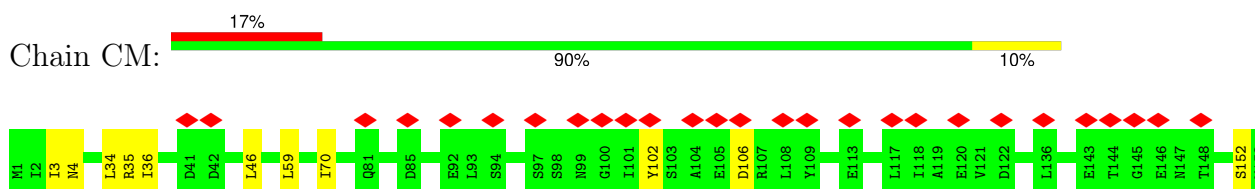
- Molecule 1: Flagellin

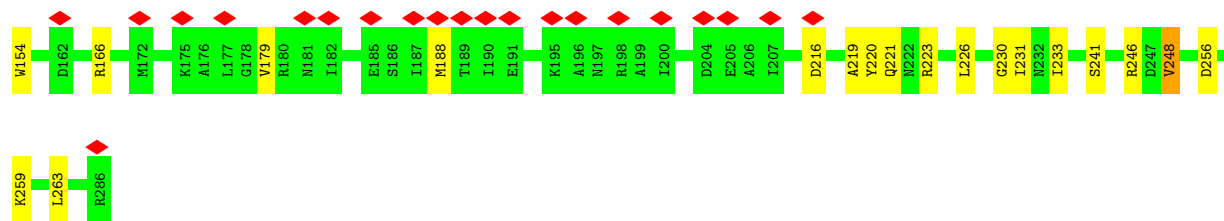


- Molecule 1: Flagellin



- Molecule 1: Flagellin

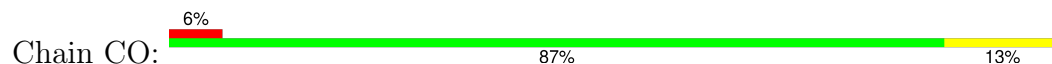




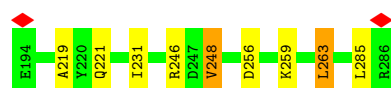
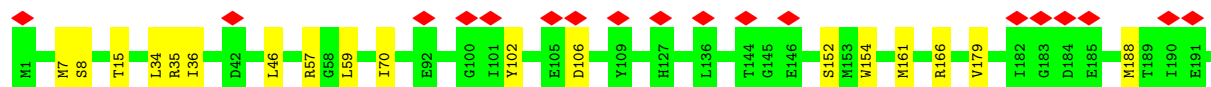
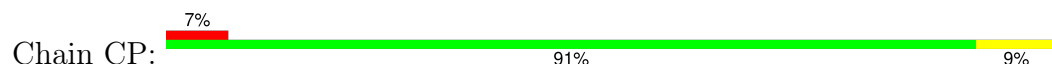
• Molecule 1: Flagellin



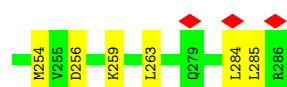
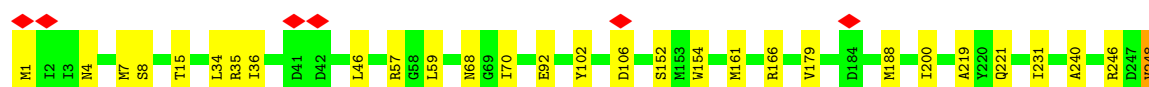
• Molecule 1: Flagellin



• Molecule 1: Flagellin

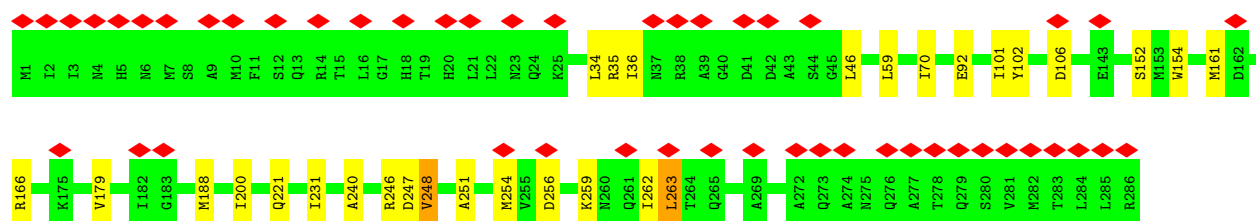


• Molecule 1: Flagellin



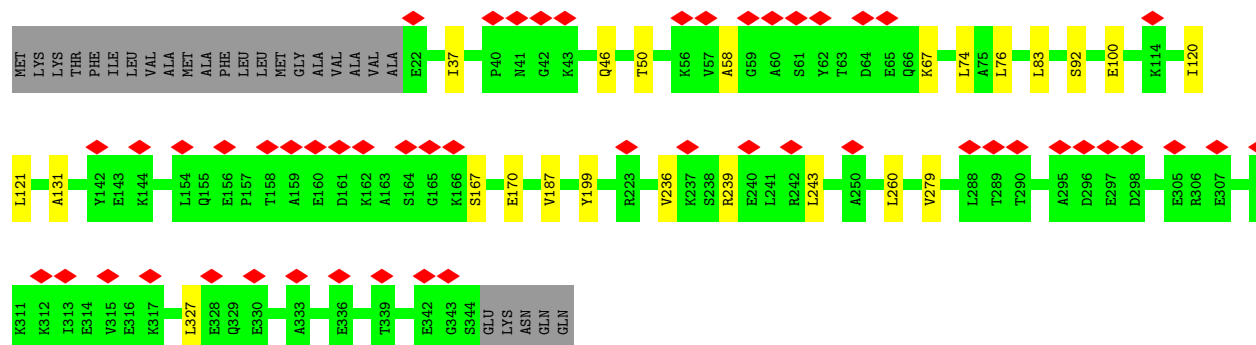
• Molecule 1: Flagellin

Chain CR: 



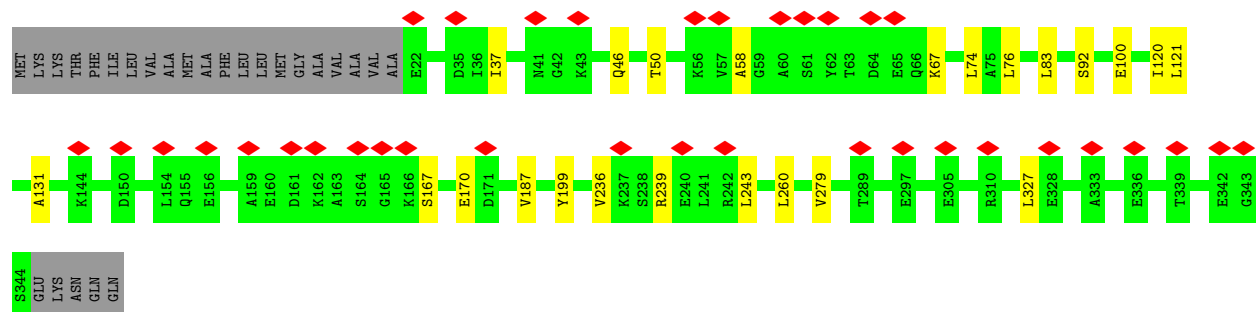
• Molecule 2: Flagellar filament outer layer protein

Chain BR: 



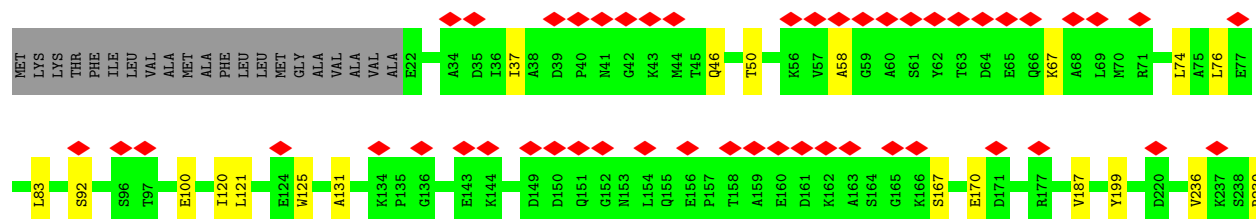
• Molecule 2: Flagellar filament outer layer protein

Chain BS: 



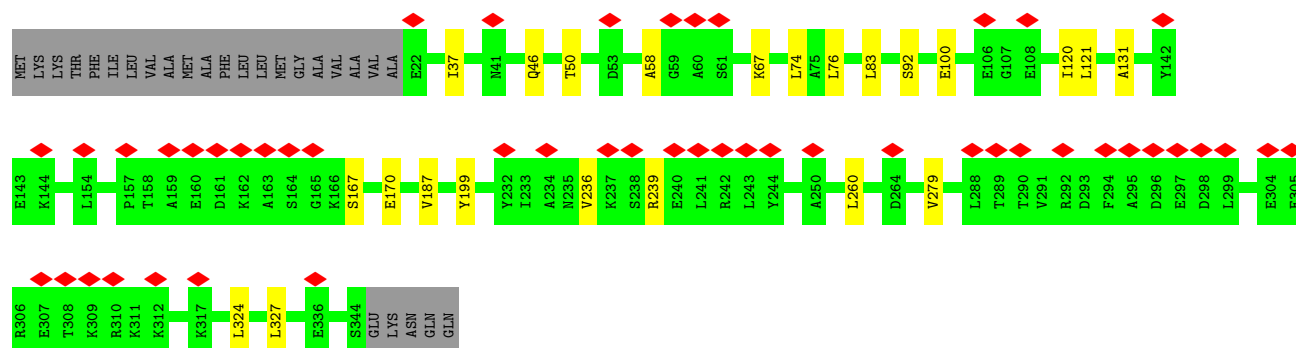
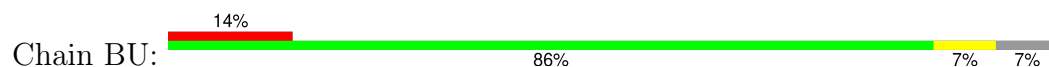
• Molecule 2: Flagellar filament outer layer protein

Chain BT: 

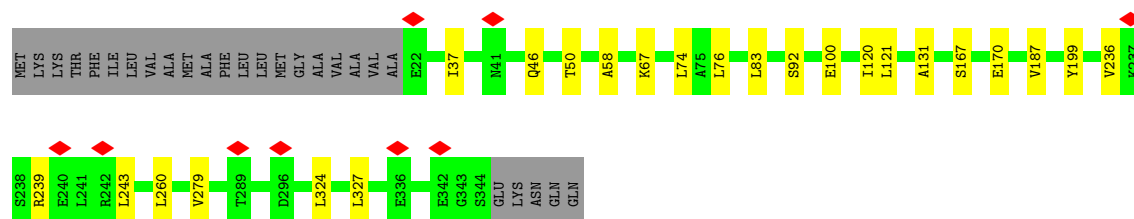




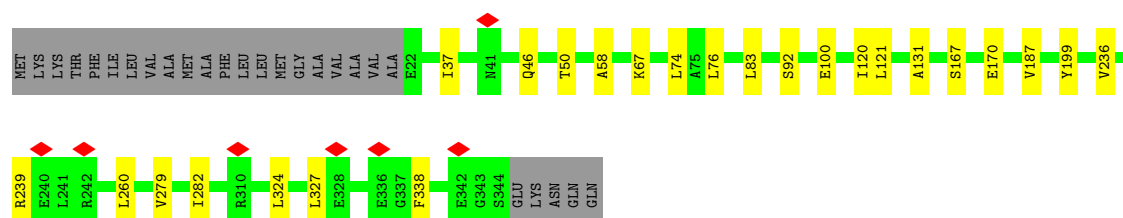
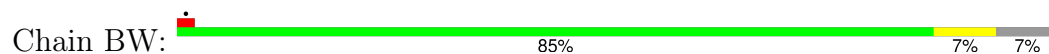
• Molecule 2: Flagellar filament outer layer protein



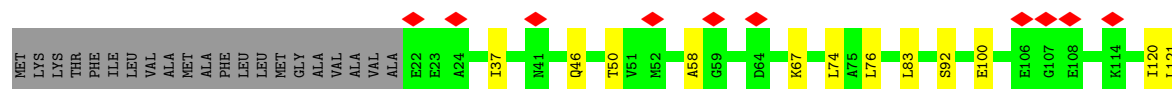
• Molecule 2: Flagellar filament outer layer protein

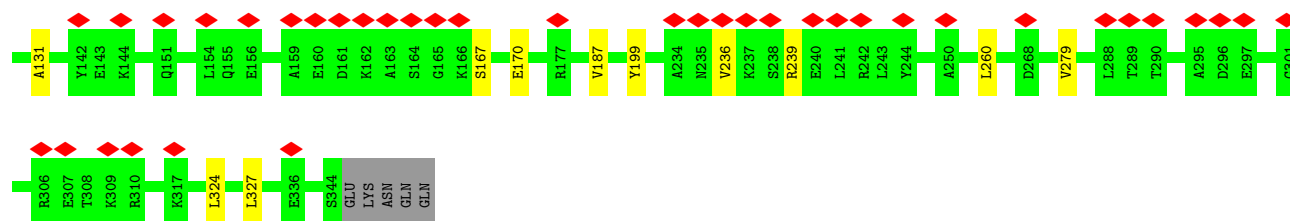


• Molecule 2: Flagellar filament outer layer protein



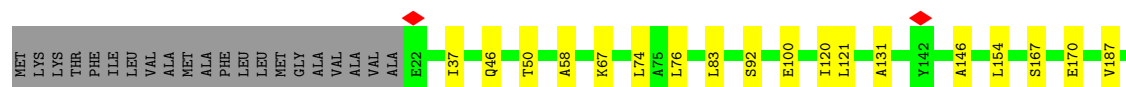
• Molecule 2: Flagellar filament outer layer protein





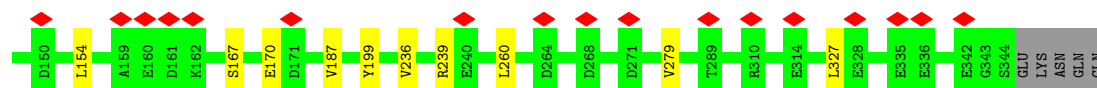
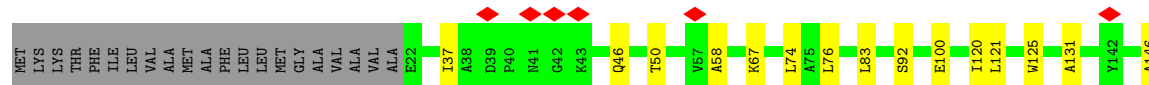
• Molecule 2: Flagellar filament outer layer protein

Chain BY: 85% 7% 7%



• Molecule 2: Flagellar filament outer layer protein

Chain BZ: 7% 85% 7% 7%



4 Experimental information

Property	Value	Source
EM reconstruction method	HELICAL	Depositor
Imposed symmetry	POINT, Not provided	
Number of segments used	56413	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 ($e^-/\text{\AA}^2$)	57.7	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	105000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.021	Depositor
Minimum map value	-0.011	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.001	Depositor
Recommended contour level	0.004	Depositor
Map size ($\text{\AA}$)	373.184, 373.184, 373.184	wwPDB
Map dimensions	448, 448, 448	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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: A1CIM

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	CJ	0.05	0/2224	0.17	0/2992
1	CK	0.05	0/2224	0.17	0/2992
1	CL	0.05	0/2224	0.17	0/2992
1	CM	0.05	0/2224	0.17	0/2992
1	CN	0.05	0/2224	0.17	0/2992
1	CO	0.05	0/2224	0.17	0/2992
1	CP	0.05	0/2224	0.17	0/2992
1	CQ	0.05	0/2224	0.17	0/2992
1	CR	0.05	0/2224	0.17	0/2992
2	BR	0.06	0/2624	0.20	0/3549
2	BS	0.06	0/2624	0.20	0/3549
2	BT	0.06	0/2624	0.20	0/3549
2	BU	0.06	0/2624	0.20	0/3549
2	BV	0.06	0/2624	0.20	0/3549
2	BW	0.06	0/2624	0.20	0/3549
2	BX	0.06	0/2624	0.20	0/3549
2	BY	0.06	0/2624	0.20	0/3549
2	BZ	0.06	0/2624	0.20	0/3549
All	All	0.05	0/43632	0.19	0/58869

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

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	CJ	2206	0	2213	24	0
1	CK	2206	0	2213	17	0
1	CL	2206	0	2213	20	0
1	CM	2206	0	2213	24	0
1	CN	2206	0	2213	21	0
1	CO	2206	0	2213	29	0
1	CP	2206	0	2213	18	0
1	CQ	2206	0	2213	26	0
1	CR	2206	0	2213	20	0
2	BR	2571	0	2528	12	0
2	BS	2571	0	2528	12	0
2	BT	2571	0	2528	14	0
2	BU	2571	0	2528	12	0
2	BV	2571	0	2528	13	0
2	BW	2571	0	2528	14	0
2	BX	2571	0	2528	12	0
2	BY	2571	0	2528	13	0
2	BZ	2571	0	2528	13	0
3	CJ	145	0	0	0	0
3	CK	145	0	0	0	0
3	CL	145	0	0	0	0
3	CM	145	0	0	0	0
3	CN	145	0	0	0	0
3	CO	145	0	0	0	0
3	CP	145	0	0	0	0
3	CQ	145	0	0	0	0
3	CR	145	0	0	0	0
All	All	44298	0	42669	250	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 250 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:CQ:7:MET:HE2	1:CR:240:ALA:HB2	1.59	0.83
1:CQ:285:LEU:HA	1:CR:254:MET:HE3	1.73	0.70
1:CJ:86:VAL:HG22	1:CM:226:LEU:HD13	1.72	0.70
1:CP:7:MET:HE2	1:CQ:240:ALA:HB2	1.74	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:CO:32:SER:HA	1:CQ:15:THR:HG21	1.77	0.65

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	CJ	284/286 (99%)	281 (99%)	3 (1%)	0	100	100
1	CK	284/286 (99%)	281 (99%)	3 (1%)	0	100	100
1	CL	284/286 (99%)	281 (99%)	3 (1%)	0	100	100
1	CM	284/286 (99%)	281 (99%)	3 (1%)	0	100	100
1	CN	284/286 (99%)	281 (99%)	3 (1%)	0	100	100
1	CO	284/286 (99%)	281 (99%)	3 (1%)	0	100	100
1	CP	284/286 (99%)	281 (99%)	3 (1%)	0	100	100
1	CQ	284/286 (99%)	281 (99%)	3 (1%)	0	100	100
1	CR	284/286 (99%)	281 (99%)	3 (1%)	0	100	100
2	BR	321/349 (92%)	315 (98%)	6 (2%)	0	100	100
2	BS	321/349 (92%)	315 (98%)	6 (2%)	0	100	100
2	BT	321/349 (92%)	315 (98%)	6 (2%)	0	100	100
2	BU	321/349 (92%)	316 (98%)	5 (2%)	0	100	100
2	BV	321/349 (92%)	315 (98%)	6 (2%)	0	100	100
2	BW	321/349 (92%)	315 (98%)	6 (2%)	0	100	100
2	BX	321/349 (92%)	315 (98%)	6 (2%)	0	100	100
2	BY	321/349 (92%)	315 (98%)	6 (2%)	0	100	100
2	BZ	321/349 (92%)	316 (98%)	5 (2%)	0	100	100
All	All	5445/5715 (95%)	5366 (98%)	79 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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	CJ	236/236 (100%)	233 (99%)	3 (1%)	61	83
1	CK	236/236 (100%)	233 (99%)	3 (1%)	61	83
1	CL	236/236 (100%)	233 (99%)	3 (1%)	61	83
1	CM	236/236 (100%)	233 (99%)	3 (1%)	61	83
1	CN	236/236 (100%)	233 (99%)	3 (1%)	61	83
1	CO	236/236 (100%)	233 (99%)	3 (1%)	61	83
1	CP	236/236 (100%)	233 (99%)	3 (1%)	61	83
1	CQ	236/236 (100%)	233 (99%)	3 (1%)	61	83
1	CR	236/236 (100%)	233 (99%)	3 (1%)	61	83
2	BR	270/290 (93%)	269 (100%)	1 (0%)	84	93
2	BS	270/290 (93%)	269 (100%)	1 (0%)	84	93
2	BT	270/290 (93%)	269 (100%)	1 (0%)	84	93
2	BU	270/290 (93%)	269 (100%)	1 (0%)	84	93
2	BV	270/290 (93%)	269 (100%)	1 (0%)	84	93
2	BW	270/290 (93%)	269 (100%)	1 (0%)	84	93
2	BX	270/290 (93%)	269 (100%)	1 (0%)	84	93
2	BY	270/290 (93%)	269 (100%)	1 (0%)	84	93
2	BZ	270/290 (93%)	269 (100%)	1 (0%)	84	93
All	All	4554/4734 (96%)	4518 (99%)	36 (1%)	70	88

5 of 36 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	BS	327	LEU
2	BZ	327	LEU
2	BT	327	LEU

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Mol	Chain	Res	Type
2	BW	327	LEU
1	CN	152	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 49 such sidechains are listed below:

Mol	Chain	Res	Type
1	CR	156	HIS
2	BT	130	ASN
1	CR	160	ASN
2	BR	228	ASN
2	BU	130	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

45 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	$\# Z > 2$
3	A1CIM	CR	303	1	27,29,31	2.26	6 (22%)	29,42,46	1.71	4 (13%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	A1CIM	CO	303	1	27,29,31	2.26	6 (22%)	29,42,46	1.71	4 (13%)
3	A1CIM	CK	301	1	27,29,31	2.20	6 (22%)	29,42,46	1.76	8 (27%)
3	A1CIM	CK	304	1	27,29,31	2.25	6 (22%)	29,42,46	1.38	4 (13%)
3	A1CIM	CR	301	1	27,29,31	2.20	6 (22%)	29,42,46	1.76	8 (27%)
3	A1CIM	CR	304	1	27,29,31	2.25	6 (22%)	29,42,46	1.38	4 (13%)
3	A1CIM	CQ	303	1	27,29,31	2.26	6 (22%)	29,42,46	1.71	4 (13%)
3	A1CIM	CO	304	1	27,29,31	2.25	6 (22%)	29,42,46	1.38	4 (13%)
3	A1CIM	CN	305	1	27,29,31	2.19	6 (22%)	29,42,46	2.21	8 (27%)
3	A1CIM	CM	304	1	27,29,31	2.25	6 (22%)	29,42,46	1.38	4 (13%)
3	A1CIM	CM	301	1	27,29,31	2.20	6 (22%)	29,42,46	1.76	8 (27%)
3	A1CIM	CP	304	1	27,29,31	2.25	6 (22%)	29,42,46	1.38	4 (13%)
3	A1CIM	CP	302	1	27,29,31	2.22	6 (22%)	29,42,46	1.79	6 (20%)
3	A1CIM	CJ	303	1	27,29,31	2.26	6 (22%)	29,42,46	1.71	4 (13%)
3	A1CIM	CP	303	1	27,29,31	2.26	6 (22%)	29,42,46	1.71	4 (13%)
3	A1CIM	CQ	305	1	27,29,31	2.19	6 (22%)	29,42,46	2.21	8 (27%)
3	A1CIM	CL	303	1	27,29,31	2.26	6 (22%)	29,42,46	1.71	4 (13%)
3	A1CIM	CL	304	1	27,29,31	2.25	6 (22%)	29,42,46	1.38	4 (13%)
3	A1CIM	CO	302	1	27,29,31	2.22	6 (22%)	29,42,46	1.79	6 (20%)
3	A1CIM	CR	305	1	27,29,31	2.19	6 (22%)	29,42,46	2.21	8 (27%)
3	A1CIM	CJ	302	1	27,29,31	2.22	6 (22%)	29,42,46	1.79	6 (20%)
3	A1CIM	CM	302	1	27,29,31	2.22	6 (22%)	29,42,46	1.79	6 (20%)
3	A1CIM	CO	305	1	27,29,31	2.19	6 (22%)	29,42,46	2.21	8 (27%)
3	A1CIM	CK	303	1	27,29,31	2.26	6 (22%)	29,42,46	1.71	4 (13%)
3	A1CIM	CL	301	1	27,29,31	2.20	6 (22%)	29,42,46	1.76	8 (27%)
3	A1CIM	CP	305	1	27,29,31	2.19	6 (22%)	29,42,46	2.21	8 (27%)
3	A1CIM	CR	302	1	27,29,31	2.22	6 (22%)	29,42,46	1.79	6 (20%)
3	A1CIM	CL	302	1	27,29,31	2.22	6 (22%)	29,42,46	1.79	6 (20%)
3	A1CIM	CK	302	1	27,29,31	2.22	6 (22%)	29,42,46	1.79	6 (20%)
3	A1CIM	CQ	301	1	27,29,31	2.20	6 (22%)	29,42,46	1.76	8 (27%)
3	A1CIM	CM	303	1	27,29,31	2.26	6 (22%)	29,42,46	1.71	4 (13%)
3	A1CIM	CN	304	1	27,29,31	2.25	6 (22%)	29,42,46	1.38	4 (13%)
3	A1CIM	CN	301	1	27,29,31	2.20	6 (22%)	29,42,46	1.76	8 (27%)
3	A1CIM	CO	301	1	27,29,31	2.20	6 (22%)	29,42,46	1.76	8 (27%)
3	A1CIM	CQ	304	1	27,29,31	2.25	6 (22%)	29,42,46	1.38	4 (13%)
3	A1CIM	CJ	304	1	27,29,31	2.25	6 (22%)	29,42,46	1.38	4 (13%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	A1CIM	CK	305	1	27,29,31	2.19	6 (22%)	29,42,46	2.21	8 (27%)
3	A1CIM	CJ	301	1	27,29,31	2.20	6 (22%)	29,42,46	1.76	8 (27%)
3	A1CIM	CP	301	1	27,29,31	2.20	6 (22%)	29,42,46	1.76	8 (27%)
3	A1CIM	CJ	305	1	27,29,31	2.19	6 (22%)	29,42,46	2.21	8 (27%)
3	A1CIM	CN	302	1	27,29,31	2.22	6 (22%)	29,42,46	1.79	6 (20%)
3	A1CIM	CQ	302	1	27,29,31	2.22	6 (22%)	29,42,46	1.79	6 (20%)
3	A1CIM	CM	305	1	27,29,31	2.19	6 (22%)	29,42,46	2.21	8 (27%)
3	A1CIM	CN	303	1	27,29,31	2.26	6 (22%)	29,42,46	1.71	4 (13%)
3	A1CIM	CL	305	1	27,29,31	2.19	6 (22%)	29,42,46	2.21	8 (27%)

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
3	A1CIM	CR	303	1	-	13/31/51/58	0/1/1/1
3	A1CIM	CO	303	1	-	13/31/51/58	0/1/1/1
3	A1CIM	CK	301	1	-	19/31/51/58	0/1/1/1
3	A1CIM	CK	304	1	-	14/31/51/58	0/1/1/1
3	A1CIM	CR	301	1	-	19/31/51/58	0/1/1/1
3	A1CIM	CR	304	1	-	14/31/51/58	0/1/1/1
3	A1CIM	CQ	303	1	-	12/31/51/58	0/1/1/1
3	A1CIM	CO	304	1	-	14/31/51/58	0/1/1/1
3	A1CIM	CN	305	1	-	10/31/51/58	0/1/1/1
3	A1CIM	CM	304	1	-	14/31/51/58	0/1/1/1
3	A1CIM	CM	301	1	-	19/31/51/58	0/1/1/1
3	A1CIM	CP	304	1	-	14/31/51/58	0/1/1/1
3	A1CIM	CP	302	1	-	10/31/51/58	0/1/1/1
3	A1CIM	CJ	303	1	-	12/31/51/58	0/1/1/1
3	A1CIM	CP	303	1	-	12/31/51/58	0/1/1/1
3	A1CIM	CQ	305	1	-	10/31/51/58	0/1/1/1
3	A1CIM	CL	303	1	-	13/31/51/58	0/1/1/1
3	A1CIM	CL	304	1	-	14/31/51/58	0/1/1/1
3	A1CIM	CO	302	1	-	10/31/51/58	0/1/1/1
3	A1CIM	CR	305	1	-	10/31/51/58	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	A1CIM	CJ	302	1	-	10/31/51/58	0/1/1/1
3	A1CIM	CM	302	1	-	10/31/51/58	0/1/1/1
3	A1CIM	CO	305	1	-	10/31/51/58	0/1/1/1
3	A1CIM	CK	303	1	-	12/31/51/58	0/1/1/1
3	A1CIM	CL	301	1	-	19/31/51/58	0/1/1/1
3	A1CIM	CP	305	1	-	10/31/51/58	0/1/1/1
3	A1CIM	CR	302	1	-	10/31/51/58	0/1/1/1
3	A1CIM	CL	302	1	-	10/31/51/58	0/1/1/1
3	A1CIM	CK	302	1	-	10/31/51/58	0/1/1/1
3	A1CIM	CQ	301	1	-	19/31/51/58	0/1/1/1
3	A1CIM	CM	303	1	-	13/31/51/58	0/1/1/1
3	A1CIM	CN	304	1	-	14/31/51/58	0/1/1/1
3	A1CIM	CN	301	1	-	19/31/51/58	0/1/1/1
3	A1CIM	CO	301	1	-	19/31/51/58	0/1/1/1
3	A1CIM	CQ	304	1	-	14/31/51/58	0/1/1/1
3	A1CIM	CJ	304	1	-	14/31/51/58	0/1/1/1
3	A1CIM	CK	305	1	-	10/31/51/58	0/1/1/1
3	A1CIM	CJ	301	1	-	19/31/51/58	0/1/1/1
3	A1CIM	CP	301	1	-	19/31/51/58	0/1/1/1
3	A1CIM	CJ	305	1	-	10/31/51/58	0/1/1/1
3	A1CIM	CN	302	1	-	10/31/51/58	0/1/1/1
3	A1CIM	CQ	302	1	-	10/31/51/58	0/1/1/1
3	A1CIM	CM	305	1	-	10/31/51/58	0/1/1/1
3	A1CIM	CN	303	1	-	12/31/51/58	0/1/1/1
3	A1CIM	CL	305	1	-	10/31/51/58	0/1/1/1

The worst 5 of 270 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	CJ	303	A1CIM	C7-N1	6.57	1.47	1.34
3	CP	303	A1CIM	C7-N1	6.57	1.47	1.34
3	CL	303	A1CIM	C7-N1	6.57	1.47	1.34
3	CR	303	A1CIM	C7-N1	6.56	1.47	1.34
3	CM	303	A1CIM	C7-N1	6.56	1.47	1.34

The worst 5 of 270 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	CM	305	A1CIM	O7-C10-C14	7.52	119.07	109.95
3	CR	305	A1CIM	O7-C10-C14	7.52	119.07	109.95
3	CJ	305	A1CIM	O7-C10-C14	7.52	119.07	109.95
3	CO	305	A1CIM	O7-C10-C14	7.52	119.07	109.95
3	CP	305	A1CIM	O7-C10-C14	7.52	119.06	109.95

There are no chirality outliers.

5 of 589 torsion outliers are listed below:

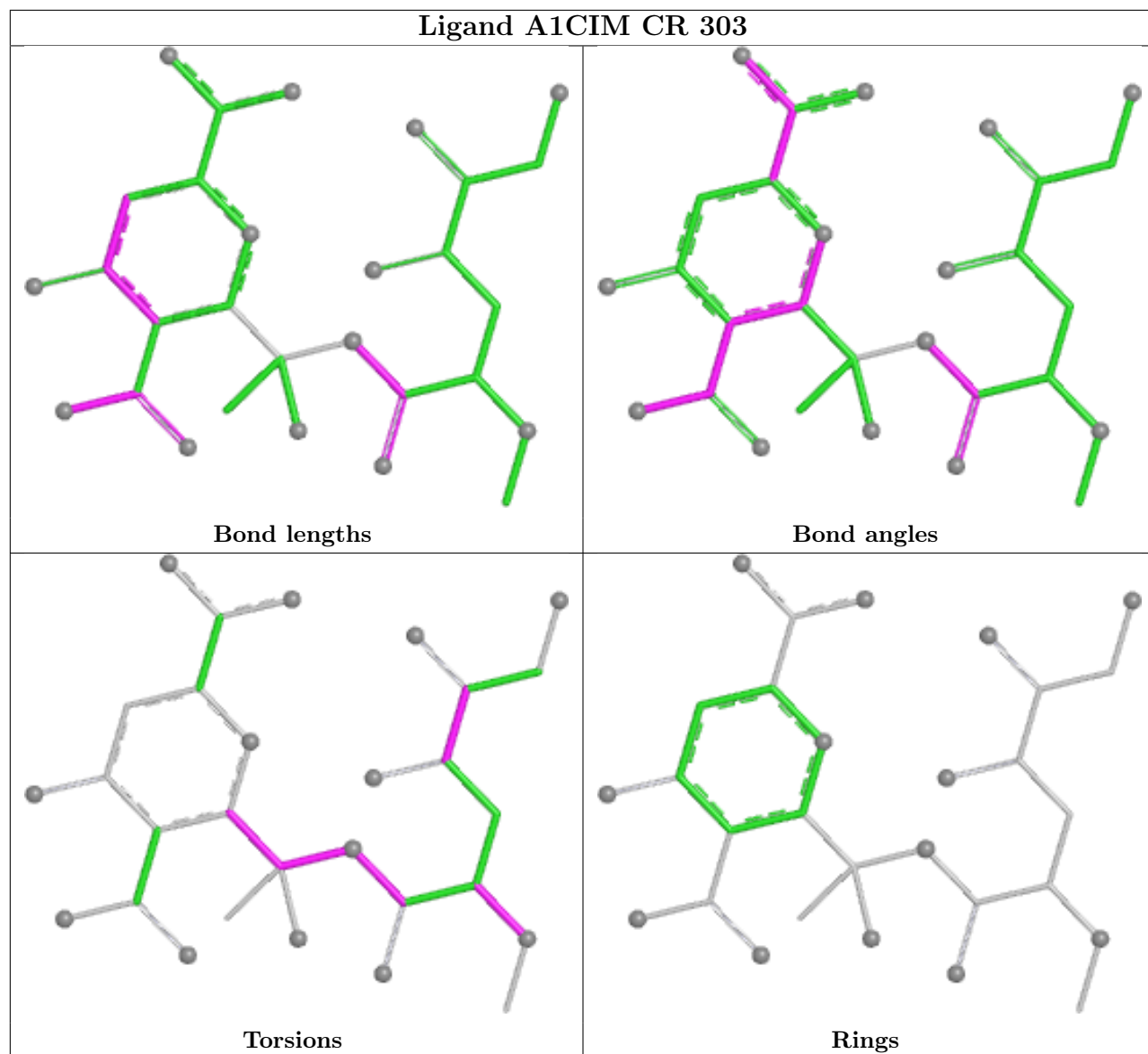
Mol	Chain	Res	Type	Atoms
3	CJ	301	A1CIM	C3-C2-C7-N1
3	CJ	301	A1CIM	C3-C2-C7-O5
3	CJ	301	A1CIM	C2-C3-C4-C5
3	CJ	301	A1CIM	C2-C3-C4-O2
3	CJ	301	A1CIM	C3-C4-C5-C6

There are no ring outliers.

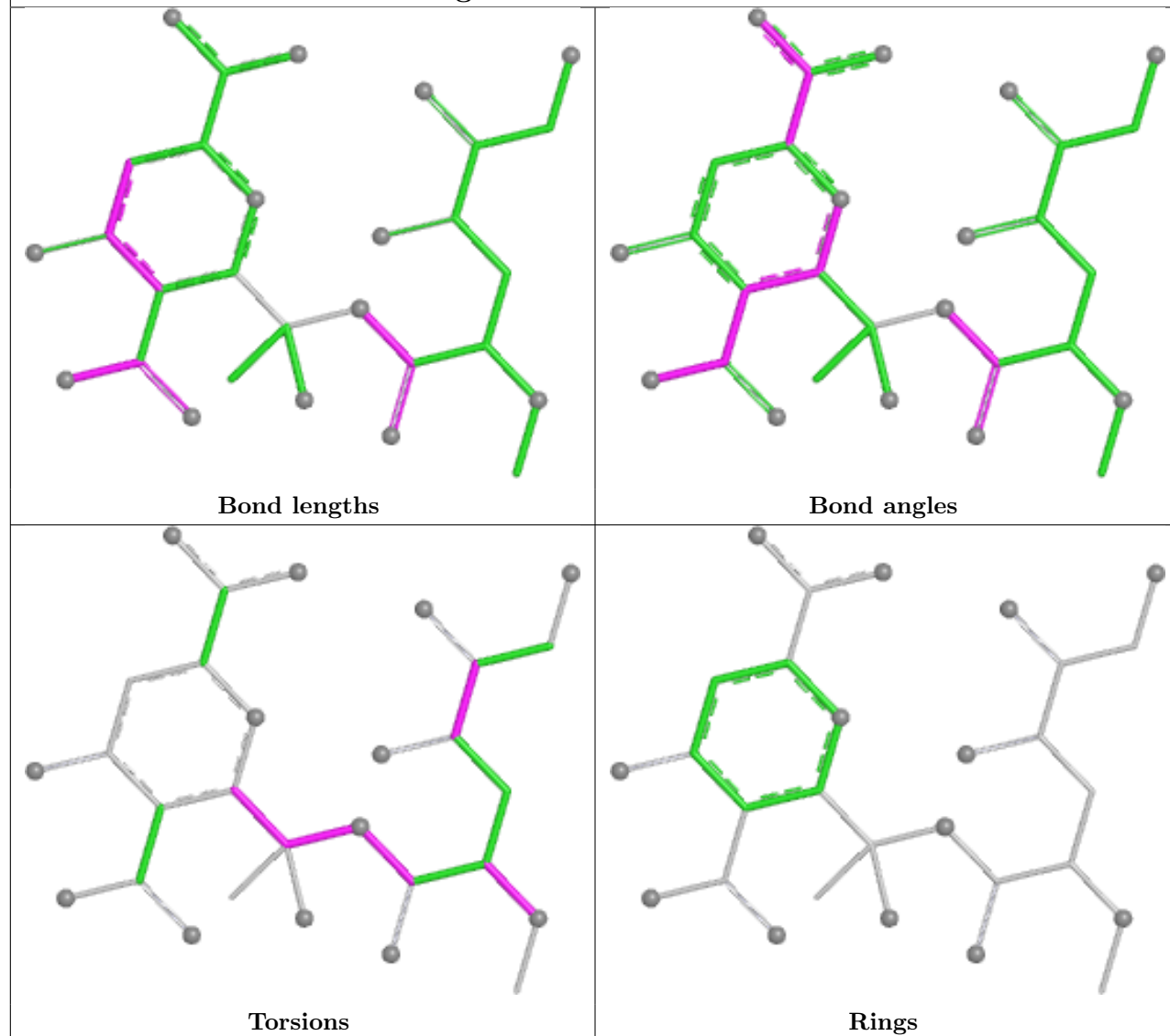
No monomer is involved in short contacts.

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

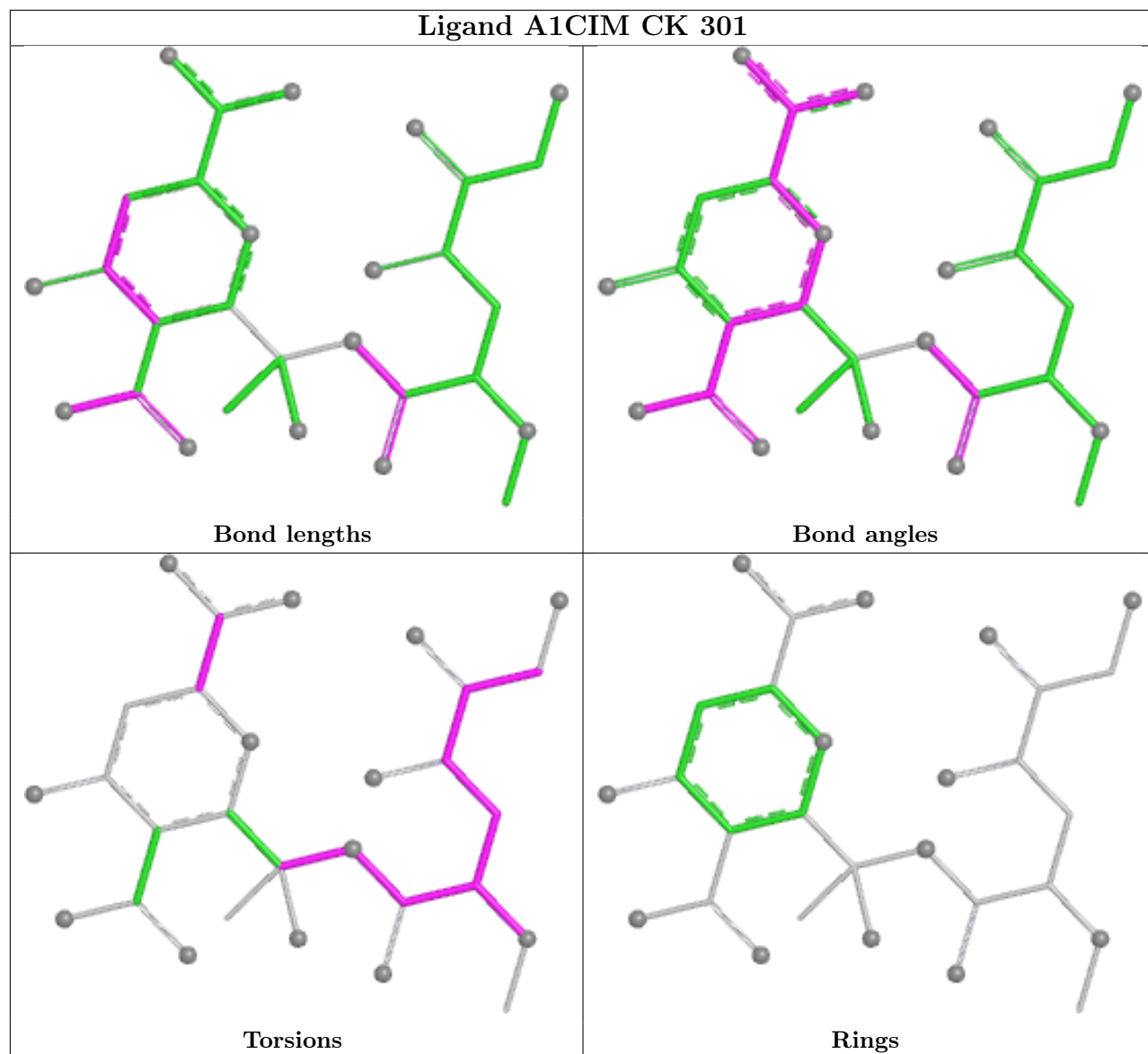
Ligand A1CIM CR 303



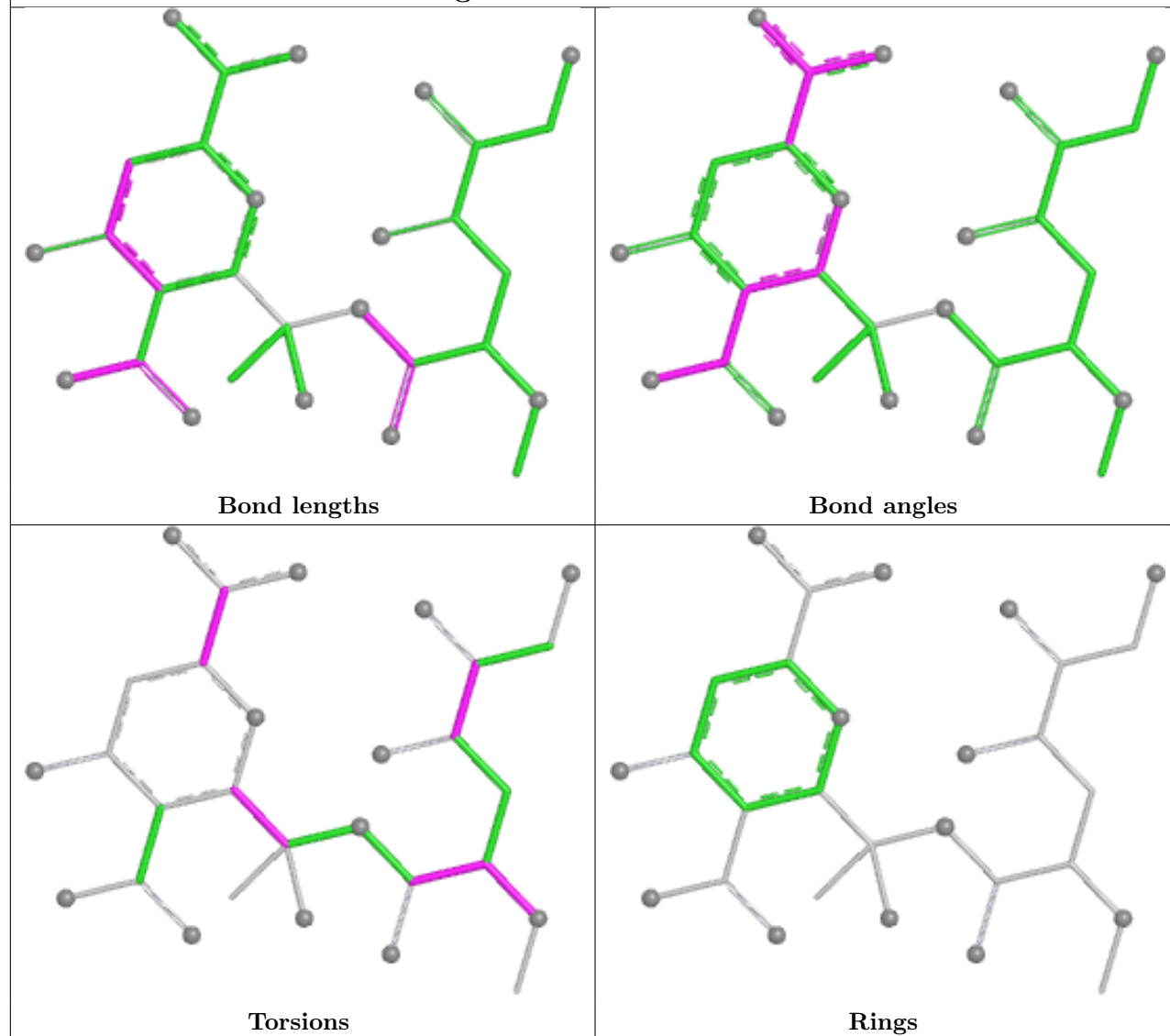
Ligand A1CIM CO 303



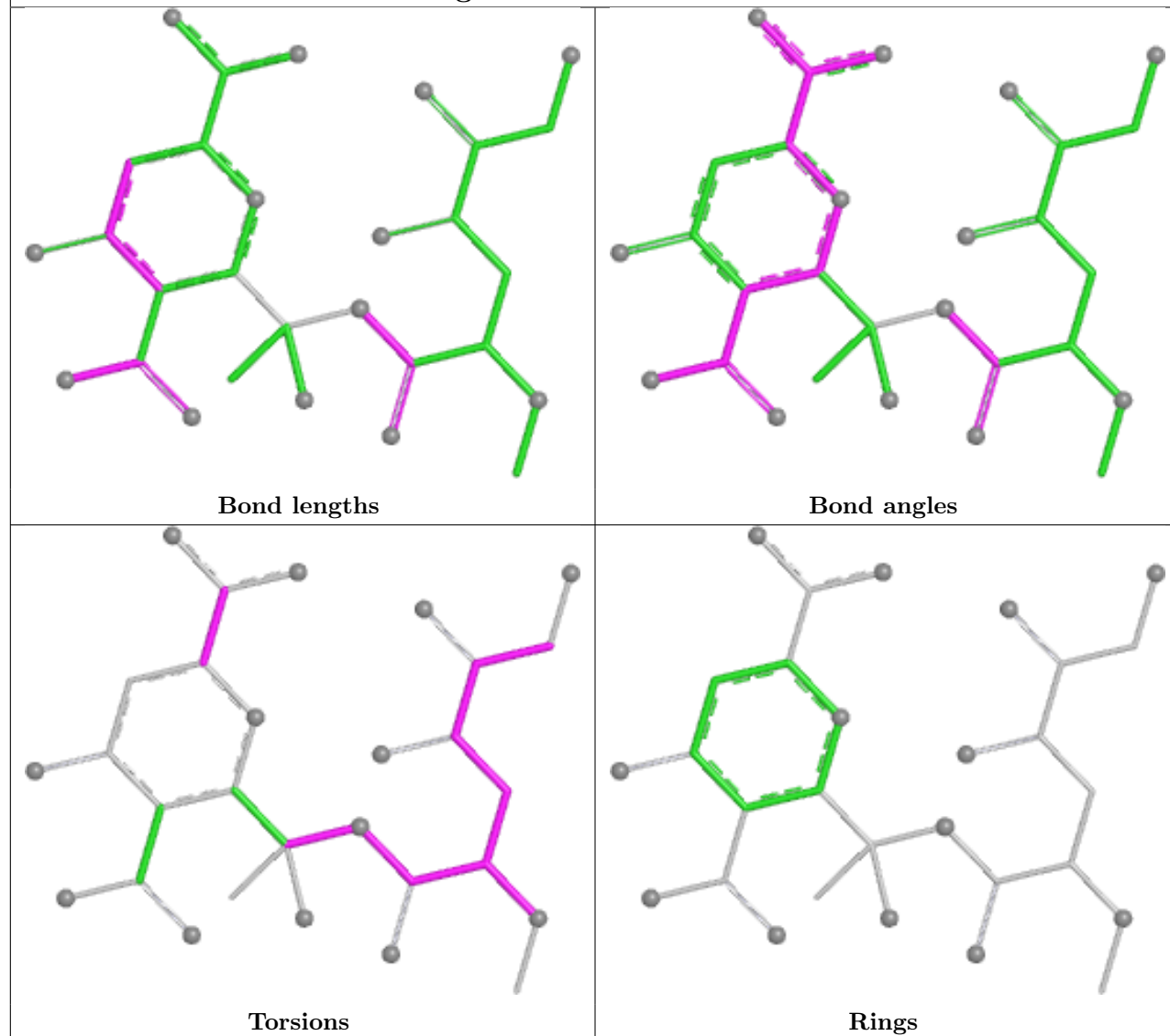
Ligand A1CIM CK 301



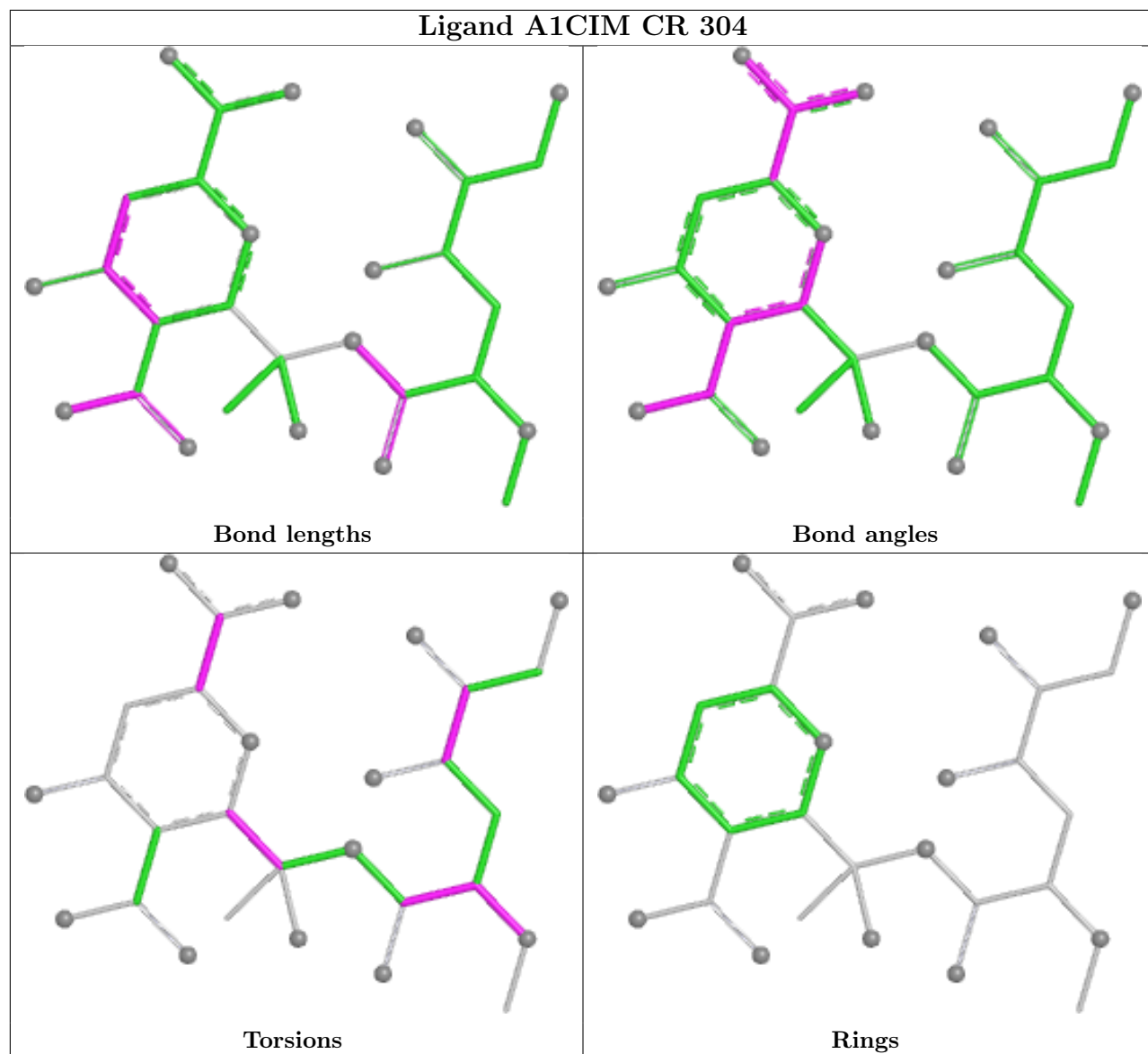
Ligand A1CIM CK 304



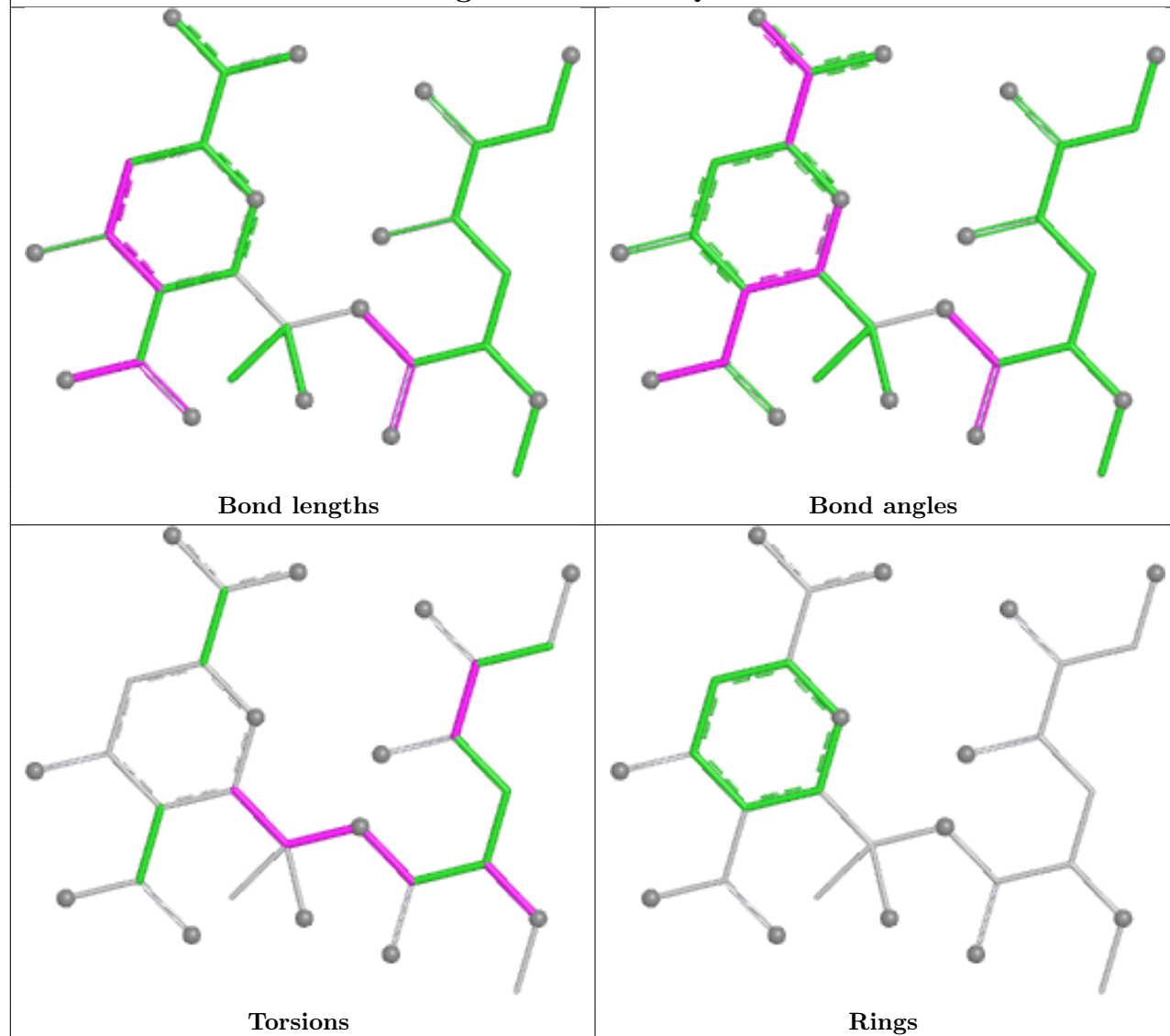
Ligand A1CIM CR 301



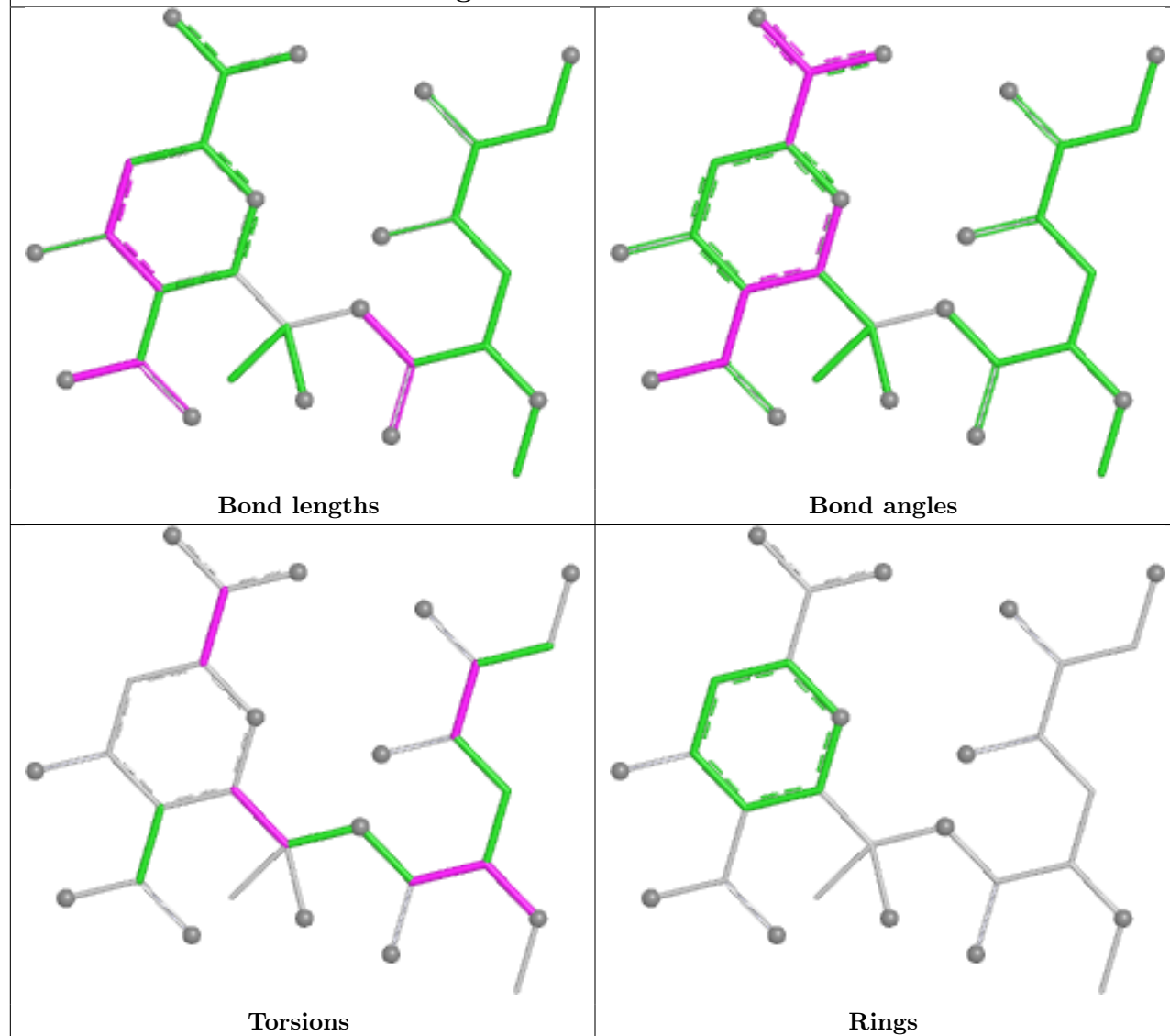
Ligand A1CIM CR 304



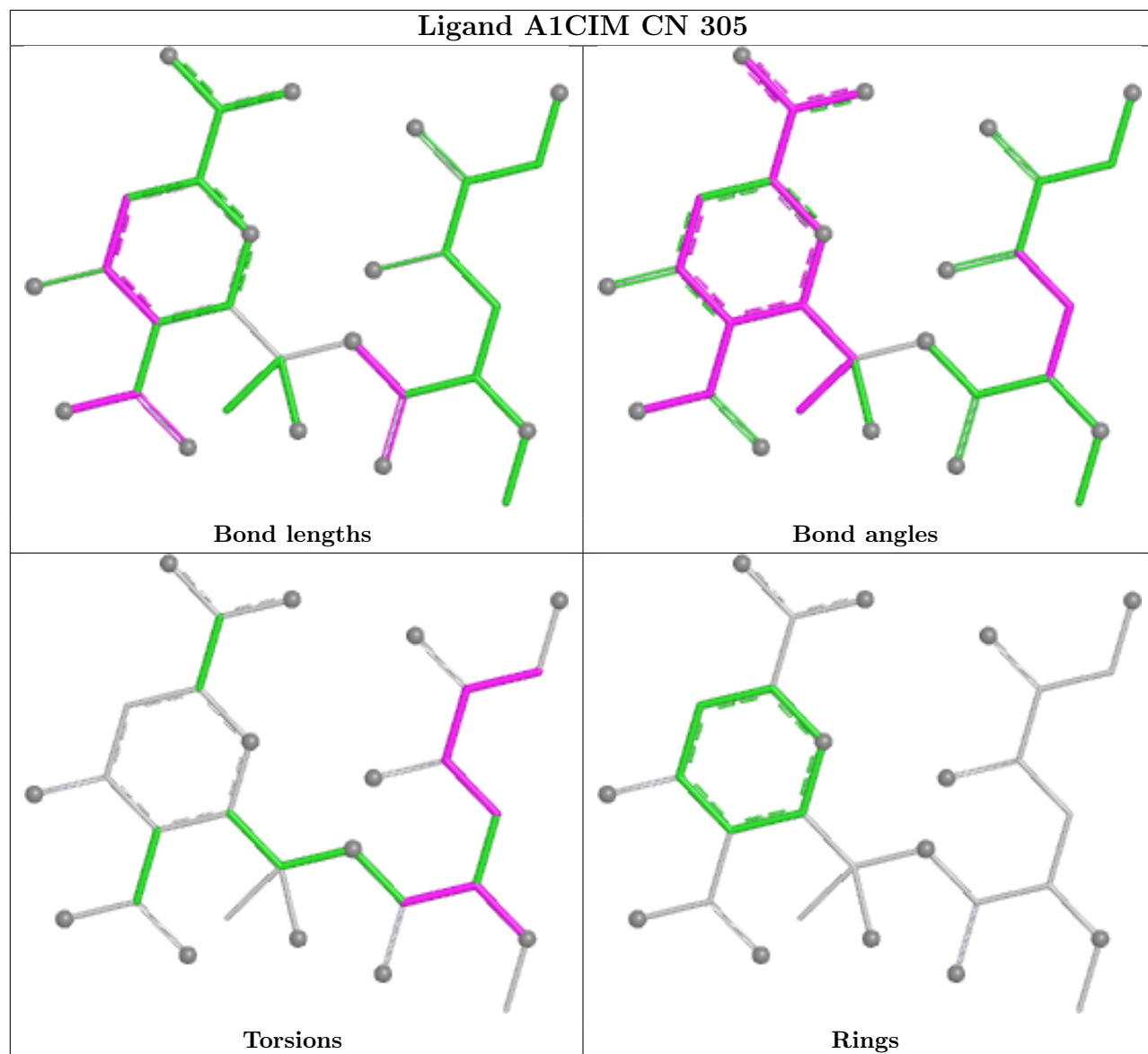
Ligand A1CIM CQ 303

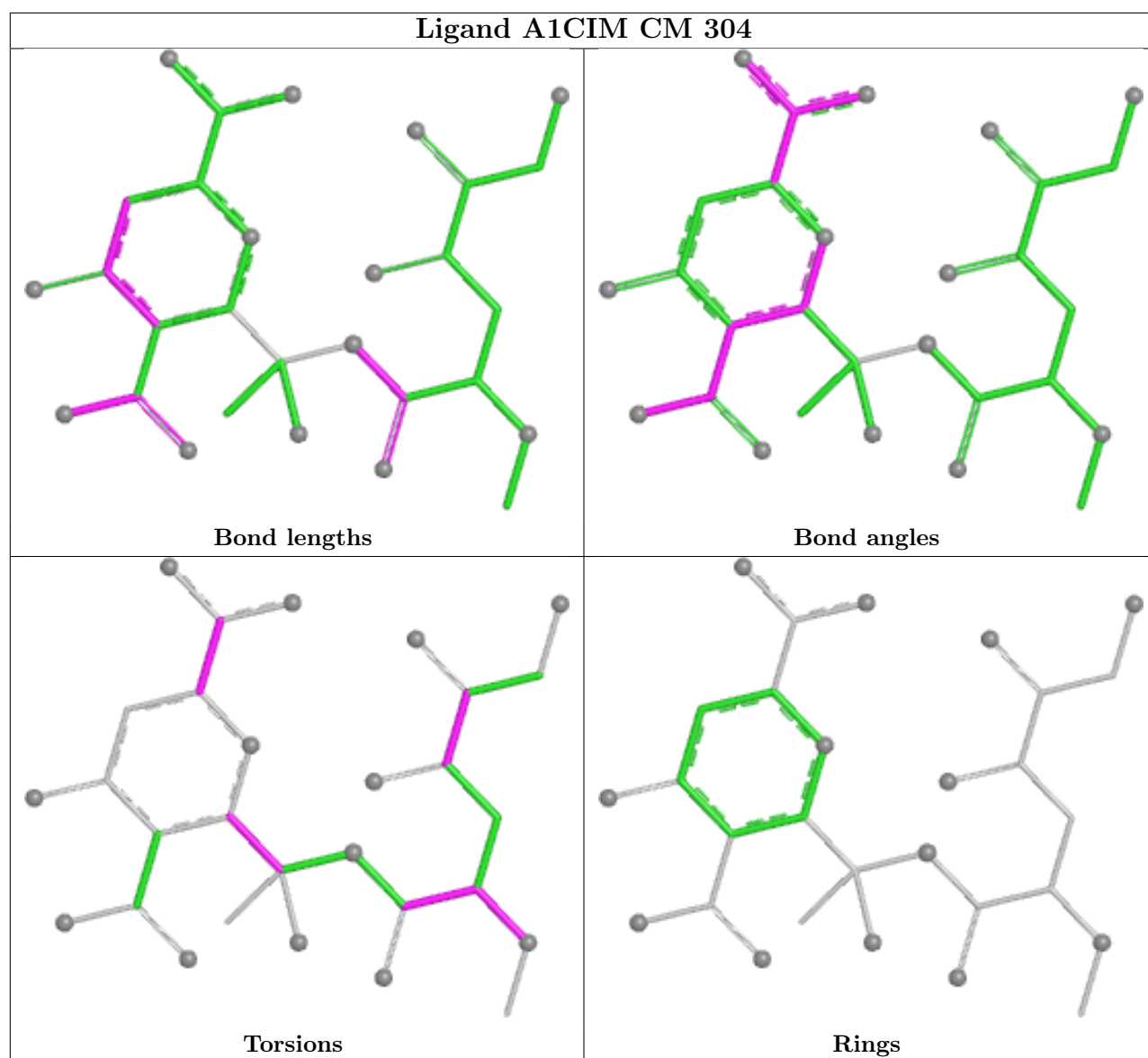


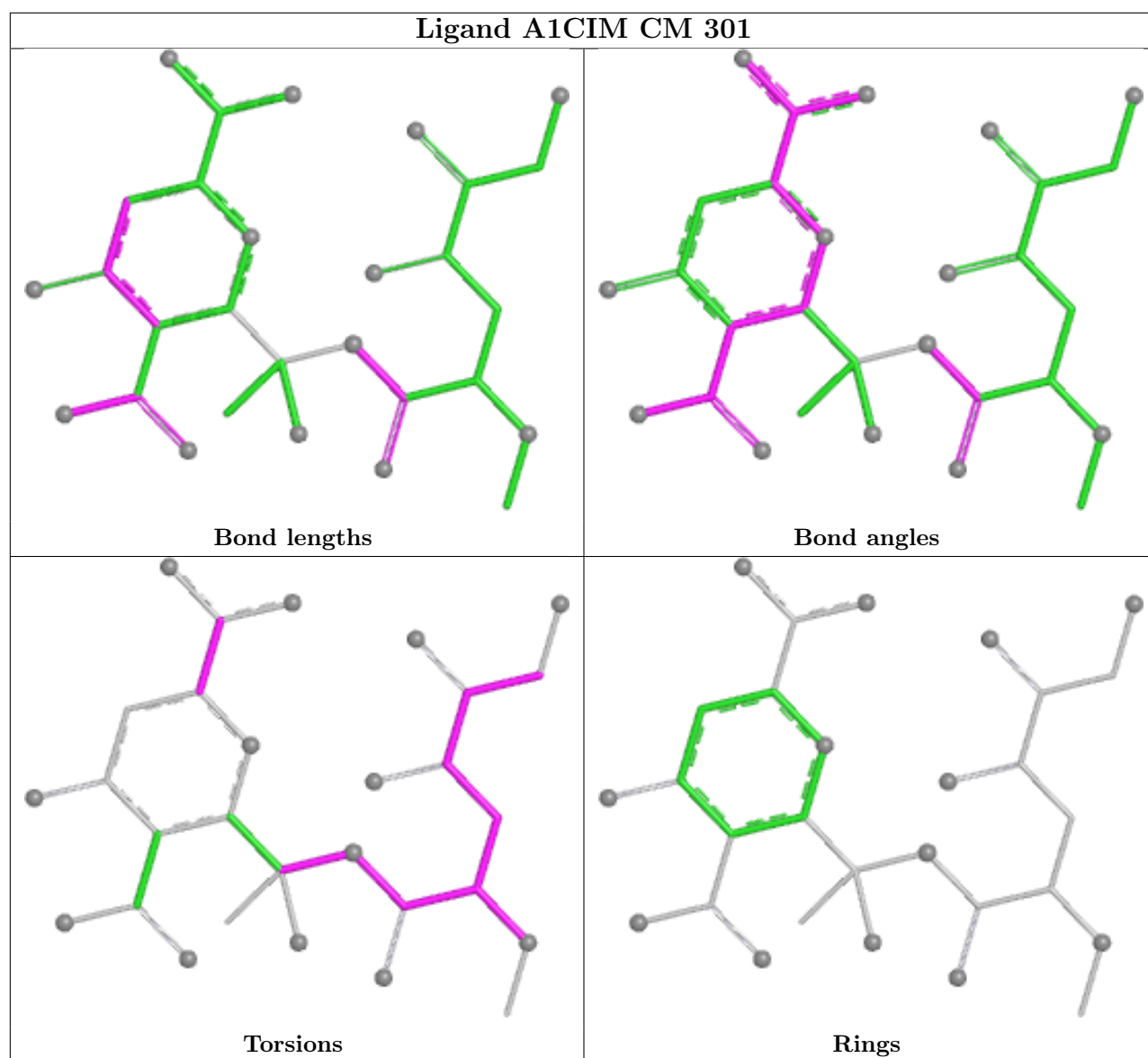
Ligand A1CIM CO 304



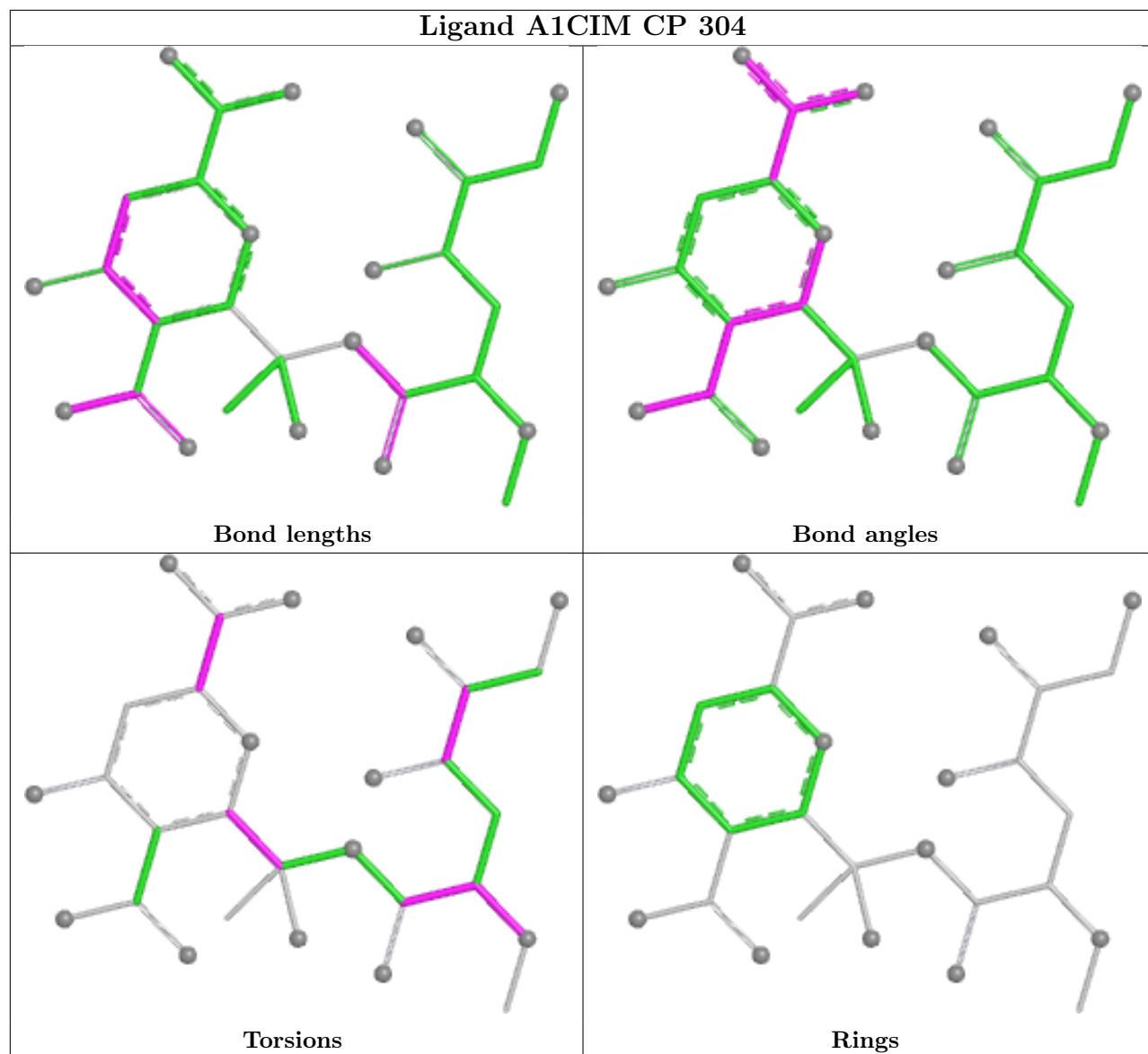
Ligand A1CIM CN 305



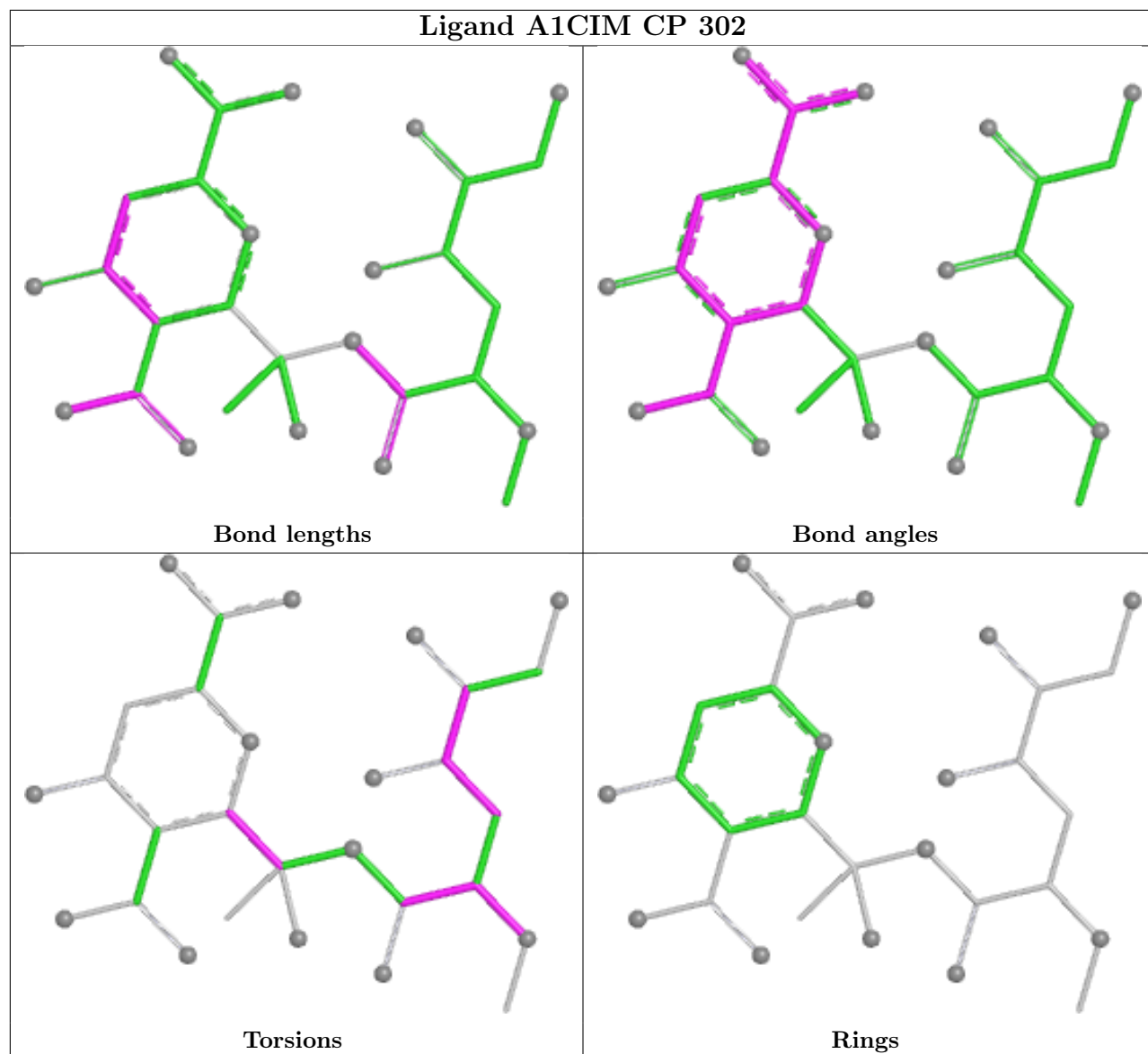




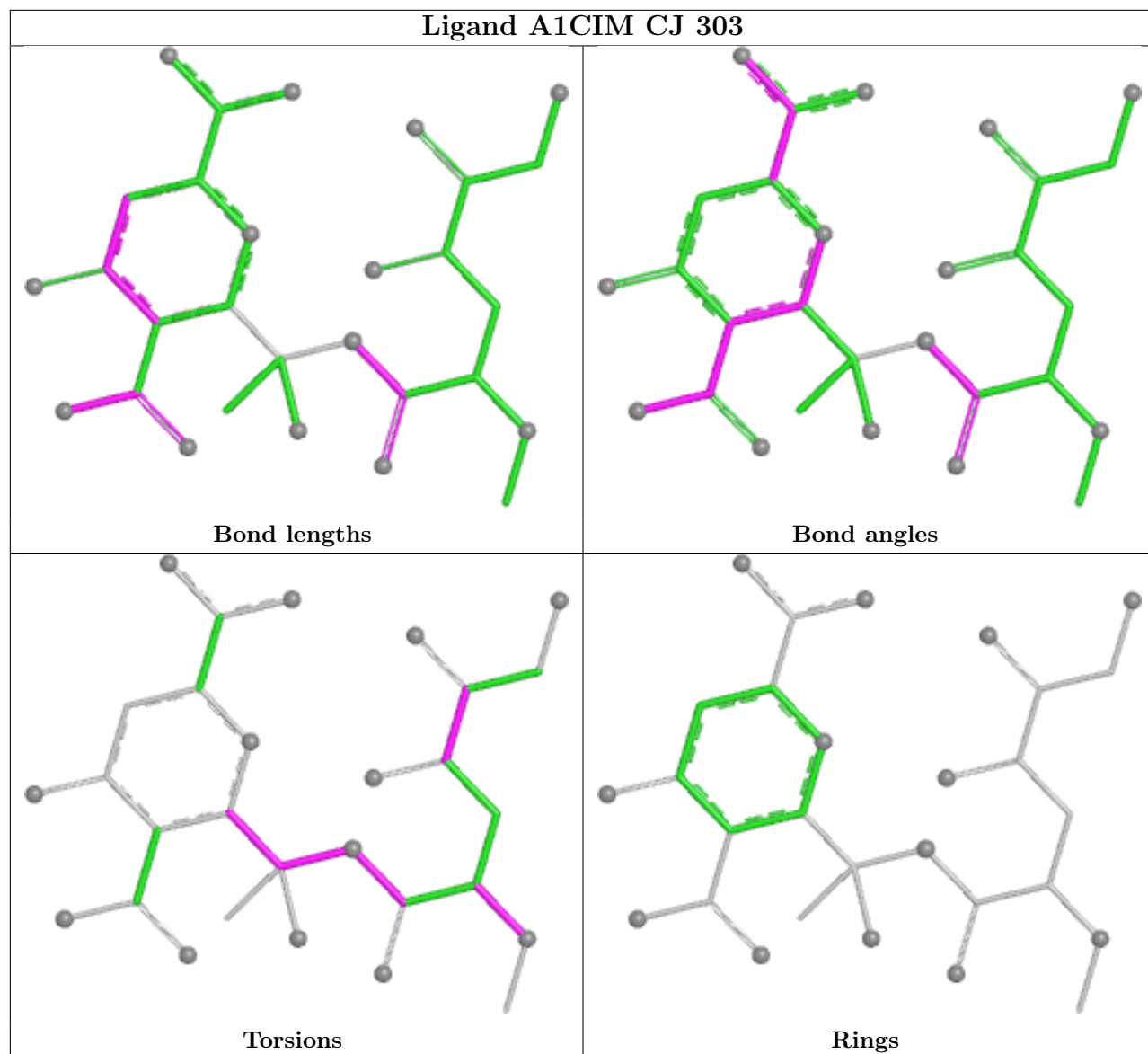
Ligand A1CIM CP 304



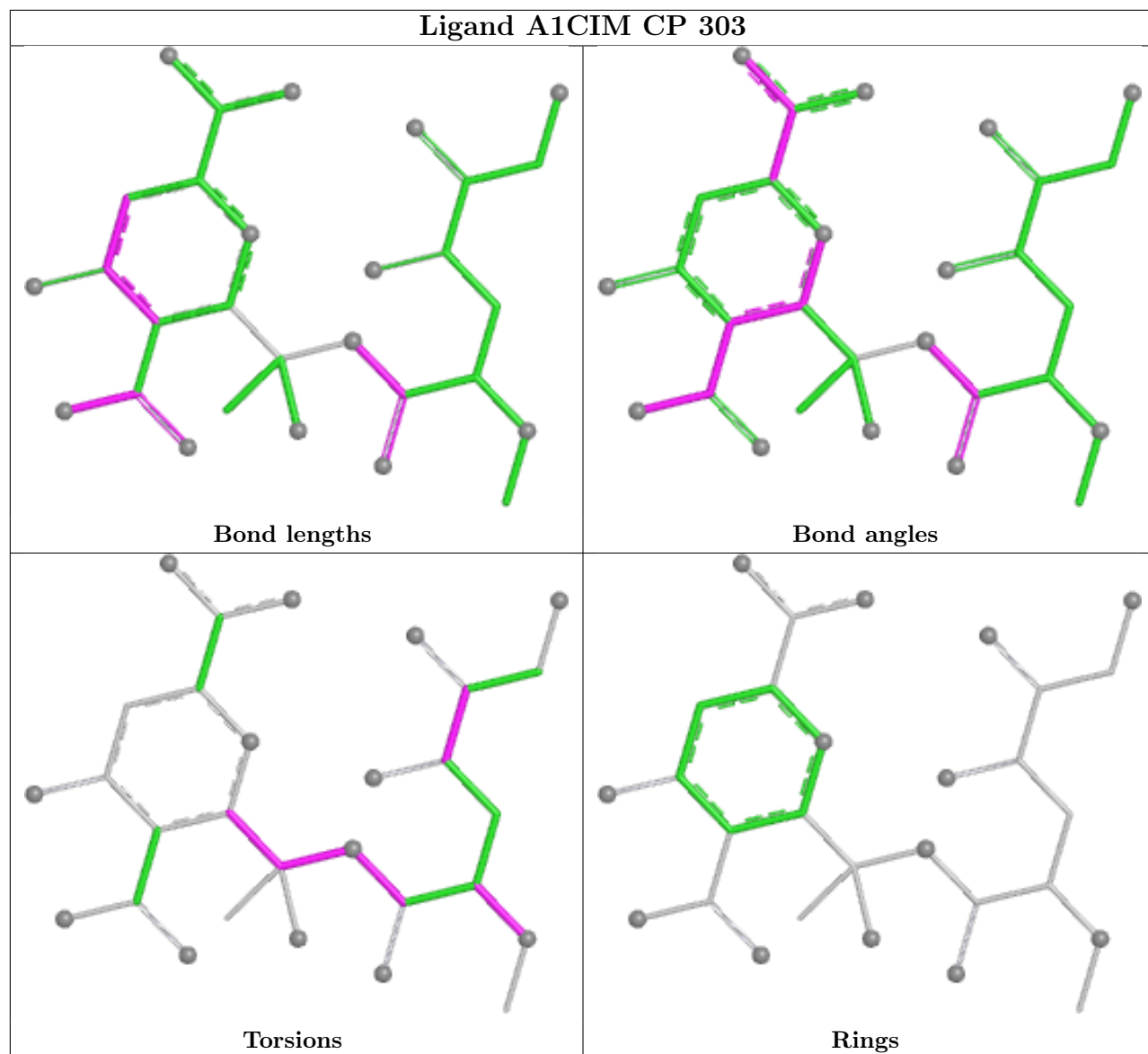
Ligand A1CIM CP 302



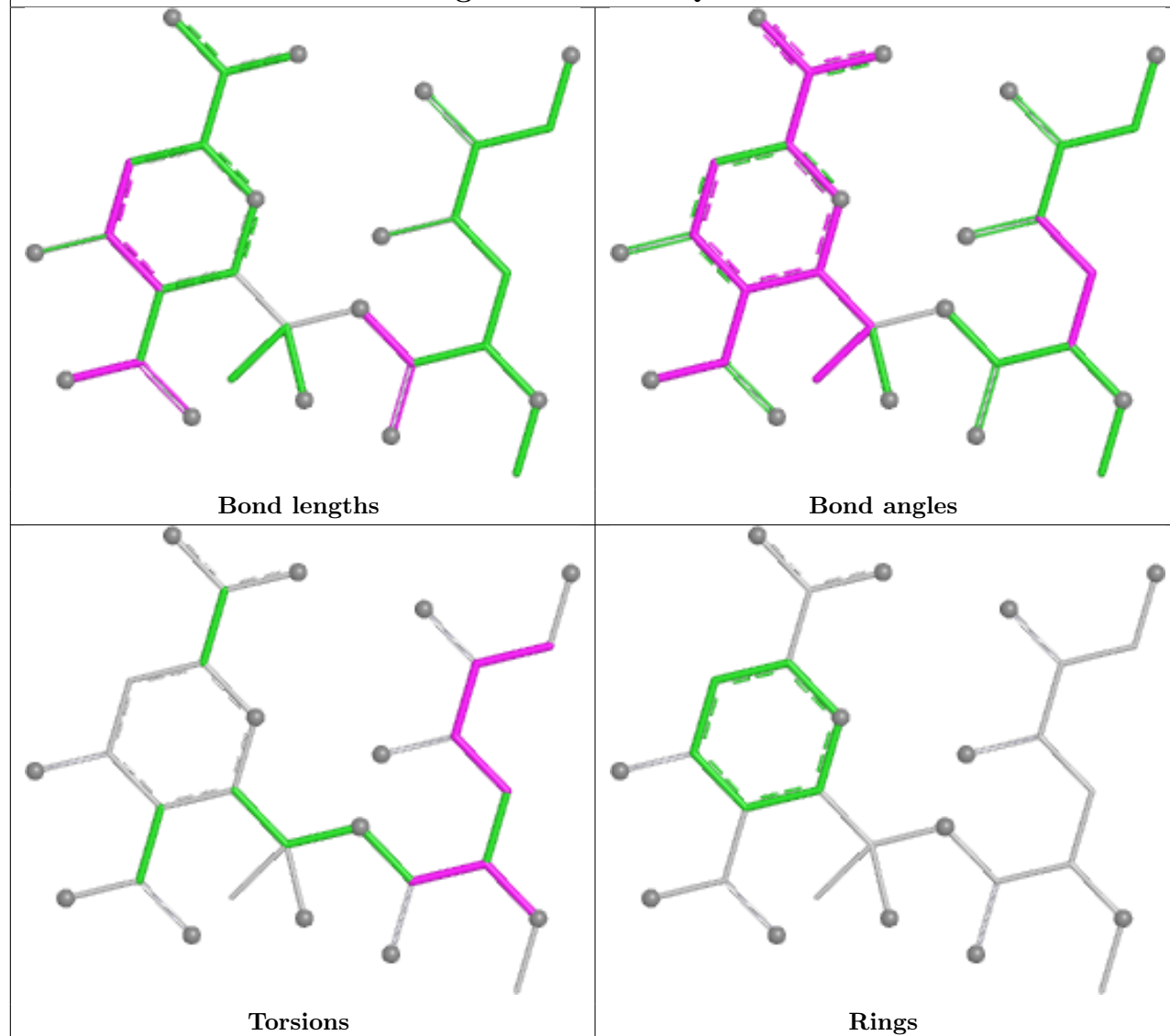
Ligand A1CIM CJ 303



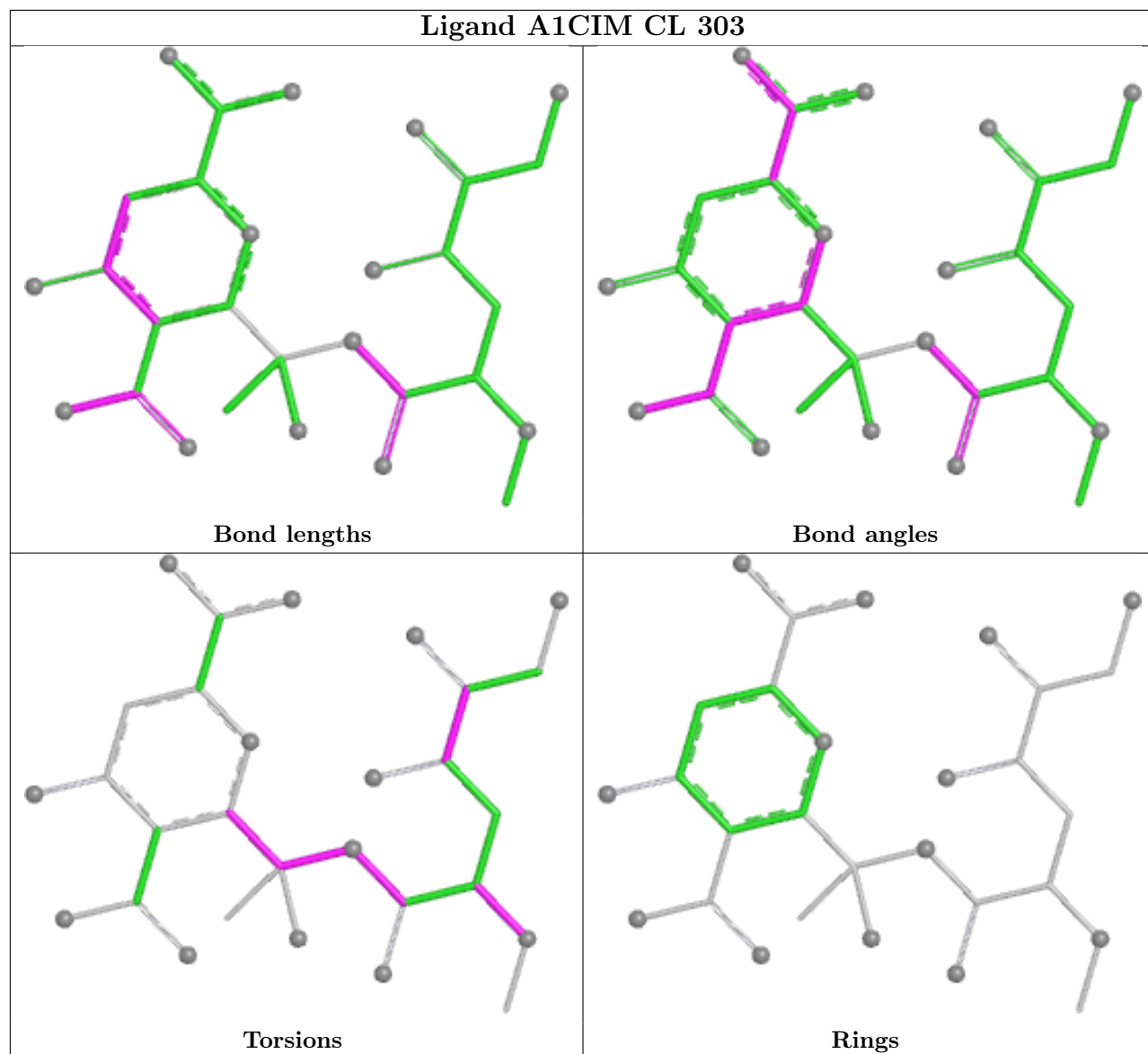
Ligand A1CIM CP 303



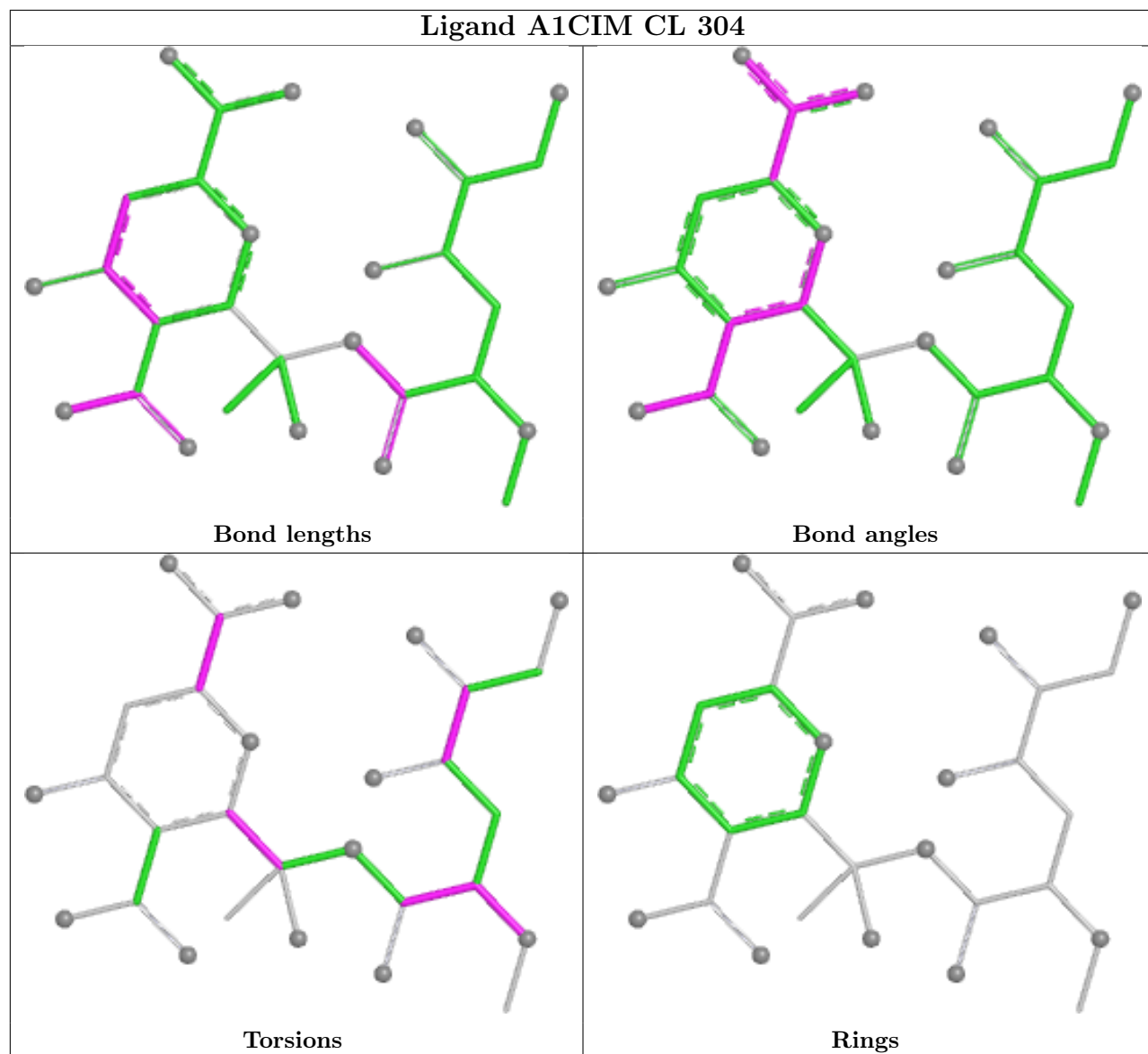
Ligand A1CIM CQ 305



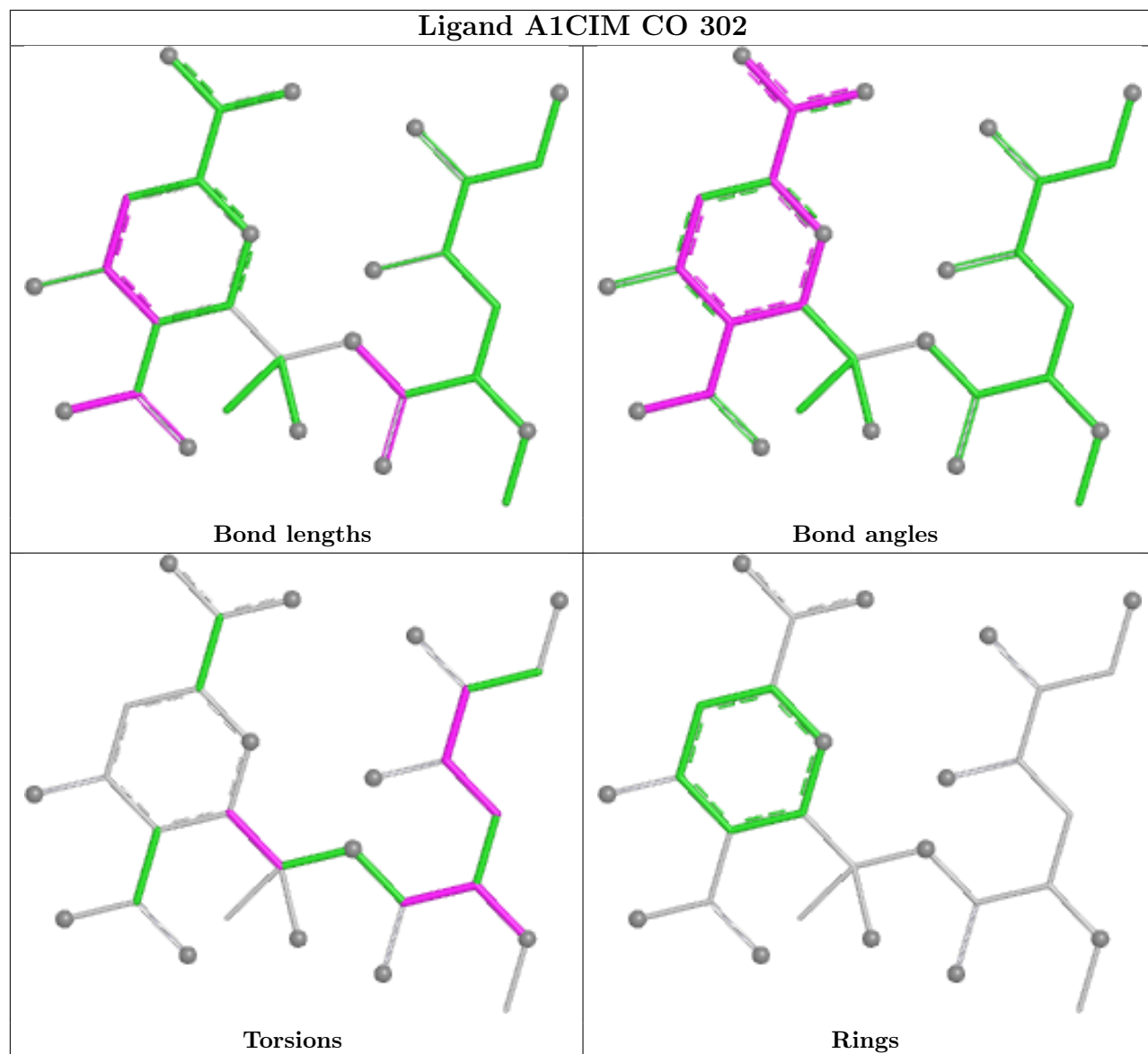
Ligand A1CIM CL 303



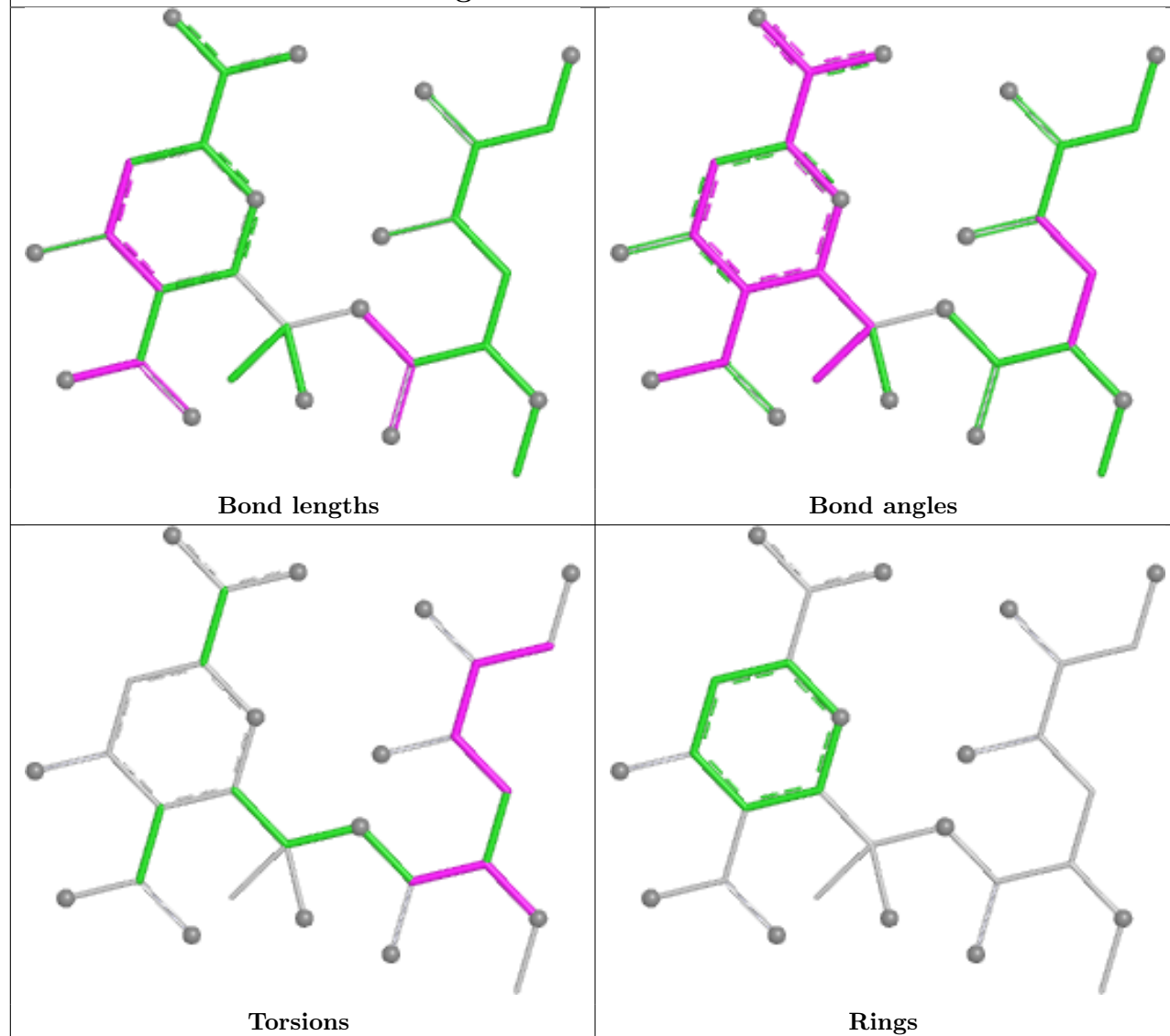
Ligand A1CIM CL 304



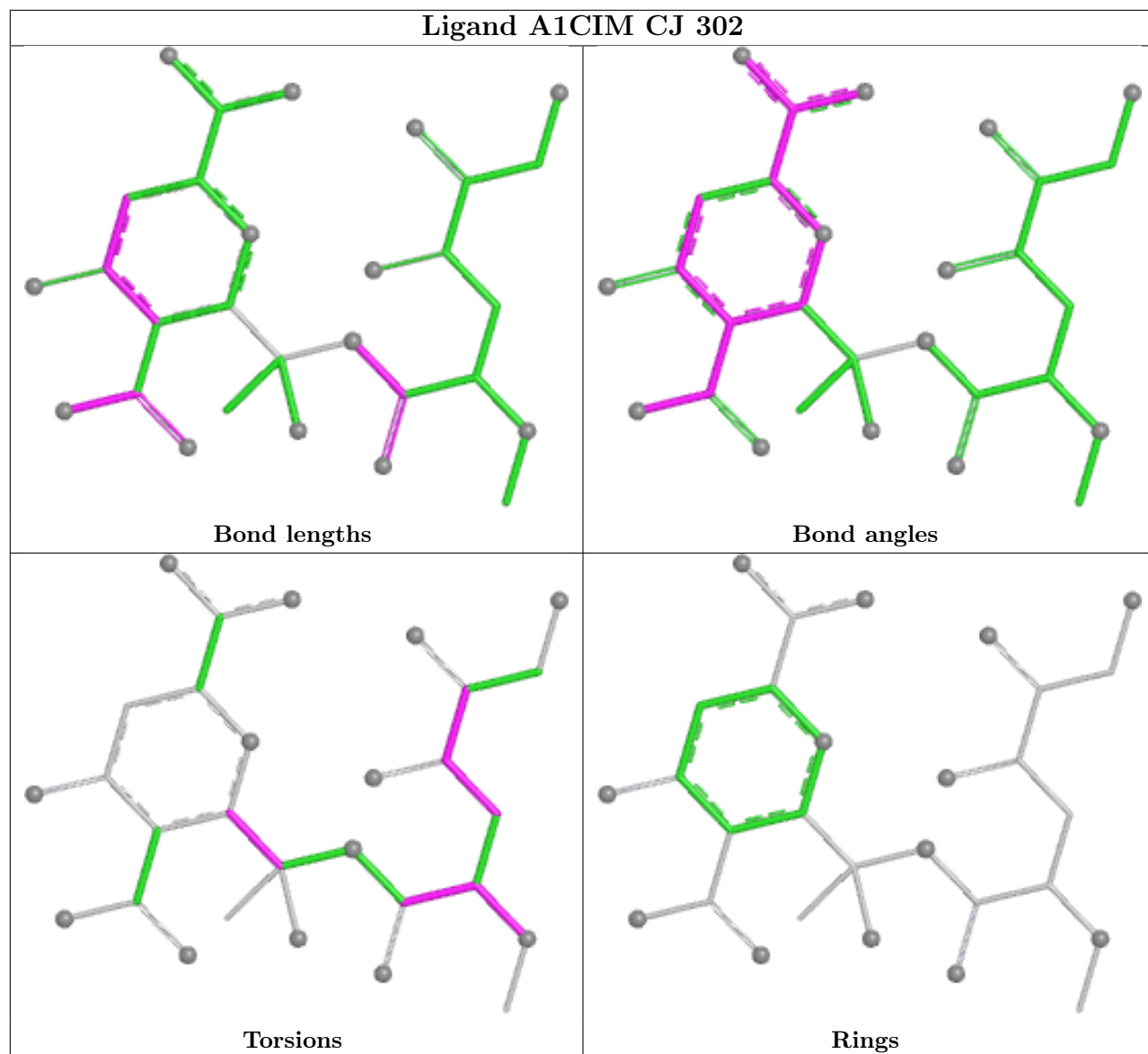
Ligand A1CIM CO 302



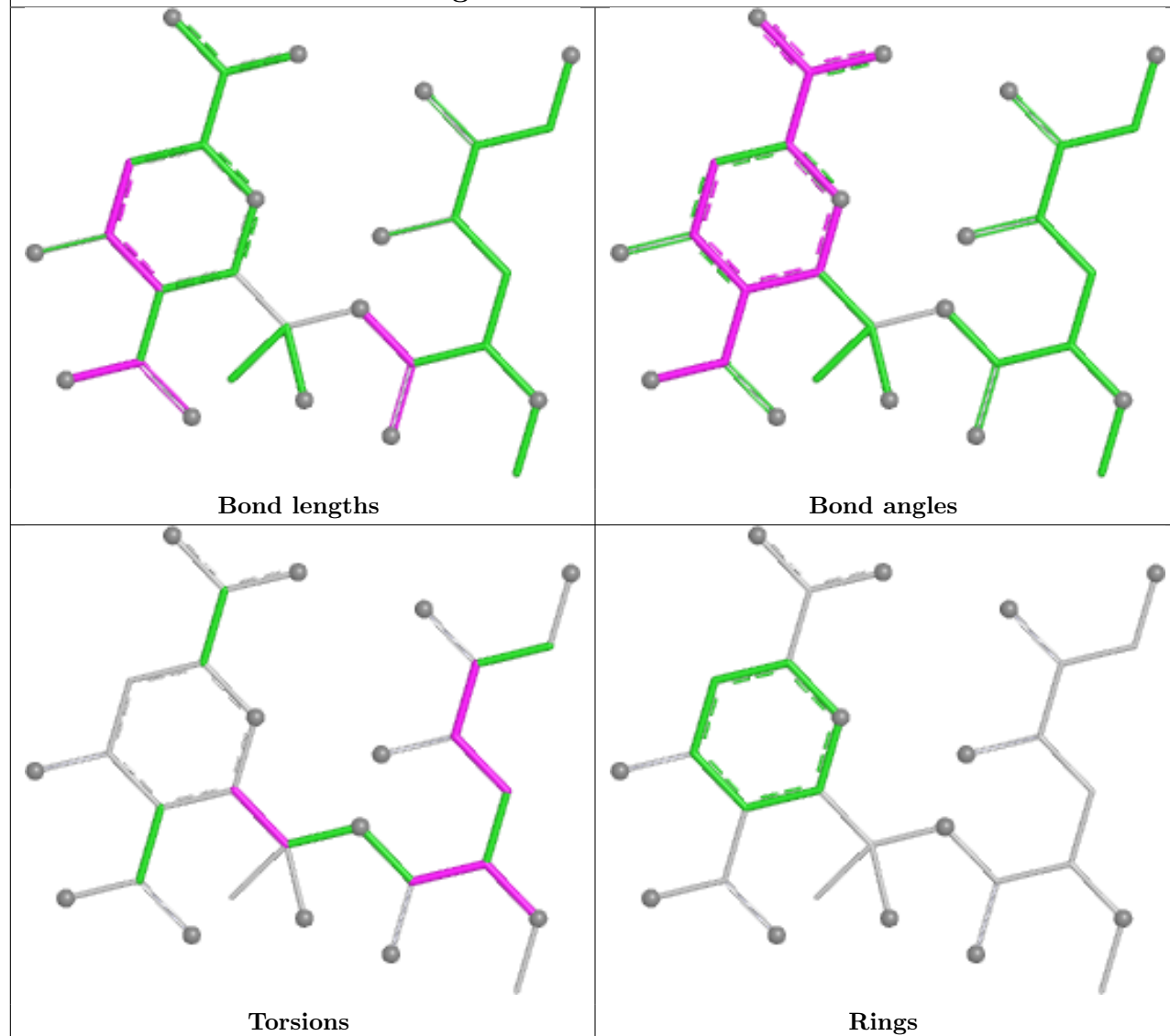
Ligand A1CIM CR 305



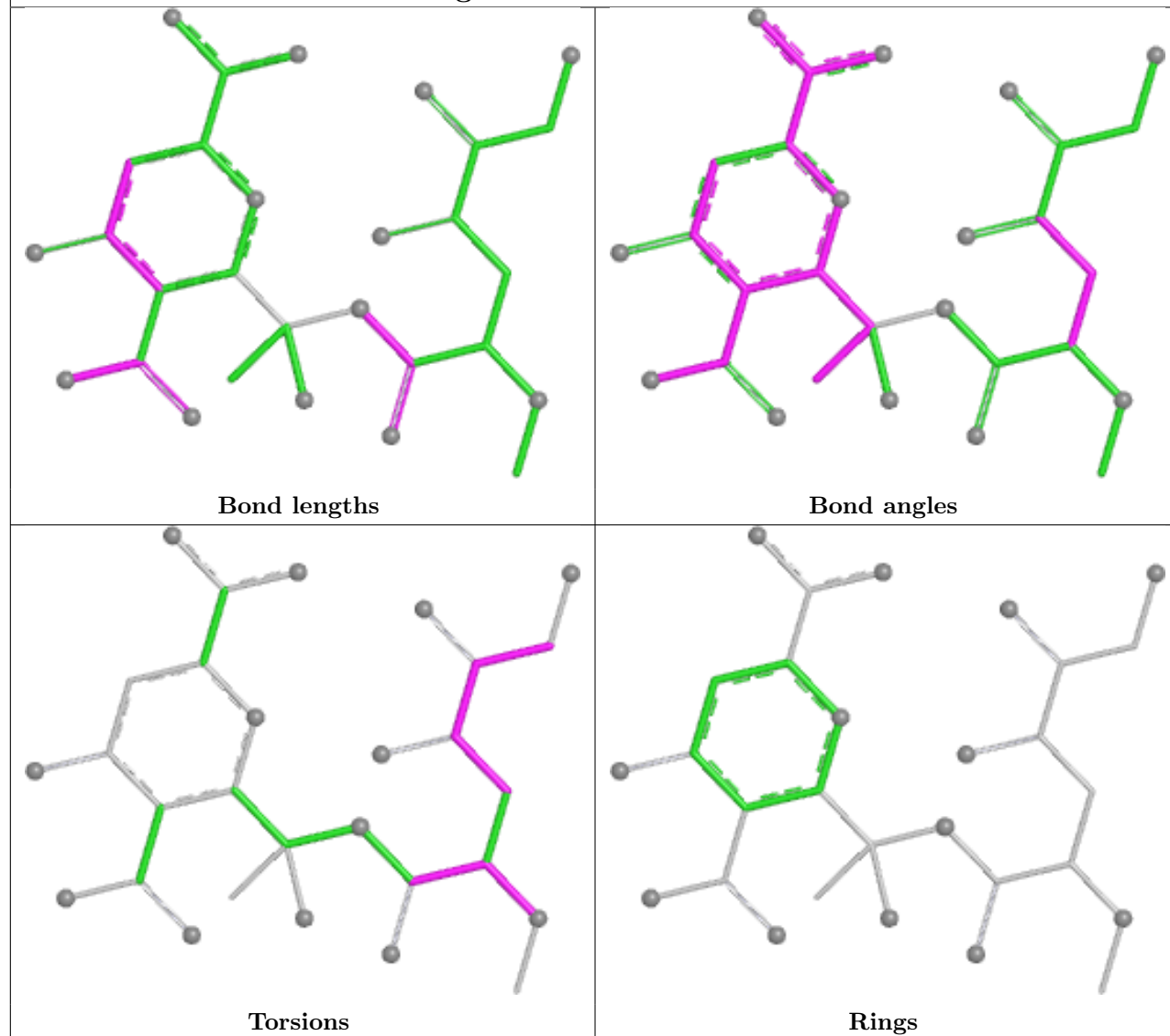
Ligand A1CIM CJ 302



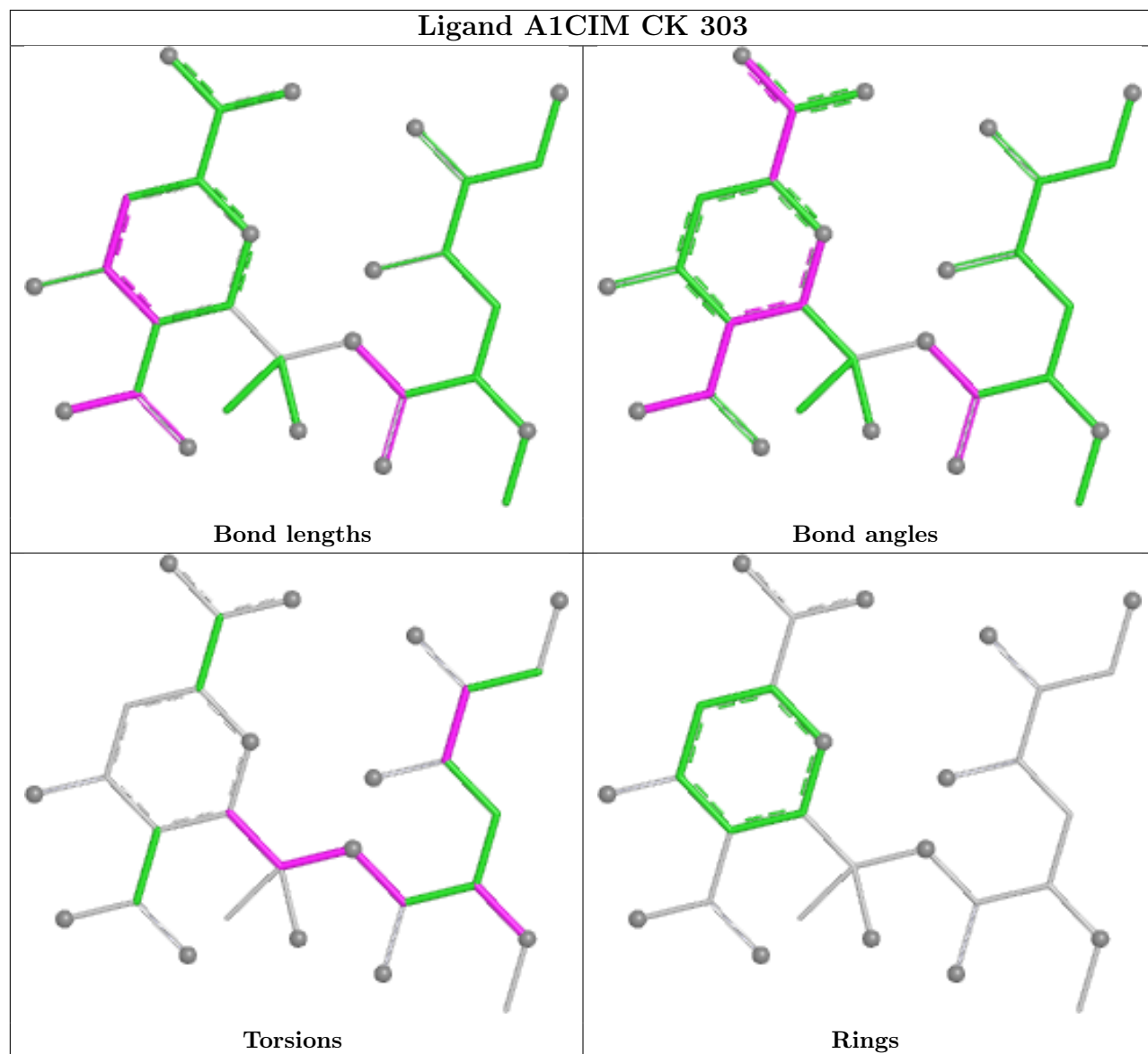
Ligand A1CIM CM 302



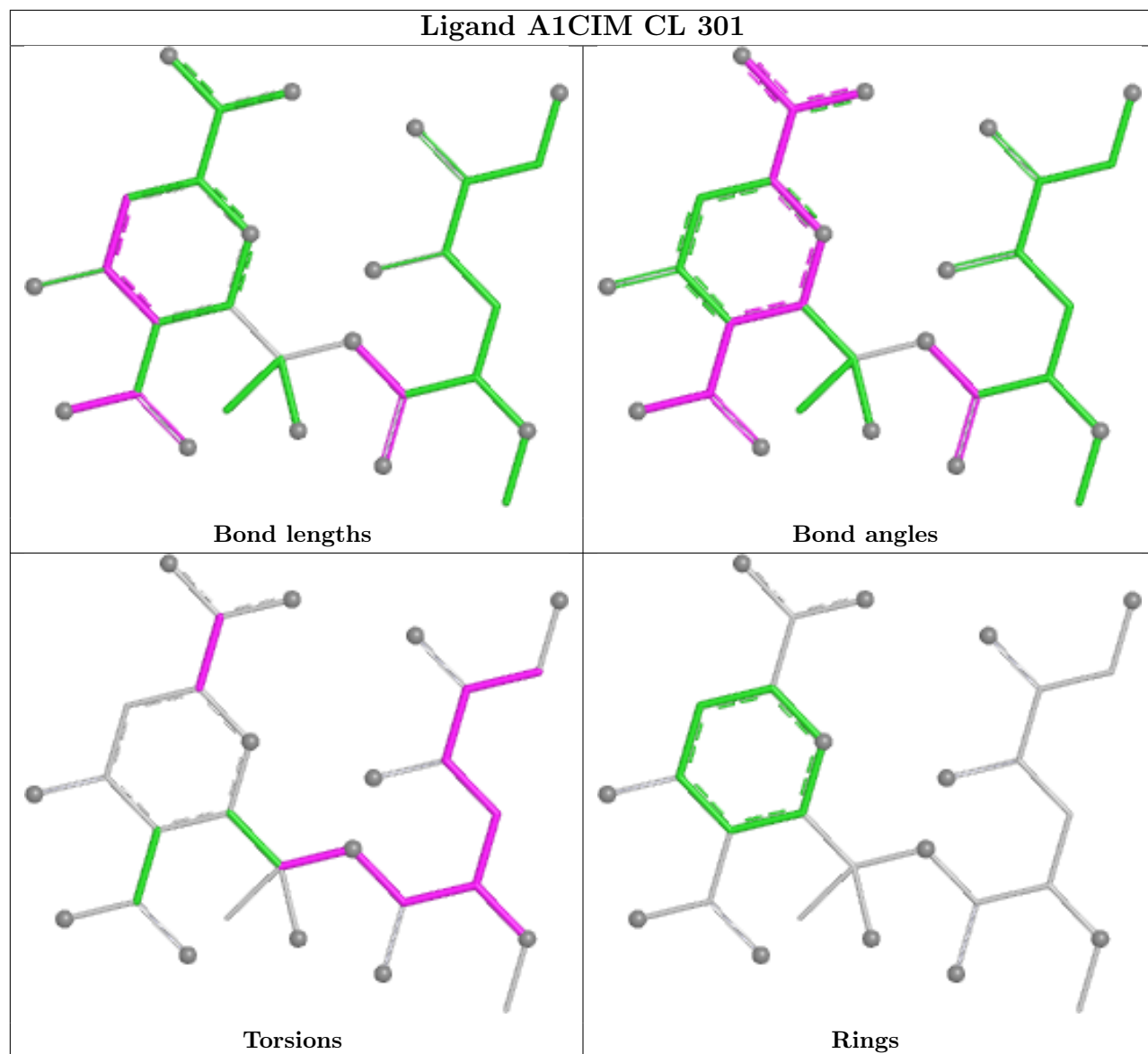
Ligand A1CIM CO 305



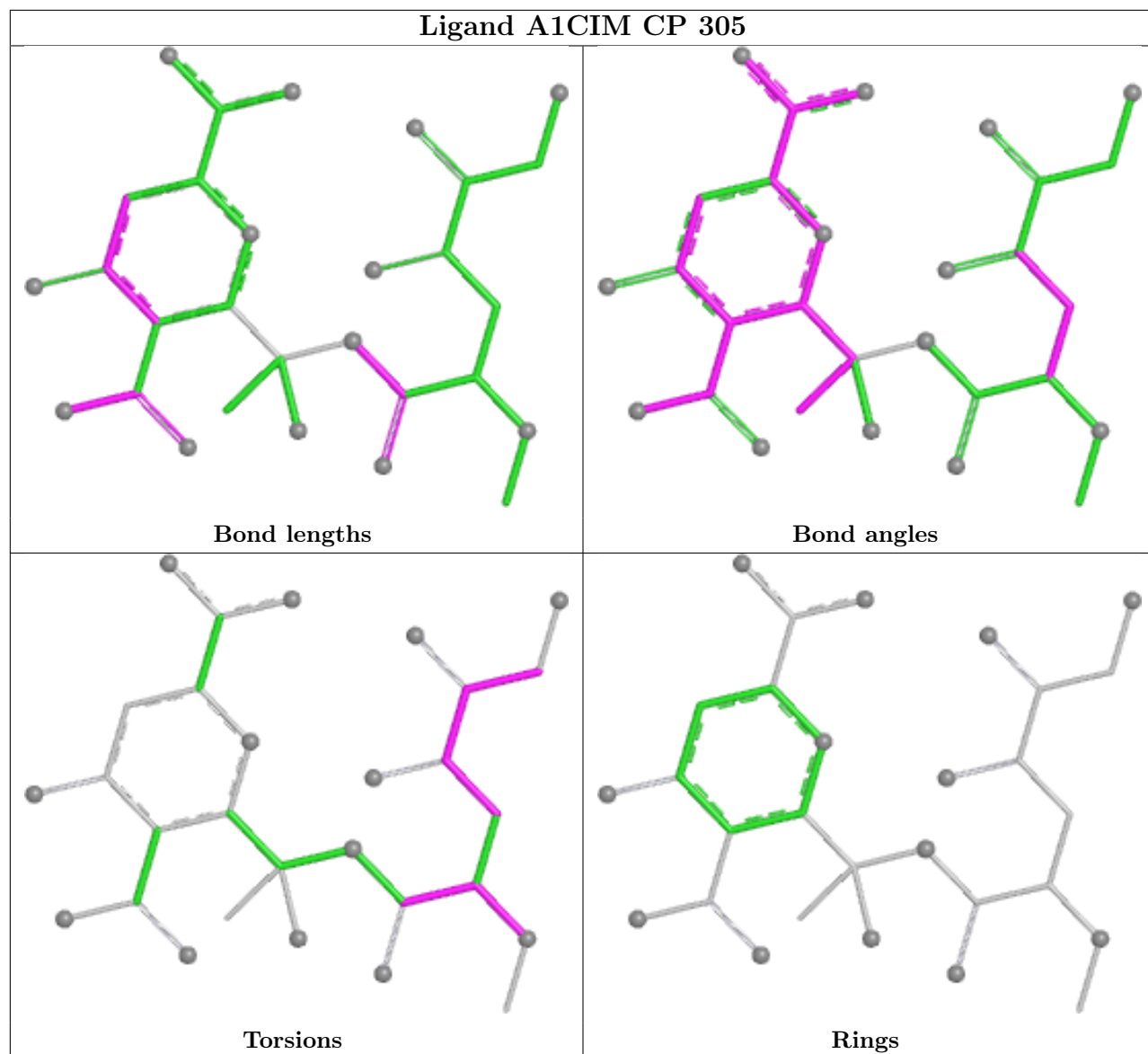
Ligand A1CIM CK 303



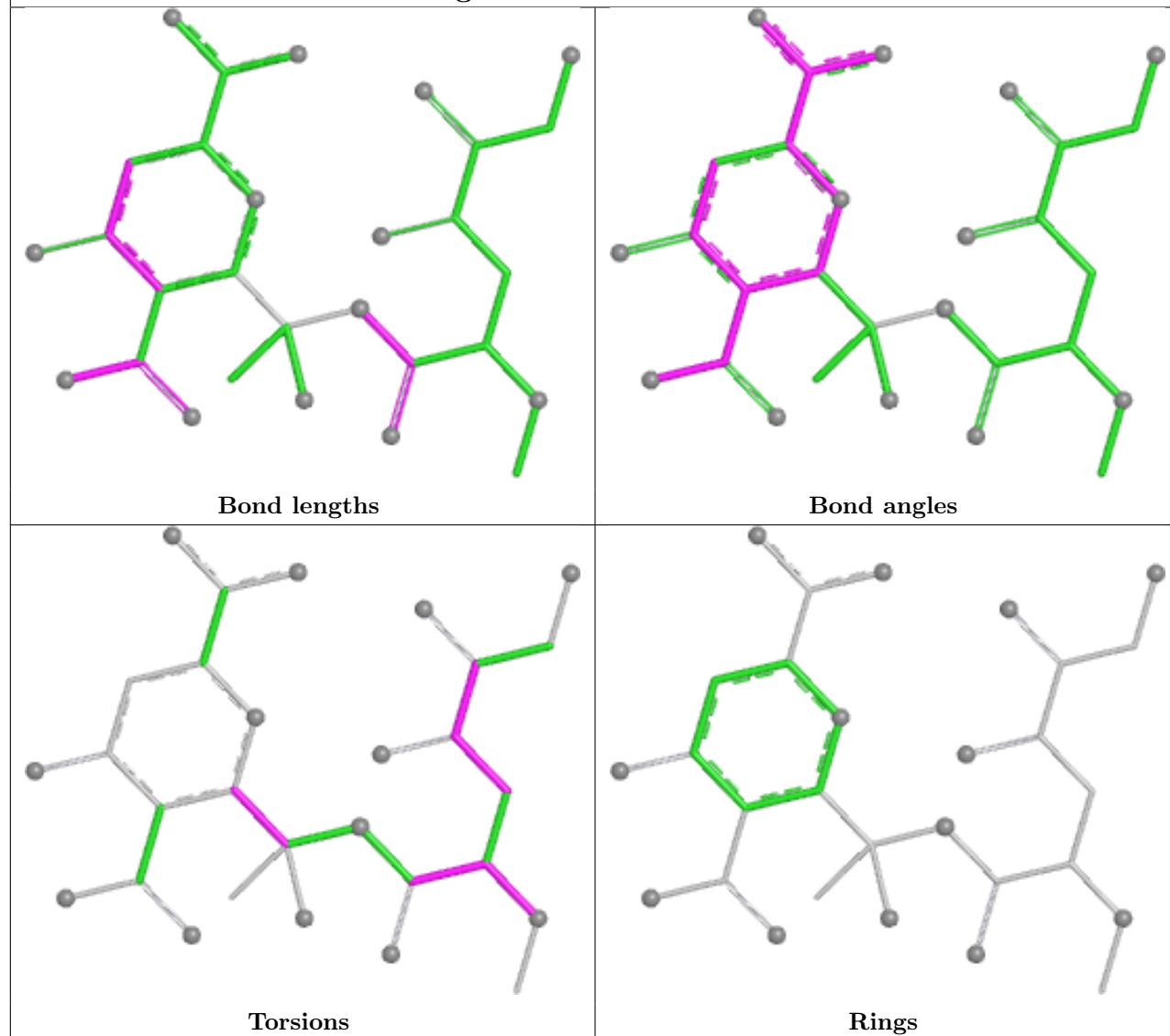
Ligand A1CIM CL 301



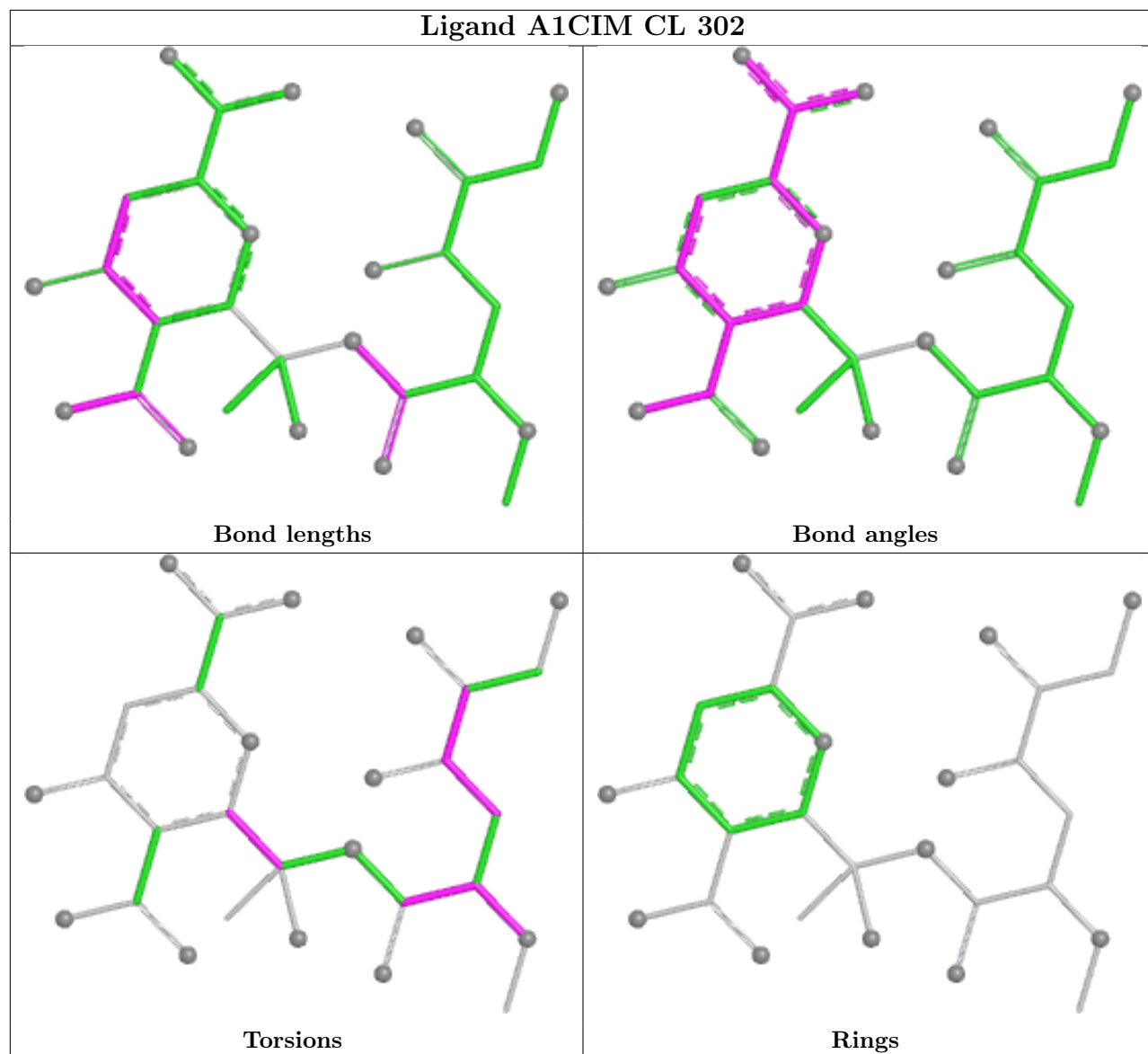
Ligand A1CIM CP 305



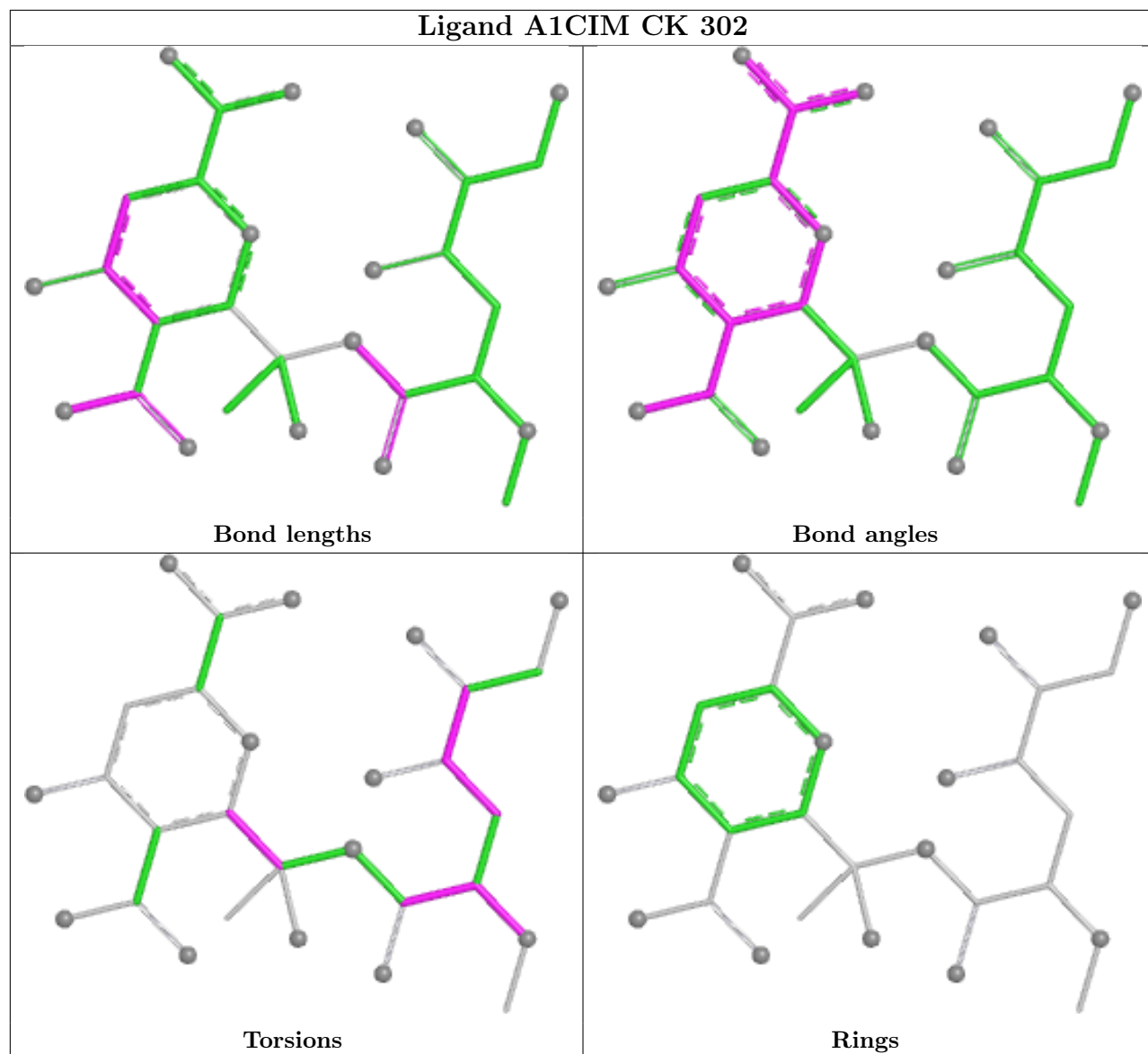
Ligand A1CIM CR 302



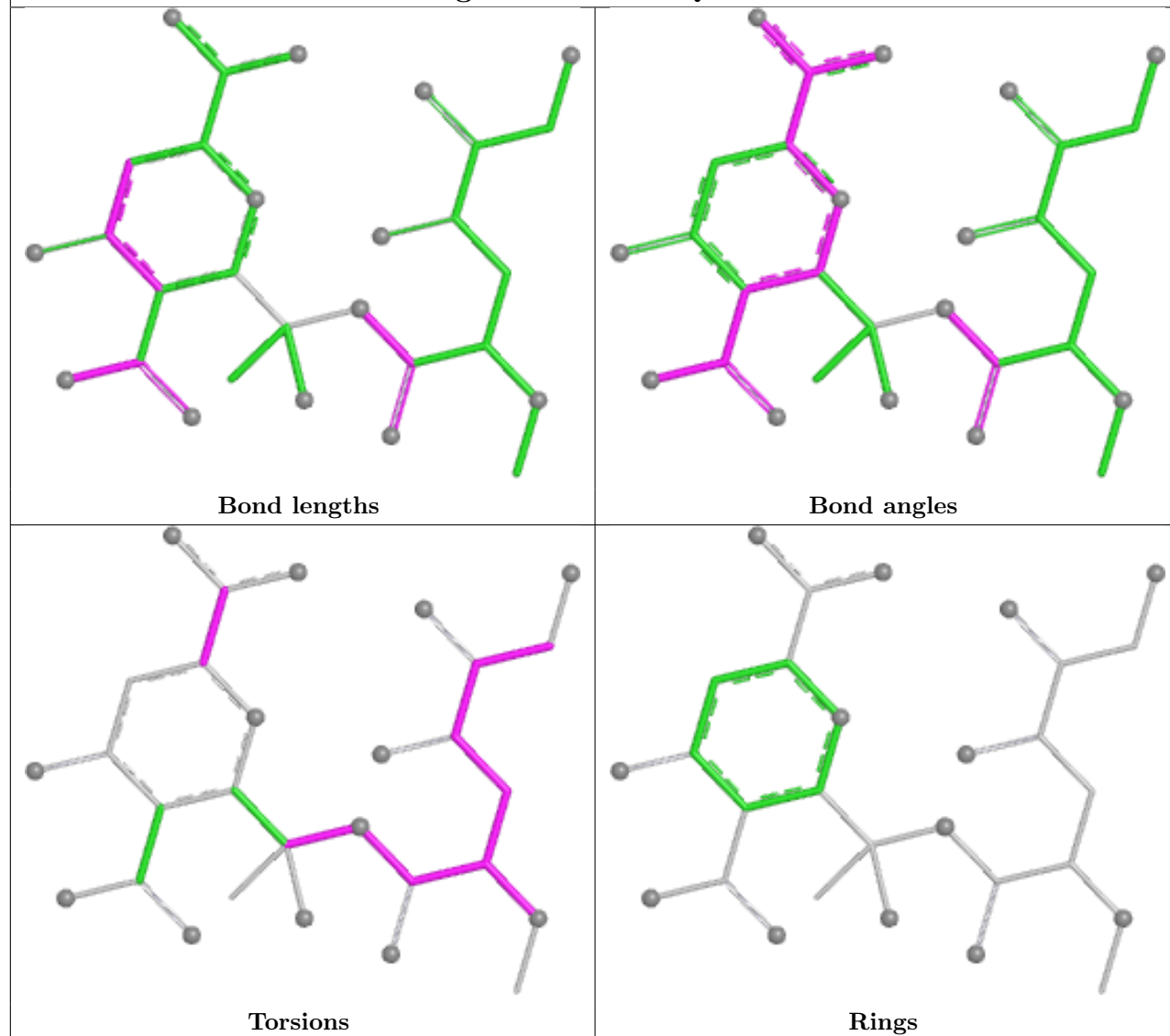
Ligand A1CIM CL 302

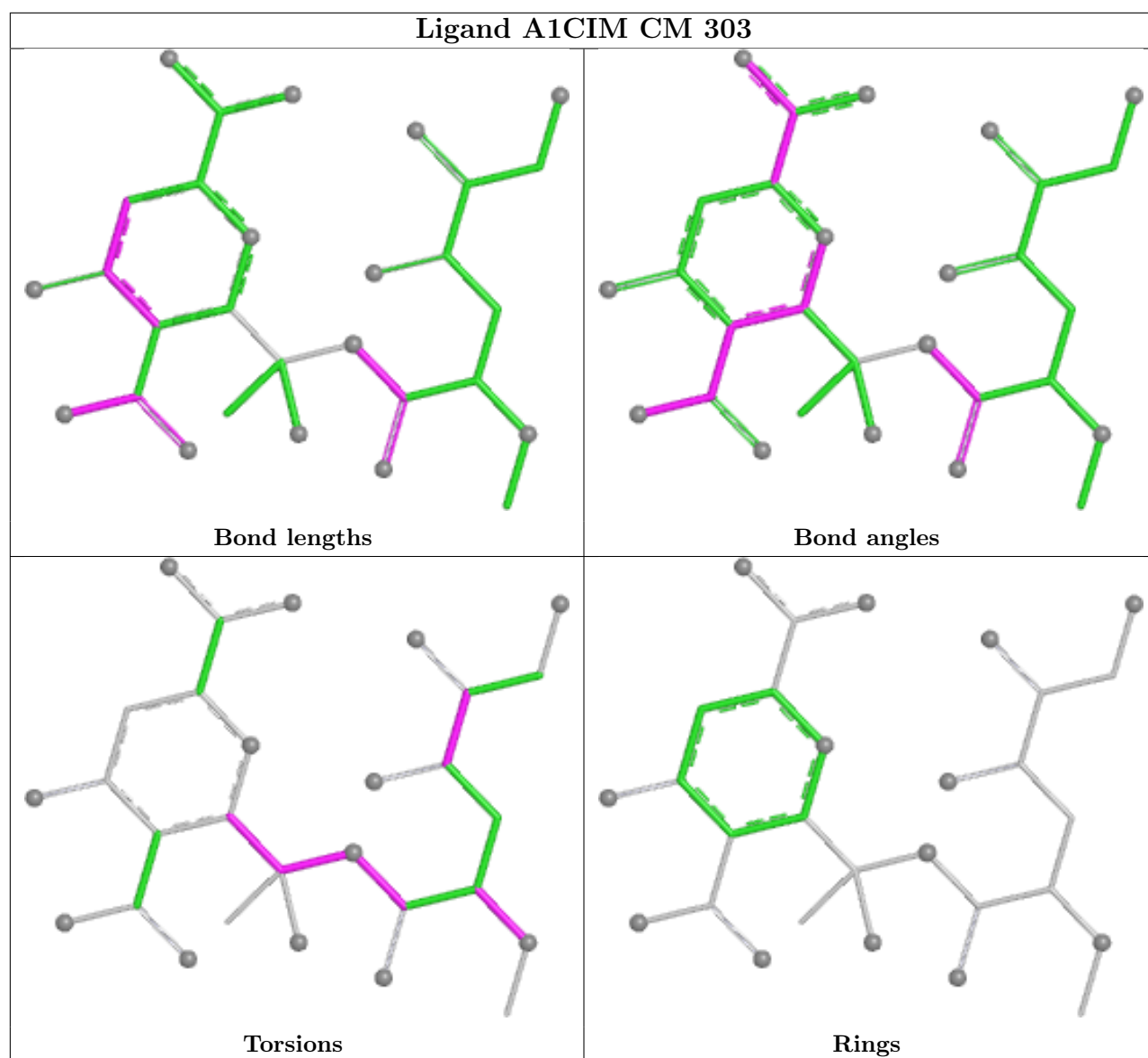


Ligand A1CIM CK 302

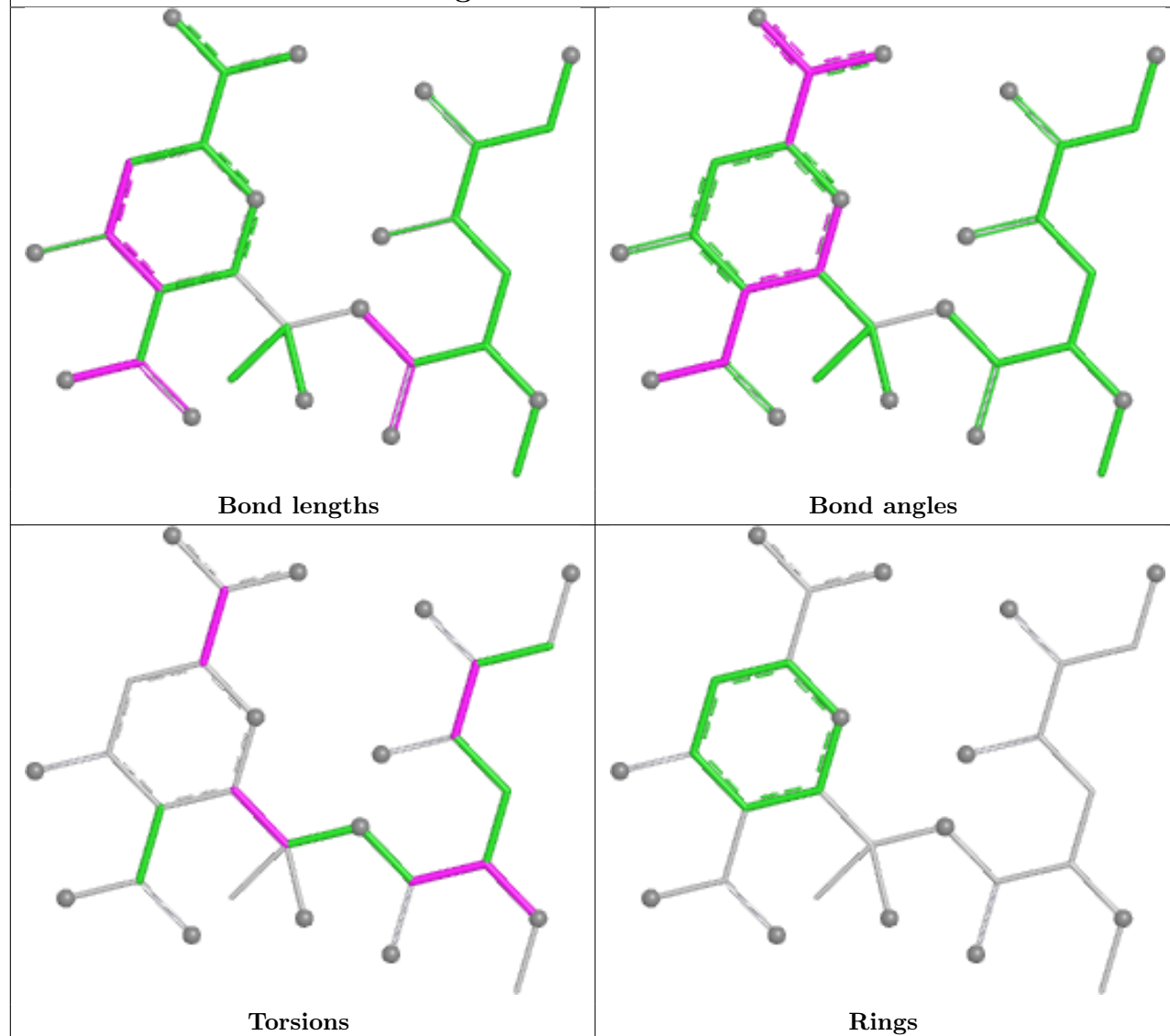


Ligand A1CIM CQ 301

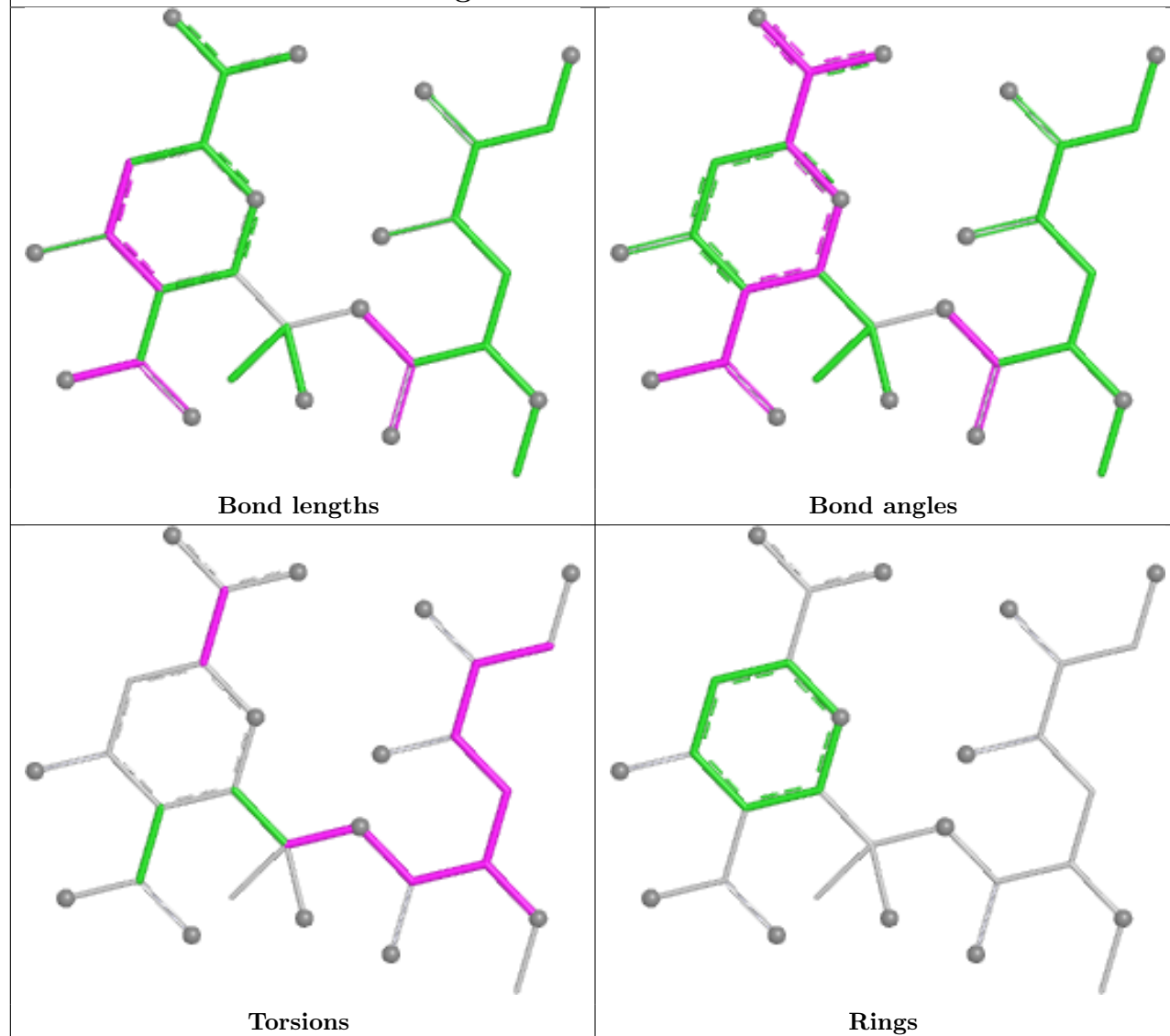




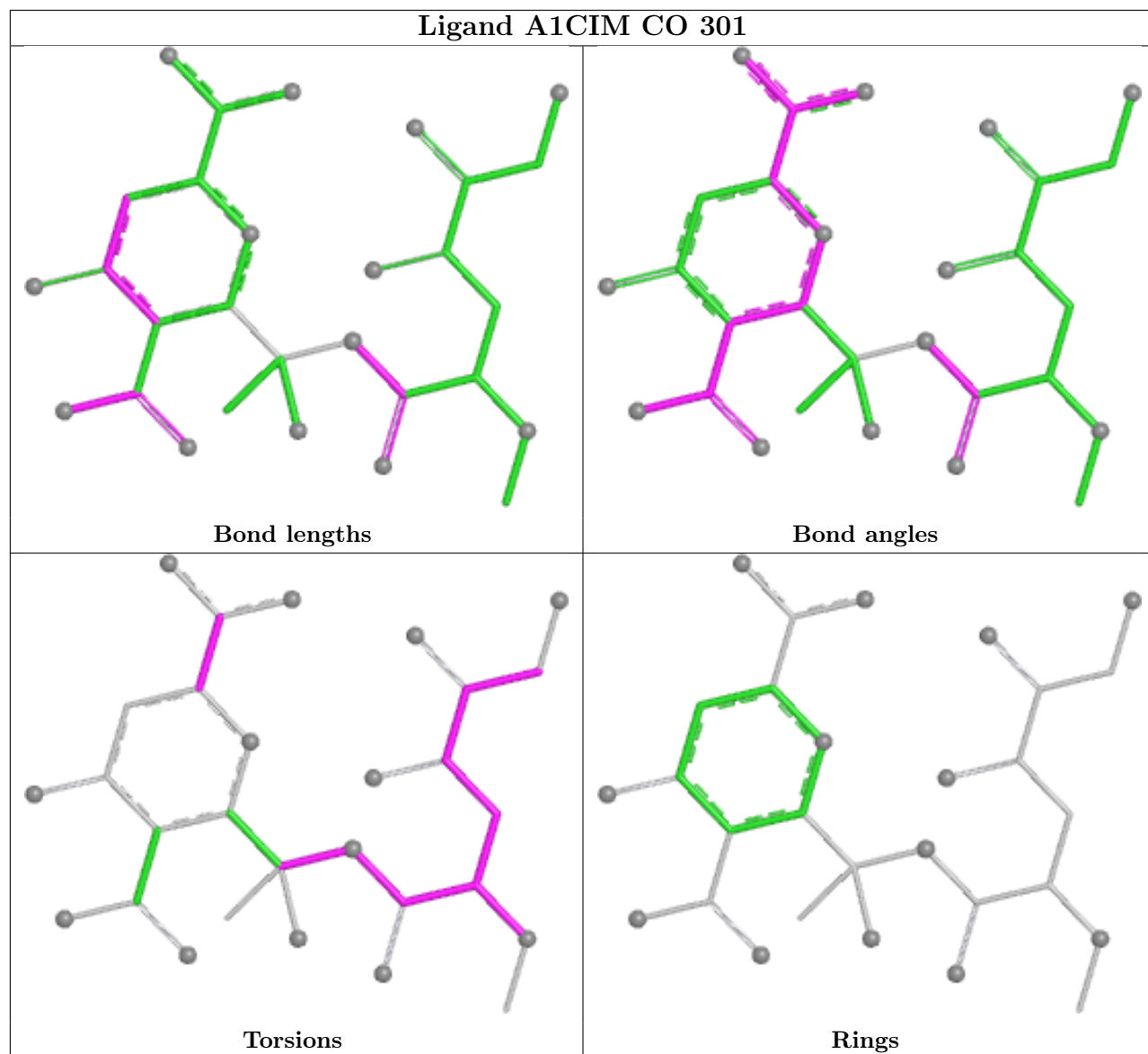
Ligand A1CIM CN 304



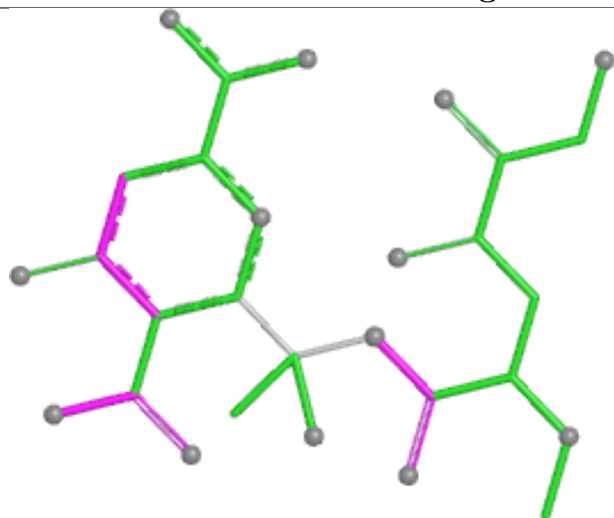
Ligand A1CIM CN 301



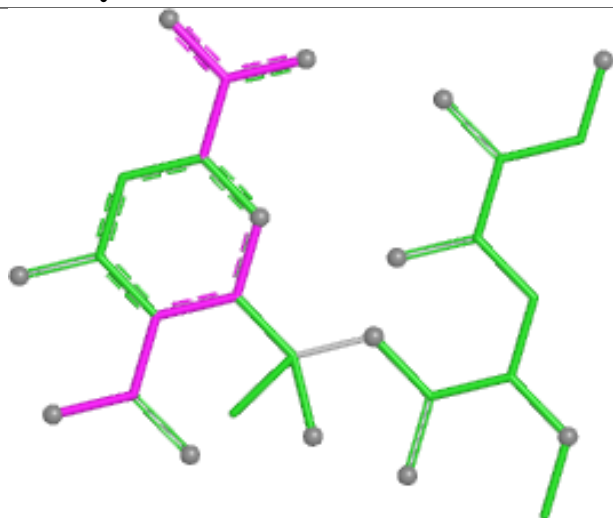
Ligand A1CIM CO 301



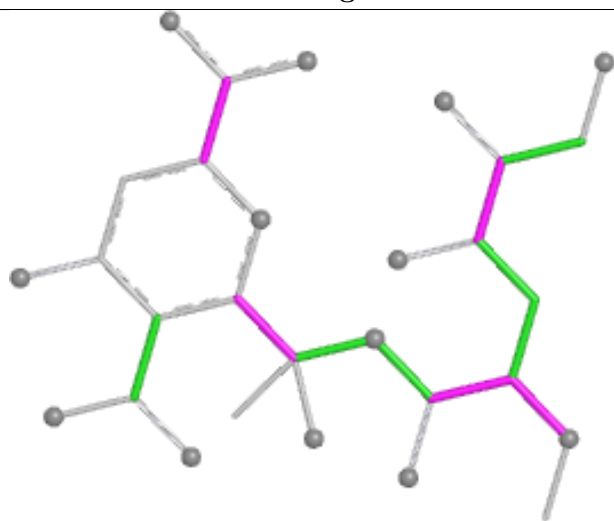
Ligand A1CIM CQ 304



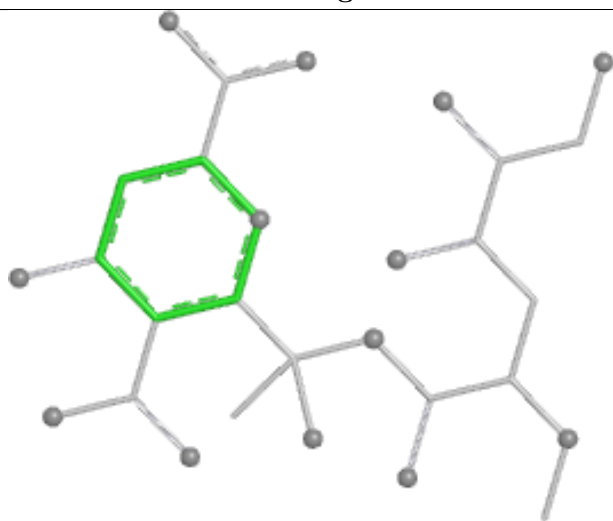
Bond lengths



Bond angles

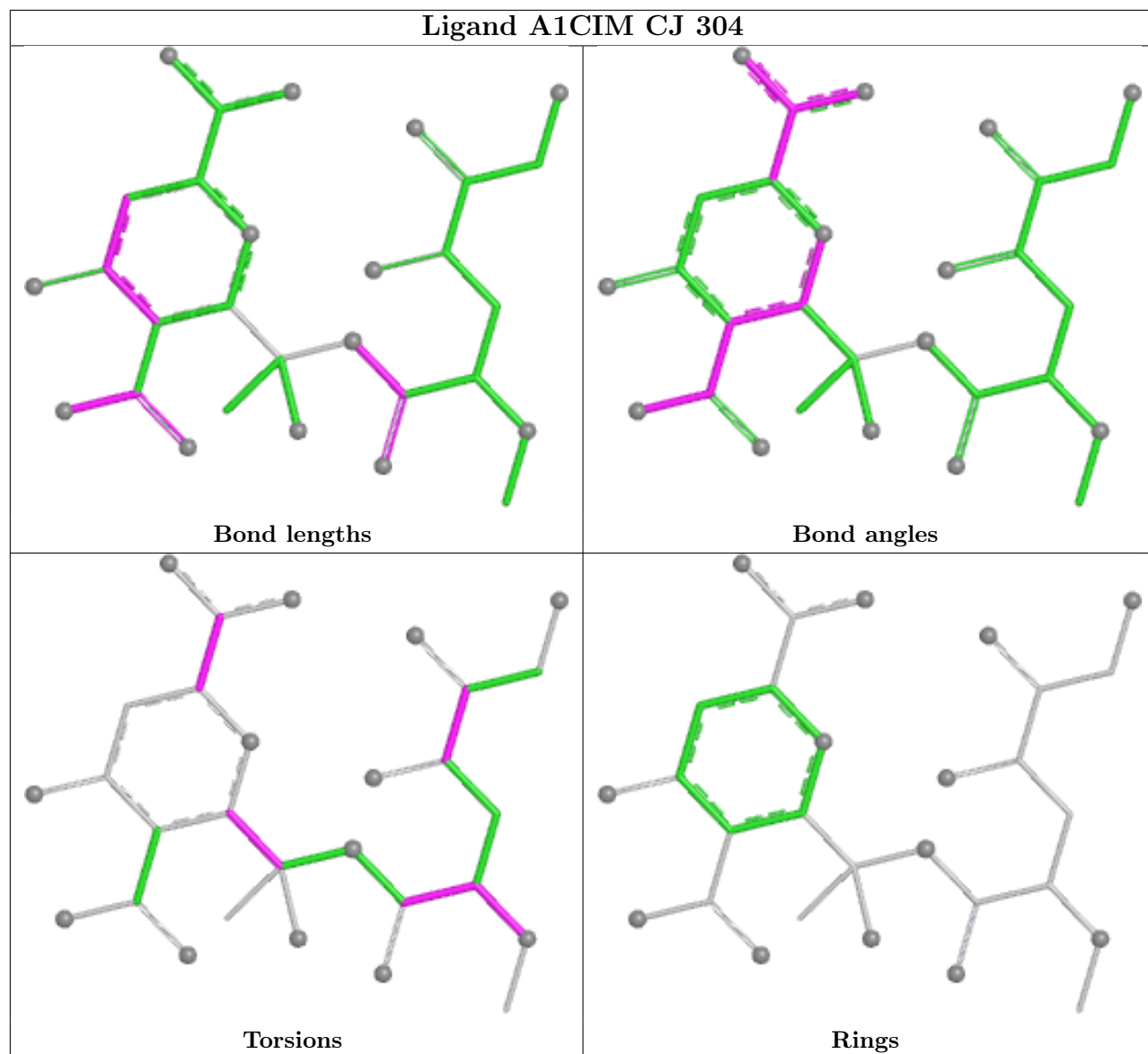


Torsions

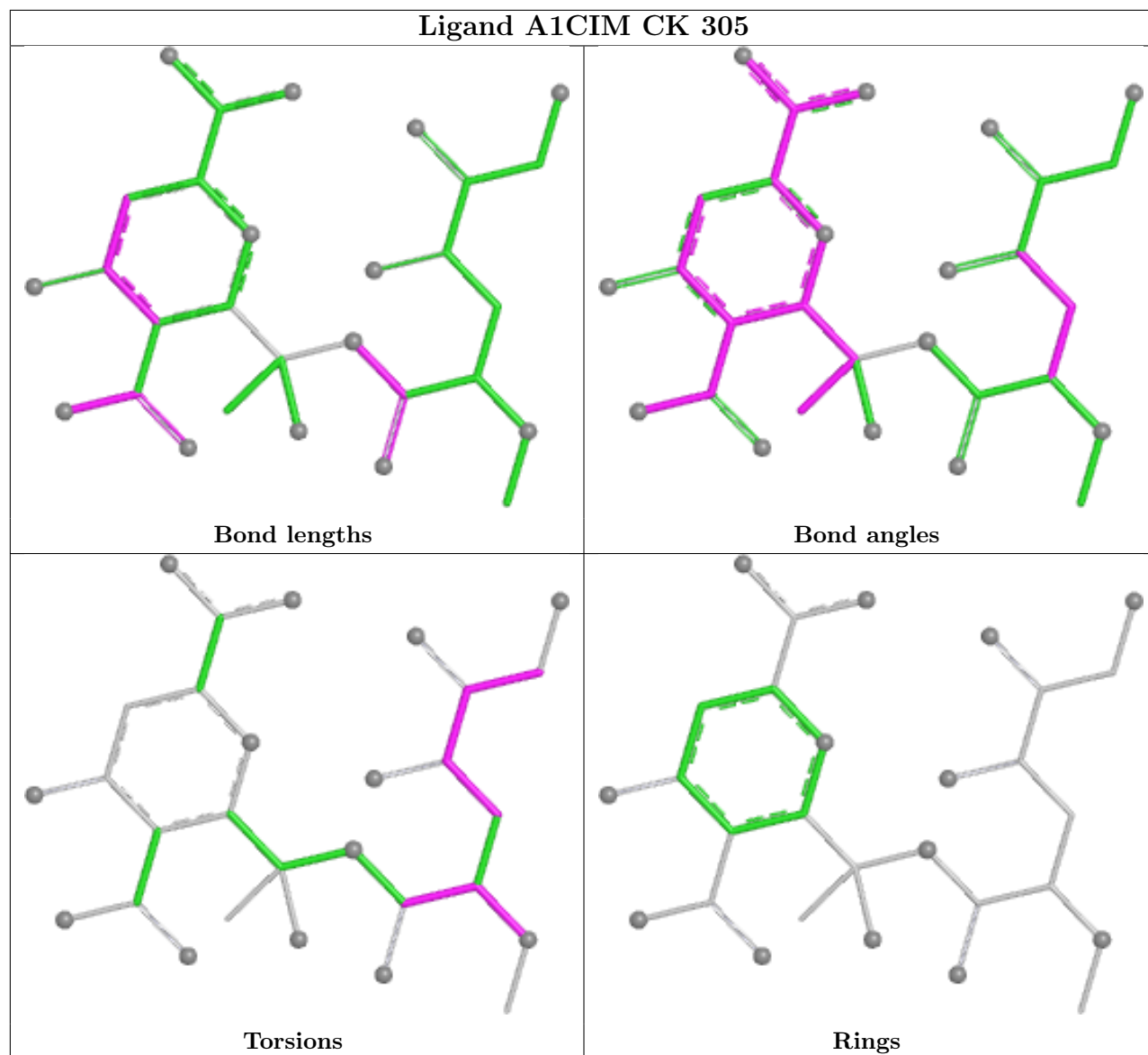


Rings

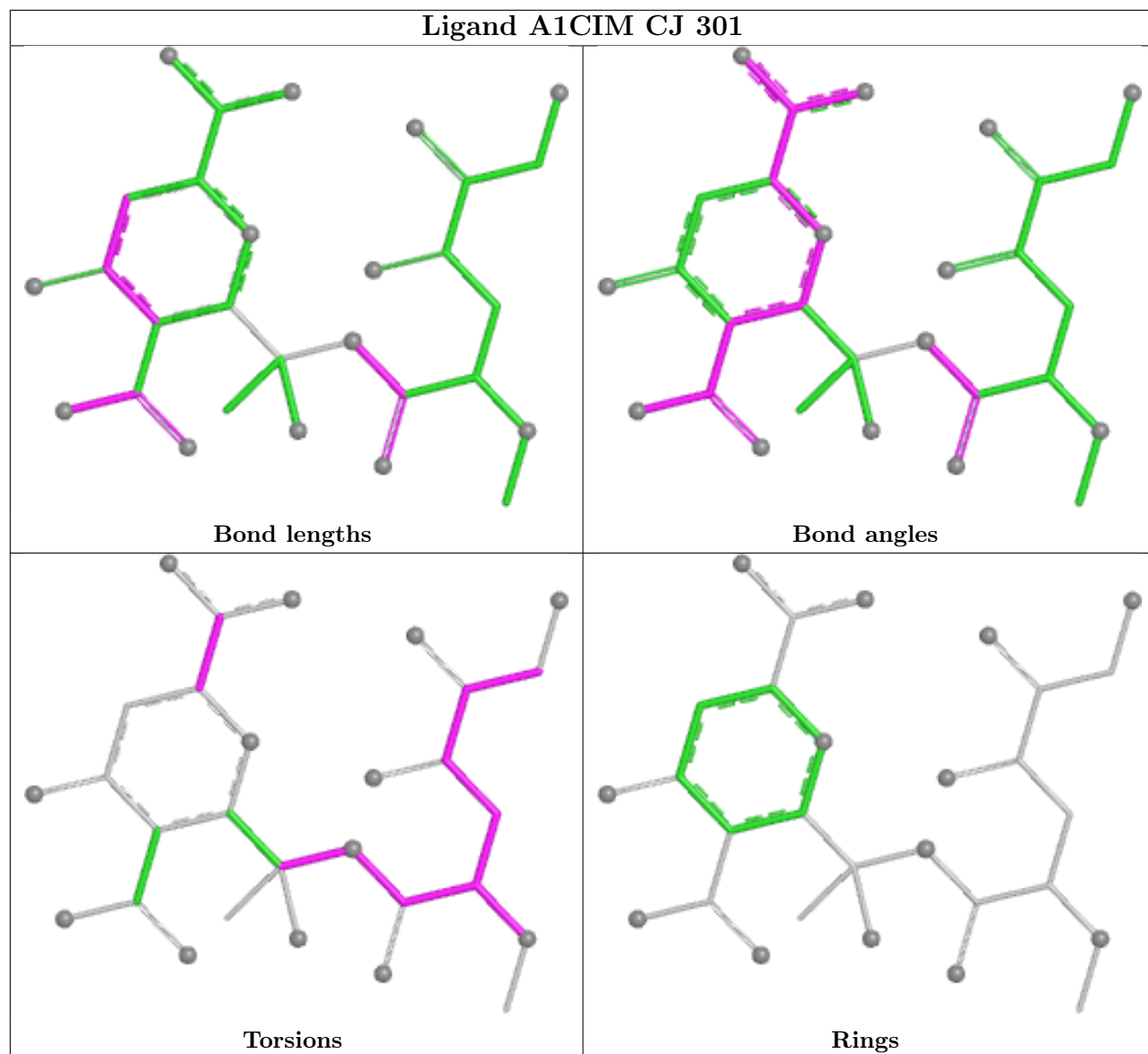
Ligand A1CIM CJ 304



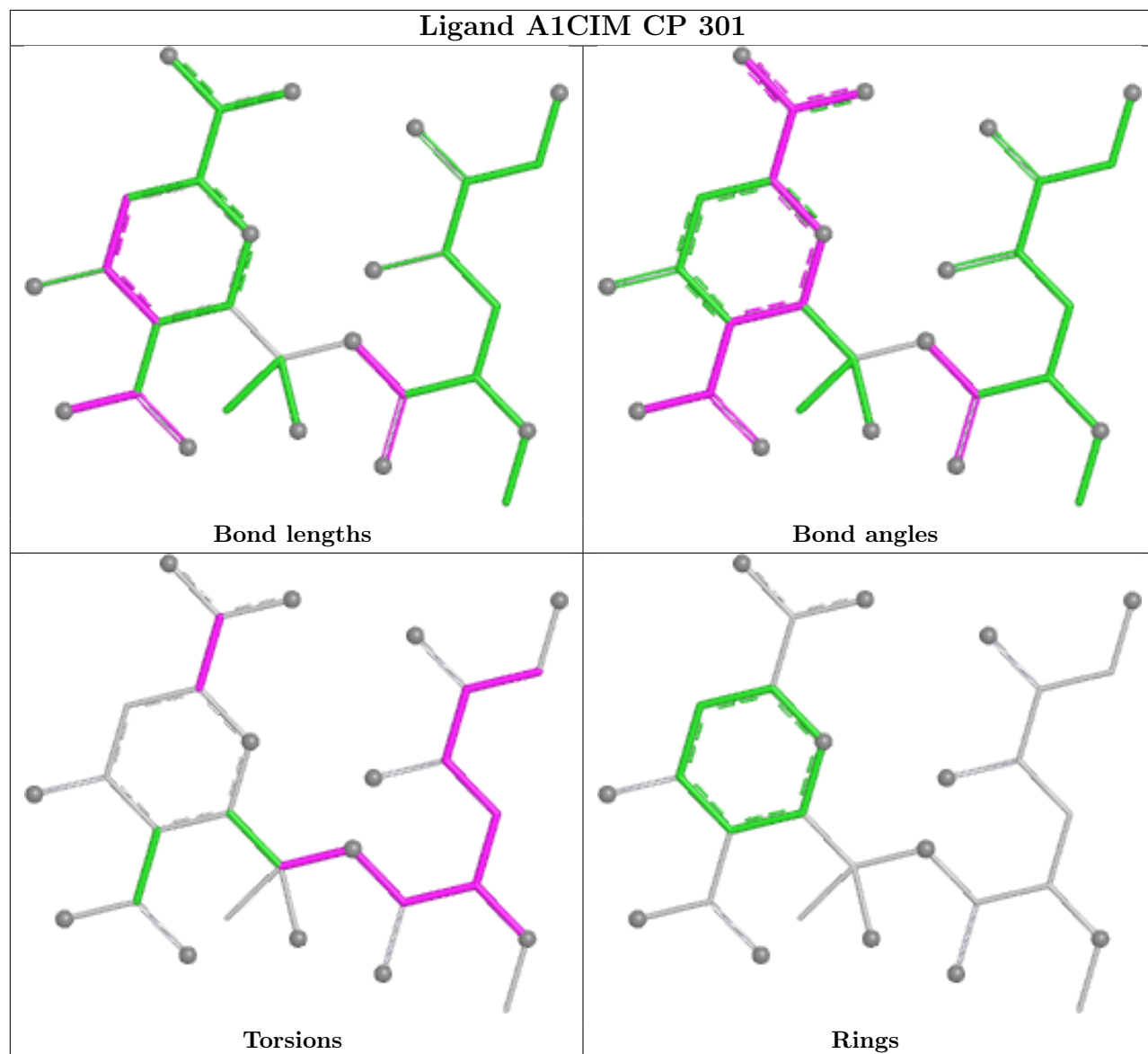
Ligand A1CIM CK 305



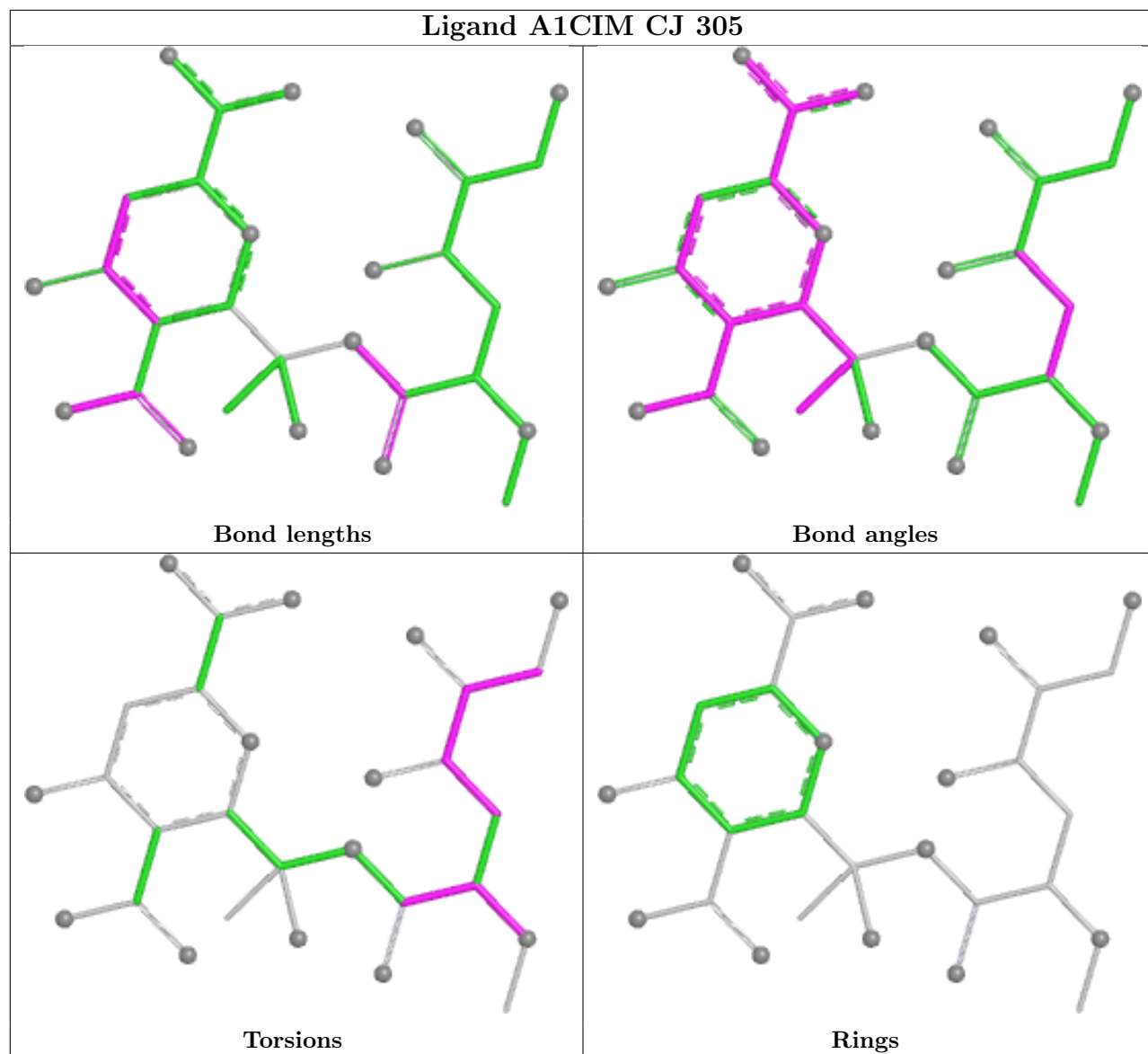
Ligand A1CIM CJ 301



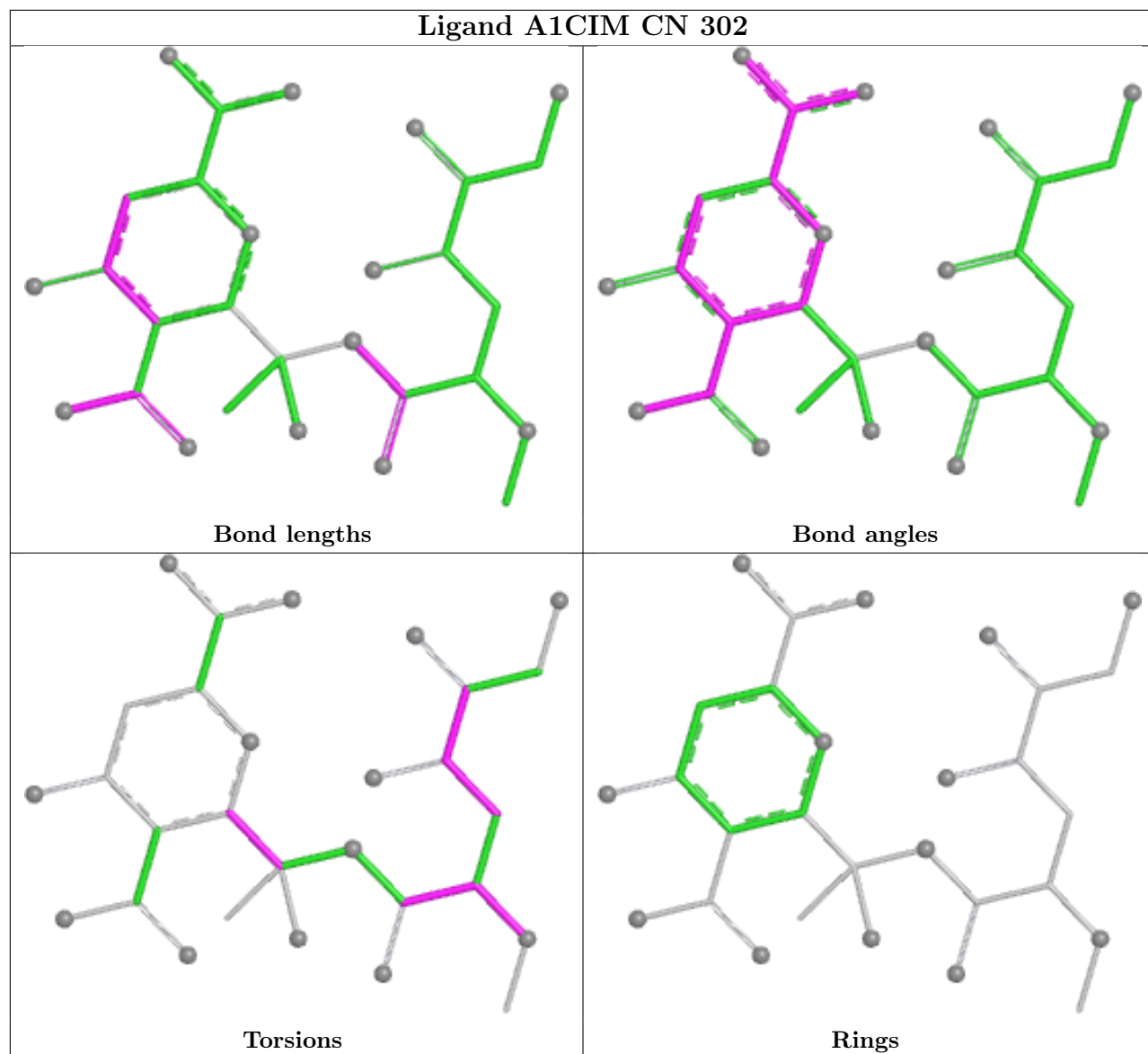
Ligand A1CIM CP 301



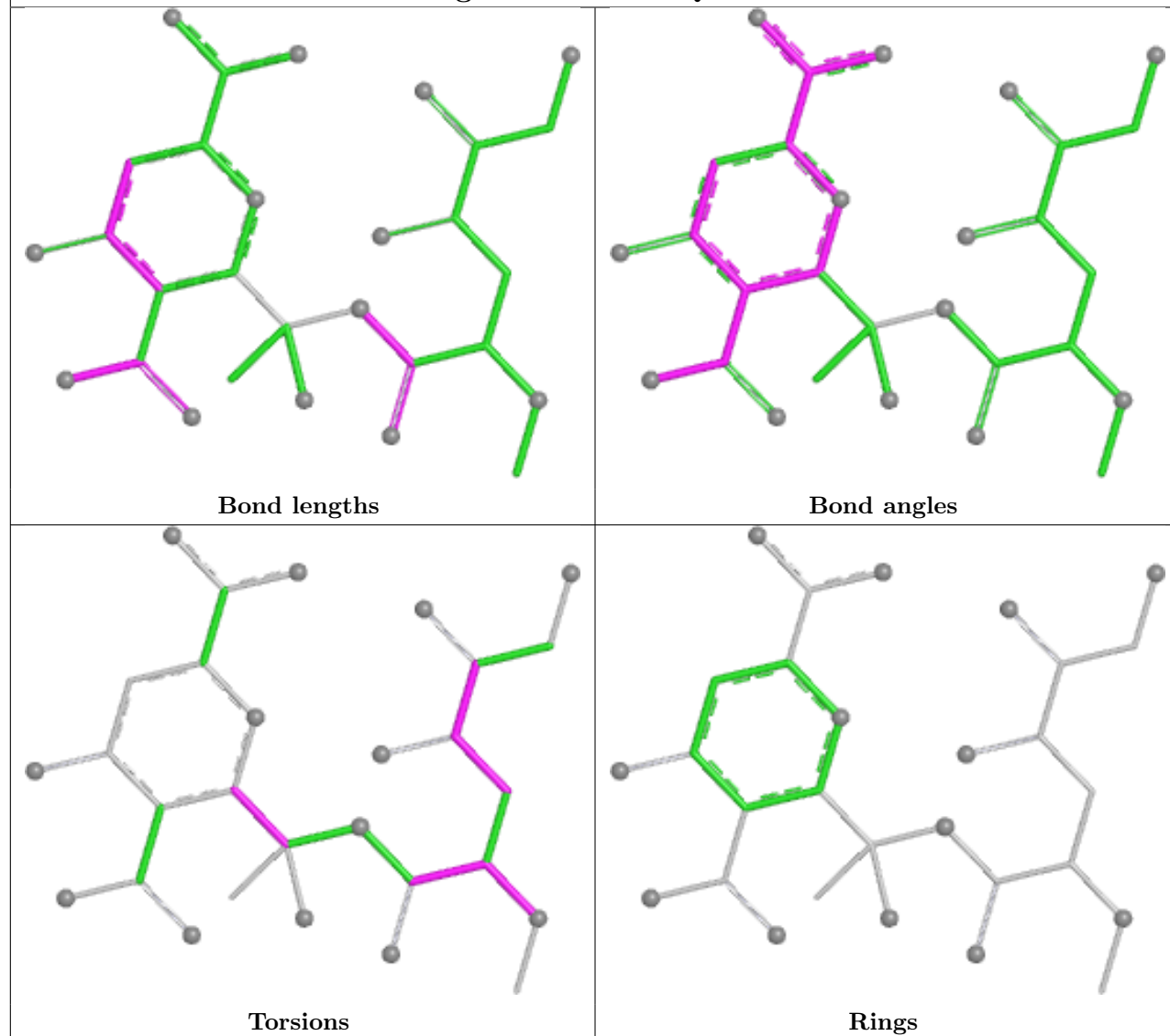
Ligand A1CIM CJ 305

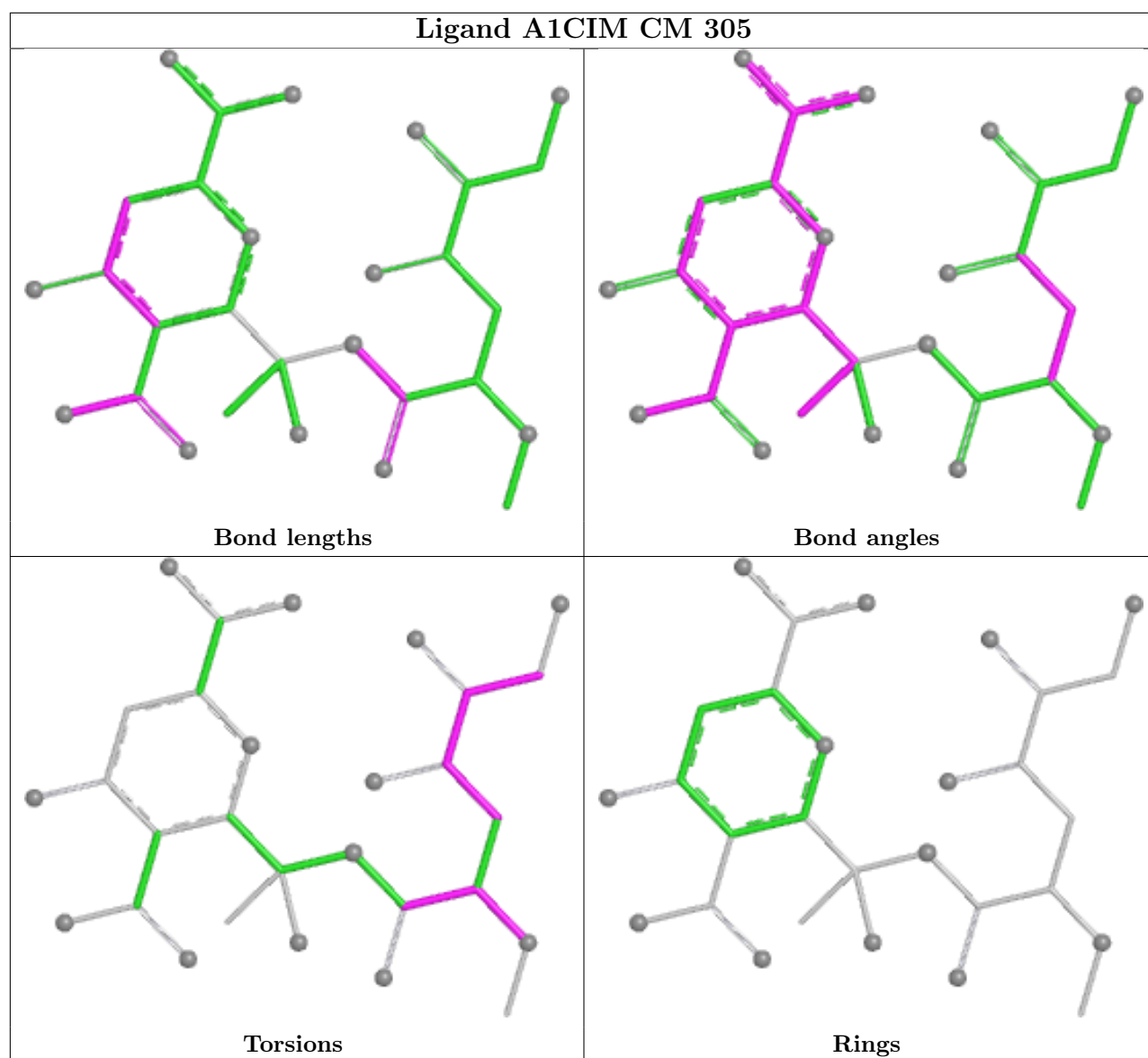


Ligand A1CIM CN 302

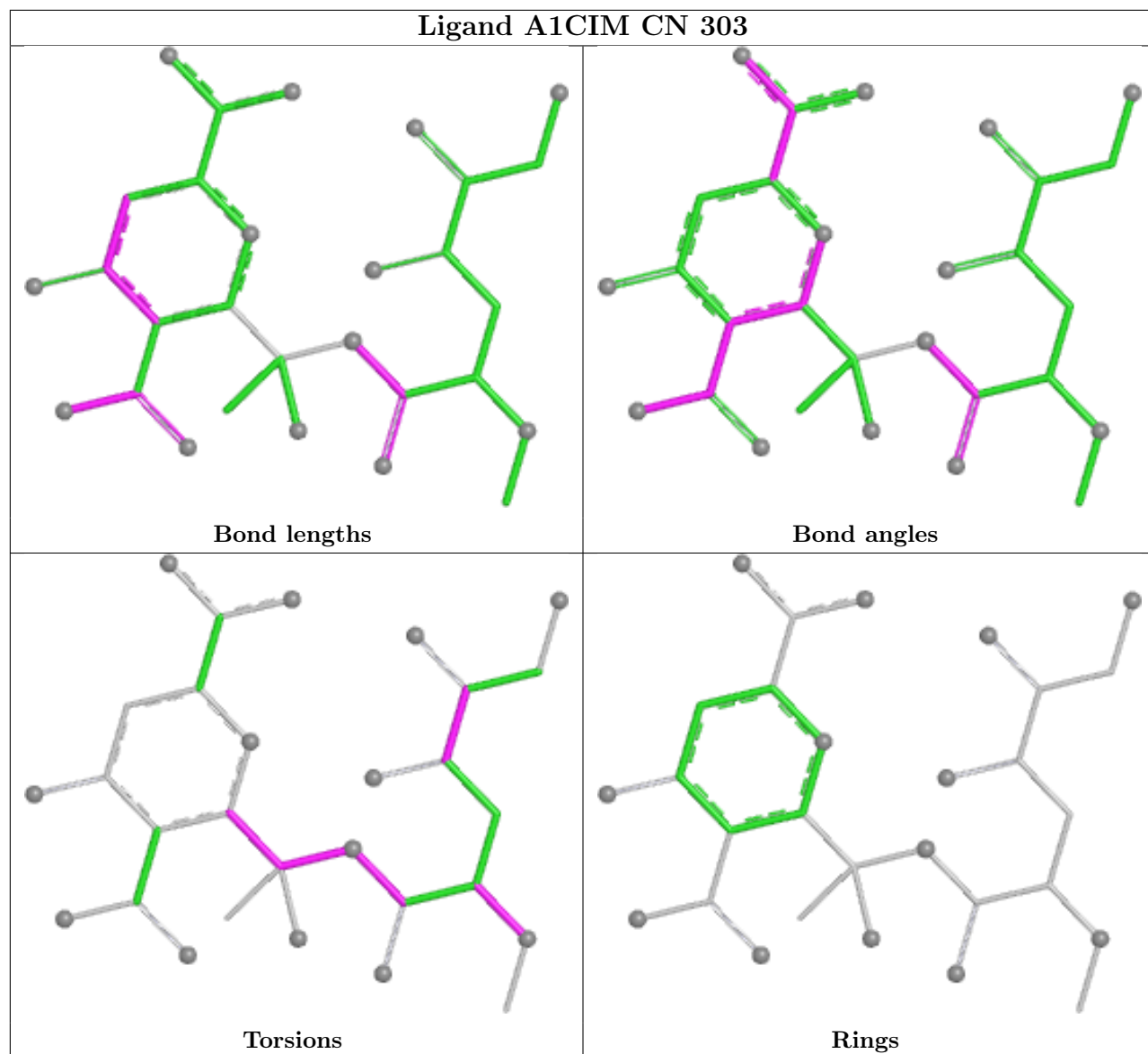


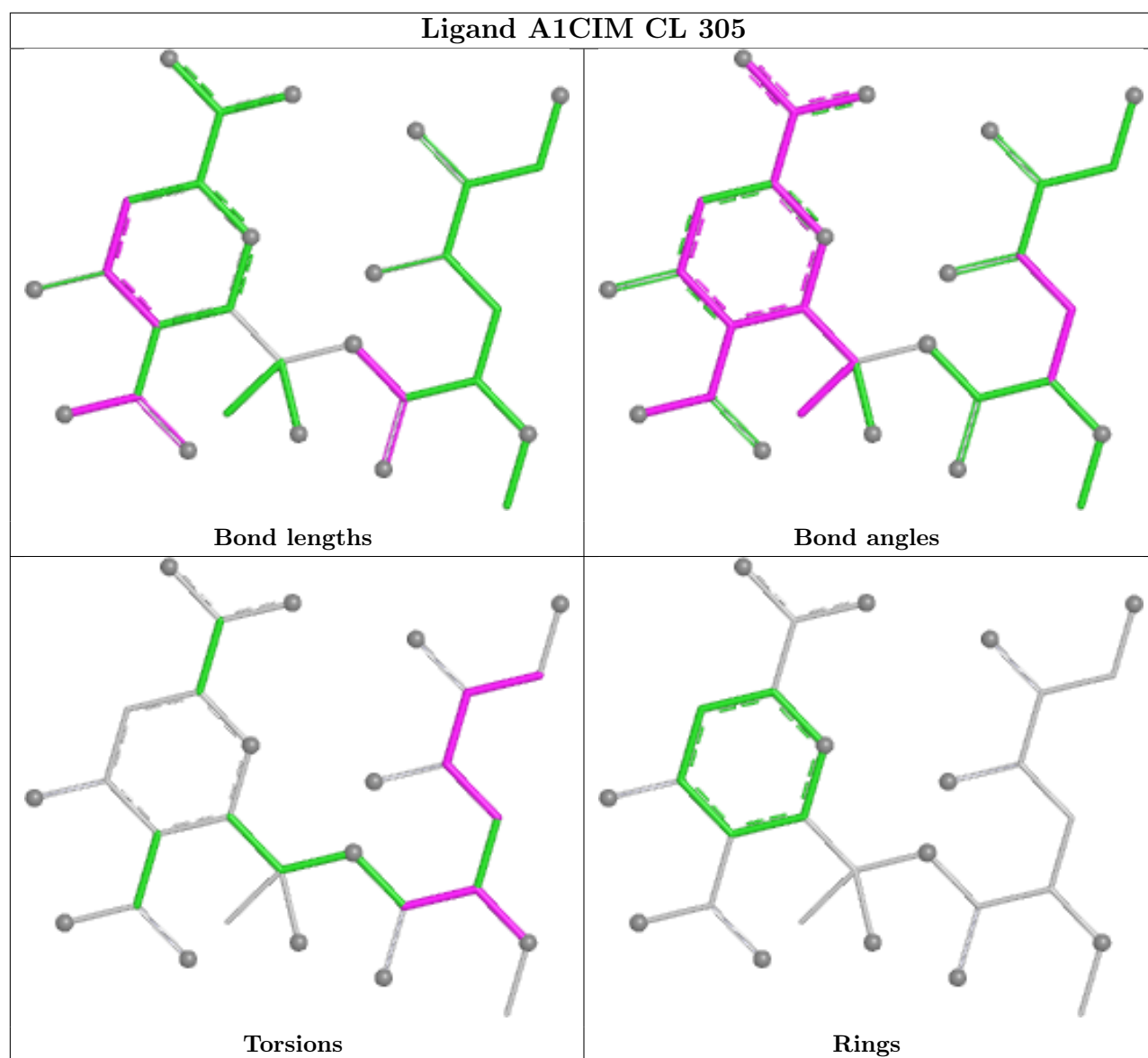
Ligand A1CIM CQ 302





Ligand A1CIM CN 303





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.

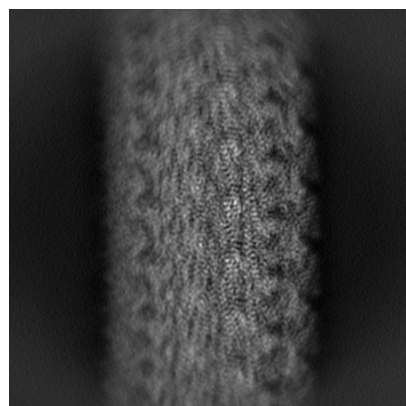
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-71672. These allow visual inspection of the internal detail of the map and identification of artifacts.

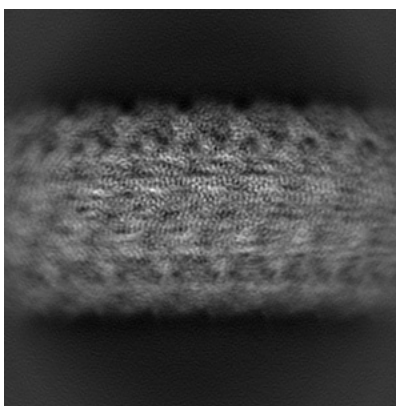
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

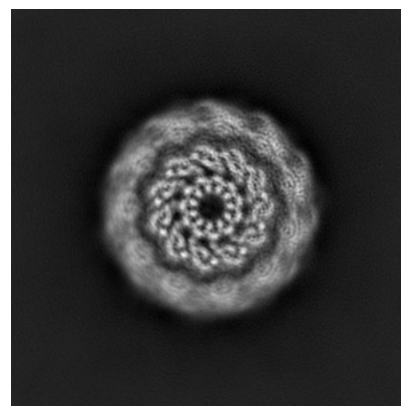
6.1.1 Primary map



X

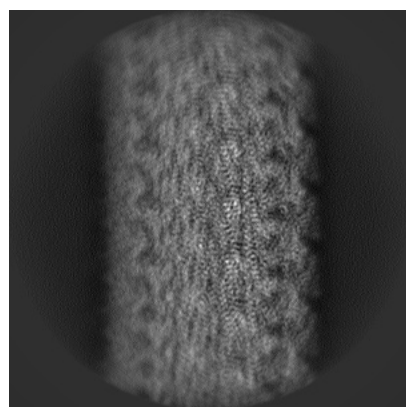


Y

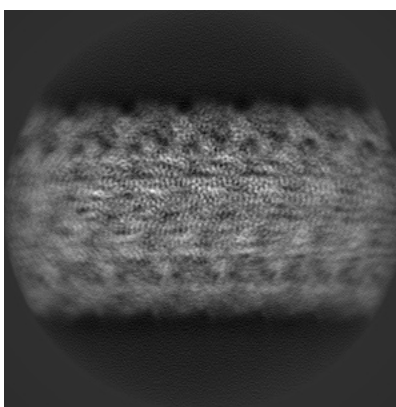


Z

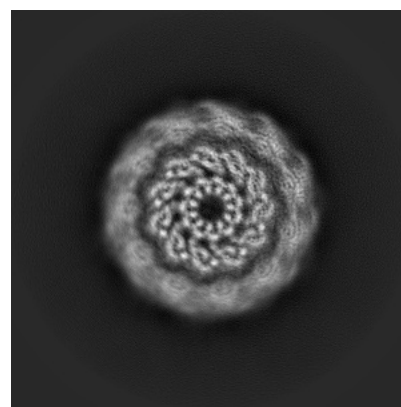
6.1.2 Raw map



X



Y

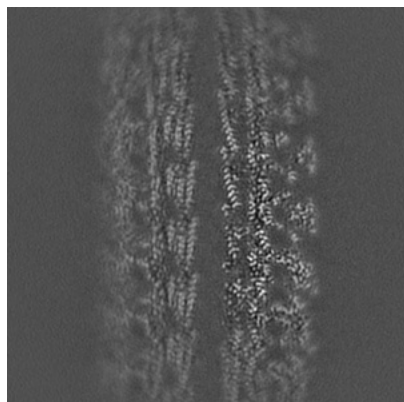


Z

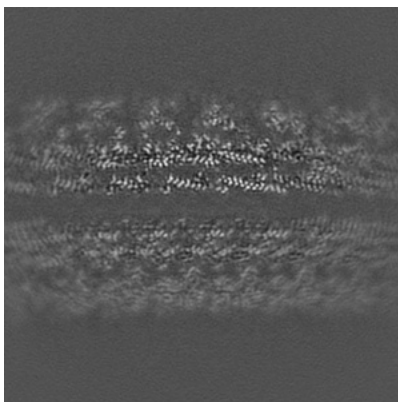
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

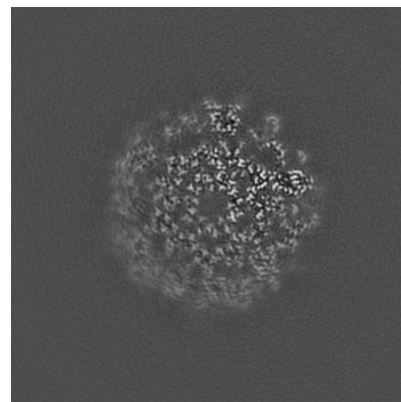
6.2.1 Primary map



X Index: 224

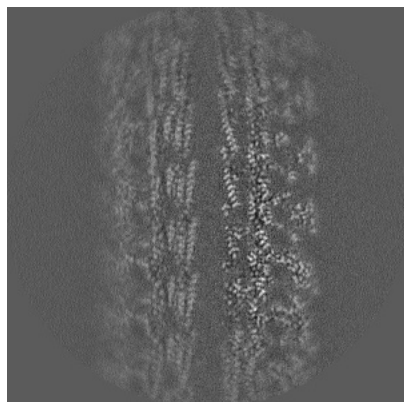


Y Index: 224

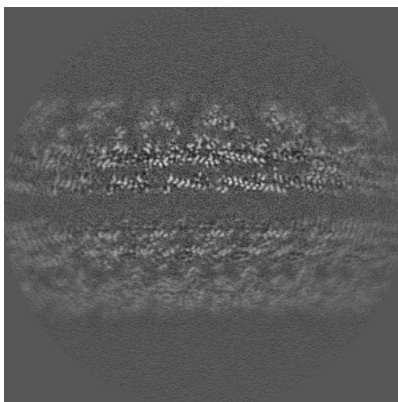


Z Index: 224

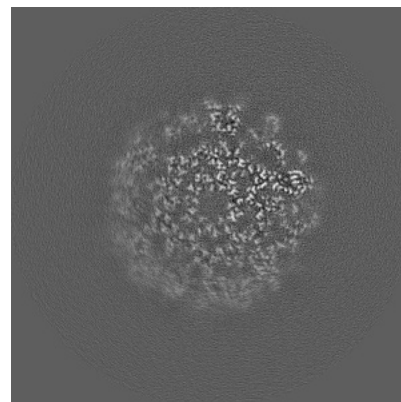
6.2.2 Raw map



X Index: 224



Y Index: 224

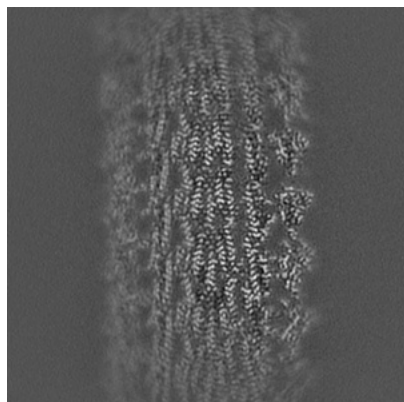


Z Index: 224

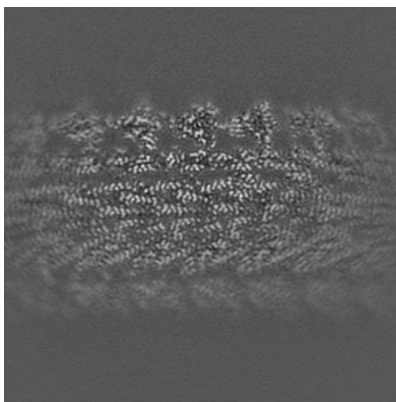
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

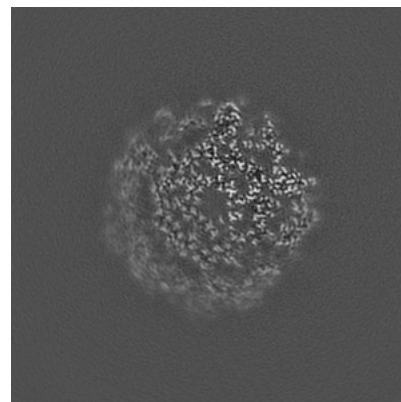
6.3.1 Primary map



X Index: 246

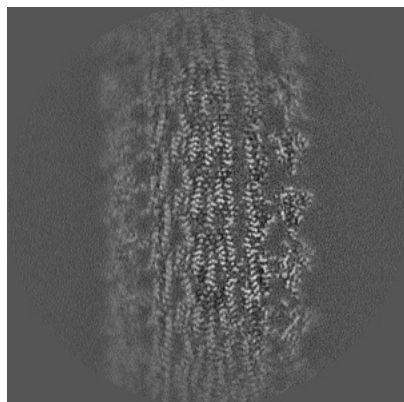


Y Index: 249

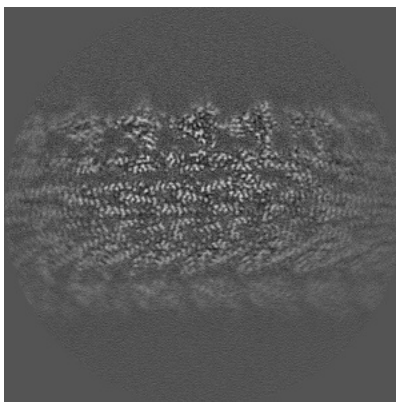


Z Index: 230

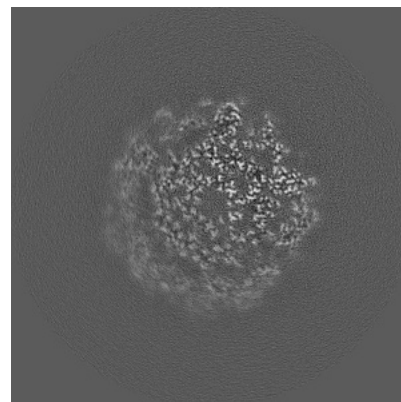
6.3.2 Raw map



X Index: 246



Y Index: 249

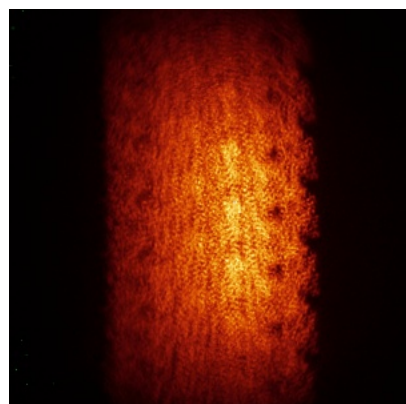


Z Index: 230

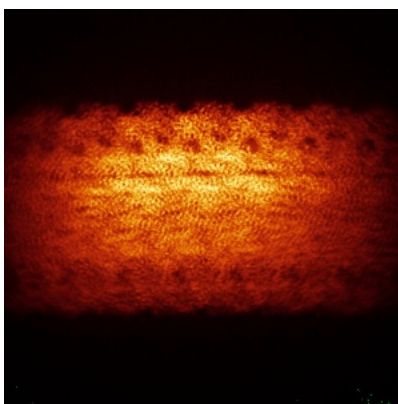
The images above show the largest variance slices of the map in three orthogonal directions.

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

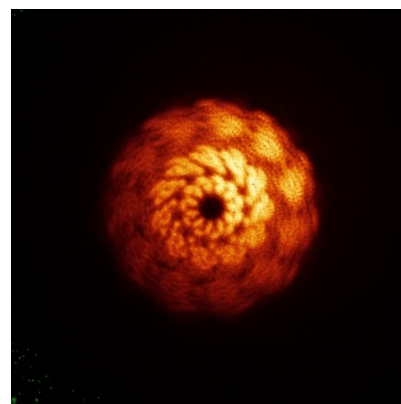
6.4.1 Primary map



X

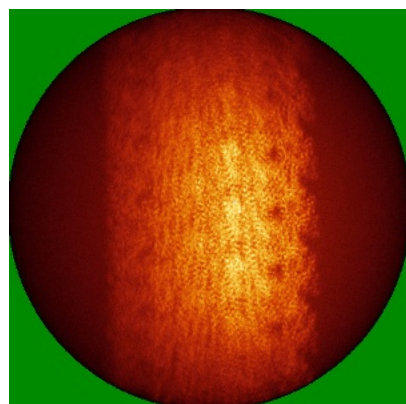


Y

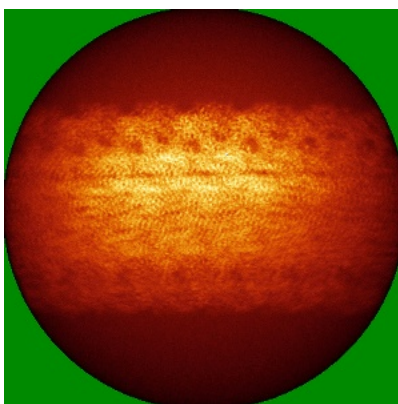


Z

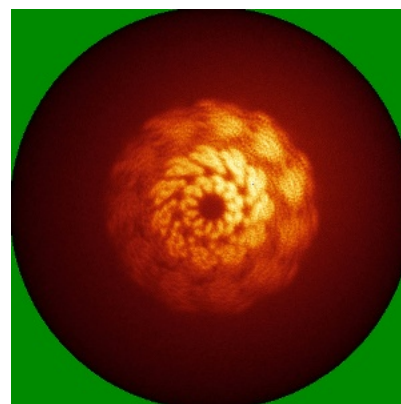
6.4.2 Raw map



X



Y

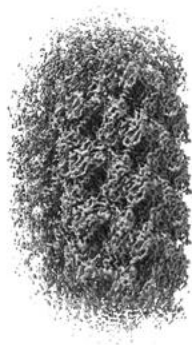


Z

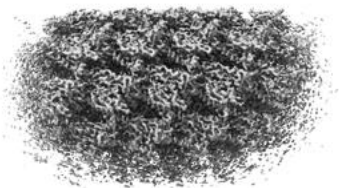
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



X



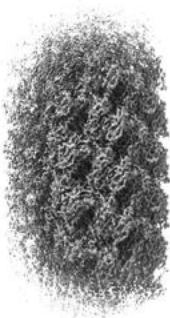
Y



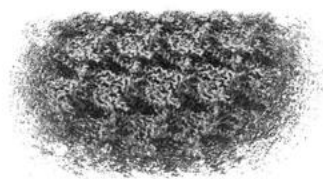
Z

The images above show the 3D surface view of the map at the recommended contour level 0.004. 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.

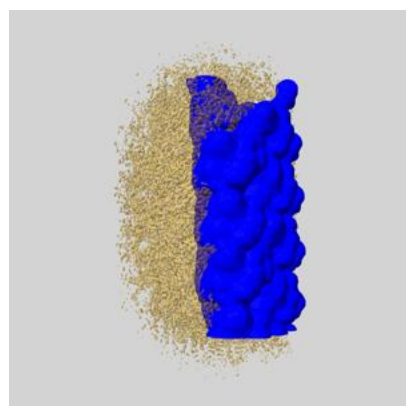
6.6 Mask visualisation [i](#)

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

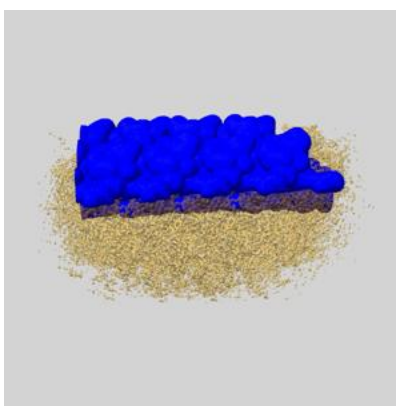
A mask typically either:

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

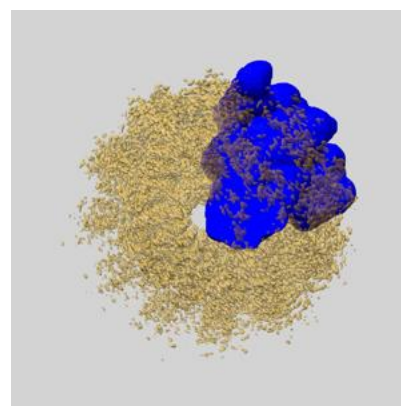
6.6.1 emd_71672_msk_1.map [i](#)



X



Y

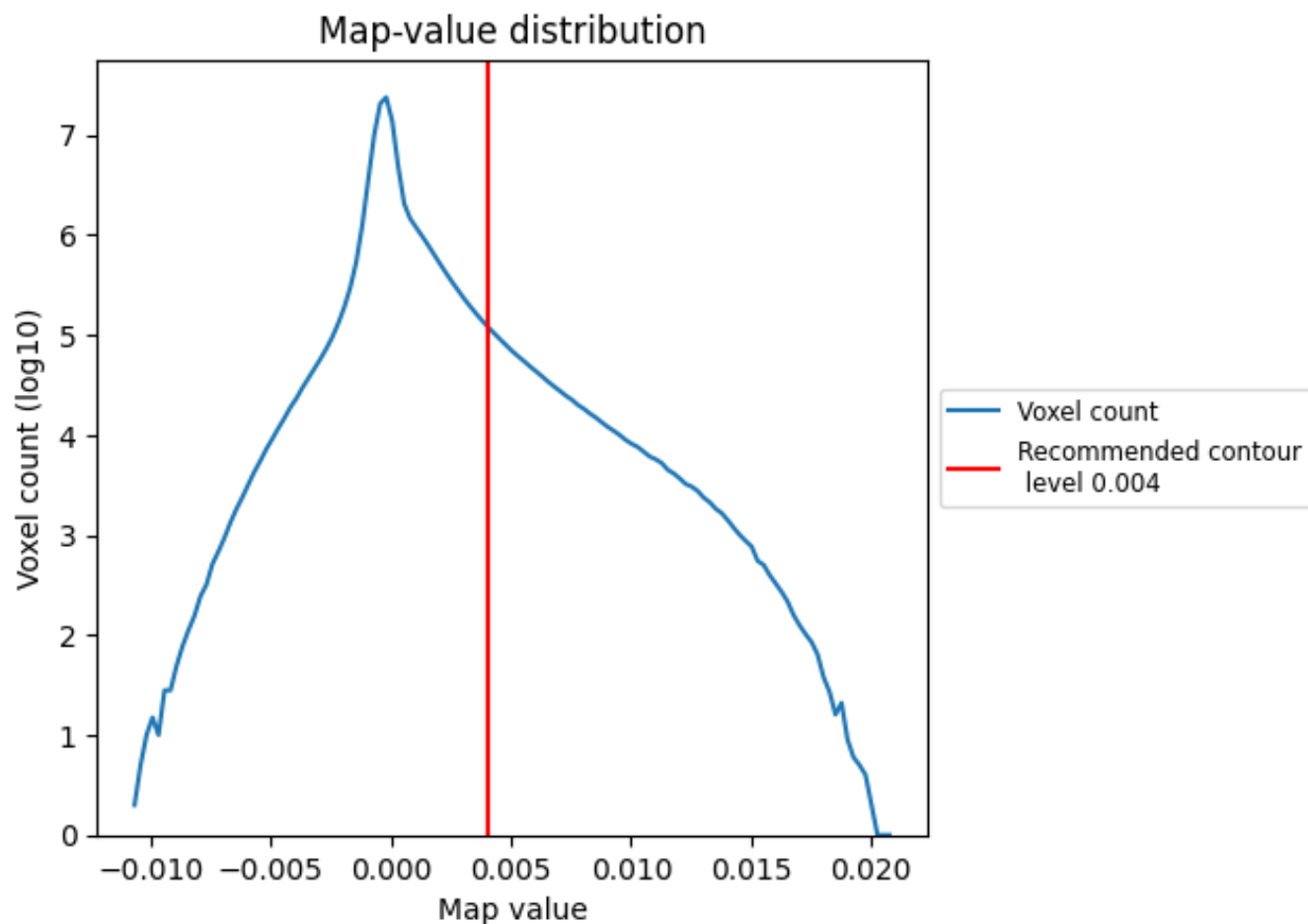


Z

7 Map analysis [i](#)

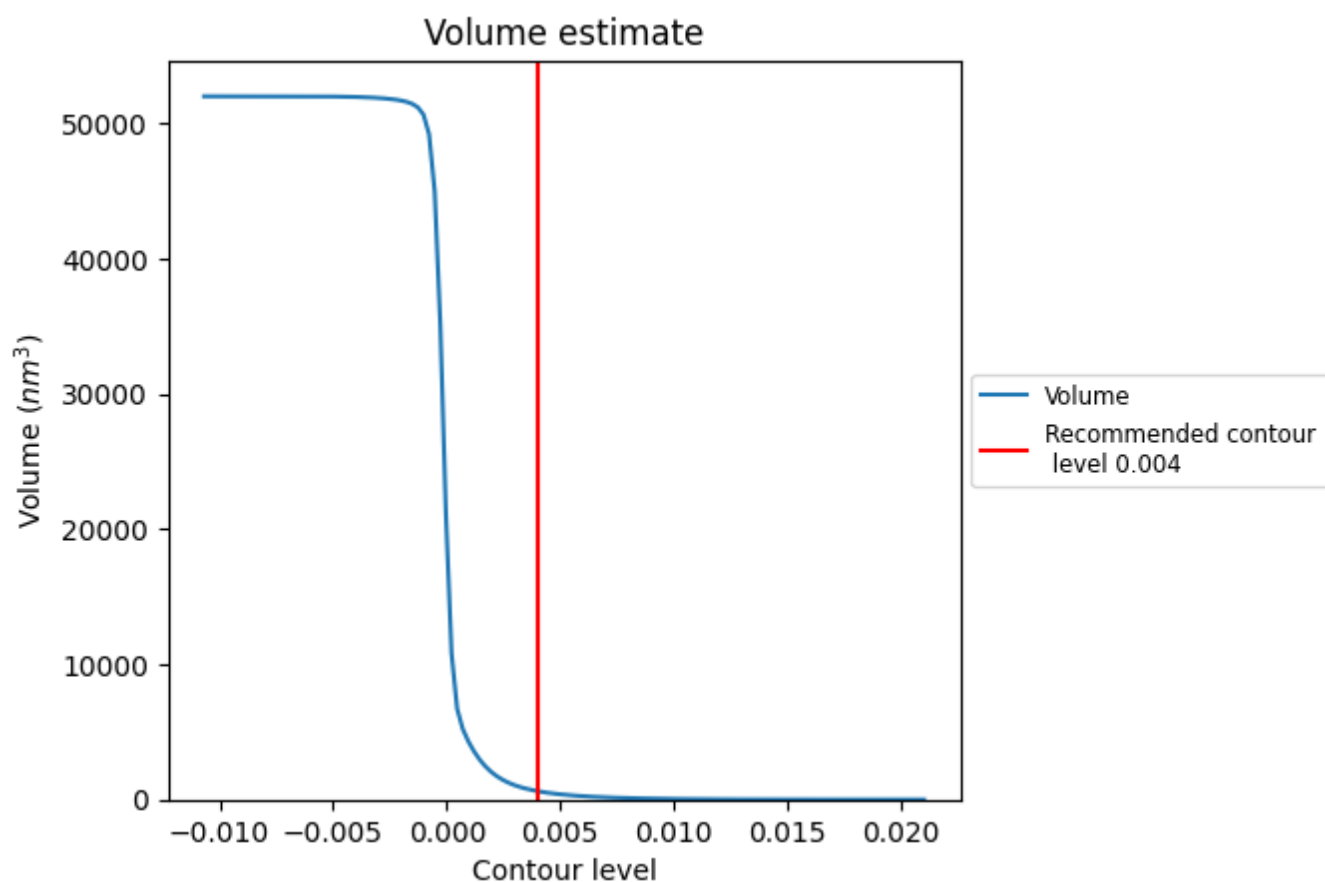
This section contains the results of statistical analysis of the map.

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.

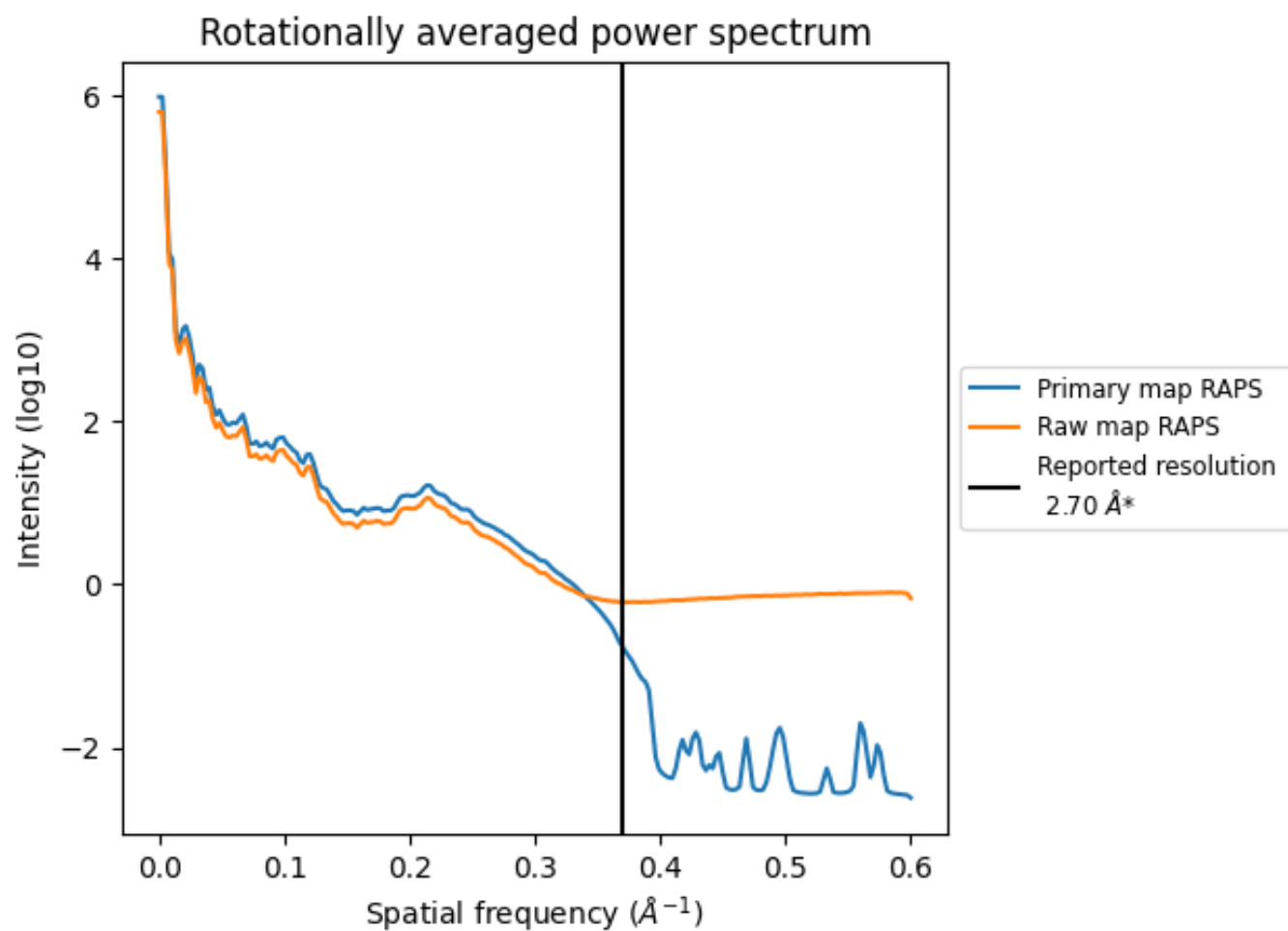
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 622 nm³; this corresponds to an approximate mass of 562 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 ⓘ

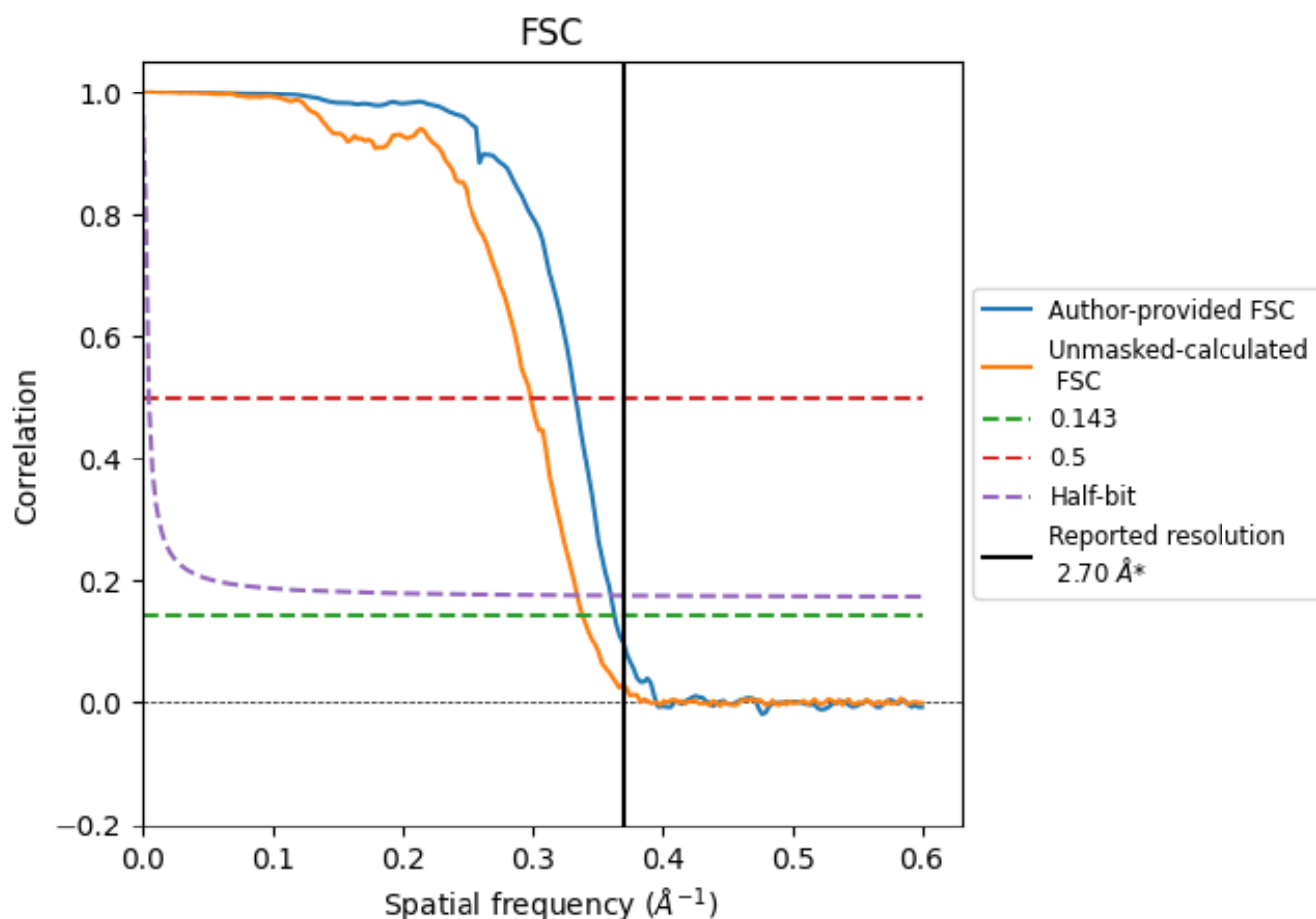


*Reported resolution corresponds to spatial frequency of 0.370 Å⁻¹

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 $0.370 \text{ \AA}^{-1}$

8.2 Resolution estimates [i](#)

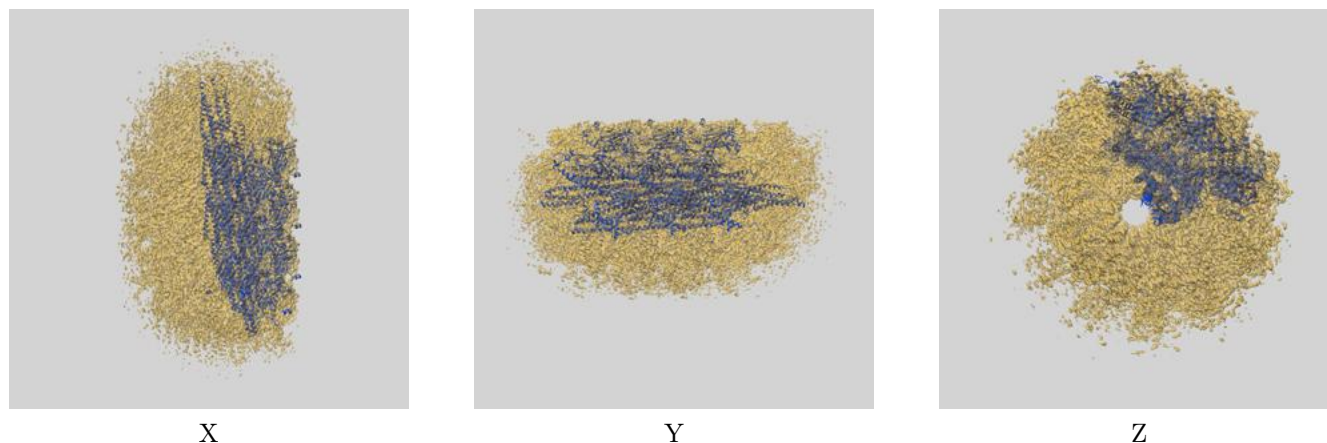
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.70	-	-
Author-provided FSC curve	2.75	3.00	2.77
Unmasked-calculated*	2.95	3.34	2.99

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

9 Map-model fit [i](#)

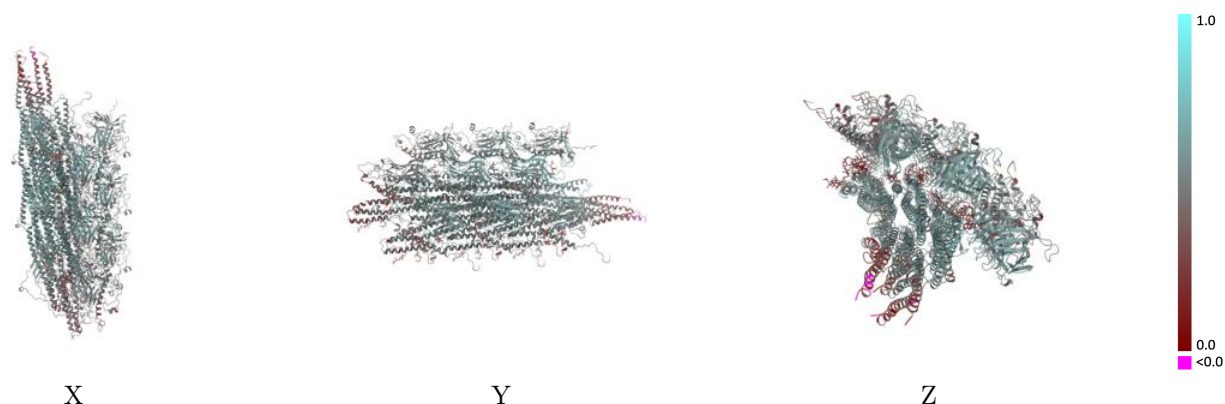
This section contains information regarding the fit between EMDB map EMD-71672 and PDB model 9PIM. Per-residue inclusion information can be found in section [3](#) on page [8](#).

9.1 Map-model overlay [i](#)



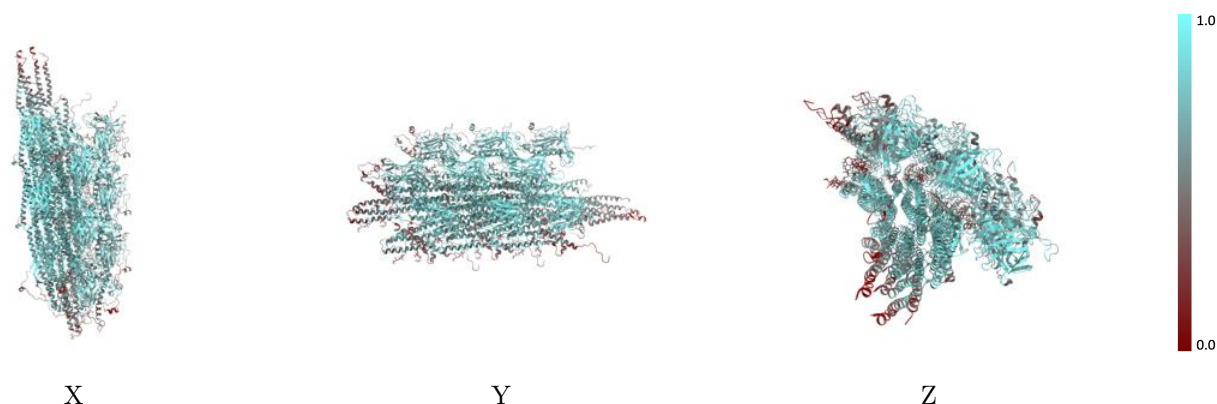
The images above show the 3D surface view of the map at the recommended contour level 0.004 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



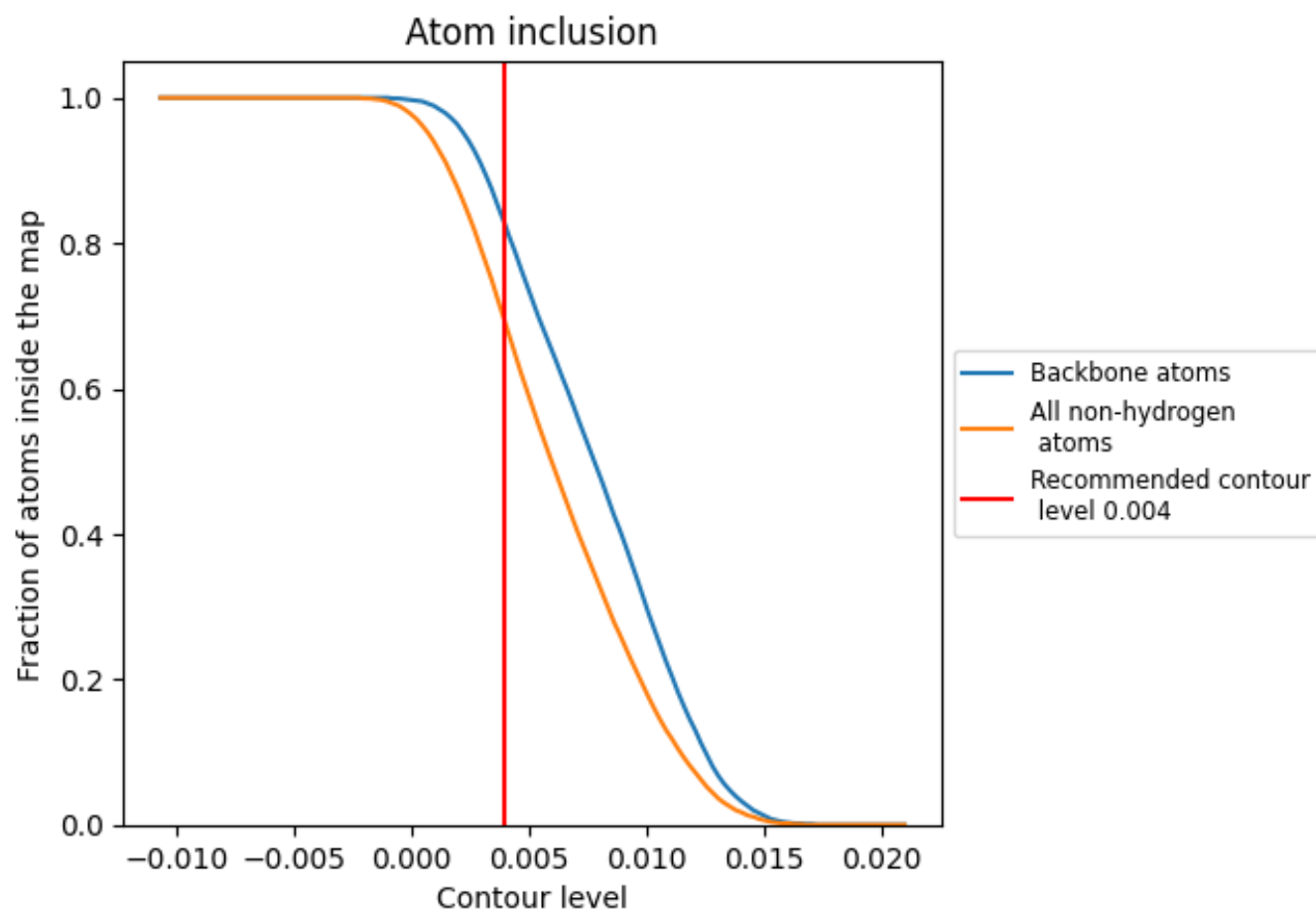
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.004).

9.4 Atom inclusion [i](#)



At the recommended contour level, 82% of all backbone atoms, 69% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.004) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6910	 0.5170
BR	 0.6420	 0.5040
BS	 0.6980	 0.5250
BT	 0.6070	 0.4870
BU	 0.6280	 0.4830
BV	 0.7780	 0.5630
BW	 0.7860	 0.5570
BX	 0.6560	 0.4840
BY	 0.7760	 0.5530
BZ	 0.7130	 0.5090
CJ	 0.6960	 0.5210
CK	 0.7620	 0.5590
CL	 0.6740	 0.4930
CM	 0.6110	 0.4890
CN	 0.7550	 0.5570
CO	 0.7200	 0.5340
CP	 0.6490	 0.5130
CQ	 0.7030	 0.5320
CR	 0.5740	 0.4480

