



## Full wwPDB EM Validation Report ⓘ

Jul 9, 2025 – 01:41 PM JST

PDB ID : 9JE5 / pdb\_00009je5  
EMDB ID : EMD-61407  
Title : Cryo-EM structure of human TRPV3 in complex with citronellal determined in MSP2N2 nanodisc  
Authors : Lu, X.; Yao, J.  
Deposited on : 2024-09-02  
Resolution : 3.53 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : **FAILED**  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4-5-2 with Phenix2.0rc1  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
MapQ : **FAILED**  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.44

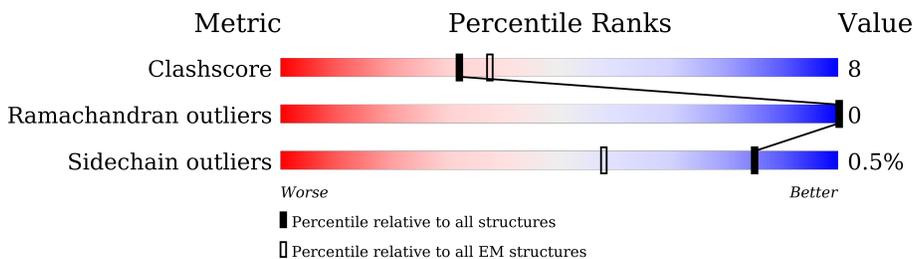
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.53 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ .

Mol	Chain	Length	Quality of chain			
1	A	799		61%	16%	23%
1	B	799		61%	16%	23%
1	C	799		61%	16%	23%
1	D	799		61%	16%	23%

## 2 Entry composition i

There are 3 unique types of molecules in this entry. The entry contains 20824 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 Transient receptor potential cation channel subfamily V member 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	617	5015	3268	827	888	32	0	0
1	B	617	5015	3268	827	888	32	0	0
1	C	617	5015	3268	827	888	32	0	0
1	D	617	5015	3268	827	888	32	0	0

There are 40 discrepancies between the modelled and reference sequences:

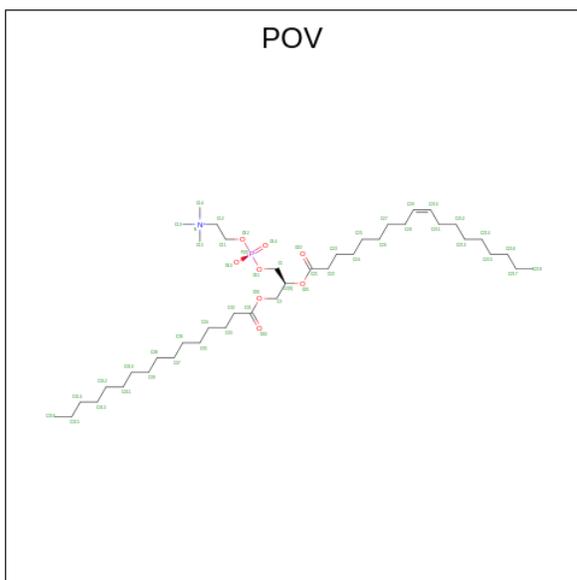
Chain	Residue	Modelled	Actual	Comment	Reference
A	25	VAL	ILE	variant	UNP Q8NET8
A	791	SER	-	expression tag	UNP Q8NET8
A	792	ASN	-	expression tag	UNP Q8NET8
A	793	SER	-	expression tag	UNP Q8NET8
A	794	LEU	-	expression tag	UNP Q8NET8
A	795	GLU	-	expression tag	UNP Q8NET8
A	796	VAL	-	expression tag	UNP Q8NET8
A	797	LEU	-	expression tag	UNP Q8NET8
A	798	PHE	-	expression tag	UNP Q8NET8
A	799	GLN	-	expression tag	UNP Q8NET8
B	25	VAL	ILE	variant	UNP Q8NET8
B	791	SER	-	expression tag	UNP Q8NET8
B	792	ASN	-	expression tag	UNP Q8NET8
B	793	SER	-	expression tag	UNP Q8NET8
B	794	LEU	-	expression tag	UNP Q8NET8
B	795	GLU	-	expression tag	UNP Q8NET8
B	796	VAL	-	expression tag	UNP Q8NET8
B	797	LEU	-	expression tag	UNP Q8NET8
B	798	PHE	-	expression tag	UNP Q8NET8
B	799	GLN	-	expression tag	UNP Q8NET8
C	25	VAL	ILE	variant	UNP Q8NET8

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Chain	Residue	Modelled	Actual	Comment	Reference
C	791	SER	-	expression tag	UNP Q8NET8
C	792	ASN	-	expression tag	UNP Q8NET8
C	793	SER	-	expression tag	UNP Q8NET8
C	794	LEU	-	expression tag	UNP Q8NET8
C	795	GLU	-	expression tag	UNP Q8NET8
C	796	VAL	-	expression tag	UNP Q8NET8
C	797	LEU	-	expression tag	UNP Q8NET8
C	798	PHE	-	expression tag	UNP Q8NET8
C	799	GLN	-	expression tag	UNP Q8NET8
D	25	VAL	ILE	variant	UNP Q8NET8
D	791	SER	-	expression tag	UNP Q8NET8
D	792	ASN	-	expression tag	UNP Q8NET8
D	793	SER	-	expression tag	UNP Q8NET8
D	794	LEU	-	expression tag	UNP Q8NET8
D	795	GLU	-	expression tag	UNP Q8NET8
D	796	VAL	-	expression tag	UNP Q8NET8
D	797	LEU	-	expression tag	UNP Q8NET8
D	798	PHE	-	expression tag	UNP Q8NET8
D	799	GLN	-	expression tag	UNP Q8NET8

- Molecule 2 is (2S)-3-(hexadecanoyloxy)-2-[(9Z)-octadec-9-enoyloxy]propyl 2-(trimethylamm onio)ethyl phosphate (CCD ID: POV) (formula: C<sub>42</sub>H<sub>82</sub>NO<sub>8</sub>P).



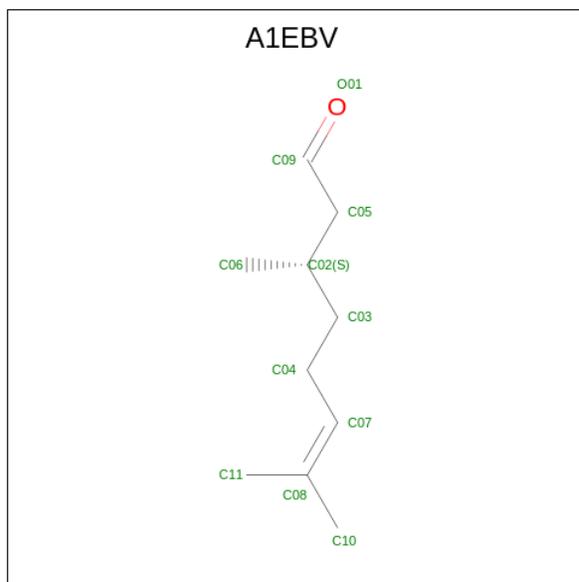
Mol	Chain	Residues	Atoms				AltConf	
			Total	C	N	O		P
2	A	1	44	34	1	8	1	0

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
2	A	1	32	22	1	8	1	0
2	A	1	32	22	1	8	1	0
2	A	1	36	26	1	8	1	0
2	A	1	36	26	1	8	1	0
2	B	1	36	26	1	8	1	0
2	B	1	44	34	1	8	1	0
2	B	1	32	22	1	8	1	0
2	B	1	32	22	1	8	1	0
2	B	1	36	26	1	8	1	0
2	C	1	36	26	1	8	1	0
2	C	1	44	34	1	8	1	0
2	C	1	32	22	1	8	1	0
2	C	1	32	22	1	8	1	0
2	C	1	36	26	1	8	1	0
2	D	1	36	26	1	8	1	0
2	D	1	44	34	1	8	1	0
2	D	1	32	22	1	8	1	0
2	D	1	32	22	1	8	1	0
2	D	1	36	26	1	8	1	0

- Molecule 3 is (3 {S})-3,7-dimethyloct-6-enal (CCD ID: A1EBV) (formula: C<sub>10</sub>H<sub>18</sub>O) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			AltConf
			Total	C	O	
3	A	1	Total 11	C 10	O 1	0
3	B	1	Total 11	C 10	O 1	0
3	C	1	Total 11	C 10	O 1	0
3	D	1	Total 11	C 10	O 1	0





LEU	V278	A437	G573
ASN	M282	S444	M574
GLU	L303	D586	H585
ASP	D309	GLU	V587
PRO	F310	GLU	L588
PRO	V317	ALA	K589
VAL	R327	ILE	L591
ARG	E332	PRO	I595
ARG	T335	HIS	L598
THR	T336	LEU	L608
THR	R337	ALA	K617
ASP	N338	LEU	S624
SER	N339	ALA	F625
SER	D340	LEU	V629
ARG	G341	THR	Y661
ASN	L342	HIS	L664
ASN	A349	THR	L668
SER	L357	ASN	L669
THR	I360	ALA	I670
THR	R363	ALA	M671
GLU	L373	PHE	M672
VAL	S374	GLU	L673
VAL	R375	VAL	I674
LEU	D379	GLU	M677
LEU	L392	PHE	S688
THR	T393	PRO	E689
SER	N394	GLU	R690
SER	V395	THR	I691
ASN	D396	VAL	L701
ASN	T397	ASN	R714
LEU	V403	SER	F715
LEU	L404	THR	R716
LEU	R416	SER	L720
LEU	H417	VAL	G721
PHE	E418	GLN	K722
GLN	M419	LEU	R729
GLN	L429	LEU	R733
GLN	K432	VAL	W739
GLN	M433	GLU	F748
GLN	F436	GLU	
GLN	M572	GLU	

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	73759	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	50	Depositor
Minimum defocus (nm)	1400	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: A1EBV, POV

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	0.16	0/5121	0.43	2/6920 (0.0%)
1	B	0.17	0/5121	0.43	2/6920 (0.0%)
1	C	0.17	0/5121	0.43	2/6920 (0.0%)
1	D	0.17	0/5121	0.43	2/6920 (0.0%)
All	All	0.17	0/20484	0.43	8/27680 (0.0%)

There are no bond length outliers.

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	729	ARG	CB-CA-C	-6.33	109.26	116.54
1	A	729	ARG	CB-CA-C	-6.31	109.28	116.54
1	C	729	ARG	CB-CA-C	-6.30	109.30	116.54
1	B	729	ARG	CB-CA-C	-6.30	109.30	116.54
1	C	340	ASP	N-CA-C	-5.19	105.30	111.69
1	D	340	ASP	N-CA-C	-5.19	105.31	111.69
1	A	340	ASP	N-CA-C	-5.18	105.32	111.69
1	B	340	ASP	N-CA-C	-5.18	105.32	111.69

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	A	5015	0	5095	93	0
1	B	5015	0	5095	90	0
1	C	5015	0	5095	91	0
1	D	5015	0	5095	91	0
2	A	180	0	225	6	0
2	B	180	0	225	6	0
2	C	180	0	225	6	0
2	D	180	0	225	6	0
3	A	11	0	0	0	0
3	B	11	0	0	0	0
3	C	11	0	0	0	0
3	D	11	0	0	0	0
All	All	20824	0	21280	353	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 8.

All (353) 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:204:ILE:CD1	1:C:234:LEU:HD22	1.61	1.30
1:D:204:ILE:CD1	1:D:234:LEU:HD22	1.61	1.30
1:A:204:ILE:CD1	1:A:234:LEU:HD22	1.61	1.27
1:B:204:ILE:CD1	1:B:234:LEU:HD22	1.61	1.27
1:A:204:ILE:HD11	1:A:234:LEU:CD2	1.71	1.20
1:D:204:ILE:HD11	1:D:234:LEU:CD2	1.71	1.20
1:B:204:ILE:HD11	1:B:234:LEU:CD2	1.71	1.20
1:C:204:ILE:HD11	1:C:234:LEU:CD2	1.71	1.20
1:C:338:ASN:H	1:C:342:LEU:H	1.28	0.80
1:A:338:ASN:H	1:A:342:LEU:H	1.28	0.80
1:D:338:ASN:H	1:D:342:LEU:H	1.28	0.79
1:B:338:ASN:H	1:B:342:LEU:H	1.28	0.78
1:C:204:ILE:HD11	1:C:234:LEU:HD22	0.81	0.77
1:D:204:ILE:HD11	1:D:234:LEU:HD22	0.81	0.75
1:A:204:ILE:HD11	1:A:234:LEU:HD22	0.81	0.73
1:B:204:ILE:HD11	1:B:234:LEU:HD22	0.81	0.73
1:C:204:ILE:CD1	1:C:234:LEU:CD2	2.48	0.70
1:D:204:ILE:CD1	1:D:234:LEU:CD2	2.48	0.70
1:D:278:VAL:O	1:D:282:MET:HG2	1.92	0.69
1:B:278:VAL:O	1:B:282:MET:HG2	1.92	0.68
1:A:278:VAL:O	1:A:282:MET:HG2	1.92	0.68
1:A:282:MET:HE2	1:A:327:ARG:CG	2.23	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:278:VAL:O	1:C:282:MET:HG2	1.92	0.68
1:B:265:PRO:HA	1:B:268:LEU:HD23	1.76	0.68
1:C:282:MET:HE2	1:C:327:ARG:CG	2.24	0.68
1:A:265:PRO:HA	1:A:268:LEU:HD23	1.76	0.68
1:B:282:MET:HE2	1:B:327:ARG:CG	2.23	0.67
1:A:204:ILE:CD1	1:A:234:LEU:CD2	2.48	0.67
1:C:265:PRO:HA	1:C:268:LEU:HD23	1.76	0.67
1:D:282:MET:HE2	1:D:327:ARG:CG	2.23	0.67
1:D:265:PRO:HA	1:D:268:LEU:HD23	1.76	0.67
1:B:65:SER:OG	1:B:66:LYS:N	2.29	0.66
1:A:65:SER:OG	1:A:66:LYS:N	2.29	0.66
1:C:173:MET:SD	1:C:208:TYR:HE1	2.19	0.65
1:B:204:ILE:CD1	1:B:234:LEU:CD2	2.48	0.65
1:A:661:TYR:HA	1:A:664:LEU:HD23	1.79	0.65
1:A:173:MET:SD	1:A:208:TYR:HE1	2.19	0.65
1:D:173:MET:SD	1:D:208:TYR:HE1	2.19	0.64
1:B:661:TYR:HA	1:B:664:LEU:HD23	1.79	0.64
1:C:661:TYR:HA	1:C:664:LEU:HD23	1.79	0.64
1:B:173:MET:SD	1:B:208:TYR:HE1	2.19	0.64
1:D:65:SER:OG	1:D:66:LYS:N	2.29	0.64
1:A:214:GLU:OE2	1:A:246:LYS:HG3	1.98	0.64
1:A:433:TRP:HA	1:A:437:ALA:HB3	1.80	0.64
1:D:661:TYR:HA	1:D:664:LEU:HD23	1.79	0.64
1:B:433:TRP:HA	1:B:437:ALA:HB3	1.80	0.63
1:C:65:SER:OG	1:C:66:LYS:N	2.29	0.63
1:C:214:GLU:OE2	1:C:246:LYS:HG3	1.98	0.63
1:D:214:GLU:OE2	1:D:246:LYS:HG3	1.98	0.63
1:C:433:TRP:HA	1:C:437:ALA:HB3	1.80	0.62
1:D:433:TRP:HA	1:D:437:ALA:HB3	1.80	0.62
1:C:173:MET:HB2	1:C:221:ILE:HD12	1.82	0.62
1:A:173:MET:HB2	1:A:221:ILE:HD12	1.81	0.61
1:B:173:MET:HB2	1:B:221:ILE:HD12	1.81	0.61
1:B:214:GLU:OE2	1:B:246:LYS:HG3	1.98	0.61
1:D:598:LEU:HD21	1:D:629:VAL:HG13	1.82	0.61
1:C:598:LEU:HD21	1:C:629:VAL:HG13	1.82	0.61
1:D:173:MET:HB2	1:D:221:ILE:HD12	1.82	0.60
1:A:598:LEU:HD21	1:A:629:VAL:HG13	1.82	0.60
1:B:598:LEU:HD21	1:B:629:VAL:HG13	1.82	0.59
1:A:303:LEU:HD12	1:A:317:VAL:HG23	1.85	0.59
1:D:303:LEU:HD12	1:D:317:VAL:HG23	1.84	0.59
1:B:303:LEU:HD12	1:B:317:VAL:HG23	1.84	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:303:LEU:HD12	1:C:317:VAL:HG23	1.85	0.58
1:D:416:ARG:HA	1:D:419:MET:HB3	1.87	0.57
1:B:714:ARG:O	1:B:716:ARG:NH2	2.38	0.57
1:A:714:ARG:O	1:A:716:ARG:NH2	2.38	0.57
1:C:585:HIS:O	1:C:589:LYS:NZ	2.32	0.57
1:B:585:HIS:O	1:B:589:LYS:NZ	2.32	0.56
1:D:714:ARG:O	1:D:716:ARG:NH2	2.38	0.56
1:B:416:ARG:HA	1:B:419:MET:HB3	1.87	0.56
1:C:416:ARG:HA	1:C:419:MET:HB3	1.87	0.56
1:C:714:ARG:O	1:C:716:ARG:NH2	2.38	0.56
1:A:416:ARG:HA	1:A:419:MET:HB3	1.87	0.56
1:C:173:MET:SD	1:C:208:TYR:CE1	3.00	0.55
1:C:128:SER:O	1:C:178:ASN:ND2	2.40	0.55
1:B:128:SER:O	1:B:178:ASN:ND2	2.40	0.55
1:D:173:MET:SD	1:D:208:TYR:CE1	3.00	0.55
1:B:379:ASP:OD2	1:B:733:ARG:NH2	2.39	0.55
1:A:128:SER:O	1:A:178:ASN:ND2	2.40	0.54
1:A:173:MET:SD	1:A:208:TYR:CE1	3.00	0.54
1:A:585:HIS:O	1:A:589:LYS:NZ	2.32	0.54
1:B:173:MET:SD	1:B:208:TYR:CE1	3.00	0.54
1:D:128:SER:O	1:D:178:ASN:ND2	2.40	0.54
1:A:379:ASP:OD2	1:A:733:ARG:NH2	2.39	0.53
1:B:588:LEU:HD12	2:C:801:POV:H37	1.90	0.53
1:B:588:LEU:HB3	2:C:801:POV:H35	1.90	0.53
1:C:574:MET:HE1	1:C:689:GLU:HA	1.91	0.53
1:C:588:LEU:HB3	2:D:801:POV:H35	1.90	0.53
1:A:552:VAL:HG21	1:D:608:LEU:HG	1.90	0.53
1:D:585:HIS:O	1:D:589:LYS:NZ	2.32	0.53
1:A:588:LEU:HB3	2:B:801:POV:H35	1.90	0.53
1:D:574:MET:HE1	1:D:689:GLU:HA	1.91	0.53
1:D:688:SER:HA	1:D:691:ILE:HG22	1.91	0.53
2:A:806:POV:H35	1:D:588:LEU:HB3	1.90	0.52
1:C:379:ASP:OD2	1:C:733:ARG:NH2	2.39	0.52
1:C:688:SER:HA	1:C:691:ILE:HG22	1.91	0.52
1:B:527:PHE:O	1:B:531:VAL:HG23	2.10	0.52
1:C:588:LEU:HD12	2:D:801:POV:H37	1.90	0.52
1:C:527:PHE:O	1:C:531:VAL:HG23	2.10	0.52
1:C:608:LEU:HG	1:D:552:VAL:HG21	1.91	0.52
1:A:688:SER:HA	1:A:691:ILE:HG22	1.91	0.52
1:C:69:ASP:OD1	1:C:69:ASP:N	2.42	0.52
1:A:527:PHE:O	1:A:531:VAL:HG23	2.10	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:246:LYS:HG3	1:B:246:LYS:O	2.10	0.52
1:B:688:SER:HA	1:B:691:ILE:HG22	1.91	0.52
1:D:527:PHE:O	1:D:531:VAL:HG23	2.10	0.52
1:A:246:LYS:HG3	1:A:246:LYS:O	2.10	0.52
1:A:608:LEU:HG	1:B:552:VAL:HG21	1.90	0.52
1:B:574:MET:HE1	1:B:689:GLU:HA	1.91	0.52
1:B:671:ASN:HB2	1:C:674:ILE:HG12	1.92	0.52
1:A:69:ASP:N	1:A:69:ASP:OD1	2.42	0.52
2:A:806:POV:H37	1:D:588:LEU:HD12	1.91	0.52
1:A:588:LEU:HD12	2:B:801:POV:H37	1.90	0.51
1:D:379:ASP:OD2	1:D:733:ARG:NH2	2.39	0.51
1:A:574:MET:HE1	1:A:689:GLU:HA	1.91	0.51
1:A:673:LEU:O	1:A:677:MET:HG3	2.11	0.51
1:B:608:LEU:HG	1:C:552:VAL:HG21	1.91	0.51
1:C:517:LEU:HD13	1:C:691:ILE:HG12	1.93	0.51
1:B:673:LEU:O	1:B:677:MET:HG3	2.11	0.51
1:C:673:LEU:O	1:C:677:MET:HG3	2.11	0.51
1:B:517:LEU:HD13	1:B:691:ILE:HG12	1.93	0.51
1:C:671:ASN:HB2	1:D:674:ILE:HG12	1.92	0.51
1:D:673:LEU:O	1:D:677:MET:HG3	2.11	0.51
1:C:246:LYS:HG3	1:C:246:LYS:O	2.10	0.50
1:D:246:LYS:HG3	1:D:246:LYS:O	2.10	0.50
1:C:444:SER:OG	2:C:804:POV:O14	2.29	0.50
1:A:444:SER:OG	2:A:803:POV:O14	2.30	0.50
1:A:671:ASN:HB2	1:B:674:ILE:HG12	1.94	0.50
1:C:282:MET:HE2	1:C:327:ARG:HG2	1.94	0.50
1:D:270:ALA:HB1	1:D:303:LEU:HD21	1.93	0.50
1:D:176:LEU:HD13	1:D:222:ALA:HB2	1.94	0.50
1:B:270:ALA:HB1	1:B:303:LEU:HD21	1.93	0.50
1:D:517:LEU:HD13	1:D:691:ILE:HG12	1.93	0.50
1:A:176:LEU:HD13	1:A:222:ALA:HB2	1.94	0.50
1:D:69:ASP:N	1:D:69:ASP:OD1	2.42	0.49
1:A:282:MET:HE2	1:A:327:ARG:HG2	1.94	0.49
1:B:444:SER:OG	2:B:804:POV:O14	2.30	0.49
1:A:517:LEU:HD13	1:A:691:ILE:HG12	1.93	0.49
1:D:282:MET:HE2	1:D:327:ARG:HG2	1.94	0.49
1:C:270:ALA:HB1	1:C:303:LEU:HD21	1.93	0.49
1:D:444:SER:OG	2:D:804:POV:O14	2.30	0.49
1:B:69:ASP:OD1	1:B:69:ASP:N	2.42	0.49
1:C:565:TYR:OH	2:C:804:POV:O14	2.31	0.49
1:D:565:TYR:OH	2:D:804:POV:O14	2.31	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:270:ALA:HB1	1:A:303:LEU:HD21	1.93	0.49
1:A:674:ILE:HG12	1:D:671:ASN:HB2	1.94	0.49
1:D:629:VAL:HG12	2:D:802:POV:H26	1.95	0.49
1:A:629:VAL:HG12	2:A:801:POV:H26	1.95	0.49
1:C:176:LEU:HD13	1:C:222:ALA:HB2	1.94	0.49
1:B:176:LEU:HD13	1:B:222:ALA:HB2	1.94	0.48
1:B:565:TYR:OH	2:B:804:POV:O14	2.31	0.48
1:C:629:VAL:HG12	2:C:802:POV:H26	1.95	0.48
1:A:565:TYR:OH	2:A:803:POV:O14	2.31	0.48
1:D:157:PHE:CE2	1:D:159:MET:HA	2.49	0.48
1:A:157:PHE:CE2	1:A:159:MET:HA	2.49	0.48
1:A:363:ARG:NH1	1:A:373:LEU:O	2.47	0.48
1:C:157:PHE:CE2	1:C:159:MET:HA	2.49	0.48
1:D:363:ARG:NH1	1:D:373:LEU:O	2.47	0.48
1:C:363:ARG:NH1	1:C:373:LEU:O	2.47	0.48
1:B:629:VAL:HG12	2:B:802:POV:H26	1.95	0.48
1:A:590:PHE:HD1	1:A:669:LEU:HD12	1.79	0.48
1:B:157:PHE:CE2	1:B:159:MET:HA	2.49	0.48
1:B:397:THR:HG21	1:B:701:LEU:HD11	1.96	0.48
1:C:569:PHE:O	1:C:573:GLY:N	2.35	0.48
1:D:590:PHE:HD1	1:D:669:LEU:HD12	1.79	0.48
1:B:282:MET:HE2	1:B:327:ARG:HG2	1.94	0.47
1:B:363:ARG:NH1	1:B:373:LEU:O	2.47	0.47
1:C:590:PHE:HD1	1:C:669:LEU:HD12	1.79	0.47
1:A:397:THR:HG21	1:A:701:LEU:HD11	1.96	0.47
1:A:536:SER:OG	1:A:551:LEU:HB2	2.14	0.47
1:A:566:THR:O	1:A:566:THR:OG1	2.33	0.47
1:D:397:THR:HG21	1:D:701:LEU:HD11	1.96	0.47
1:C:545:LYS:HB2	1:C:545:LYS:HE2	1.67	0.47
1:B:349:ALA:HB2	1:B:403:VAL:HG23	1.97	0.47
1:C:397:THR:O	1:C:397:THR:OG1	2.31	0.47
1:C:397:THR:HG21	1:C:701:LEU:HD11	1.96	0.47
1:B:357:LEU:HA	1:B:360:ILE:HG22	1.96	0.47
1:C:180:ASN:O	1:C:183:THR:OG1	2.33	0.47
1:C:349:ALA:HB2	1:C:403:VAL:HG23	1.97	0.47
1:C:536:SER:OG	1:C:551:LEU:HB2	2.14	0.47
1:D:180:ASN:O	1:D:183:THR:OG1	2.33	0.47
1:C:357:LEU:HA	1:C:360:ILE:HG22	1.96	0.47
1:D:357:LEU:HA	1:D:360:ILE:HG22	1.96	0.47
1:A:525:VAL:HG13	1:A:557:LEU:HD21	1.97	0.47
1:B:536:SER:OG	1:B:551:LEU:HB2	2.14	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:240:ASP:O	1:D:242:ASN:N	2.44	0.47
1:D:536:SER:OG	1:D:551:LEU:HB2	2.14	0.47
1:B:590:PHE:HD1	1:B:669:LEU:HD12	1.79	0.46
1:D:397:THR:O	1:D:397:THR:OG1	2.31	0.46
1:C:624:SER:OG	1:C:625:PHE:N	2.49	0.46
1:C:240:ASP:O	1:C:242:ASN:N	2.44	0.46
1:A:392:LEU:HB2	1:A:395:VAL:HB	1.98	0.46
1:A:357:LEU:HA	1:A:360:ILE:HG22	1.96	0.46
1:A:349:ALA:HB2	1:A:403:VAL:HG23	1.97	0.46
1:B:180:ASN:O	1:B:183:THR:OG1	2.33	0.46
1:D:392:LEU:HB2	1:D:395:VAL:HB	1.98	0.46
1:B:566:THR:O	1:B:566:THR:OG1	2.33	0.46
1:D:349:ALA:HB2	1:D:403:VAL:HG23	1.97	0.46
1:A:180:ASN:O	1:A:183:THR:OG1	2.33	0.46
1:B:123:ILE:HD12	1:B:123:ILE:H	1.80	0.46
1:C:123:ILE:HD12	1:C:123:ILE:H	1.80	0.46
1:C:392:LEU:HB2	1:C:395:VAL:HB	1.98	0.46
1:C:525:VAL:HG13	1:C:557:LEU:HD21	1.97	0.46
1:A:545:LYS:HE2	1:A:545:LYS:HB2	1.67	0.46
1:A:569:PHE:O	1:A:573:GLY:N	2.35	0.46
1:B:624:SER:OG	1:B:625:PHE:N	2.49	0.46
1:D:569:PHE:O	1:D:573:GLY:N	2.35	0.46
1:A:624:SER:OG	1:A:625:PHE:N	2.49	0.45
1:B:240:ASP:O	1:B:242:ASN:N	2.44	0.45
1:A:375:ARG:HH12	1:A:393:THR:HG22	1.82	0.45
1:D:123:ILE:HD12	1:D:123:ILE:H	1.80	0.45
1:D:624:SER:OG	1:D:625:PHE:N	2.49	0.45
1:B:375:ARG:HH12	1:B:393:THR:HG22	1.82	0.45
1:D:525:VAL:HG13	1:D:557:LEU:HD21	1.97	0.45
1:B:392:LEU:HB2	1:B:395:VAL:HB	1.98	0.45
1:A:123:ILE:HD12	1:A:123:ILE:H	1.80	0.45
1:B:525:VAL:HG13	1:B:557:LEU:HD21	1.97	0.45
1:D:595:ILE:HD11	2:D:802:POV:H21A	1.98	0.45
1:A:595:ILE:HD11	2:A:801:POV:H21A	1.98	0.45
1:A:131:CYS:HB3	1:A:134:GLU:HB2	1.99	0.45
1:D:123:ILE:O	1:D:127:VAL:HG22	2.17	0.45
1:C:375:ARG:HH12	1:C:393:THR:HG22	1.82	0.45
1:A:123:ILE:O	1:A:127:VAL:HG22	2.17	0.45
1:D:131:CYS:HB3	1:D:134:GLU:HB2	1.99	0.45
1:D:375:ARG:HH12	1:D:393:THR:HG22	1.82	0.44
1:B:131:CYS:HB3	1:B:134:GLU:HB2	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:595:ILE:HD11	2:C:802:POV:H21A	1.98	0.44
1:B:397:THR:O	1:B:397:THR:OG1	2.31	0.44
1:B:130:GLY:HA3	1:B:180:ASN:HD21	1.83	0.44
1:C:211:GLU:OE1	1:C:211:GLU:N	2.50	0.44
1:A:397:THR:O	1:A:397:THR:OG1	2.31	0.44
1:C:417:HIS:CD2	1:C:690:ARG:HD3	2.53	0.44
1:D:130:GLY:HA3	1:D:180:ASN:HD21	1.83	0.44
1:B:595:ILE:HD11	2:B:802:POV:H21A	1.98	0.44
1:C:123:ILE:HA	1:C:138:LEU:HD11	1.99	0.44
1:A:130:GLY:HA3	1:A:180:ASN:HD21	1.83	0.44
1:A:417:HIS:CD2	1:A:690:ARG:HD3	2.53	0.44
1:C:130:GLY:HA3	1:C:180:ASN:HD21	1.83	0.44
1:C:587:VAL:O	1:C:591:LEU:HB2	2.18	0.44
1:D:545:LYS:HB2	1:D:545:LYS:HE2	1.67	0.44
1:C:123:ILE:O	1:C:127:VAL:HG22	2.17	0.44
1:C:131:CYS:HB3	1:C:134:GLU:HB2	1.99	0.43
1:D:587:VAL:O	1:D:591:LEU:HB2	2.18	0.43
1:A:123:ILE:HA	1:A:138:LEU:HD11	1.99	0.43
1:B:532:LEU:HB2	1:B:554:ALA:HB2	2.01	0.43
1:D:417:HIS:CD2	1:D:690:ARG:HD3	2.53	0.43
1:D:566:THR:O	1:D:566:THR:OG1	2.33	0.43
1:B:123:ILE:O	1:B:127:VAL:HG22	2.17	0.43
1:B:534:ILE:HA	1:B:537:VAL:HG22	2.00	0.43
1:B:668:LEU:O	1:B:672:MET:HB3	2.18	0.43
1:C:337:ARG:HB3	1:C:341:GLY:HA2	2.01	0.43
1:D:532:LEU:HB2	1:D:554:ALA:HB2	2.00	0.43
1:A:534:ILE:HA	1:A:537:VAL:HG22	2.00	0.43
1:A:668:LEU:O	1:A:672:MET:HB3	2.18	0.43
1:B:337:ARG:HB3	1:B:341:GLY:HA2	2.01	0.43
1:B:587:VAL:O	1:B:591:LEU:HB2	2.18	0.43
1:C:282:MET:HE2	1:C:327:ARG:HG3	2.00	0.43
1:C:532:LEU:HB2	1:C:554:ALA:HB2	2.01	0.43
1:D:668:LEU:O	1:D:672:MET:HB3	2.18	0.43
1:B:417:HIS:CD2	1:B:690:ARG:HD3	2.53	0.43
1:C:566:THR:O	1:C:566:THR:OG1	2.33	0.43
1:A:337:ARG:HB3	1:A:341:GLY:HA2	2.01	0.43
1:A:587:VAL:O	1:A:591:LEU:HB2	2.18	0.43
1:A:259:PHE:HD1	1:B:739:TRP:CH2	2.37	0.43
1:A:501:GLU:OE1	1:A:523:HIS:ND1	2.43	0.43
1:A:532:LEU:HB2	1:A:554:ALA:HB2	2.01	0.43
1:A:608:LEU:HD23	1:A:608:LEU:HA	1.91	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:123:ILE:HA	1:B:138:LEU:HD11	1.99	0.43
1:D:337:ARG:HB3	1:D:341:GLY:HA2	2.01	0.43
1:A:617:LYS:HD2	1:A:617:LYS:HA	1.84	0.42
1:B:211:GLU:OE1	1:B:211:GLU:N	2.50	0.42
1:C:309:ASP:OD1	1:C:310:PHE:N	2.50	0.42
1:C:668:LEU:O	1:C:672:MET:HB3	2.18	0.42
1:A:484:LEU:HA	1:A:487:ARG:HG3	2.01	0.42
1:D:123:ILE:HA	1:D:138:LEU:HD11	1.99	0.42
1:D:211:GLU:OE1	1:D:211:GLU:N	2.50	0.42
1:D:617:LYS:HA	1:D:617:LYS:HD2	1.84	0.42
1:A:211:GLU:OE1	1:A:211:GLU:N	2.50	0.42
1:A:360:ILE:HD12	1:A:363:ARG:HE	1.84	0.42
1:B:267:ALA:HA	1:B:270:ALA:HB3	2.02	0.42
1:B:569:PHE:O	1:B:573:GLY:N	2.35	0.42
1:C:259:PHE:HD1	1:D:739:TRP:CH2	2.38	0.42
1:C:669:LEU:HD13	1:C:672:MET:HE2	2.01	0.42
1:A:166:ASP:OD1	1:A:166:ASP:N	2.53	0.42
1:D:309:ASP:OD1	1:D:310:PHE:N	2.50	0.42
1:B:669:LEU:HD13	1:B:672:MET:HE2	2.01	0.42
1:A:432:LYS:HG2	1:A:436:PHE:HE1	1.85	0.42
1:A:612:CYS:HB3	1:A:619:CYS:HB2	1.95	0.42
1:C:267:ALA:HA	1:C:270:ALA:HB3	2.02	0.42
1:D:267:ALA:HA	1:D:270:ALA:HB3	2.02	0.42
1:D:534:ILE:HA	1:D:537:VAL:HG22	2.00	0.42
1:C:185:GLU:HA	1:C:188:ARG:HG2	2.02	0.42
1:C:534:ILE:HA	1:C:537:VAL:HG22	2.00	0.42
1:D:484:LEU:HA	1:D:487:ARG:HG3	2.00	0.42
1:A:267:ALA:HA	1:A:270:ALA:HB3	2.02	0.42
1:A:309:ASP:OD1	1:A:310:PHE:N	2.50	0.42
1:D:669:LEU:HD13	1:D:672:MET:HE2	2.01	0.42
1:B:501:GLU:OE1	1:B:523:HIS:ND1	2.43	0.42
1:D:185:GLU:HA	1:D:188:ARG:HG2	2.02	0.42
1:A:669:LEU:HD13	1:A:672:MET:HE2	2.01	0.42
1:B:259:PHE:HD1	1:C:739:TRP:CH2	2.38	0.42
1:B:282:MET:HE2	1:B:327:ARG:HG3	2.00	0.42
1:C:360:ILE:HD12	1:C:363:ARG:HE	1.84	0.42
1:B:484:LEU:HA	1:B:487:ARG:HG3	2.00	0.41
1:C:123:ILE:HG13	1:C:138:LEU:HD12	2.02	0.41
1:A:123:ILE:HG13	1:A:138:LEU:HD12	2.02	0.41
1:B:360:ILE:HD12	1:B:363:ARG:HE	1.84	0.41
1:C:432:LYS:HG2	1:C:436:PHE:HE1	1.85	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:451:TYR:HE1	1:C:490:VAL:HG23	1.85	0.41
1:C:501:GLU:OE1	1:C:523:HIS:ND1	2.43	0.41
1:D:691:ILE:HD12	1:D:691:ILE:HA	1.92	0.41
1:D:720:LEU:HG	1:D:722:LYS:HE3	2.03	0.41
1:B:123:ILE:HG13	1:B:138:LEU:HD12	2.02	0.41
1:C:404:LEU:HD11	1:C:429:LEU:HD21	2.02	0.41
1:A:185:GLU:HA	1:A:188:ARG:HG2	2.02	0.41
1:D:123:ILE:HG13	1:D:138:LEU:HD12	2.02	0.41
1:B:166:ASP:OD1	1:B:166:ASP:N	2.53	0.41
1:D:360:ILE:HD12	1:D:363:ARG:HE	1.84	0.41
1:D:569:PHE:HB3	1:D:572:MET:HB3	2.03	0.41
1:B:432:LYS:HG2	1:B:436:PHE:HE1	1.85	0.41
1:C:484:LEU:HA	1:C:487:ARG:HG3	2.01	0.41
1:A:569:PHE:HB3	1:A:572:MET:HB3	2.03	0.41
1:B:720:LEU:HG	1:B:722:LYS:HE3	2.03	0.41
1:A:674:ILE:HG12	1:D:671:ASN:HD22	1.86	0.41
1:B:451:TYR:HE1	1:B:490:VAL:HG23	1.86	0.41
1:A:123:ILE:HG13	1:A:138:LEU:CD1	2.51	0.41
1:A:172:LEU:O	1:A:176:LEU:HG	2.21	0.41
1:B:185:GLU:HA	1:B:188:ARG:HG2	2.02	0.41
1:C:289:ILE:H	1:C:289:ILE:HG13	1.65	0.41
1:C:569:PHE:HB3	1:C:572:MET:HB3	2.03	0.41
1:C:617:LYS:HA	1:C:617:LYS:HD2	1.84	0.41
1:C:720:LEU:HG	1:C:722:LYS:HE3	2.02	0.41
1:D:404:LEU:HD11	1:D:429:LEU:HD21	2.02	0.41
1:A:404:LEU:HD11	1:A:429:LEU:HD21	2.02	0.41
1:B:302:ALA:O	1:B:306:VAL:HG12	2.21	0.41
1:D:65:SER:HG	1:D:66:LYS:H	1.63	0.41
1:D:123:ILE:HG13	1:D:138:LEU:CD1	2.51	0.41
1:D:432:LYS:HG2	1:D:436:PHE:HE1	1.85	0.41
1:A:451:TYR:HE1	1:A:490:VAL:HG23	1.86	0.40
1:D:332:GLU:HA	1:D:335:THR:HG22	2.03	0.40
1:A:302:ALA:O	1:A:306:VAL:HG12	2.21	0.40
1:B:332:GLU:HA	1:B:335:THR:HG22	2.03	0.40
1:B:569:PHE:HB3	1:B:572:MET:HB3	2.03	0.40
1:C:123:ILE:HG13	1:C:138:LEU:CD1	2.51	0.40
1:C:172:LEU:O	1:C:176:LEU:HG	2.21	0.40
1:A:535:LEU:HD23	1:A:535:LEU:HA	1.90	0.40
1:A:720:LEU:HG	1:A:722:LYS:HE3	2.02	0.40
1:B:123:ILE:HG13	1:B:138:LEU:CD1	2.51	0.40
1:D:282:MET:HE2	1:D:327:ARG:HG3	2.00	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:515:SER:OG	1:D:518:SER:OG	2.37	0.40
1:B:404:LEU:HD11	1:B:429:LEU:HD21	2.02	0.40
1:B:172:LEU:O	1:B:176:LEU:HG	2.21	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

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

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	609/799 (76%)	562 (92%)	47 (8%)	0	100	100
1	B	609/799 (76%)	561 (92%)	48 (8%)	0	100	100
1	C	609/799 (76%)	563 (92%)	46 (8%)	0	100	100
1	D	609/799 (76%)	562 (92%)	47 (8%)	0	100	100
All	All	2436/3196 (76%)	2248 (92%)	188 (8%)	0	100	100

There are no Ramachandran outliers to report.

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

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	547/712 (77%)	544 (100%)	3 (0%)	86	93
1	B	547/712 (77%)	544 (100%)	3 (0%)	86	93

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	C	547/712 (77%)	544 (100%)	3 (0%)	86	93
1	D	547/712 (77%)	544 (100%)	3 (0%)	86	93
All	All	2188/2848 (77%)	2176 (100%)	12 (0%)	85	93

All (12) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	138	LEU
1	A	149	ARG
1	A	664	LEU
1	B	138	LEU
1	B	149	ARG
1	B	664	LEU
1	C	138	LEU
1	C	149	ARG
1	C	664	LEU
1	D	138	LEU
1	D	149	ARG
1	D	664	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (30) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	143	GLN
1	A	216	GLN
1	A	227	GLN
1	A	298	ASN
1	A	426	HIS
1	A	430	HIS
1	A	643	ASN
1	A	646	GLN
1	B	143	GLN
1	B	227	GLN
1	B	298	ASN
1	B	426	HIS
1	B	430	HIS
1	B	643	ASN
1	C	143	GLN
1	C	216	GLN
1	C	227	GLN

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Mol	Chain	Res	Type
1	C	298	ASN
1	C	426	HIS
1	C	430	HIS
1	C	643	ASN
1	C	646	GLN
1	D	143	GLN
1	D	216	GLN
1	D	227	GLN
1	D	298	ASN
1	D	426	HIS
1	D	430	HIS
1	D	643	ASN
1	D	646	GLN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

### 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

### 5.6 Ligand geometry [i](#)

24 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	$\# Z  > 2$
2	POV	D	802	-	43,43,51	0.53	0	49,51,59	0.48	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	POV	D	801	-	35,35,51	0.59	0	41,43,59	0.51	0
3	A1EBV	D	806	-	10,10,10	0.93	0	9,11,11	1.55	2 (22%)
2	POV	C	805	-	35,35,51	0.59	0	41,43,59	0.51	0
2	POV	C	801	-	35,35,51	0.58	0	41,43,59	0.52	0
2	POV	C	804	-	31,31,51	0.61	0	37,39,59	0.55	0
3	A1EBV	C	806	-	10,10,10	0.93	0	9,11,11	1.55	2 (22%)
2	POV	C	803	-	31,31,51	0.61	0	37,39,59	0.52	0
2	POV	D	803	-	31,31,51	0.61	0	37,39,59	0.53	0
2	POV	A	806	-	35,35,51	0.59	0	41,43,59	0.52	0
2	POV	C	802	-	43,43,51	0.53	0	49,51,59	0.48	0
2	POV	B	804	-	31,31,51	0.61	0	37,39,59	0.55	0
2	POV	A	803	-	31,31,51	0.61	0	37,39,59	0.55	0
2	POV	D	804	-	31,31,51	0.61	0	37,39,59	0.55	0
2	POV	D	805	-	35,35,51	0.58	0	41,43,59	0.51	0
2	POV	A	802	-	31,31,51	0.61	0	37,39,59	0.53	0
2	POV	B	805	-	35,35,51	0.59	0	41,43,59	0.51	0
3	A1EBV	B	806	-	10,10,10	0.93	0	9,11,11	1.54	2 (22%)
2	POV	B	803	-	31,31,51	0.61	0	37,39,59	0.53	0
2	POV	A	801	-	43,43,51	0.53	0	49,51,59	0.48	0
2	POV	A	804	-	35,35,51	0.59	0	41,43,59	0.51	0
2	POV	B	802	-	43,43,51	0.53	0	49,51,59	0.48	0
3	A1EBV	A	805	-	10,10,10	0.93	0	9,11,11	1.54	2 (22%)
2	POV	B	801	-	35,35,51	0.59	0	41,43,59	0.52	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	POV	D	802	-	-	13/47/47/55	-
2	POV	D	801	-	-	6/39/39/55	-
3	A1EBV	D	806	-	-	6/9/9/9	-
2	POV	C	805	-	-	8/39/39/55	-
2	POV	C	801	-	-	6/39/39/55	-
2	POV	C	804	-	-	11/35/35/55	-
3	A1EBV	C	806	-	-	6/9/9/9	-
2	POV	C	803	-	-	6/35/35/55	-
2	POV	D	803	-	-	6/35/35/55	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	POV	A	806	-	-	6/39/39/55	-
2	POV	C	802	-	-	13/47/47/55	-
2	POV	B	804	-	-	12/35/35/55	-
2	POV	A	803	-	-	12/35/35/55	-
2	POV	D	804	-	-	12/35/35/55	-
2	POV	D	805	-	-	8/39/39/55	-
2	POV	A	802	-	-	6/35/35/55	-
2	POV	B	805	-	-	8/39/39/55	-
3	A1EBV	B	806	-	-	6/9/9/9	-
2	POV	B	803	-	-	6/35/35/55	-
2	POV	A	801	-	-	13/47/47/55	-
2	POV	A	804	-	-	8/39/39/55	-
2	POV	B	802	-	-	13/47/47/55	-
3	A1EBV	A	805	-	-	6/9/9/9	-
2	POV	B	801	-	-	6/39/39/55	-

There are no bond length outliers.

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	806	A1EBV	C04-C07-C08	-2.53	119.09	127.75
3	A	805	A1EBV	C04-C07-C08	-2.53	119.10	127.75
3	B	806	A1EBV	C04-C07-C08	-2.52	119.13	127.75
3	C	806	A1EBV	C04-C07-C08	-2.52	119.13	127.75
3	D	806	A1EBV	C11-C08-C10	2.50	120.12	114.60
3	C	806	A1EBV	C11-C08-C10	2.48	120.09	114.60
3	A	805	A1EBV	C11-C08-C10	2.48	120.08	114.60
3	B	806	A1EBV	C11-C08-C10	2.48	120.08	114.60

There are no chirality outliers.

All (203) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	801	POV	C11-O12-P-O14
2	A	801	POV	O11-C1-C2-O21
2	A	801	POV	O12-C11-C12-N
2	A	803	POV	C1-O11-P-O13
2	A	803	POV	C2-C1-O11-P

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Mol	Chain	Res	Type	Atoms
2	A	806	POV	O12-C11-C12-N
2	B	801	POV	O12-C11-C12-N
2	B	802	POV	C11-O12-P-O14
2	B	802	POV	O11-C1-C2-O21
2	B	802	POV	O12-C11-C12-N
2	B	804	POV	C1-O11-P-O13
2	B	804	POV	C2-C1-O11-P
2	C	801	POV	O12-C11-C12-N
2	C	802	POV	C11-O12-P-O14
2	C	802	POV	O11-C1-C2-O21
2	C	802	POV	O12-C11-C12-N
2	C	804	POV	C1-O11-P-O13
2	C	804	POV	C2-C1-O11-P
2	D	801	POV	O12-C11-C12-N
2	D	802	POV	C11-O12-P-O14
2	D	802	POV	O11-C1-C2-O21
2	D	802	POV	O12-C11-C12-N
2	D	804	POV	C1-O11-P-O13
2	D	804	POV	C2-C1-O11-P
3	A	805	A1EBV	C03-C02-C05-C09
3	A	805	A1EBV	C02-C05-C09-O01
3	B	806	A1EBV	C03-C02-C05-C09
3	B	806	A1EBV	C02-C05-C09-O01
3	C	806	A1EBV	C03-C02-C05-C09
3	C	806	A1EBV	C02-C05-C09-O01
3	D	806	A1EBV	C03-C02-C05-C09
3	D	806	A1EBV	C02-C05-C09-O01
2	A	806	POV	C22-C21-O21-C2
2	B	801	POV	C22-C21-O21-C2
2	C	801	POV	C22-C21-O21-C2
2	D	801	POV	C22-C21-O21-C2
2	A	802	POV	C11-O12-P-O11
2	A	803	POV	C1-O11-P-O12
2	B	803	POV	C11-O12-P-O11
2	B	804	POV	C1-O11-P-O12
2	C	803	POV	C11-O12-P-O11
2	C	804	POV	C1-O11-P-O12
2	D	803	POV	C11-O12-P-O11
2	D	804	POV	C1-O11-P-O12
2	A	806	POV	O22-C21-O21-C2
2	B	801	POV	O22-C21-O21-C2
2	C	801	POV	O22-C21-O21-C2

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Mol	Chain	Res	Type	Atoms
2	D	801	POV	O22-C21-O21-C2
2	A	801	POV	C210-C211-C212-C213
2	B	802	POV	C210-C211-C212-C213
2	C	802	POV	C210-C211-C212-C213
2	D	802	POV	C210-C211-C212-C213
2	A	803	POV	C22-C21-O21-C2
2	A	804	POV	C22-C21-O21-C2
2	B	804	POV	C22-C21-O21-C2
2	B	805	POV	C22-C21-O21-C2
2	C	804	POV	C22-C21-O21-C2
2	C	805	POV	C22-C21-O21-C2
2	D	804	POV	C22-C21-O21-C2
2	D	805	POV	C22-C21-O21-C2
2	A	801	POV	C23-C24-C25-C26
2	B	802	POV	C23-C24-C25-C26
2	C	802	POV	C23-C24-C25-C26
2	D	802	POV	C23-C24-C25-C26
2	A	803	POV	O22-C21-O21-C2
2	B	804	POV	O22-C21-O21-C2
2	C	804	POV	O22-C21-O21-C2
2	D	804	POV	O22-C21-O21-C2
2	A	801	POV	C11-O12-P-O11
2	B	802	POV	C11-O12-P-O11
2	C	802	POV	C11-O12-P-O11
2	D	802	POV	C11-O12-P-O11
2	A	803	POV	O11-C1-C2-C3
2	A	804	POV	O11-C1-C2-C3
2	B	804	POV	O11-C1-C2-C3
2	B	805	POV	O11-C1-C2-C3
2	C	804	POV	O11-C1-C2-C3
2	C	805	POV	O11-C1-C2-C3
2	D	804	POV	O11-C1-C2-C3
2	D	805	POV	O11-C1-C2-C3
2	A	804	POV	O22-C21-O21-C2
2	B	805	POV	O22-C21-O21-C2
2	C	805	POV	O22-C21-O21-C2
2	D	805	POV	O22-C21-O21-C2
2	A	806	POV	C1-C2-C3-O31
2	B	801	POV	C1-C2-C3-O31
2	C	801	POV	C1-C2-C3-O31
2	D	801	POV	C1-C2-C3-O31
2	A	801	POV	C211-C212-C213-C214

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Mol	Chain	Res	Type	Atoms
2	B	802	POV	C211-C212-C213-C214
2	C	802	POV	C211-C212-C213-C214
2	D	802	POV	C211-C212-C213-C214
2	A	803	POV	O11-C1-C2-O21
2	A	804	POV	O11-C1-C2-O21
2	B	804	POV	O11-C1-C2-O21
2	B	805	POV	O11-C1-C2-O21
2	C	804	POV	O11-C1-C2-O21
2	C	805	POV	O11-C1-C2-O21
2	D	804	POV	O11-C1-C2-O21
2	D	805	POV	O11-C1-C2-O21
2	A	801	POV	O11-C1-C2-C3
2	B	802	POV	O11-C1-C2-C3
2	C	802	POV	O11-C1-C2-C3
2	D	802	POV	O11-C1-C2-C3
3	A	805	A1EBV	C02-C03-C04-C07
3	B	806	A1EBV	C02-C03-C04-C07
3	C	806	A1EBV	C02-C03-C04-C07
3	D	806	A1EBV	C02-C03-C04-C07
2	A	802	POV	O11-C1-C2-O21
2	B	803	POV	O11-C1-C2-O21
2	C	803	POV	O11-C1-C2-O21
2	D	803	POV	O11-C1-C2-O21
2	A	803	POV	C11-O12-P-O11
2	B	804	POV	C11-O12-P-O11
2	C	804	POV	C11-O12-P-O11
2	D	804	POV	C11-O12-P-O11
2	A	802	POV	C11-O12-P-O14
2	A	803	POV	C11-O12-P-O13
2	B	803	POV	C11-O12-P-O14
2	B	804	POV	C11-O12-P-O13
2	C	803	POV	C11-O12-P-O14
2	C	804	POV	C11-O12-P-O13
2	D	803	POV	C11-O12-P-O14
2	D	804	POV	C11-O12-P-O13
3	A	805	A1EBV	C06-C02-C05-C09
3	B	806	A1EBV	C06-C02-C05-C09
3	C	806	A1EBV	C06-C02-C05-C09
3	D	806	A1EBV	C06-C02-C05-C09
3	A	805	A1EBV	C05-C02-C03-C04
3	B	806	A1EBV	C05-C02-C03-C04
3	C	806	A1EBV	C05-C02-C03-C04

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Mol	Chain	Res	Type	Atoms
3	D	806	A1EBV	C05-C02-C03-C04
2	A	802	POV	O12-C11-C12-N
2	B	803	POV	O12-C11-C12-N
2	C	803	POV	O12-C11-C12-N
2	D	803	POV	O12-C11-C12-N
2	A	806	POV	O21-C2-C3-O31
2	B	801	POV	O21-C2-C3-O31
2	C	801	POV	O21-C2-C3-O31
2	D	801	POV	O21-C2-C3-O31
2	C	802	POV	C213-C214-C215-C216
2	A	801	POV	C213-C214-C215-C216
2	B	802	POV	C213-C214-C215-C216
2	D	802	POV	C213-C214-C215-C216
2	C	802	POV	C25-C26-C27-C28
2	A	801	POV	C25-C26-C27-C28
2	B	802	POV	C25-C26-C27-C28
2	D	802	POV	C25-C26-C27-C28
3	A	805	A1EBV	C06-C02-C03-C04
3	B	806	A1EBV	C06-C02-C03-C04
3	C	806	A1EBV	C06-C02-C03-C04
3	D	806	A1EBV	C06-C02-C03-C04
2	A	804	POV	C11-O12-P-O11
2	A	806	POV	C11-O12-P-O11
2	B	801	POV	C11-O12-P-O11
2	B	805	POV	C11-O12-P-O11
2	C	801	POV	C11-O12-P-O11
2	C	805	POV	C11-O12-P-O11
2	D	801	POV	C11-O12-P-O11
2	D	805	POV	C11-O12-P-O11
2	B	805	POV	C32-C33-C34-C35
2	C	805	POV	C32-C33-C34-C35
2	A	804	POV	C32-C33-C34-C35
2	D	805	POV	C32-C33-C34-C35
2	B	802	POV	C31-C32-C33-C34
2	C	802	POV	C31-C32-C33-C34
2	A	801	POV	C31-C32-C33-C34
2	D	802	POV	C31-C32-C33-C34
2	A	801	POV	C1-C2-C3-O31
2	A	802	POV	C1-C2-C3-O31
2	A	804	POV	C1-C2-C3-O31
2	B	802	POV	C1-C2-C3-O31
2	B	803	POV	C1-C2-C3-O31

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Mol	Chain	Res	Type	Atoms
2	B	805	POV	C1-C2-C3-O31
2	C	802	POV	C1-C2-C3-O31
2	C	803	POV	C1-C2-C3-O31
2	C	805	POV	C1-C2-C3-O31
2	D	802	POV	C1-C2-C3-O31
2	D	803	POV	C1-C2-C3-O31
2	D	805	POV	C1-C2-C3-O31
2	A	802	POV	O11-C1-C2-C3
2	B	803	POV	O11-C1-C2-C3
2	C	803	POV	O11-C1-C2-C3
2	D	803	POV	O11-C1-C2-C3
2	A	803	POV	O31-C31-C32-C33
2	B	804	POV	O31-C31-C32-C33
2	C	804	POV	O31-C31-C32-C33
2	D	804	POV	O31-C31-C32-C33
2	A	803	POV	C11-C12-N-C14
2	B	804	POV	C11-C12-N-C14
2	C	804	POV	C11-C12-N-C14
2	D	804	POV	C11-C12-N-C14
2	A	804	POV	C12-C11-O12-P
2	B	805	POV	C12-C11-O12-P
2	C	805	POV	C12-C11-O12-P
2	D	805	POV	C12-C11-O12-P
2	A	801	POV	C22-C23-C24-C25
2	B	802	POV	C22-C23-C24-C25
2	D	802	POV	C22-C23-C24-C25
2	C	802	POV	C22-C23-C24-C25
2	A	803	POV	C11-C12-N-C15
2	B	804	POV	C11-C12-N-C15
2	D	804	POV	C11-C12-N-C15

There are no ring outliers.

12 monomers are involved in 24 short contacts:

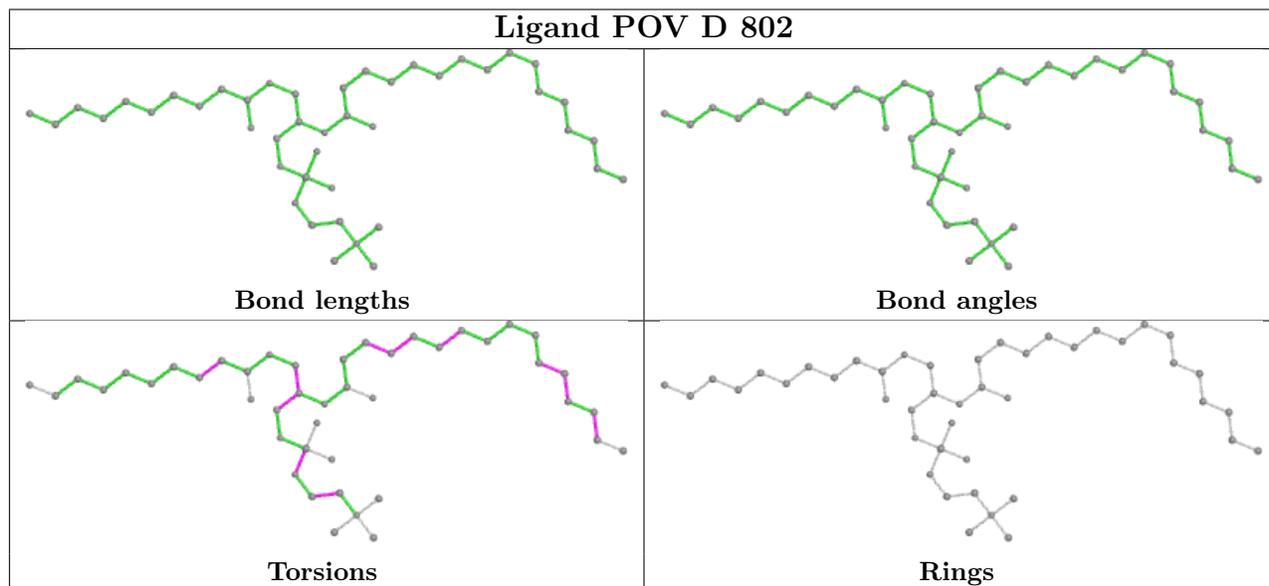
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	802	POV	2	0
2	D	801	POV	2	0
2	C	801	POV	2	0
2	C	804	POV	2	0
2	A	806	POV	2	0
2	C	802	POV	2	0
2	B	804	POV	2	0

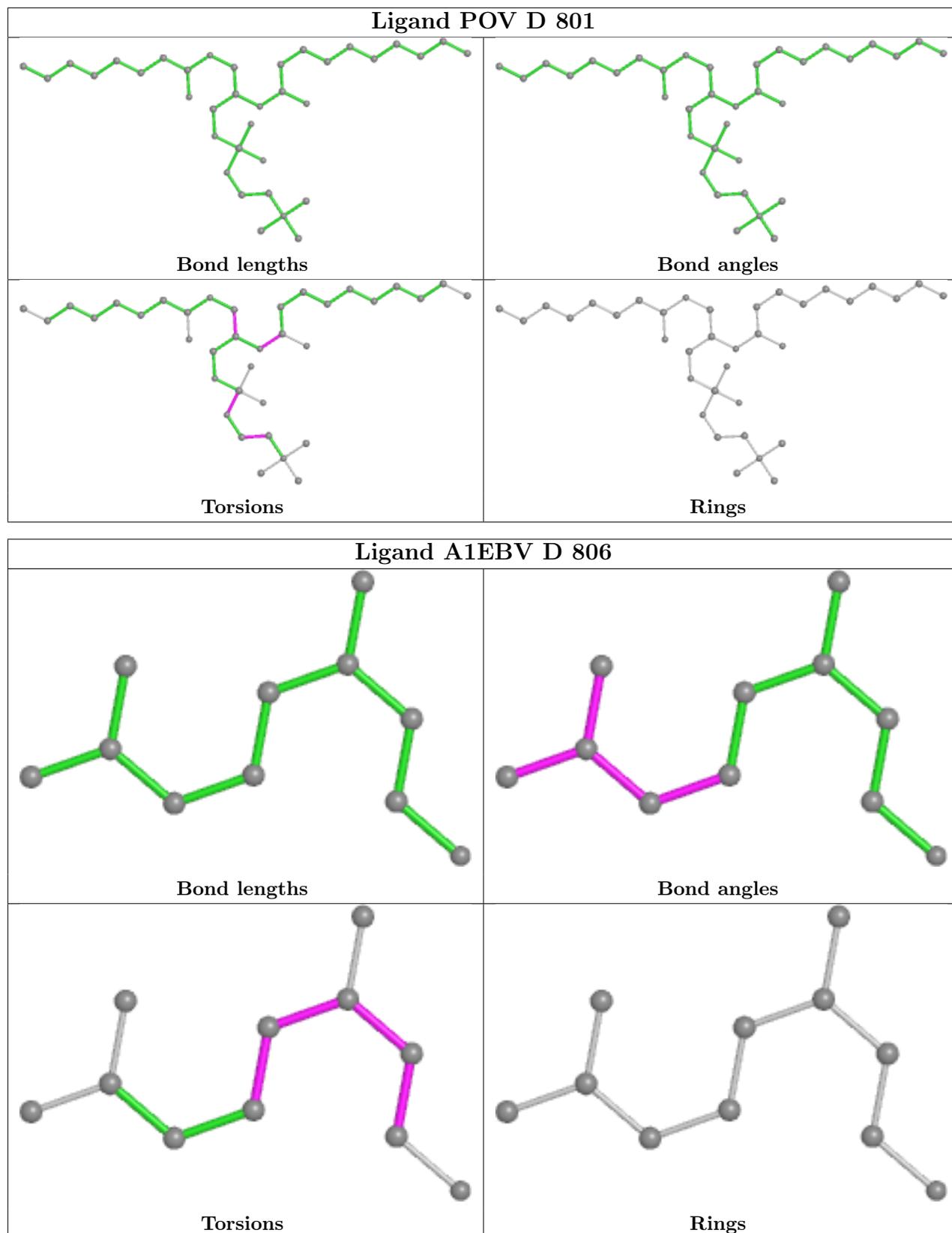
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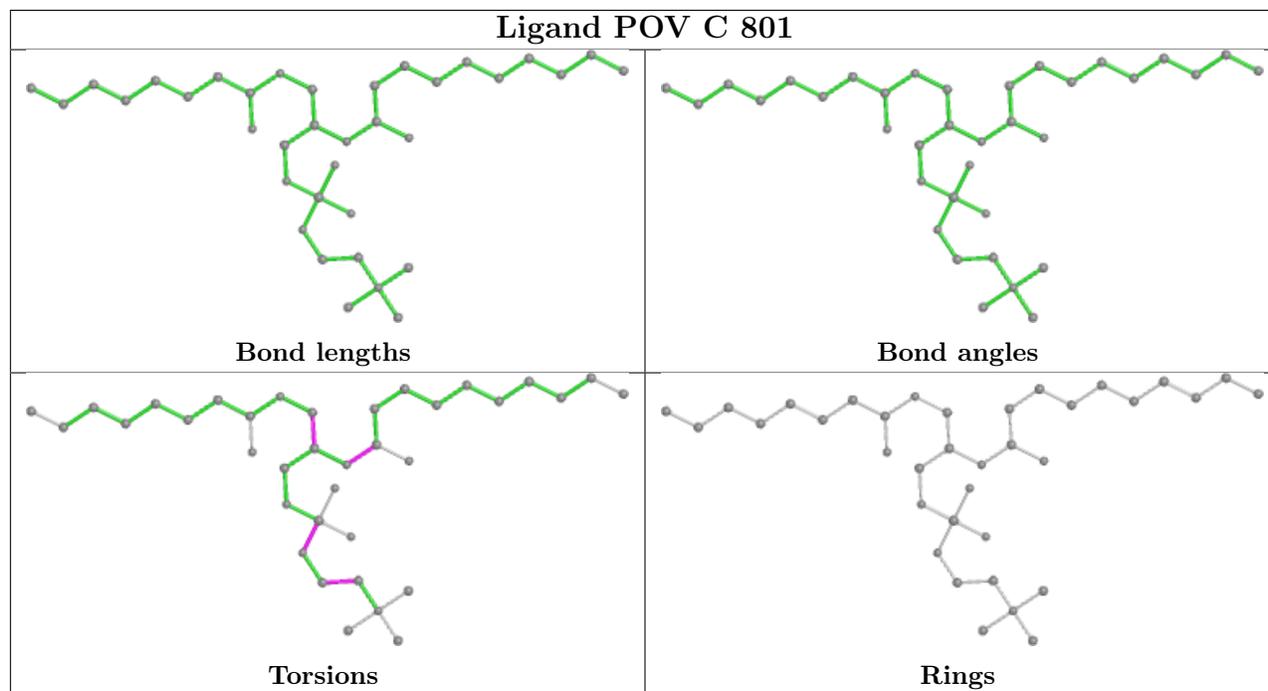
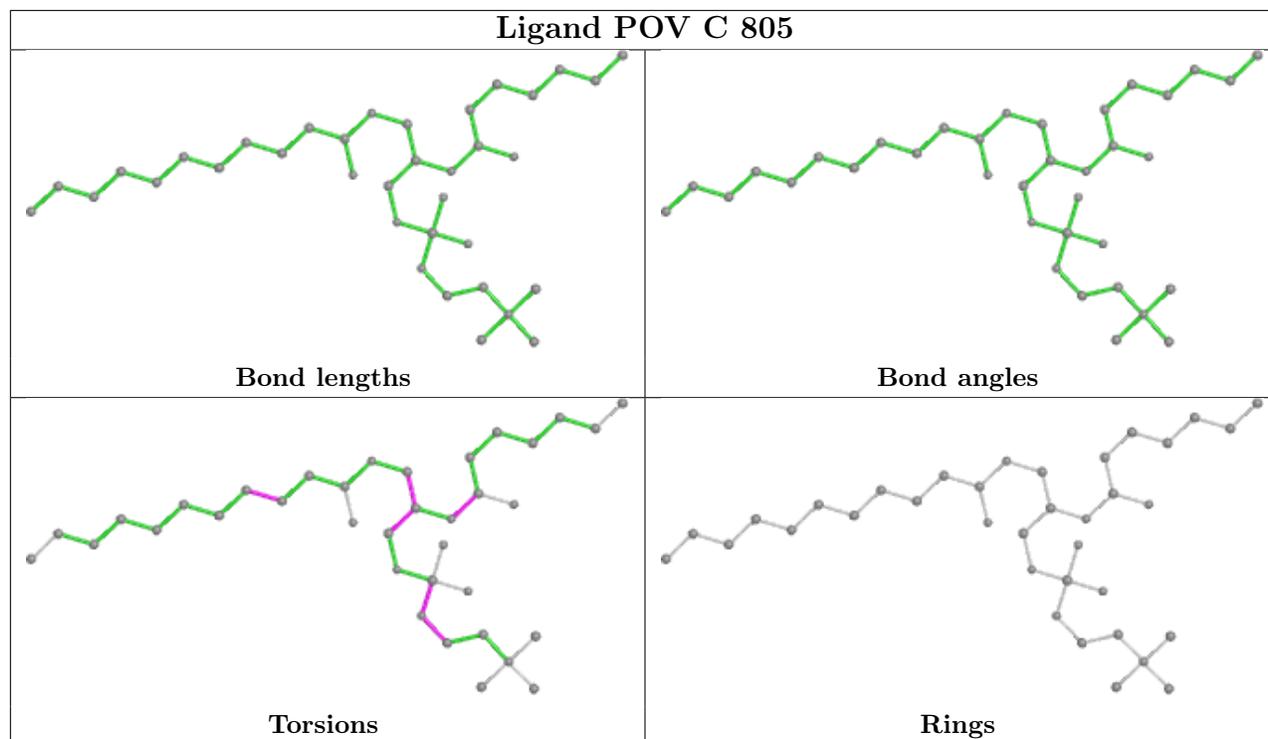
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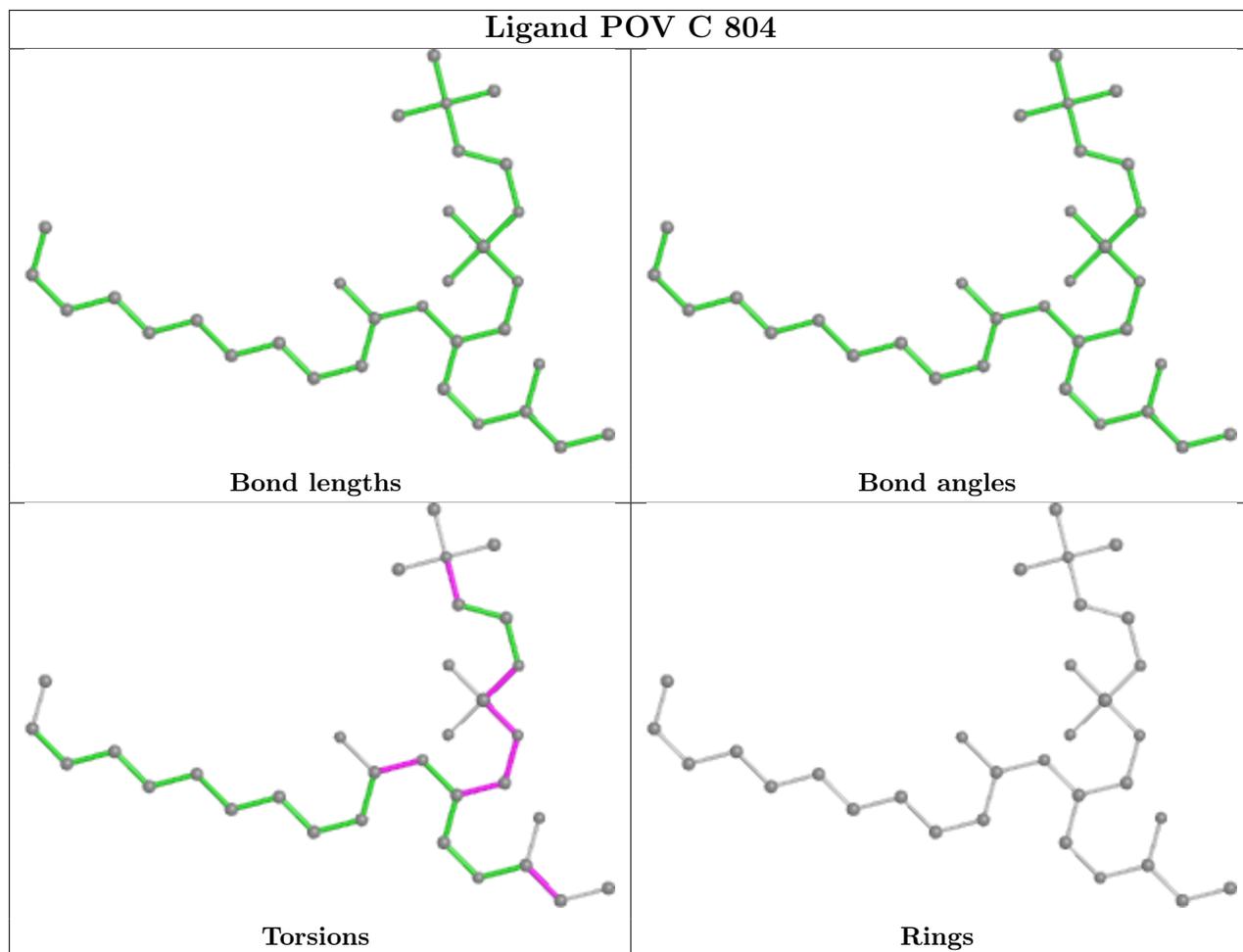
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	803	POV	2	0
2	D	804	POV	2	0
2	A	801	POV	2	0
2	B	802	POV	2	0
2	B	801	POV	2	0

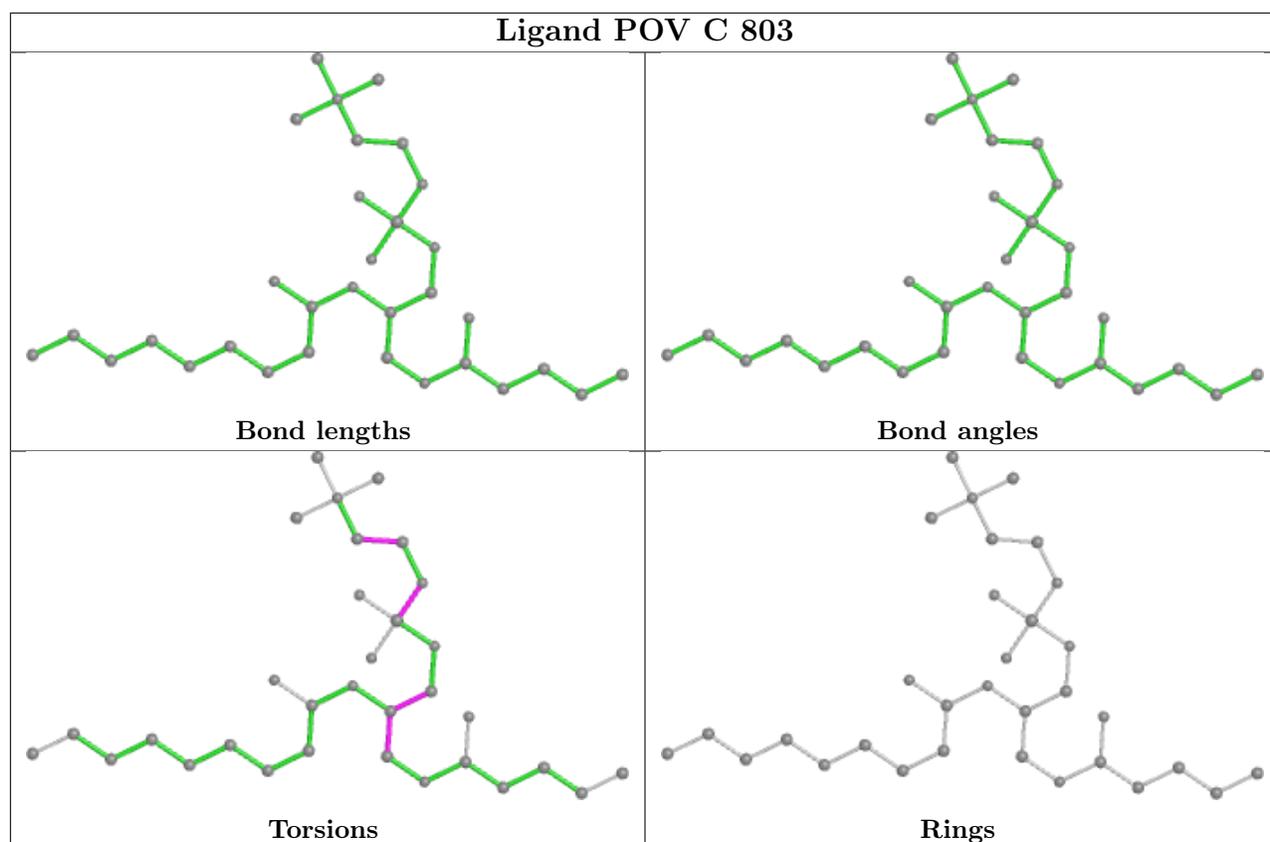
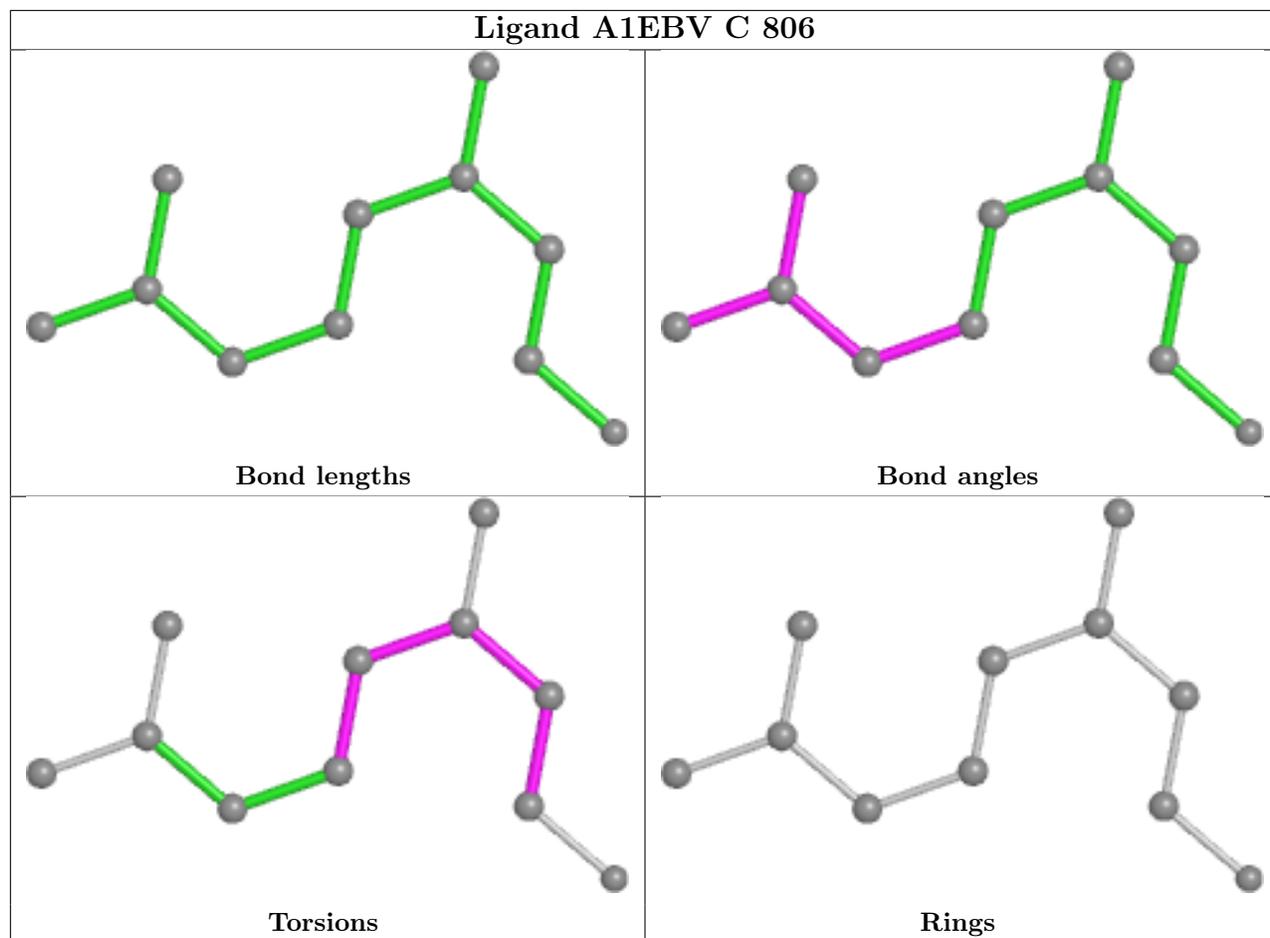
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

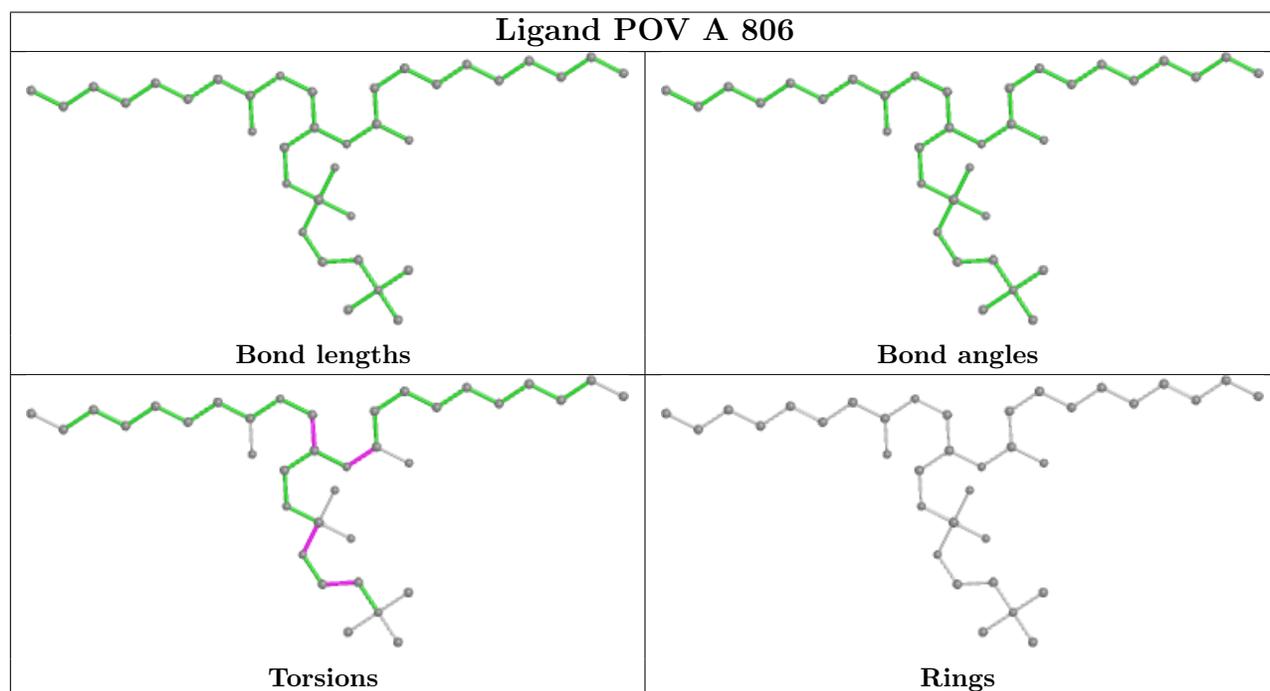
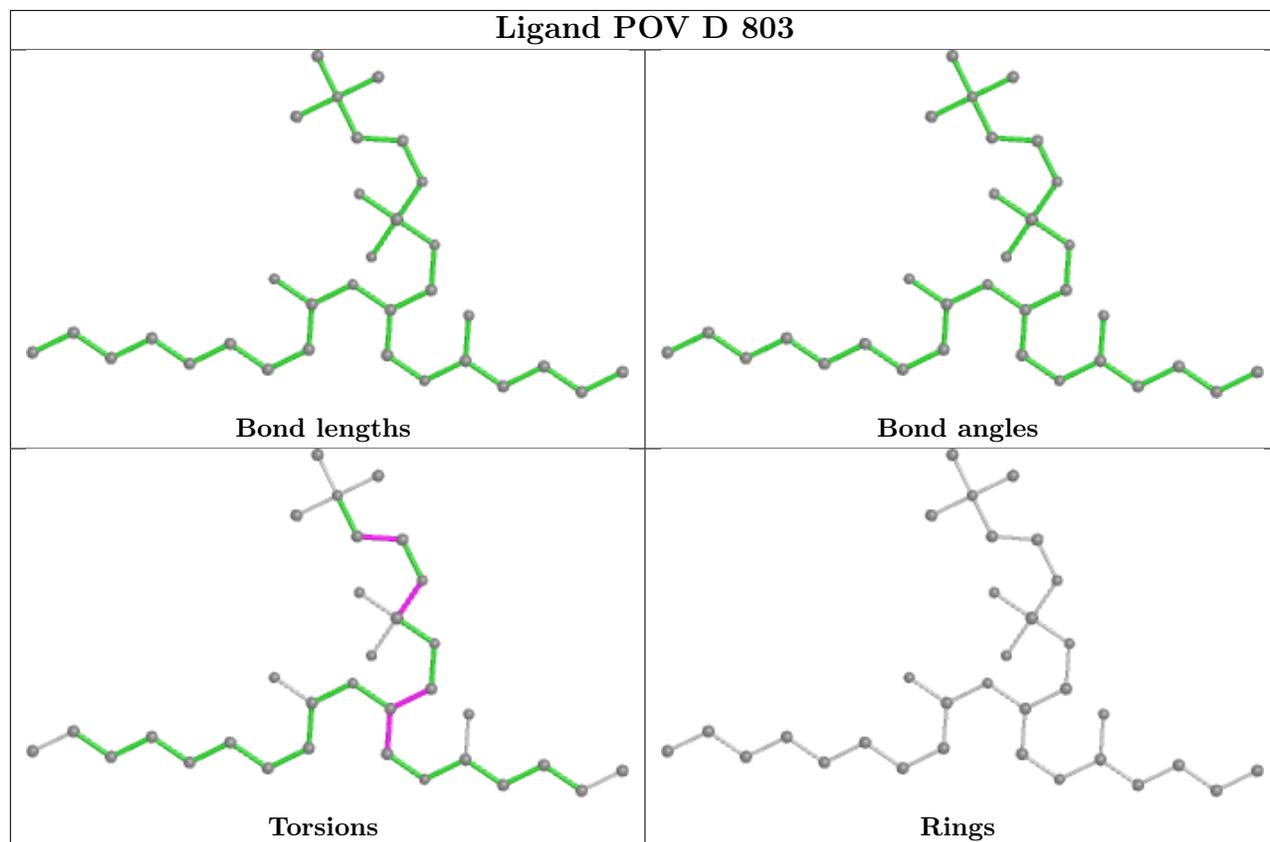


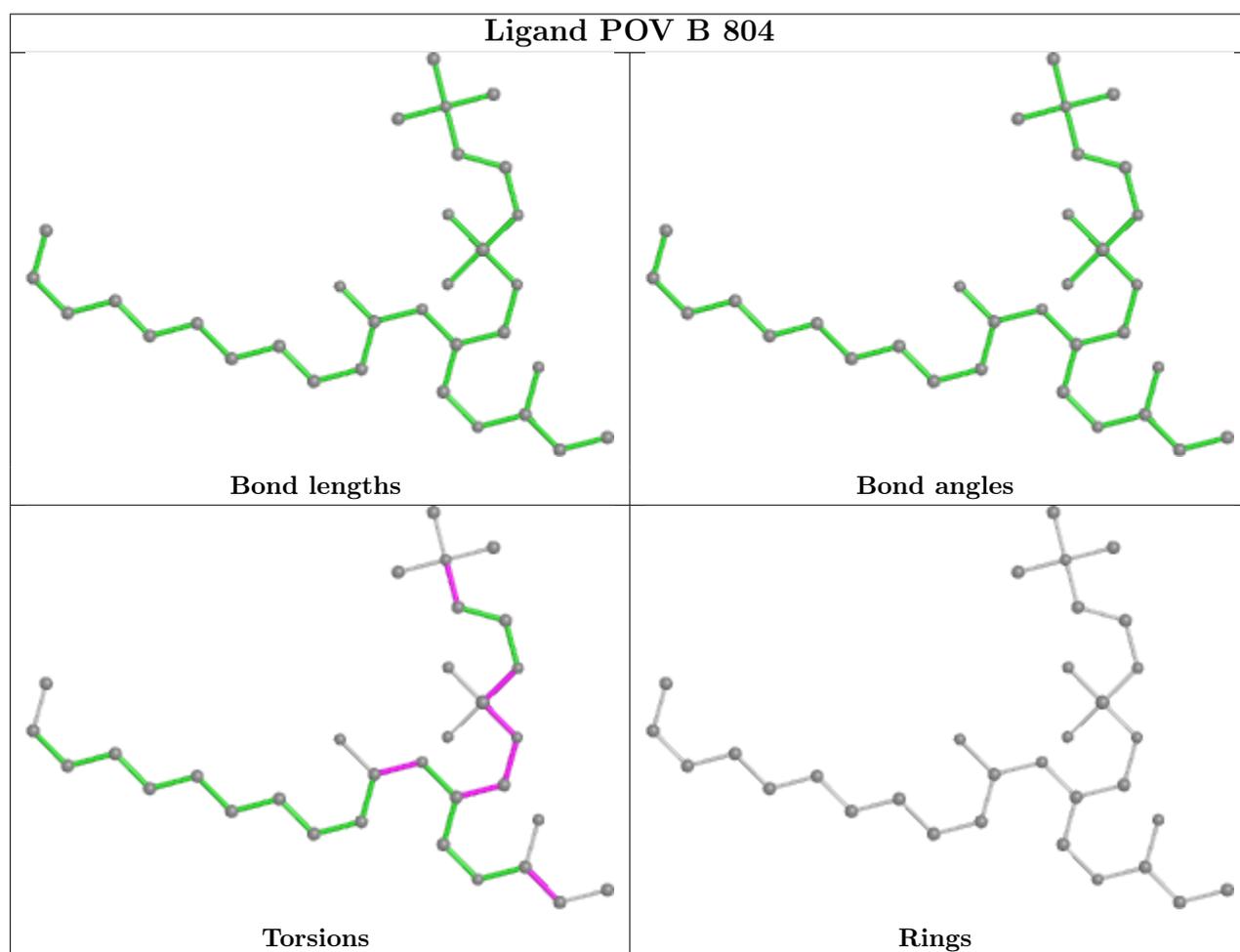
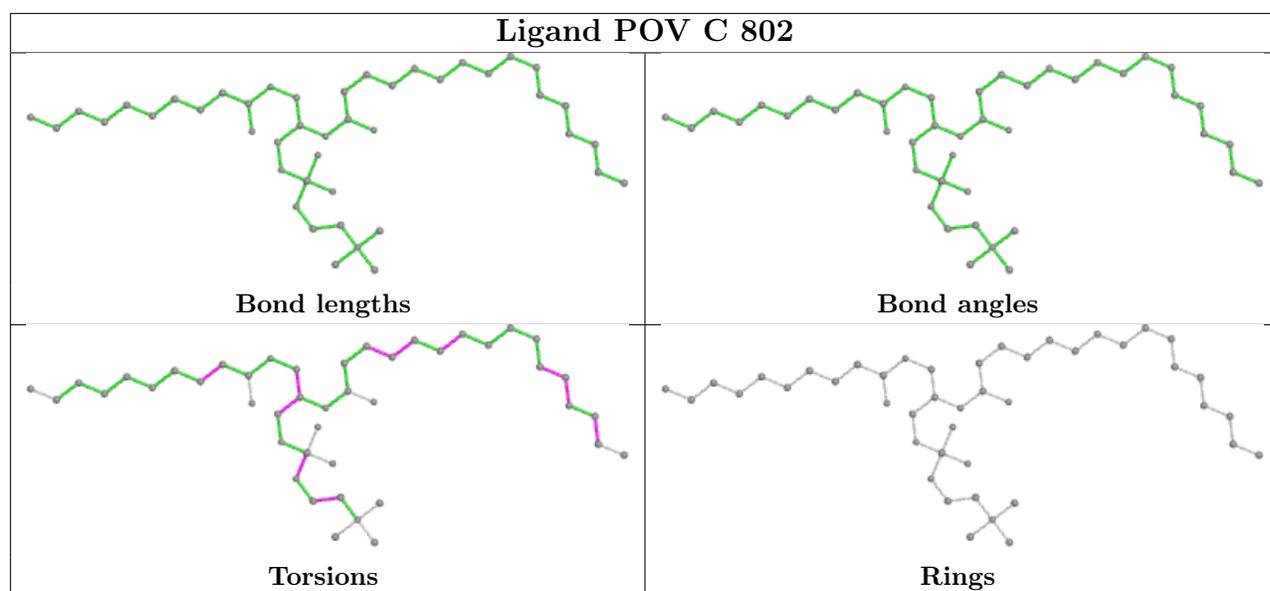


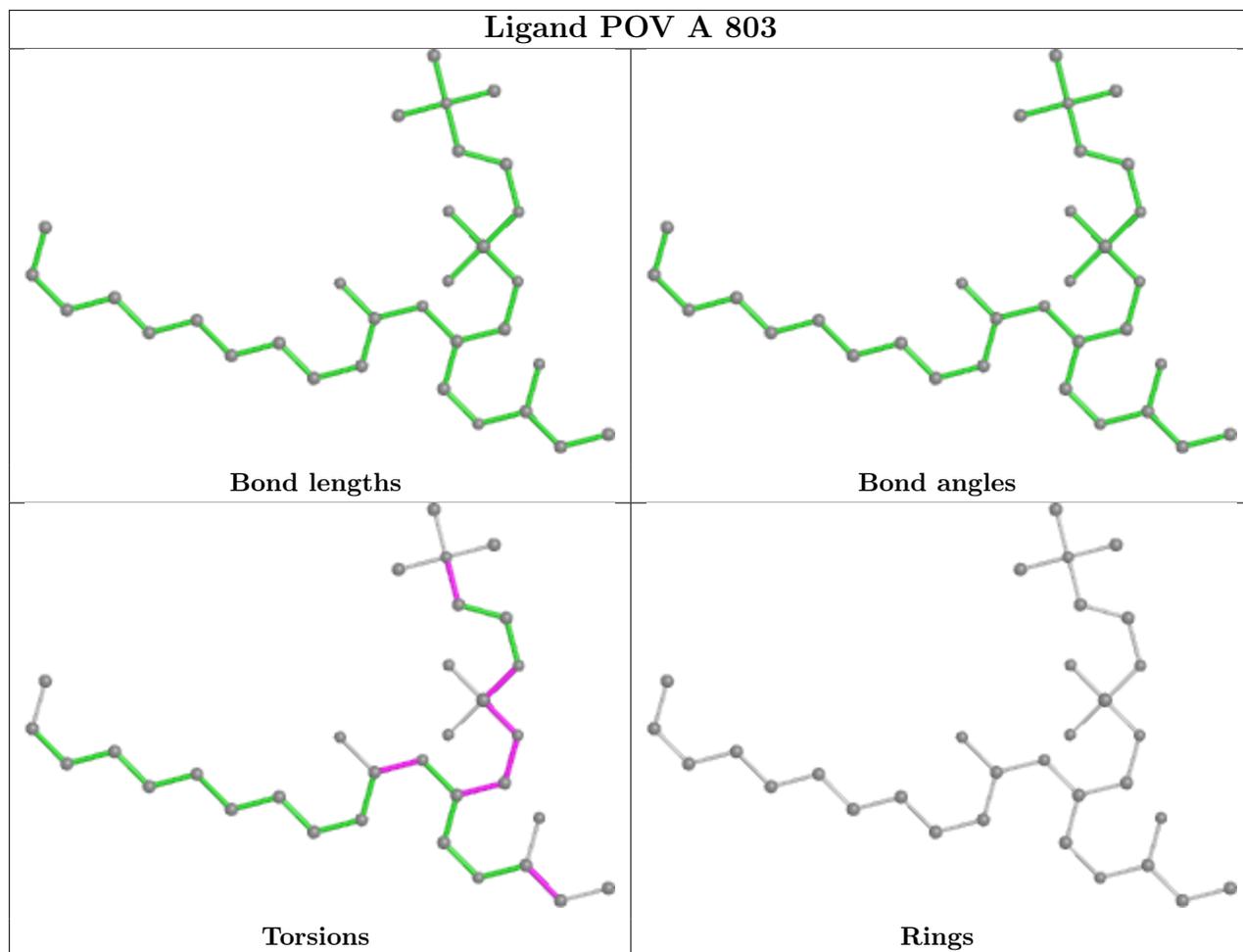


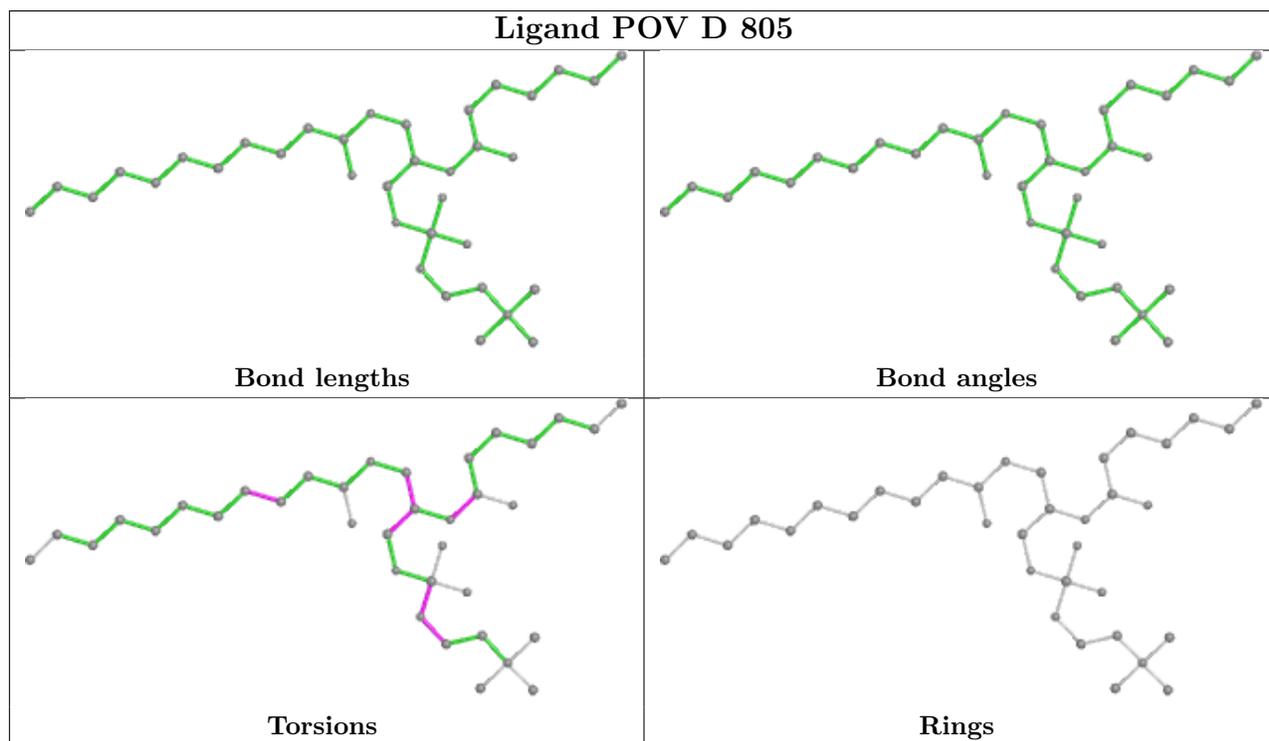
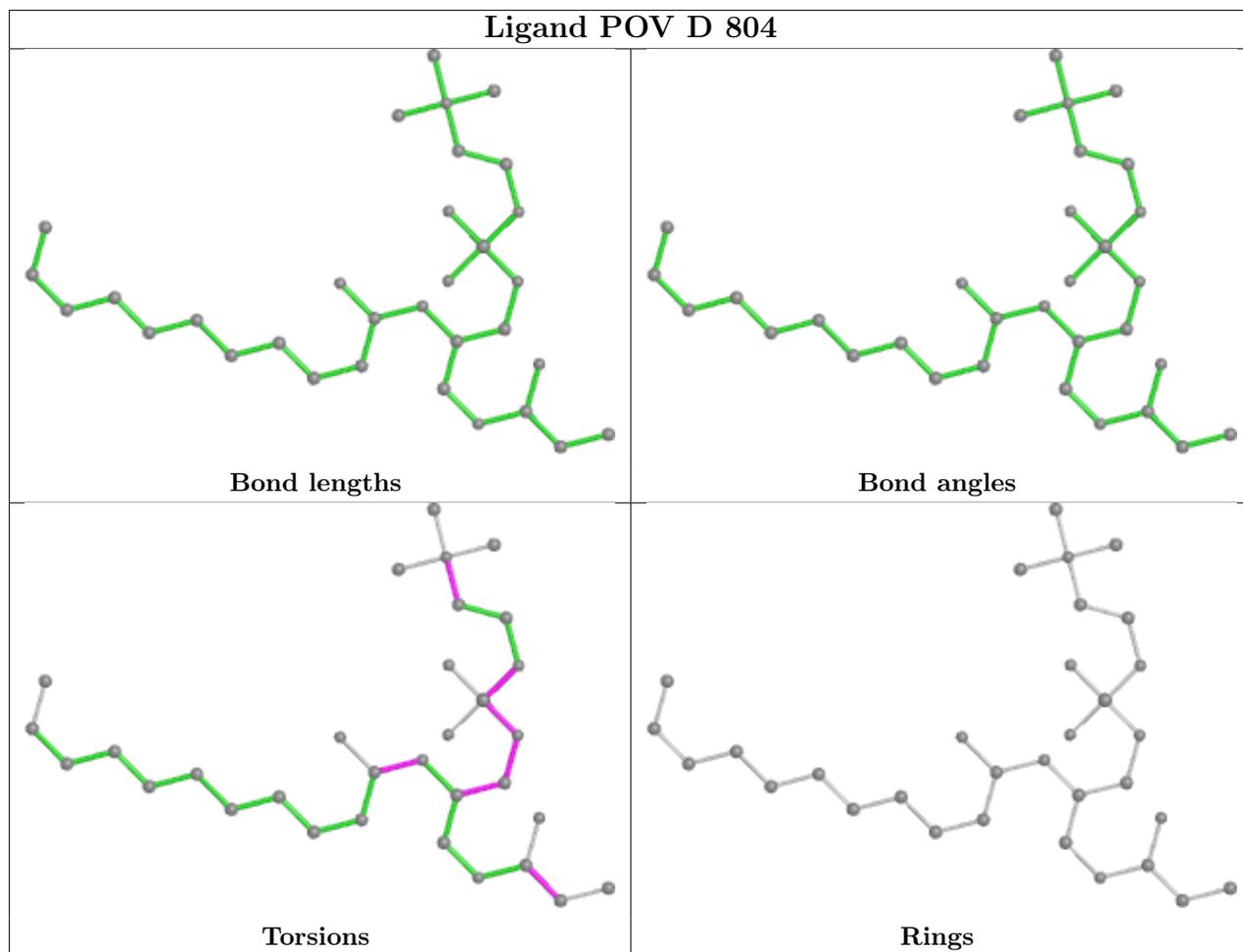


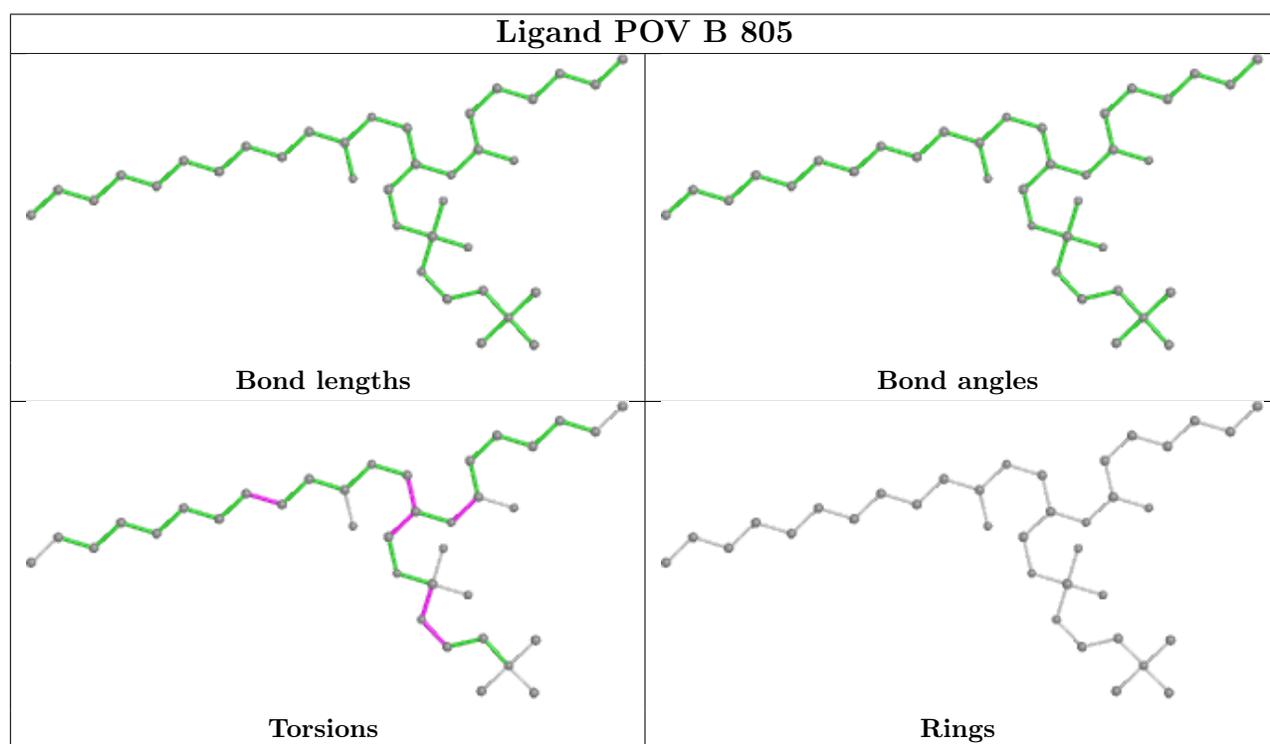
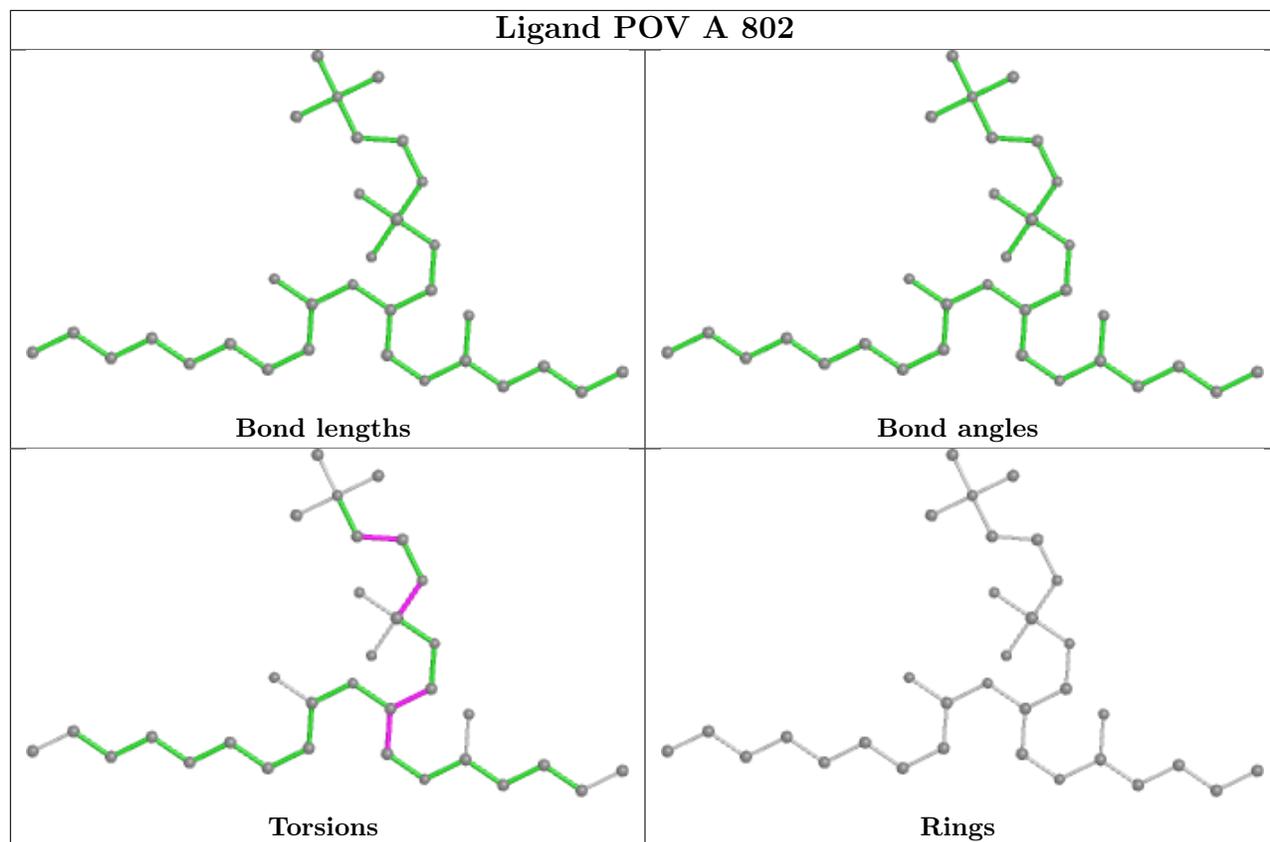


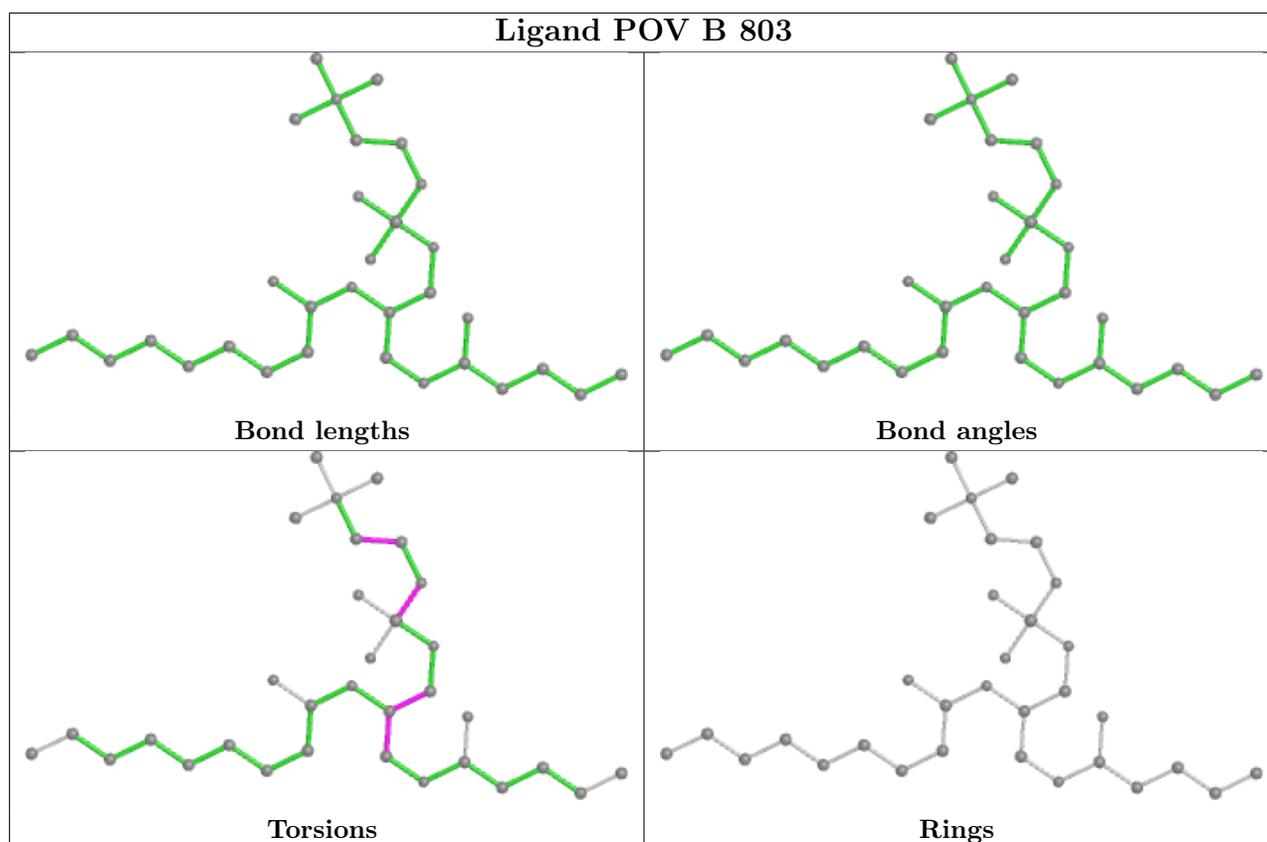
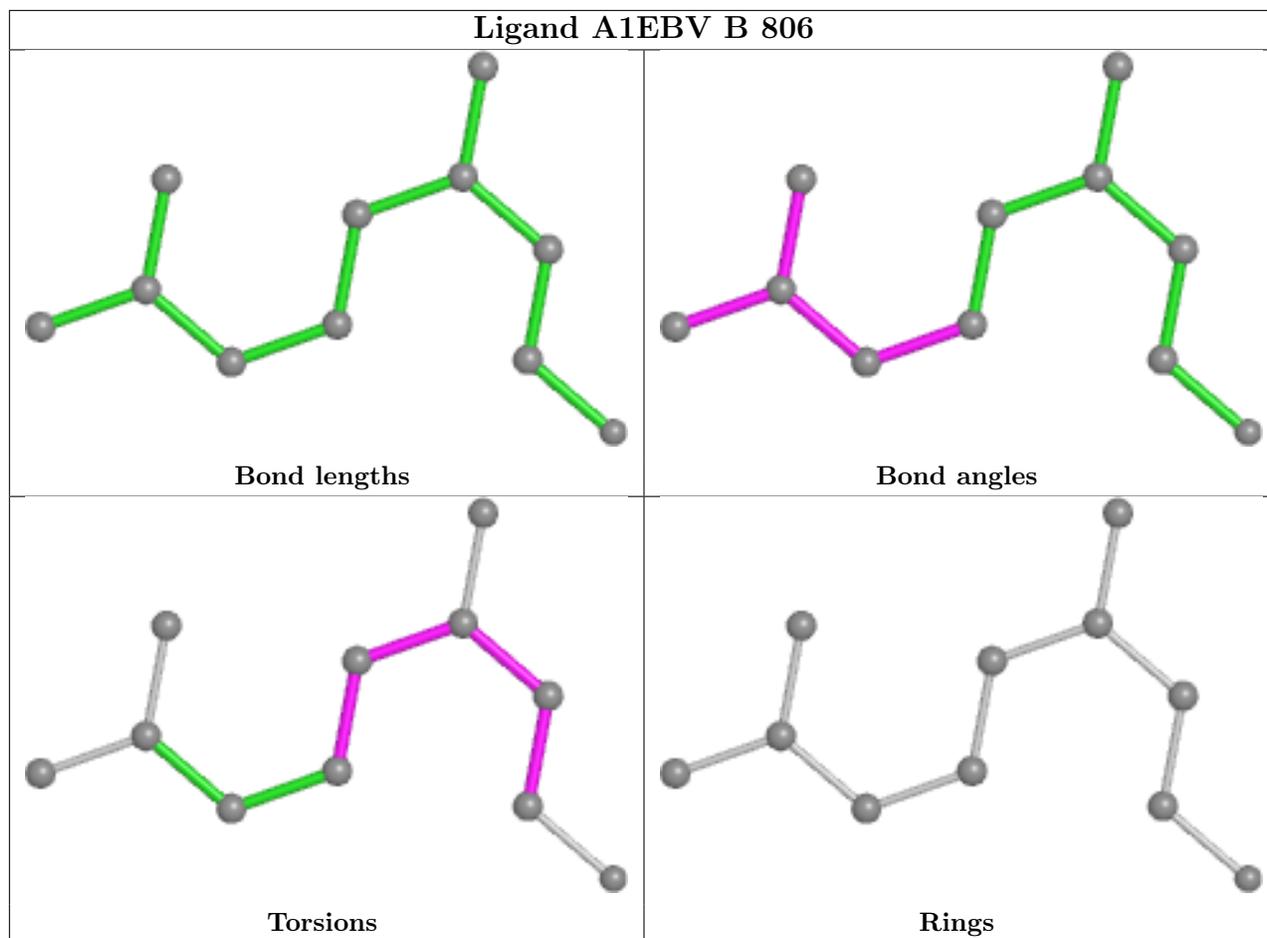


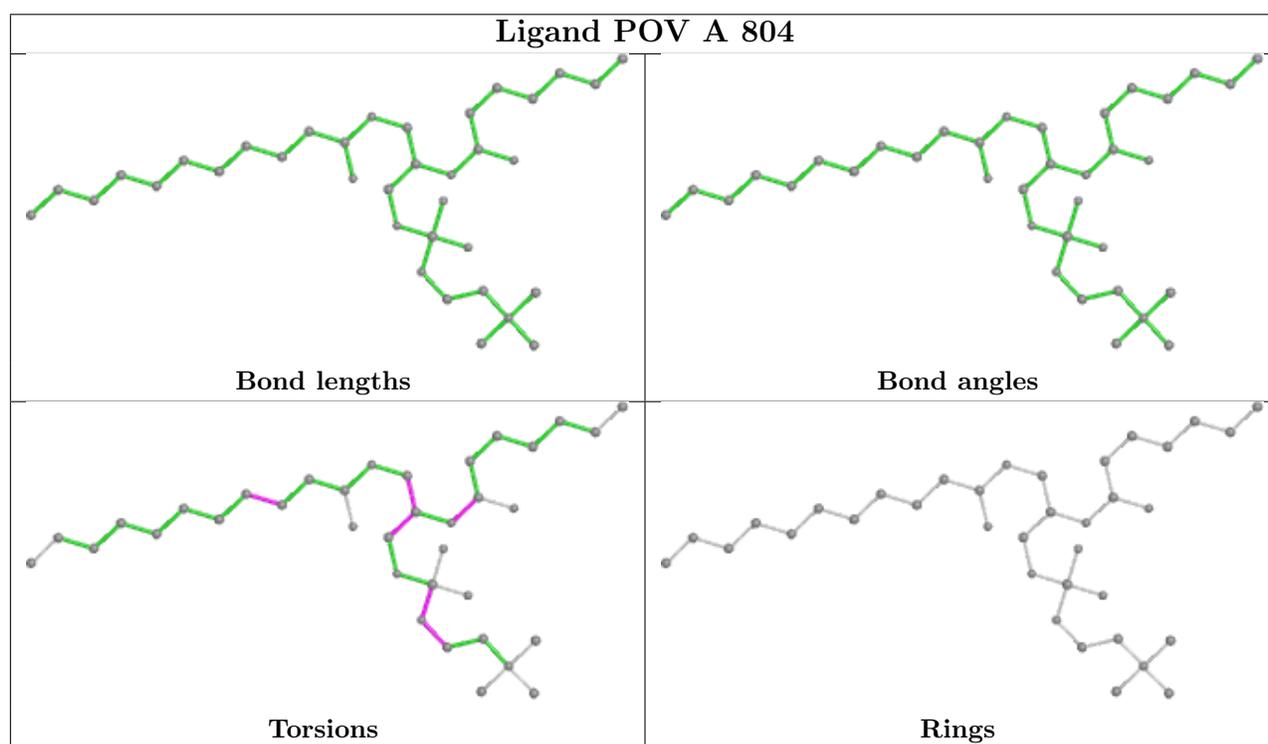
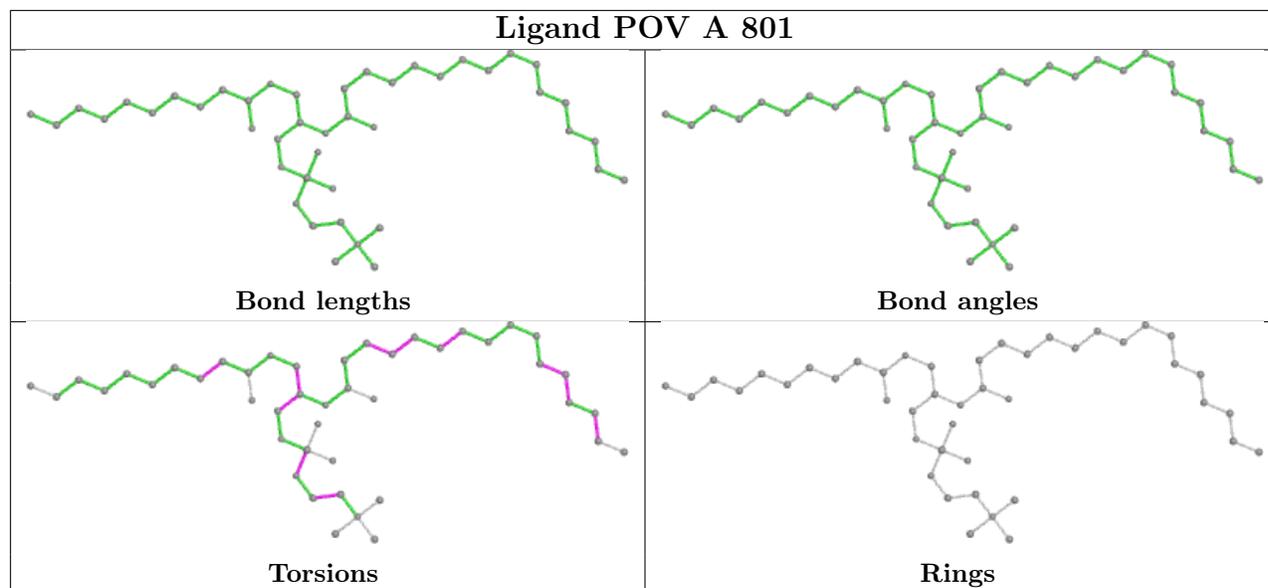


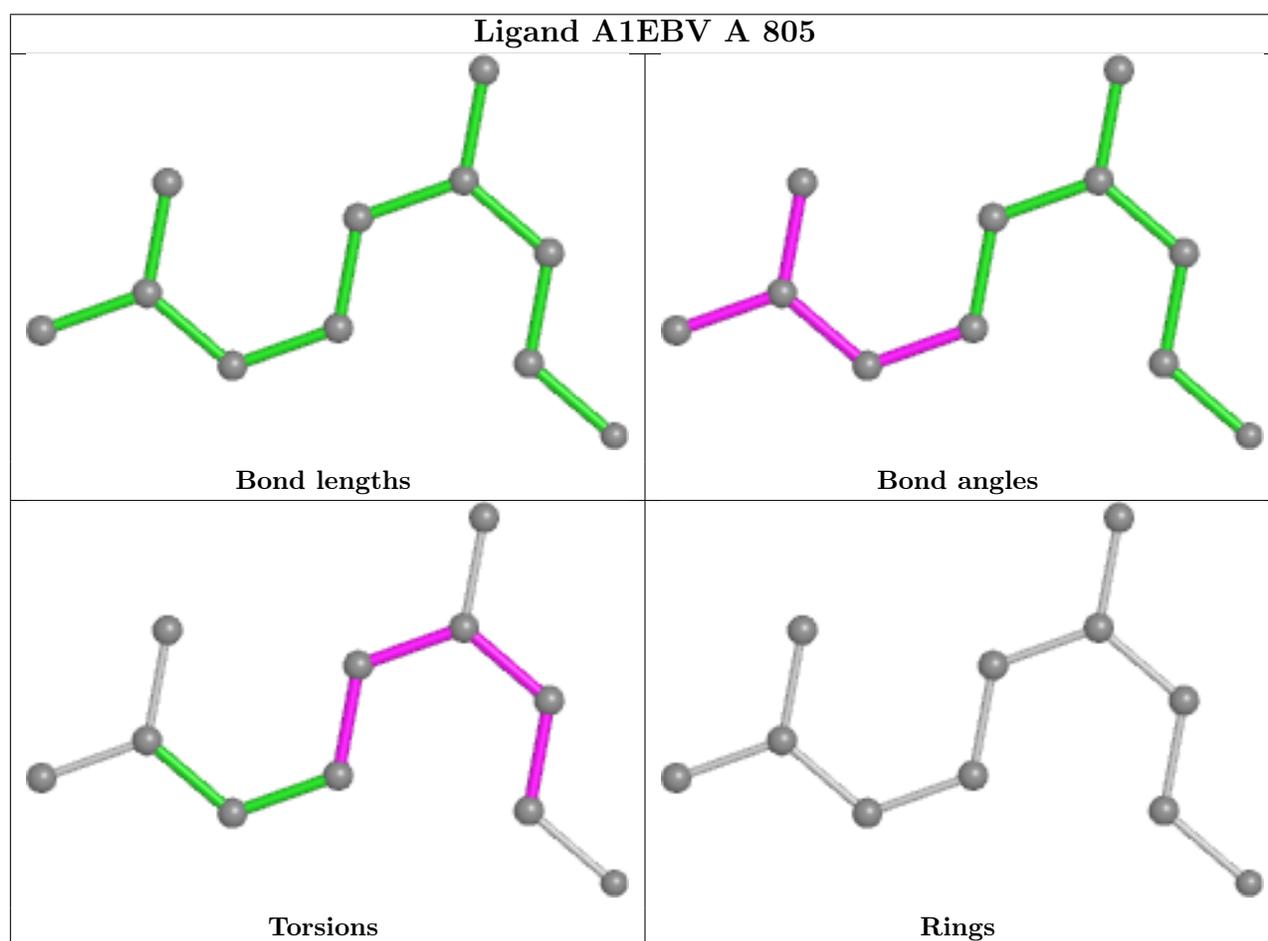
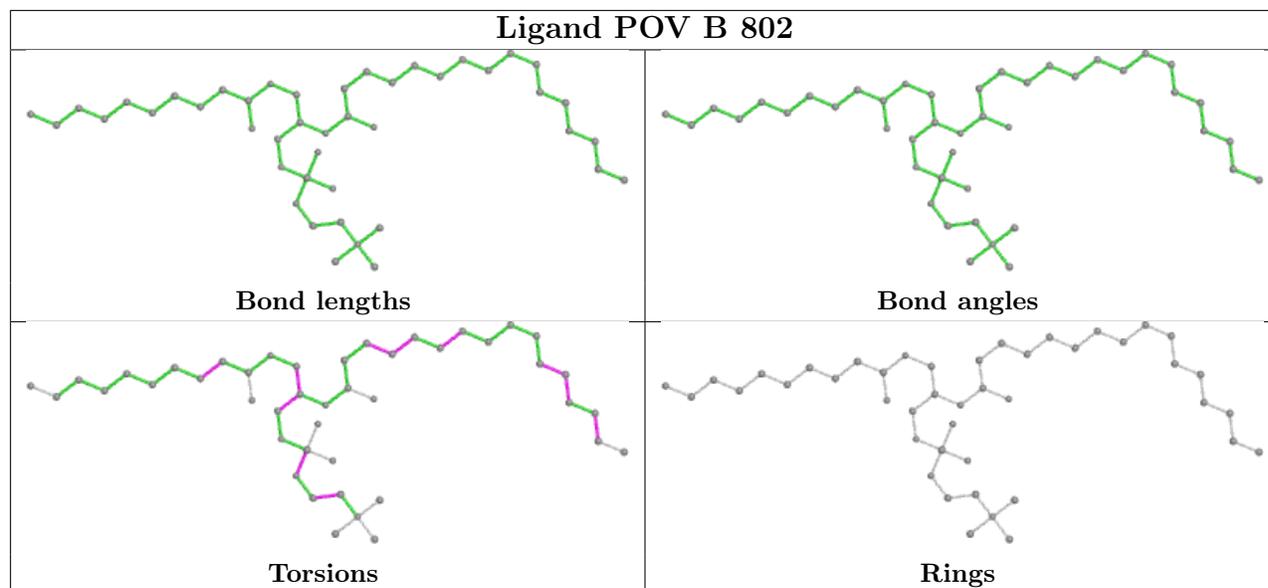


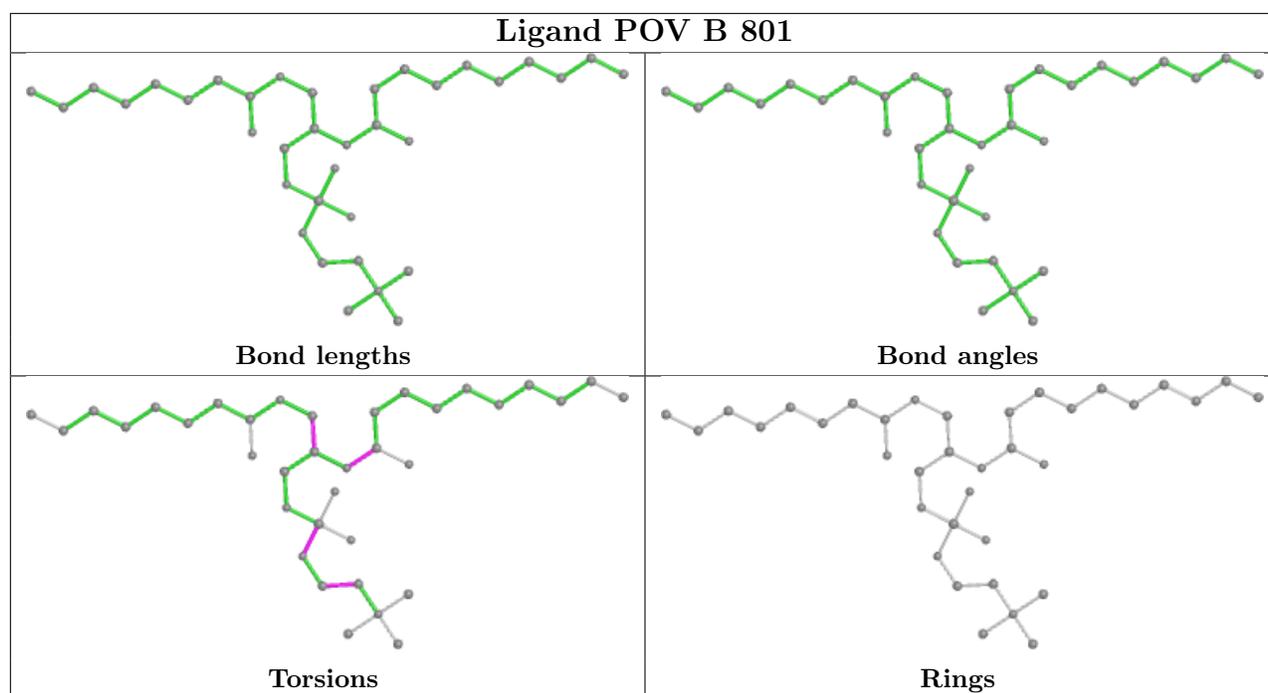












## 5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.