



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 2, 2023 – 04:25 AM EDT

PDB ID : 6N97
Title : Methylmalonyl-CoA decarboxylase in complex with 2-sulfonate-propionyl-amino(dethia)-CoA
Authors : Stunkard, L.M.; Dixon, A.D.; Huth, T.J.; Lohman, J.R.
Deposited on : 2018-11-30
Resolution : 1.75 Å(reported)

This is a Full wwPDB X-ray Structure Validation 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/XrayValidationReportHelp>

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:

MolProbity : **FAILED**
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtrriage (Phenix) : 1.13
EDS : **FAILED**
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.35.1

1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.75 Å.

There are no overall percentile quality scores available for this entry.

MolProbity and EDS failed to run properly - the sequence quality summary graphics cannot be shown.

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 15628 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, 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.

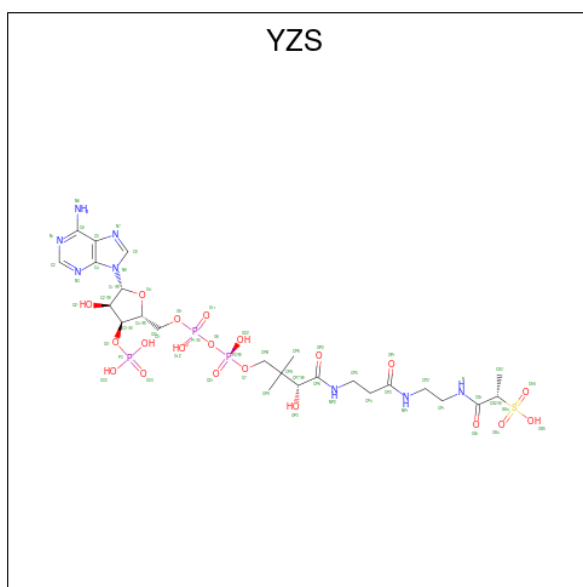
- Molecule 1 is a protein called Methylmalonyl-CoA decarboxylase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	260	2142	1373	360	396	13	0	18	0
1	B	260	2187	1406	372	395	14	0	23	0
1	C	260	2139	1375	366	386	12	0	18	0
1	D	260	2170	1395	365	397	13	0	23	0
1	E	260	2133	1365	364	392	12	0	17	0
1	F	260	2169	1397	368	391	13	0	22	0

There are 6 discrepancies between the modelled and reference sequences:

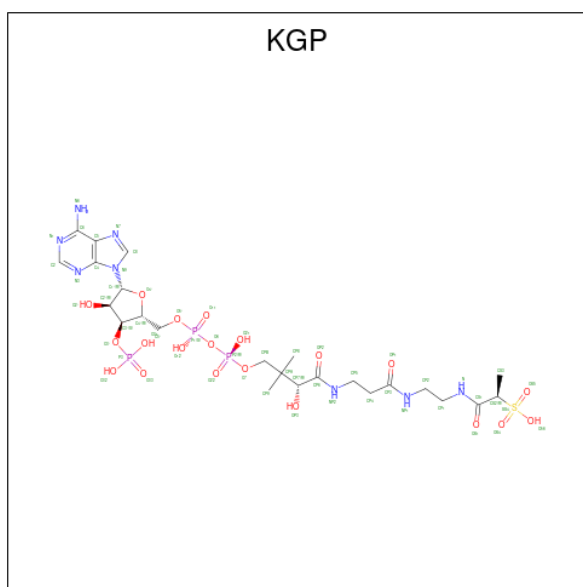
Chain	Residue	Modelled	Actual	Comment	Reference
A	2	ALA	SER	engineered mutation	UNP P52045
B	2	ALA	SER	engineered mutation	UNP P52045
C	2	ALA	SER	engineered mutation	UNP P52045
D	2	ALA	SER	engineered mutation	UNP P52045
E	2	ALA	SER	engineered mutation	UNP P52045
F	2	ALA	SER	engineered mutation	UNP P52045

- Molecule 2 is (2S)-sulfonatepropionyl-amino(dethia)-CoA (three-letter code: YZS) (formula: $C_{24}H_{41}N_8O_{20}P_3S$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	N	O	P			S
2	A	1	Total	C	N	O	P	S	0	1
			56	24	8	20	3	1		
2	B	1	Total	C	N	O	P	S	0	1
			56	24	8	20	3	1		
2	C	1	Total	C	N	O	P	S	0	1
			56	24	8	20	3	1		
2	C	1	Total	C	N	O	P		0	1
			31	10	5	13	3			
2	D	1	Total	C	N	O	P	S	0	1
			56	24	8	20	3	1		
2	E	1	Total	C	N	O	P	S	0	1
			56	24	8	20	3	1		
2	E	1	Total	C	N	O	P		0	1
			31	10	5	13	3			
2	F	1	Total	C	N	O	P	S	0	1
			56	24	8	20	3	1		
2	F	1	Total	C	N	O	P		0	1
			31	10	5	13	3			

- Molecule 3 is (2R)-sulfonatepropionyl-amino(dethia)-CoA (three-letter code: KGP) (formula: C₂₄H₄₁N₈O₂₀P₃S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	N	O	P			S
3	A	1	56	24	8	20	3	1	0	1
3	B	1	56	24	8	20	3	1	0	1
3	C	1	56	24	8	20	3	1	0	1
3	D	1	56	24	8	20	3	1	0	1
3	E	1	56	24	8	20	3	1	0	1
3	F	1	56	24	8	20	3	1	0	1

- Molecule 4 is NICKEL (II) ION (three-letter code: NI) (formula: Ni).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Ni		
4	A	1	1	1	0	0
4	E	1	1	1	0	0

- Molecule 5 is IMIDAZOLE (three-letter code: IMD) (formula: C₃H₅N₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	D	1	Total	C	N	0	0
			5	3	2		

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	322	Total	O	0	23
			341	341		
6	B	286	Total	O	0	12
			296	296		
6	C	295	Total	O	0	16
			307	307		
6	D	324	Total	O	0	21
			342	342		
6	E	291	Total	O	0	18
			304	304		
6	F	316	Total	O	0	15
			326	326		

MolProbity and EDS failed to run properly - this section is therefore empty.

3 Data and refinement statistics

EDS failed to run properly - this section is therefore incomplete.

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	86.96Å 114.61Å 192.34Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 1.75	Depositor
% Data completeness (in resolution range)	97.0 (30.00-1.75)	Depositor
R_{merge}	0.09	Depositor
R_{sym}	0.09	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.58 (at 1.75Å)	Xtrriage
Refinement program	REFMAC refmac_5.8.0238	Depositor
R, R_{free}	0.147 , 0.179	Depositor
Wilson B-factor (Å ²)	22.7	Xtrriage
Anisotropy	0.122	Xtrriage
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	15628	wwPDB-VP
Average B, all atoms (Å ²)	27.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.55% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

4 Model quality [i](#)

4.1 Standard geometry [i](#)

MolProbity failed to run properly - this section is therefore empty.

4.2 Too-close contacts [i](#)

MolProbity failed to run properly - this section is therefore empty.

4.3 Torsion angles [i](#)

4.3.1 Protein backbone [i](#)

MolProbity failed to run properly - this section is therefore empty.

4.3.2 Protein sidechains [i](#)

MolProbity failed to run properly - this section is therefore empty.

4.3.3 RNA [i](#)

MolProbity failed to run properly - this section is therefore empty.

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

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

4.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

4.6 Ligand geometry [i](#)

Of 18 ligands modelled in this entry, 2 are monoatomic - leaving 16 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond

length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	KGP	C	302[A]	-	47,58,58	1.28	3 (6%)	60,88,88	1.33	6 (10%)
5	IMD	D	303	-	3,5,5	0.22	0	4,5,5	0.72	0
3	KGP	F	302[A]	-	47,58,58	1.23	3 (6%)	60,88,88	1.84	13 (21%)
2	YZS	C	301[B]	-	47,58,58	1.27	3 (6%)	60,88,88	1.29	8 (13%)
3	KGP	D	302[A]	-	47,58,58	1.24	3 (6%)	60,88,88	1.44	7 (11%)
2	YZS	F	301[B]	-	47,58,58	1.23	3 (6%)	60,88,88	3.73	17 (28%)
3	KGP	B	302[A]	-	47,58,58	1.30	3 (6%)	60,88,88	1.56	9 (15%)
2	YZS	E	304[A]	-	28,33,58	1.11	1 (3%)	35,52,88	1.49	6 (17%)
2	YZS	A	301[B]	-	47,58,58	1.28	3 (6%)	60,88,88	3.27	12 (20%)
2	YZS	C	303[A]	-	28,33,58	1.33	3 (10%)	35,52,88	1.46	6 (17%)
2	YZS	E	302[B]	-	47,58,58	1.19	2 (4%)	60,88,88	3.19	11 (18%)
3	KGP	A	302[A]	-	47,58,58	1.29	3 (6%)	60,88,88	3.26	13 (21%)
2	YZS	F	303[A]	-	28,33,58	1.18	2 (7%)	35,52,88	1.88	10 (28%)
3	KGP	E	303[A]	-	47,58,58	1.24	2 (4%)	60,88,88	3.08	13 (21%)
2	YZS	D	301[B]	-	47,58,58	1.25	3 (6%)	60,88,88	1.36	7 (11%)
2	YZS	B	301[B]	-	47,58,58	1.26	3 (6%)	60,88,88	1.39	10 (16%)

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	KGP	C	302[A]	-	-	0/54/77/77	0/3/3/3
5	IMD	D	303	-	-	-	0/1/1/1
3	KGP	F	302[A]	-	-	10/54/77/77	0/3/3/3
2	YZS	C	301[B]	-	-	2/54/77/77	0/3/3/3
3	KGP	D	302[A]	-	-	4/54/77/77	0/3/3/3
2	YZS	F	301[B]	-	-	14/54/77/77	0/3/3/3
3	KGP	B	302[A]	-	-	2/54/77/77	0/3/3/3
2	YZS	E	304[A]	-	-	4/17/37/77	0/3/3/3
2	YZS	A	301[B]	-	-	6/54/77/77	0/3/3/3
2	YZS	C	303[A]	-	-	0/17/37/77	0/3/3/3
2	YZS	E	302[B]	-	-	13/54/77/77	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	KGP	A	302[A]	-	-	4/54/77/77	0/3/3/3
2	YZS	F	303[A]	-	-	9/17/37/77	0/3/3/3
3	KGP	E	303[A]	-	-	11/54/77/77	0/3/3/3
2	YZS	D	301[B]	-	-	6/54/77/77	0/3/3/3
2	YZS	B	301[B]	-	-	3/54/77/77	0/3/3/3

All (40) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	302[A]	KGP	CS1-N	6.97	1.48	1.33
3	E	303[A]	KGP	CS1-N	6.55	1.47	1.33
2	B	301[B]	YZS	CS1-N	6.49	1.47	1.33
3	C	302[A]	KGP	CS1-N	6.44	1.47	1.33
2	C	301[B]	YZS	CS1-N	6.29	1.47	1.33
2	D	301[B]	YZS	CS1-N	6.24	1.47	1.33
3	D	302[A]	KGP	CS1-N	6.21	1.47	1.33
3	A	302[A]	KGP	CS1-N	6.12	1.47	1.33
3	F	302[A]	KGP	CS1-N	6.10	1.46	1.33
2	E	302[B]	YZS	CS1-N	6.06	1.46	1.33
2	A	301[B]	YZS	CS1-N	6.03	1.46	1.33
2	F	301[B]	YZS	CS1-N	5.87	1.46	1.33
2	C	303[A]	YZS	C2-N3	3.97	1.38	1.32
2	F	303[A]	YZS	C5-C4	3.26	1.49	1.40
2	C	303[A]	YZS	C5-C4	3.03	1.48	1.40
2	E	304[A]	YZS	C5-C4	2.66	1.48	1.40
2	A	301[B]	YZS	O4'-C1'	2.62	1.44	1.41
3	A	302[A]	KGP	O4'-C1'	2.57	1.44	1.41
2	C	303[A]	YZS	P2-O7	2.52	1.64	1.54
3	C	302[A]	KGP	O4'-C1'	2.49	1.44	1.41
2	C	301[B]	YZS	C5-C4	2.47	1.47	1.40
3	C	302[A]	KGP	C5-C4	2.47	1.47	1.40
2	C	301[B]	YZS	O4'-C1'	2.45	1.44	1.41
2	D	301[B]	YZS	O4'-C1'	2.37	1.44	1.41
3	D	302[A]	KGP	O4'-C1'	2.36	1.44	1.41
2	E	302[B]	YZS	C5-C4	2.32	1.47	1.40
3	E	303[A]	KGP	C5-C4	2.32	1.47	1.40
2	F	301[B]	YZS	O4'-C1'	2.25	1.44	1.41
3	F	302[A]	KGP	O4'-C1'	2.25	1.44	1.41
2	B	301[B]	YZS	C2-N3	2.22	1.35	1.32
3	B	302[A]	KGP	C2-N3	2.20	1.35	1.32
2	A	301[B]	YZS	C5-C4	2.19	1.46	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	302[A]	KGP	C5-C4	2.19	1.46	1.40
2	F	303[A]	YZS	C8-N7	2.18	1.38	1.34
3	B	302[A]	KGP	C5-C4	2.15	1.46	1.40
2	B	301[B]	YZS	C5-C4	2.11	1.46	1.40
3	F	302[A]	KGP	C5-C4	2.09	1.46	1.40
2	F	301[B]	YZS	C5-C4	2.08	1.46	1.40
3	D	302[A]	KGP	C5-C4	2.05	1.46	1.40
2	D	301[B]	YZS	C5-C4	2.02	1.46	1.40

All (148) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	302[B]	YZS	CP8-CPA-CPB	-14.03	85.35	108.23
3	E	303[A]	KGP	CP8-CPA-CPB	-13.96	85.47	108.23
2	F	301[B]	YZS	CP8-CPA-CP7	-13.15	86.02	108.82
2	A	301[B]	YZS	CP8-CPA-CPB	-12.64	87.62	108.23
3	A	302[A]	KGP	CP8-CPA-CPB	-12.63	87.63	108.23
2	F	301[B]	YZS	CP9-CPA-CP7	12.56	130.59	108.82
2	F	301[B]	YZS	CP8-CPA-CPB	-11.59	89.33	108.23
2	A	301[B]	YZS	CP8-CPA-CP7	-10.74	90.19	108.82
3	A	302[A]	KGP	CP8-CPA-CP7	-10.73	90.22	108.82
2	F	301[B]	YZS	CP8-CPA-CP9	-9.97	88.85	109.17
2	F	301[B]	YZS	OS4-SS4-CS2	-9.83	102.89	109.43
2	E	302[B]	YZS	CP8-CPA-CP7	-9.47	92.41	108.82
3	E	303[A]	KGP	CP8-CPA-CP7	-9.42	92.49	108.82
3	A	302[A]	KGP	CP8-CPA-CP9	-9.40	90.00	109.17
2	A	301[B]	YZS	CP8-CPA-CP9	-9.39	90.03	109.17
2	A	301[B]	YZS	O56-SS4-CS2	-9.10	103.37	109.43
3	A	302[A]	KGP	OS4-SS4-CS2	-8.82	103.56	109.43
2	E	302[B]	YZS	OS4-SS4-CS2	-8.66	103.66	109.43
3	B	302[A]	KGP	OS4-SS4-CS2	-7.40	104.50	109.43
3	A	302[A]	KGP	CP9-CPA-CPB	7.21	119.99	108.23
2	A	301[B]	YZS	CP9-CPA-CPB	7.20	119.97	108.23
3	E	303[A]	KGP	CP8-CPA-CP9	-7.16	94.57	109.17
2	E	302[B]	YZS	CP8-CPA-CP9	-7.14	94.61	109.17
3	E	303[A]	KGP	CP9-CPA-CP7	6.77	120.55	108.82
2	E	302[B]	YZS	CP9-CPA-CP7	6.76	120.54	108.82
3	C	302[A]	KGP	OS5-SS4-CS2	-6.47	105.12	109.43
3	A	302[A]	KGP	OP3-CP7-CPA	-5.88	96.41	110.25
2	A	301[B]	YZS	OP3-CP7-CPA	-5.87	96.42	110.25
3	E	303[A]	KGP	CP9-CPA-CPB	5.78	117.67	108.23
2	E	302[B]	YZS	CP9-CPA-CPB	5.62	117.40	108.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	302[A]	KGP	OS5-SS4-CS2	-5.62	105.69	109.43
3	E	303[A]	KGP	OS4-SS4-CS2	-5.47	105.79	109.43
2	C	301[B]	YZS	O56-SS4-CS2	-5.38	105.85	109.43
3	F	302[A]	KGP	OS5-SS4-CS2	-5.30	105.90	109.43
3	A	302[A]	KGP	CP9-CPA-CP7	5.17	117.79	108.82
2	A	301[B]	YZS	CP9-CPA-CP7	5.17	117.78	108.82
2	F	301[B]	YZS	P2-O6-P1	-5.13	115.22	132.83
3	E	303[A]	KGP	OS5-SS4-CS2	-5.10	106.03	109.43
3	F	302[A]	KGP	P2-O6-P1	-5.01	115.65	132.83
2	E	302[B]	YZS	P2-O6-P1	-4.84	116.23	132.83
3	E	303[A]	KGP	P2-O6-P1	-4.80	116.37	132.83
2	F	301[B]	YZS	O56-SS4-CS2	-4.77	106.25	109.43
3	E	303[A]	KGP	OP3-CP7-CPA	-4.73	99.12	110.25
3	F	302[A]	KGP	OS4-SS4-CS2	-4.60	106.37	109.43
2	E	302[B]	YZS	OP3-CP7-CPA	-4.59	99.44	110.25
2	E	302[B]	YZS	O56-SS4-CS2	-4.41	106.49	109.43
2	B	301[B]	YZS	O56-SS4-CS2	-4.26	106.59	109.43
2	D	301[B]	YZS	OS4-SS4-CS2	-4.21	106.63	109.43
2	F	303[A]	YZS	P1-O6-P2	-4.11	118.71	132.83
2	D	301[B]	YZS	P2-O6-P1	-4.07	118.85	132.83
3	D	302[A]	KGP	P2-O6-P1	-4.04	118.96	132.83
2	C	303[A]	YZS	N3-C2-N1	-4.01	122.41	128.68
2	E	304[A]	YZS	P1-O6-P2	-3.88	119.52	132.83
3	D	302[A]	KGP	N3-C2-N1	-3.84	122.68	128.68
2	D	301[B]	YZS	N3-C2-N1	-3.81	122.72	128.68
3	F	302[A]	KGP	C5'-C4'-C3'	-3.80	101.82	114.40
2	E	302[B]	YZS	N3-C2-N1	-3.74	122.83	128.68
3	E	303[A]	KGP	N3-C2-N1	-3.74	122.83	128.68
2	B	301[B]	YZS	CP5-CP4-CP3	-3.74	106.13	112.36
3	B	302[A]	KGP	CP5-CP4-CP3	-3.72	106.16	112.36
2	E	304[A]	YZS	N3-C2-N1	-3.72	122.87	128.68
3	F	302[A]	KGP	O7-CPB-CPA	-3.71	104.59	110.55
3	F	302[A]	KGP	N3-C2-N1	-3.66	122.96	128.68
2	F	301[B]	YZS	N3-C2-N1	-3.64	123.00	128.68
2	F	301[B]	YZS	C5'-C4'-C3'	-3.61	102.43	114.40
2	F	301[B]	YZS	OP3-CP7-CPA	-3.57	101.84	110.25
2	F	303[A]	YZS	N3-C2-N1	-3.52	123.18	128.68
2	B	301[B]	YZS	N3-C2-N1	-3.46	123.26	128.68
2	F	303[A]	YZS	C1'-N9-C4	-3.46	120.56	126.64
2	F	303[A]	YZS	O7-P2-O6	3.43	116.15	104.64
3	B	302[A]	KGP	N3-C2-N1	-3.42	123.34	128.68
2	A	301[B]	YZS	N3-C2-N1	-3.34	123.46	128.68

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	302[A]	KGP	N3-C2-N1	-3.26	123.58	128.68
2	F	301[B]	YZS	P1-O5'-C5'	-3.15	103.20	121.68
2	B	301[B]	YZS	OS4-SS4-CS2	-3.13	107.34	109.43
2	E	304[A]	YZS	C4-C5-N7	-3.08	106.19	109.40
2	C	303[A]	YZS	C1'-N9-C4	-3.08	121.24	126.64
3	F	302[A]	KGP	P1-O5'-C5'	-3.07	103.68	121.68
3	A	302[A]	KGP	P2-O6-P1	-3.05	122.34	132.83
2	A	301[B]	YZS	P2-O6-P1	-3.05	122.37	132.83
2	F	303[A]	YZS	O4'-C4'-C5'	-3.01	99.47	109.37
2	F	301[B]	YZS	CP5-CP4-CP3	-3.01	107.35	112.36
2	A	301[B]	YZS	C1'-N9-C4	-3.00	121.37	126.64
3	A	302[A]	KGP	C1'-N9-C4	-2.98	121.40	126.64
3	A	302[A]	KGP	OS5-SS4-CS2	2.96	111.40	109.43
3	F	302[A]	KGP	OP3-CP7-CPA	-2.95	103.32	110.25
3	F	302[A]	KGP	C1'-N9-C4	-2.94	121.47	126.64
3	C	302[A]	KGP	N3-C2-N1	-2.92	124.11	128.68
2	D	301[B]	YZS	CP5-CP4-CP3	-2.91	107.50	112.36
2	C	301[B]	YZS	N3-C2-N1	-2.91	124.13	128.68
2	E	304[A]	YZS	O4'-C1'-C2'	2.85	111.08	106.93
2	F	301[B]	YZS	C1'-N9-C4	-2.81	121.70	126.64
2	F	303[A]	YZS	C4-C5-N7	-2.78	106.50	109.40
3	D	302[A]	KGP	CP5-CP4-CP3	-2.78	107.73	112.36
2	F	303[A]	YZS	O7-P2-O22	-2.78	97.03	107.64
2	E	304[A]	YZS	C1'-N9-C4	-2.75	121.81	126.64
2	F	303[A]	YZS	O3'-C3'-C2'	-2.71	101.85	111.68
2	C	301[B]	YZS	OS4-SS4-CS2	-2.69	107.64	109.43
3	F	302[A]	KGP	CP5-CP4-CP3	-2.66	107.93	112.36
3	B	302[A]	KGP	N6-C6-N1	2.63	124.03	118.57
2	F	301[B]	YZS	CP7-CP6-NP2	-2.63	111.35	116.58
2	F	301[B]	YZS	CP2-NP1-CP3	-2.62	117.97	122.84
2	B	301[B]	YZS	N6-C6-N1	2.62	124.01	118.57
2	C	303[A]	YZS	O5'-P1-O11	-2.61	98.86	109.07
3	B	302[A]	KGP	C5-C6-N6	-2.55	116.48	120.35
2	B	301[B]	YZS	C5-C6-N6	-2.55	116.48	120.35
3	D	302[A]	KGP	CP9-CPA-CP7	2.51	113.18	108.82
2	D	301[B]	YZS	CP9-CPA-CP7	2.51	113.17	108.82
3	C	302[A]	KGP	CP5-NP2-CP6	-2.48	118.16	122.59
2	F	303[A]	YZS	C2-N1-C6	2.46	122.97	118.75
2	A	301[B]	YZS	CP5-CP4-CP3	-2.43	108.30	112.36
2	C	303[A]	YZS	O22-P2-O6	2.43	112.79	104.64
2	F	301[B]	YZS	CP4-CP5-NP2	-2.41	107.04	111.90
3	F	302[A]	KGP	CP2-NP1-CP3	-2.40	118.38	122.84

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	302[A]	KGP	CP5-CP4-CP3	-2.39	108.37	112.36
3	B	302[A]	KGP	O7-CPB-CPA	-2.34	106.78	110.55
2	B	301[B]	YZS	O7-CPB-CPA	-2.33	106.79	110.55
3	D	302[A]	KGP	N6-C6-N1	2.33	123.41	118.57
2	C	301[B]	YZS	C4-C5-N7	-2.31	106.99	109.40
2	D	301[B]	YZS	N6-C6-N1	2.31	123.36	118.57
3	C	302[A]	KGP	C4-C5-N7	-2.29	107.02	109.40
2	B	301[B]	YZS	C1'-N9-C4	-2.27	122.64	126.64
2	C	301[B]	YZS	P2-O6-P1	-2.27	125.04	132.83
3	C	302[A]	KGP	P2-O6-P1	-2.26	125.09	132.83
2	B	301[B]	YZS	OP3-CP7-CPA	-2.22	105.04	110.25
3	B	302[A]	KGP	OP3-CP7-CPA	-2.21	105.05	110.25
2	C	303[A]	YZS	C2-N1-C6	2.18	122.48	118.75
2	C	301[B]	YZS	CP5-NP2-CP6	-2.17	118.72	122.59
3	E	303[A]	KGP	C4-C5-N7	-2.17	107.14	109.40
2	F	303[A]	YZS	O4'-C1'-C2'	2.15	110.07	106.93
2	E	302[B]	YZS	C4-C5-N7	-2.13	107.18	109.40
3	B	302[A]	KGP	C1'-N9-C4	-2.12	122.91	126.64
2	C	301[B]	YZS	OS4-SS4-O56	-2.11	108.18	116.52
3	A	302[A]	KGP	N6-C6-N1	2.11	122.96	118.57
2	A	301[B]	YZS	N6-C6-N1	2.11	122.96	118.57
2	E	304[A]	YZS	C2-N1-C6	2.11	122.36	118.75
3	D	302[A]	KGP	C5-C6-N6	-2.09	117.17	120.35
2	C	303[A]	YZS	C4-C5-N7	-2.07	107.24	109.40
2	B	301[B]	YZS	O3'-C3'-C4'	-2.06	102.62	110.08
3	C	302[A]	KGP	C5'-C4'-C3'	-2.06	107.57	114.40
3	E	303[A]	KGP	CP5-CP4-CP3	-2.05	108.94	112.36
3	F	302[A]	KGP	O4'-C4'-C3'	2.05	109.26	104.87
2	D	301[B]	YZS	C5-C6-N6	-2.04	117.25	120.35
2	F	301[B]	YZS	CP1-N-CS1	-2.04	118.95	122.59
2	C	301[B]	YZS	C5'-C4'-C3'	-2.03	107.68	114.40
3	B	302[A]	KGP	P2-O6-P1	-2.01	125.92	132.83
3	F	302[A]	KGP	C4-C5-N7	-2.01	107.31	109.40
3	E	303[A]	KGP	C1'-N9-C4	-2.00	123.12	126.64

There are no chirality outliers.

All (88) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	301[B]	YZS	CP7-CPA-CPB-O7
2	A	301[B]	YZS	OP3-CP7-CPA-CP9
2	A	301[B]	YZS	CP6-CP7-CPA-CP9

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Mol	Chain	Res	Type	Atoms
2	A	301[B]	YZS	N-CS1-CS2-CS3
2	B	301[B]	YZS	C3'-O3'-P3-O31
2	B	301[B]	YZS	N-CS1-CS2-CS3
2	B	301[B]	YZS	OS1-CS1-CS2-CS3
2	C	301[B]	YZS	N-CS1-CS2-CS3
2	C	301[B]	YZS	OS1-CS1-CS2-CS3
2	D	301[B]	YZS	N-CS1-CS2-CS3
2	D	301[B]	YZS	OS1-CS1-CS2-CS3
2	E	302[B]	YZS	C5'-O5'-P1-O6
2	E	302[B]	YZS	CP7-CPA-CPB-O7
2	E	302[B]	YZS	OP3-CP7-CPA-CP9
2	E	302[B]	YZS	CP6-CP7-CPA-CP9
2	E	302[B]	YZS	N-CS1-CS2-CS3
2	E	302[B]	YZS	OS1-CS1-CS2-CS3
2	E	304[A]	YZS	O4'-C4'-C5'-O5'
2	F	301[B]	YZS	C5'-O5'-P1-O11
2	F	301[B]	YZS	C5'-O5'-P1-O12
2	F	301[B]	YZS	C5'-O5'-P1-O6
2	F	301[B]	YZS	CP7-CPA-CPB-O7
2	F	301[B]	YZS	OP3-CP7-CPA-CP9
2	F	301[B]	YZS	CP6-CP7-CPA-CP9
2	F	301[B]	YZS	N-CS1-CS2-CS3
2	F	301[B]	YZS	OS1-CS1-CS2-CS3
2	F	303[A]	YZS	C5'-O5'-P1-O11
2	F	303[A]	YZS	C5'-O5'-P1-O12
2	F	303[A]	YZS	P1-O6-P2-O7
3	A	302[A]	KGP	CP7-CPA-CPB-O7
3	A	302[A]	KGP	OP3-CP7-CPA-CP9
3	A	302[A]	KGP	CP6-CP7-CPA-CP9
3	B	302[A]	KGP	C3'-O3'-P3-O33
3	D	302[A]	KGP	C3'-O3'-P3-O31
3	E	303[A]	KGP	C5'-O5'-P1-O11
3	E	303[A]	KGP	C5'-O5'-P1-O6
3	E	303[A]	KGP	CP7-CPA-CPB-O7
3	E	303[A]	KGP	OP3-CP7-CPA-CP9
3	E	303[A]	KGP	CP6-CP7-CPA-CP9
3	F	302[A]	KGP	C5'-O5'-P1-O11
3	F	302[A]	KGP	C5'-O5'-P1-O12
3	F	302[A]	KGP	C5'-O5'-P1-O6
3	F	302[A]	KGP	CP6-CP7-CPA-CPB
2	F	301[B]	YZS	C3'-C4'-C5'-O5'
3	F	302[A]	KGP	C3'-C4'-C5'-O5'

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Mol	Chain	Res	Type	Atoms
2	E	302[B]	YZS	CP8-CPA-CPB-O7
3	E	303[A]	KGP	CP8-CPA-CPB-O7
2	A	301[B]	YZS	OS1-CS1-CS2-CS3
3	F	302[A]	KGP	O4'-C4'-C5'-O5'
2	F	303[A]	YZS	C4'-C5'-O5'-P1
2	F	301[B]	YZS	O4'-C4'-C5'-O5'
2	F	303[A]	YZS	O4'-C4'-C5'-O5'
2	E	304[A]	YZS	P2-O6-P1-O5'
2	F	301[B]	YZS	P1-O6-P2-O7
2	F	303[A]	YZS	P2-O6-P1-O5'
2	D	301[B]	YZS	O4'-C4'-C5'-O5'
3	D	302[A]	KGP	O4'-C4'-C5'-O5'
2	D	301[B]	YZS	C3'-O3'-P3-O31
2	D	301[B]	YZS	C5'-O5'-P1-O6
2	F	303[A]	YZS	C5'-O5'-P1-O6
2	D	301[B]	YZS	C3'-C4'-C5'-O5'
3	D	302[A]	KGP	C3'-C4'-C5'-O5'
2	E	302[B]	YZS	OP3-CP7-CPA-CPB
3	E	303[A]	KGP	OP3-CP7-CPA-CPB
2	F	301[B]	YZS	CP4-CP5-NP2-CP6
2	E	302[B]	YZS	C3'-C4'-C5'-O5'
2	A	301[B]	YZS	CP8-CPA-CPB-O7
2	F	301[B]	YZS	CP8-CPA-CPB-O7
3	A	302[A]	KGP	CP8-CPA-CPB-O7
3	E	303[A]	KGP	C3'-C4'-C5'-O5'
2	E	304[A]	YZS	C3'-C4'-C5'-O5'
2	F	303[A]	YZS	P1-O6-P2-O21
2	E	302[B]	YZS	O4'-C4'-C5'-O5'
3	E	303[A]	KGP	O4'-C4'-C5'-O5'
2	F	301[B]	YZS	CP6-CP7-CPA-CP8
2	F	303[A]	YZS	P1-O6-P2-O22
3	F	302[A]	KGP	CP6-CP7-CPA-CP9
3	F	302[A]	KGP	CP4-CP5-NP2-CP6
2	E	302[B]	YZS	CPB-O7-P2-O6
3	B	302[A]	KGP	C3'-O3'-P3-O31
3	D	302[A]	KGP	C5'-O5'-P1-O6
3	E	303[A]	KGP	CPB-O7-P2-O6
2	E	304[A]	YZS	C4'-C5'-O5'-P1
3	F	302[A]	KGP	C2'-C3'-O3'-P3
2	E	302[B]	YZS	C5'-O5'-P1-O12
2	E	302[B]	YZS	CPB-O7-P2-O21
3	E	303[A]	KGP	CPB-O7-P2-O21

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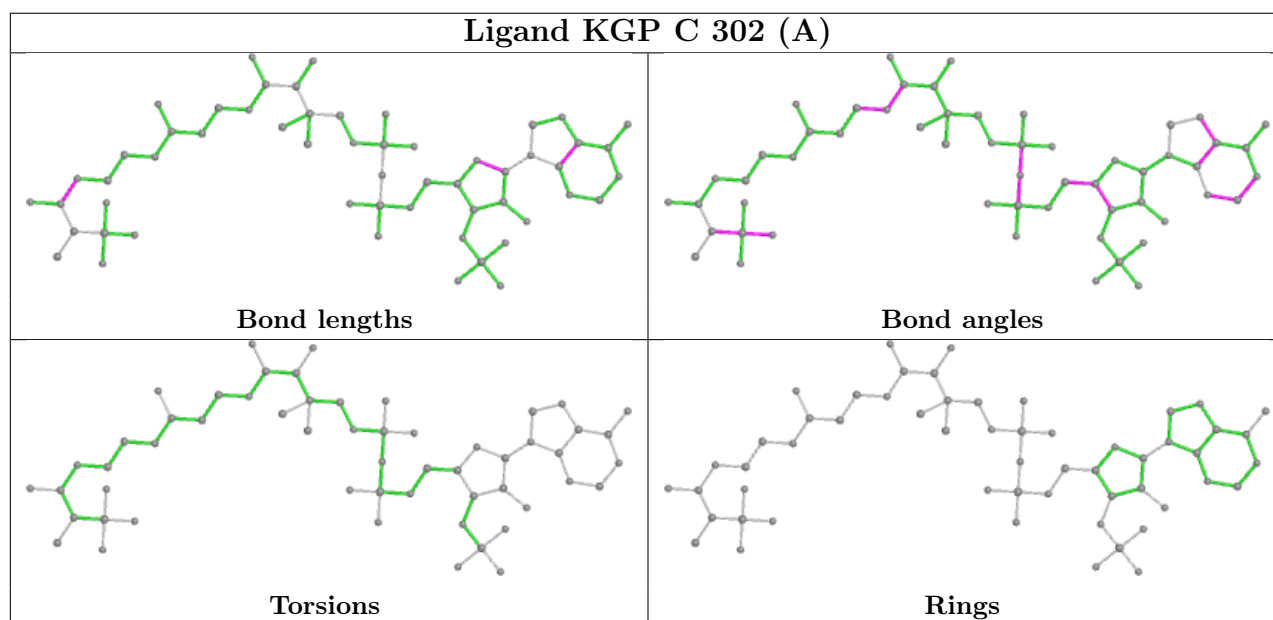
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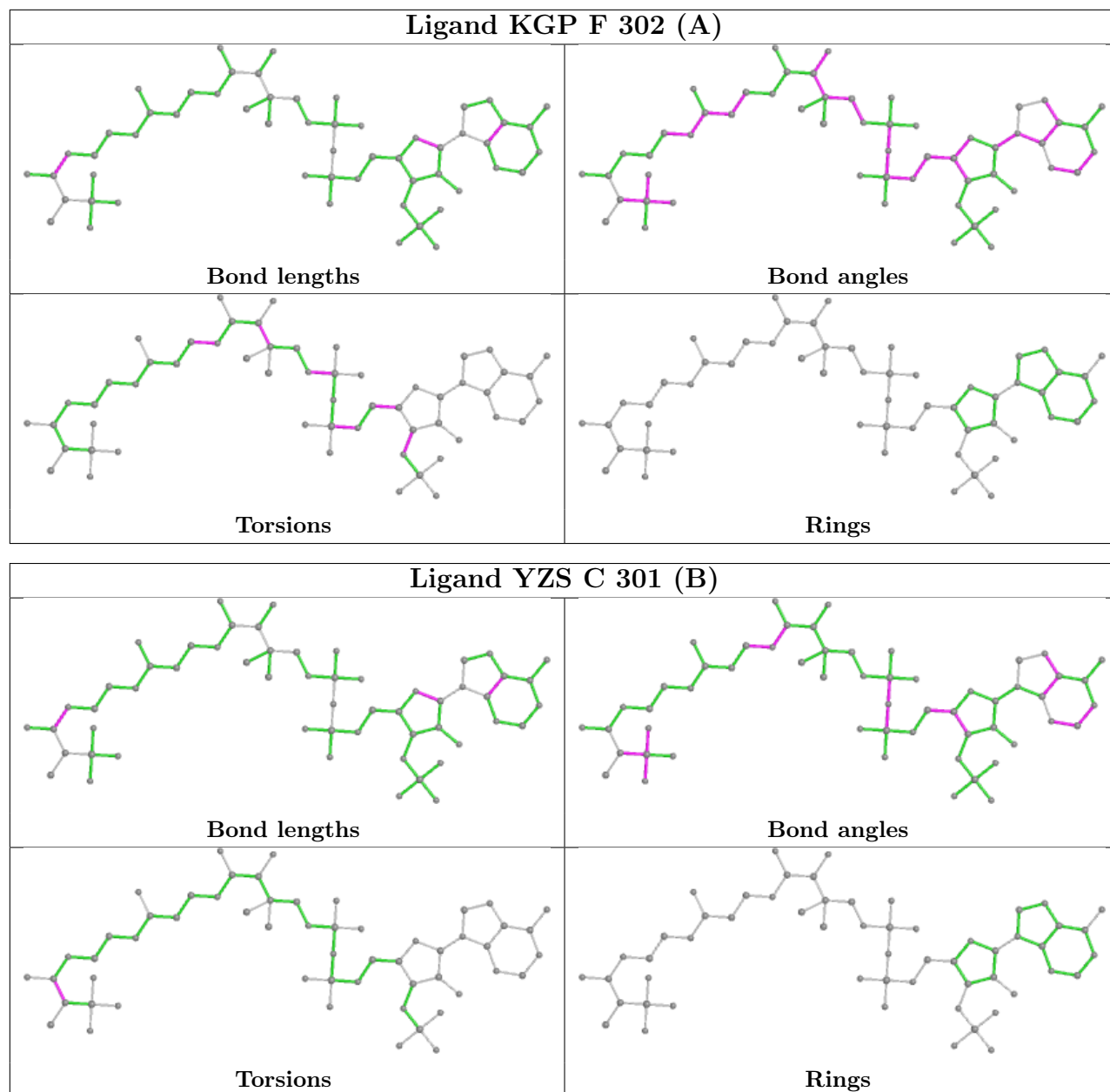
Mol	Chain	Res	Type	Atoms
3	F	302[A]	KGP	CPB-O7-P2-O22

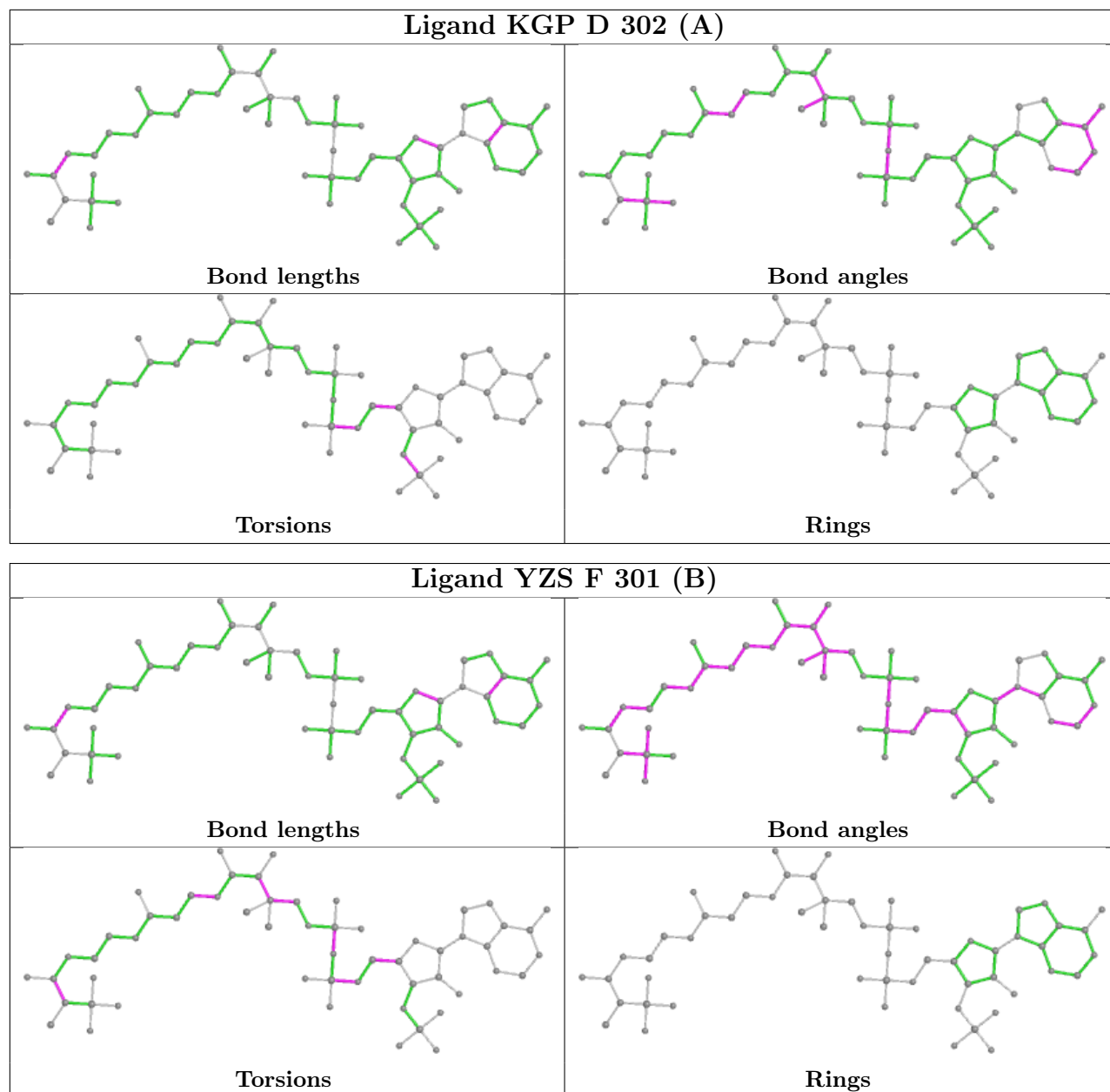
There are no ring outliers.

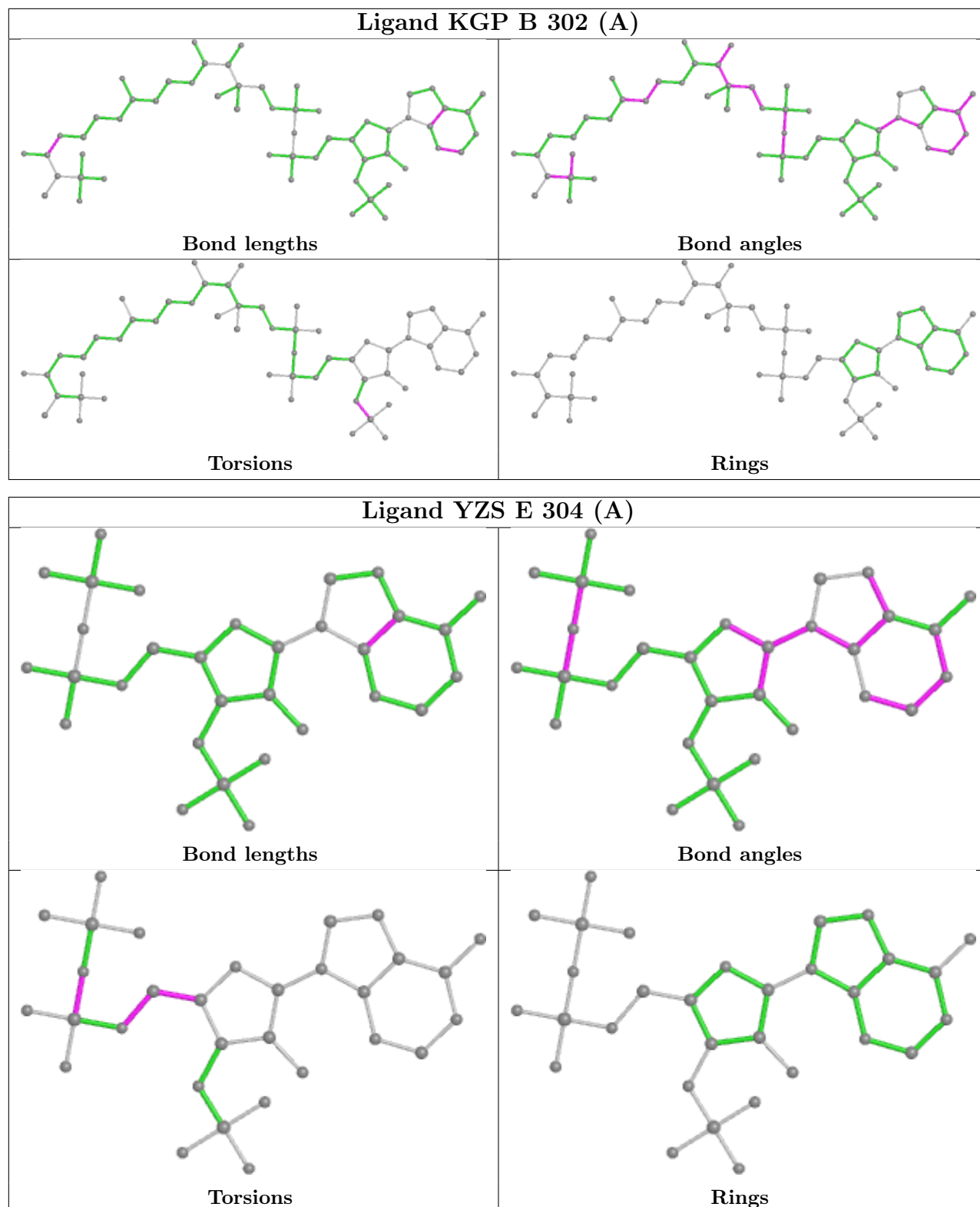
No monomer is involved in short contacts.

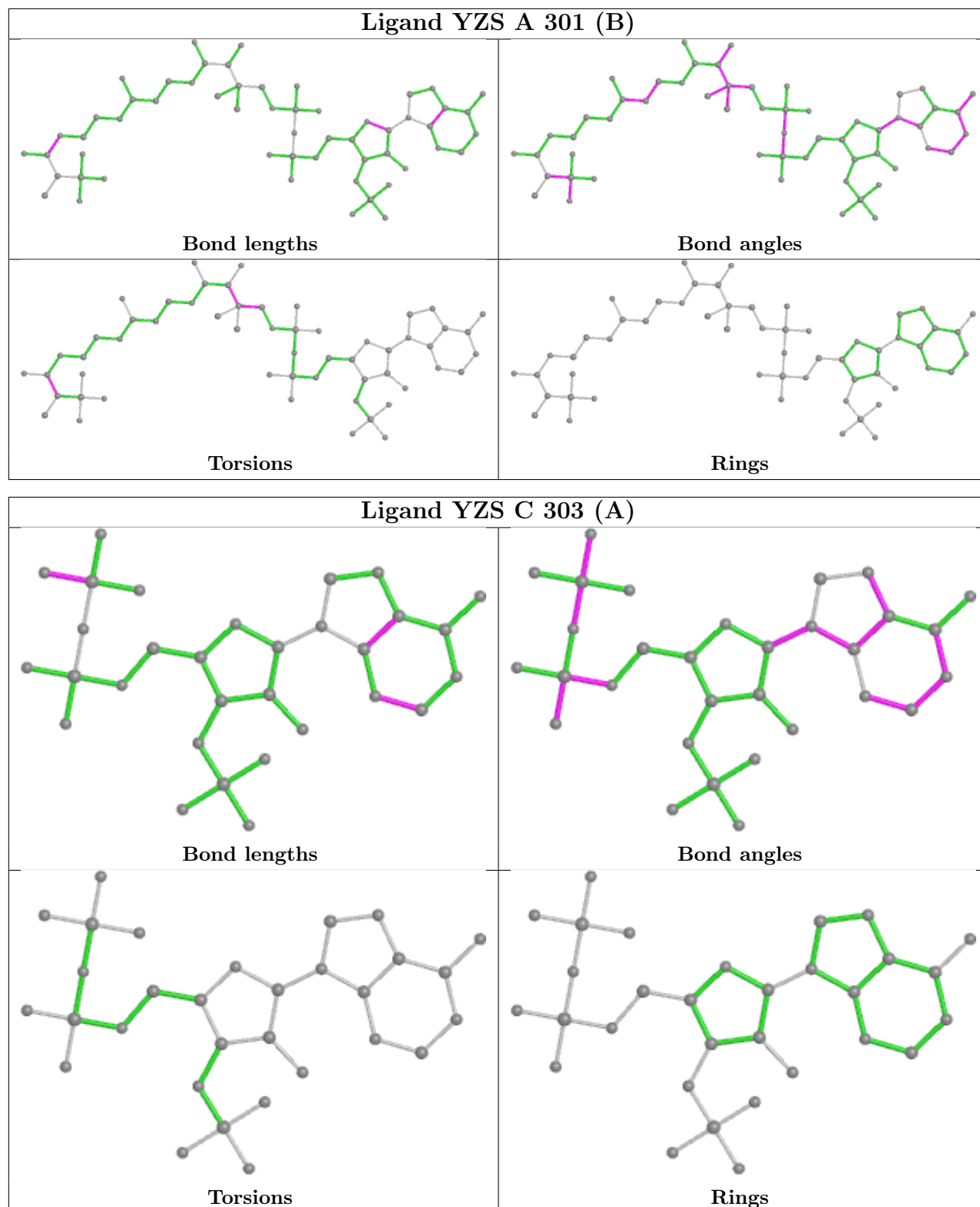
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

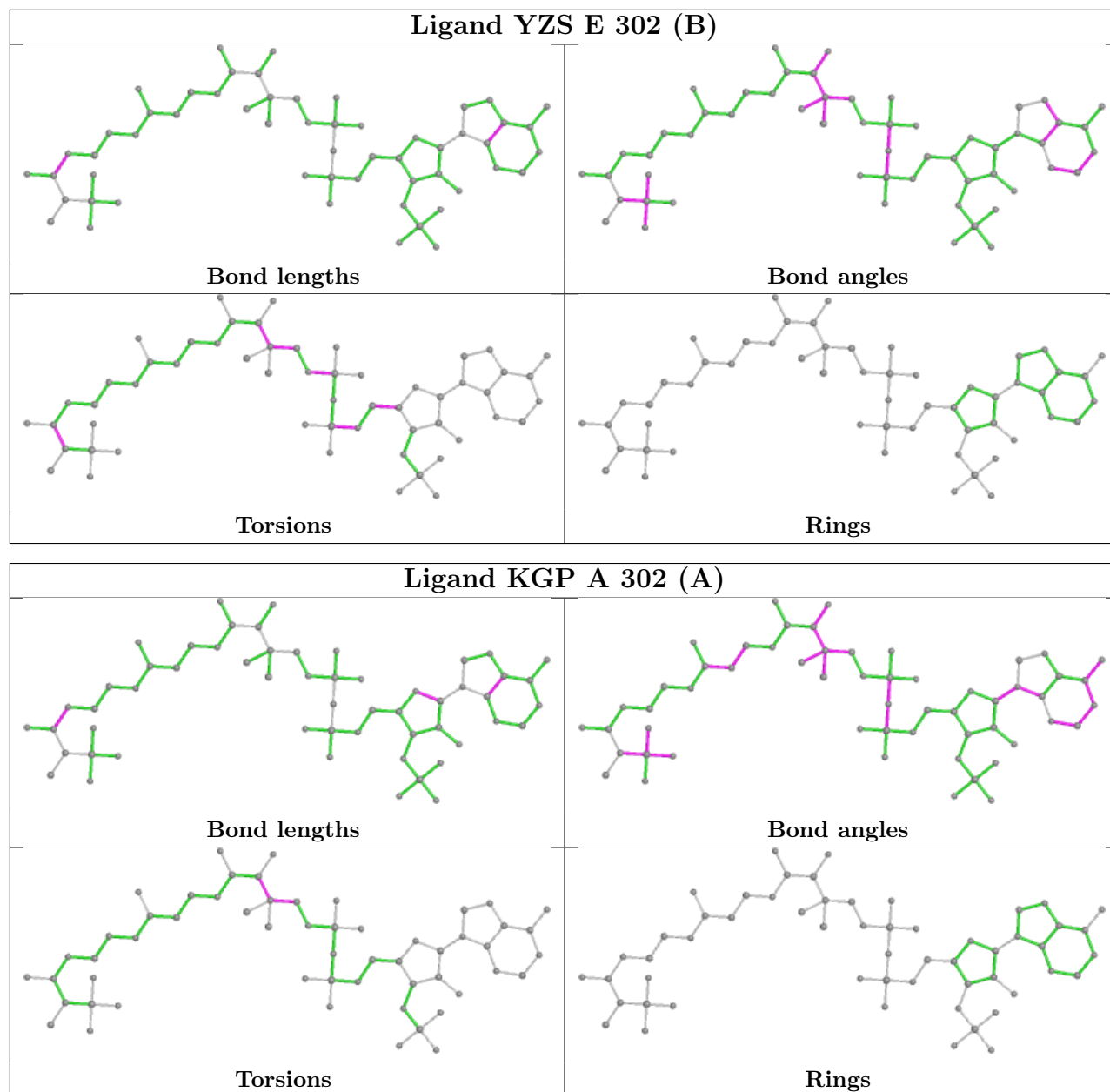


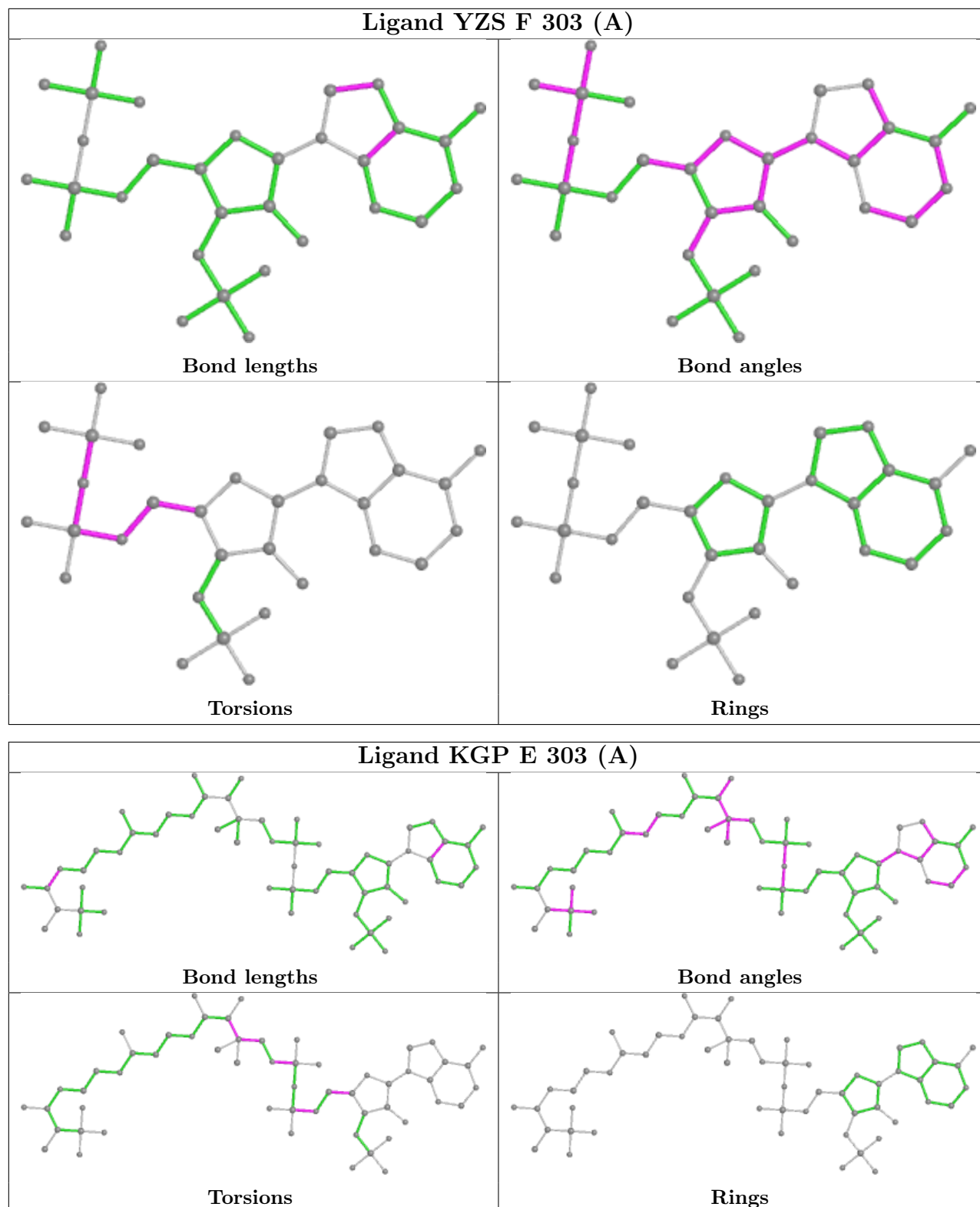


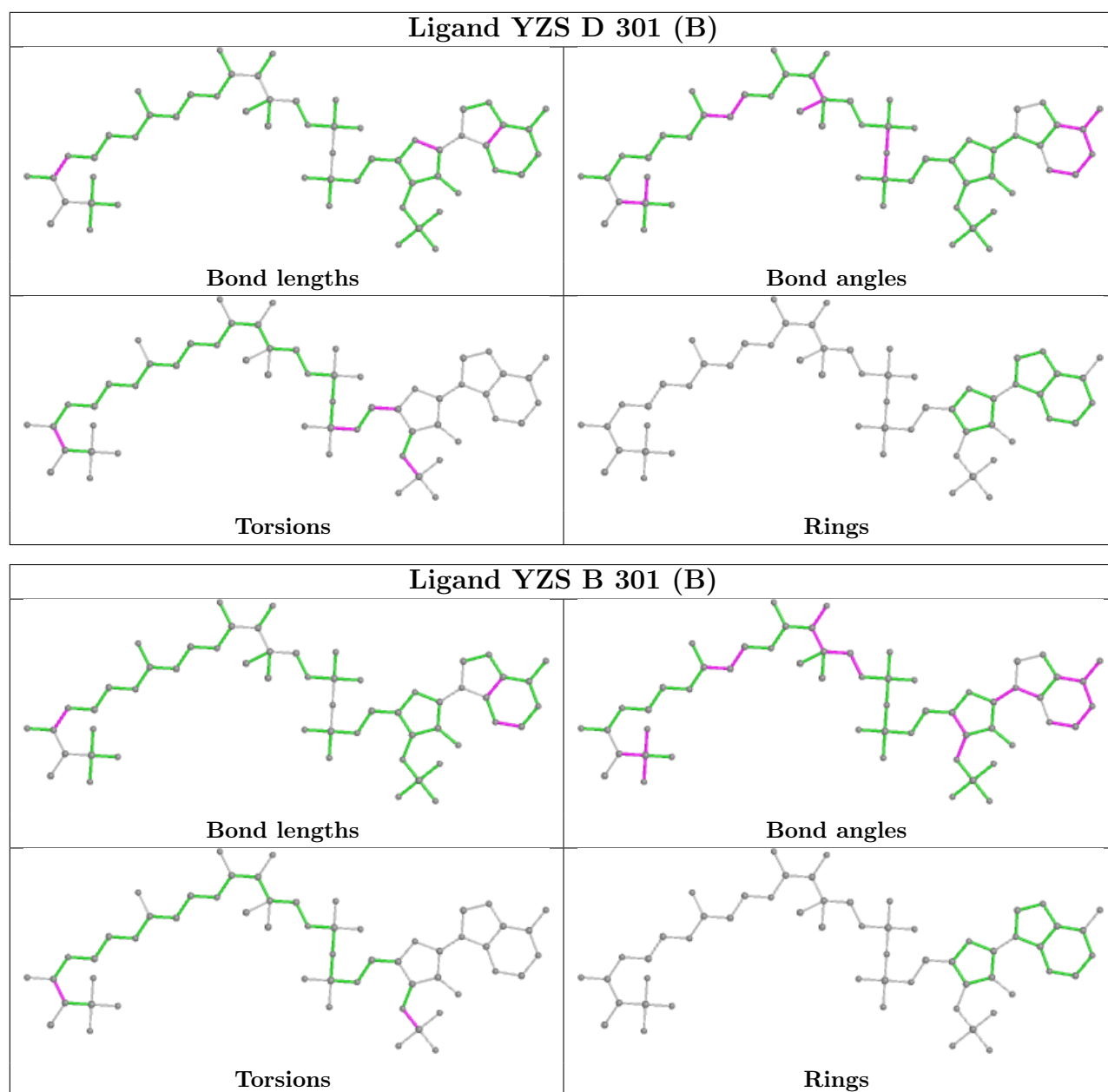












4.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

5 Fit of model and data

5.1 Protein, DNA and RNA chains

EDS failed to run properly - this section is therefore empty.

5.2 Non-standard residues in protein, DNA, RNA chains

EDS failed to run properly - this section is therefore empty.

5.3 Carbohydrates

EDS failed to run properly - this section is therefore empty.

5.4 Ligands

EDS failed to run properly - this section is therefore empty.

5.5 Other polymers

EDS failed to run properly - this section is therefore empty.