



wwPDB X-ray Structure Validation Summary Report ⓘ

Jun 13, 2024 – 10:23 AM EDT

PDB ID : 1MX9
Title : Crystal Structure of Human Liver Carboxylesterase in complexed with naloxone methiodide, a heroin analogue
Authors : Bencharit, S.; Morton, C.L.; Xue, Y.; Potter, P.M.; Redinbo, M.R.
Deposited on : 2002-10-01
Resolution : 2.90 Å(reported)

This is a wwPDB X-ray Structure 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/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 : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtrriage (Phenix) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
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) : 2.36.2

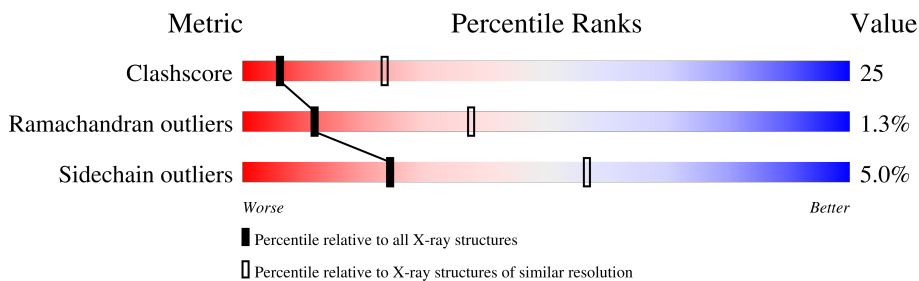
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.90 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)	Similar resolution (#Entries, resolution range(Å))
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower 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 $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	548	
1	B	548	
1	C	548	
1	D	548	
1	E	548	
1	F	548	
1	G	548	
1	H	548	

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain	
1	I	548	49%	43%
1	J	548	56%	38%
1	K	548	53%	42%
1	L	548	54%	40%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	NAG	J	479	-	-	X	-
3	NLX	A	1	X	-	X	-
3	NLX	B	2	X	-	X	-
3	NLX	C	3	X	-	X	-
3	NLX	D	4	X	-	X	-
3	NLX	E	5	X	-	X	-
3	NLX	F	6	X	-	X	-
3	NLX	G	1	X	-	X	-
3	NLX	H	2	X	-	X	-
3	NLX	I	3	X	-	X	-
3	NLX	J	4	X	-	X	-
3	NLX	K	5	X	-	X	-
3	NLX	L	6	X	-	X	-

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 51134 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 liver Carboxylesterase I.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	532	4130	2662	685	763	20	0	0	0
1	B	532	4130	2662	685	763	20	0	0	0
1	C	531	4124	2659	684	761	20	0	0	0
1	D	533	4135	2665	686	764	20	0	0	0
1	E	531	4124	2659	684	761	20	0	0	0
1	F	531	4124	2659	684	761	20	0	0	0
1	G	532	4130	2662	685	763	20	0	0	0
1	H	531	4124	2659	684	761	20	0	0	0
1	I	531	4124	2659	684	761	20	0	0	0
1	J	532	4130	2662	685	763	20	0	0	0
1	K	531	4124	2659	684	761	20	0	0	0
1	L	531	4124	2659	684	761	20	0	0	0

There are 12 discrepancies between the modelled and reference sequences:

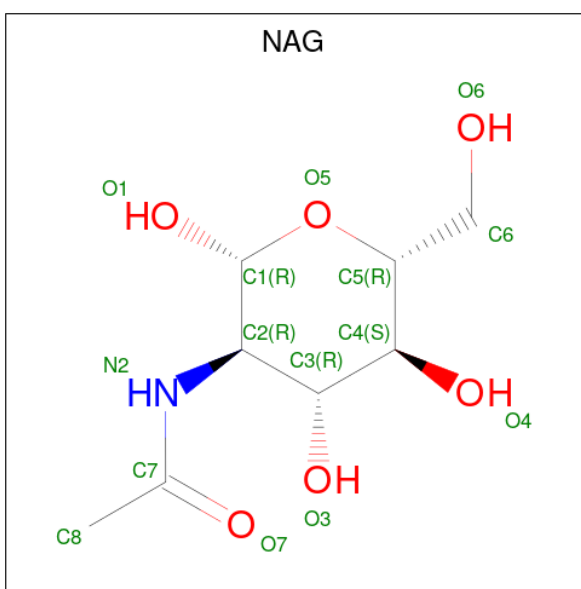
Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	GLN	deletion	UNP P23141
B	?	-	GLN	deletion	UNP P23141
C	?	-	GLN	deletion	UNP P23141
D	?	-	GLN	deletion	UNP P23141
E	?	-	GLN	deletion	UNP P23141

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
F	?	-	GLN	deletion	UNP P23141
G	?	-	GLN	deletion	UNP P23141
H	?	-	GLN	deletion	UNP P23141
I	?	-	GLN	deletion	UNP P23141
J	?	-	GLN	deletion	UNP P23141
K	?	-	GLN	deletion	UNP P23141
L	?	-	GLN	deletion	UNP P23141

- Molecule 2 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).



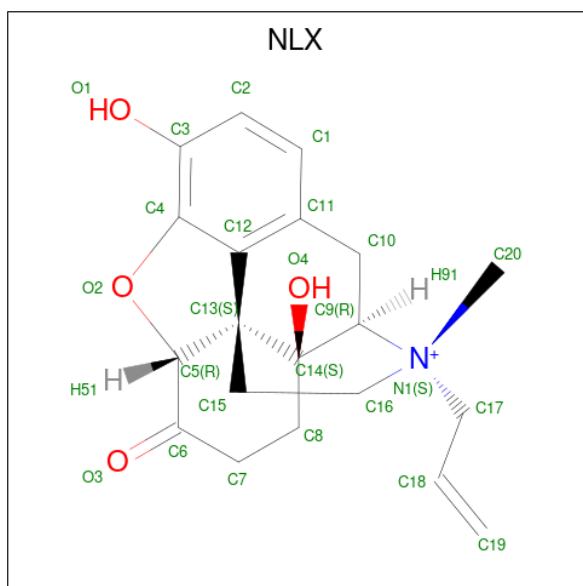
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	A	1	Total	C	N	O	0	0
			14	8	1	5		
2	B	1	Total	C	N	O	0	0
			14	8	1	5		
2	C	1	Total	C	N	O	0	0
			14	8	1	5		
2	D	1	Total	C	N	O	0	0
			14	8	1	5		
2	E	1	Total	C	N	O	0	0
			14	8	1	5		
2	F	1	Total	C	N	O	0	0
			14	8	1	5		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	G	1	Total	C	N	O	0	0
			14	8	1	5		
2	H	1	Total	C	N	O	0	0
			14	8	1	5		
2	I	1	Total	C	N	O	0	0
			14	8	1	5		
2	J	1	Total	C	N	O	0	0
			14	8	1	5		
2	K	1	Total	C	N	O	0	0
			14	8	1	5		
2	L	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 3 is (5A,17R)-4,5-EPOXY-3,14-DIHYDROXY-17-METHYL-6-OXO-17-(2-PROPENYL)-MORPHINANUM (three-letter code: NLX) (formula: C₂₀H₂₄NO₄).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			25	20	1	4		
3	B	1	Total	C	N	O	0	0
			25	20	1	4		
3	C	1	Total	C	N	O	0	0
			25	20	1	4		
3	D	1	Total	C	N	O	0	0
			25	20	1	4		
3	E	1	Total	C	N	O	0	0
			25	20	1	4		

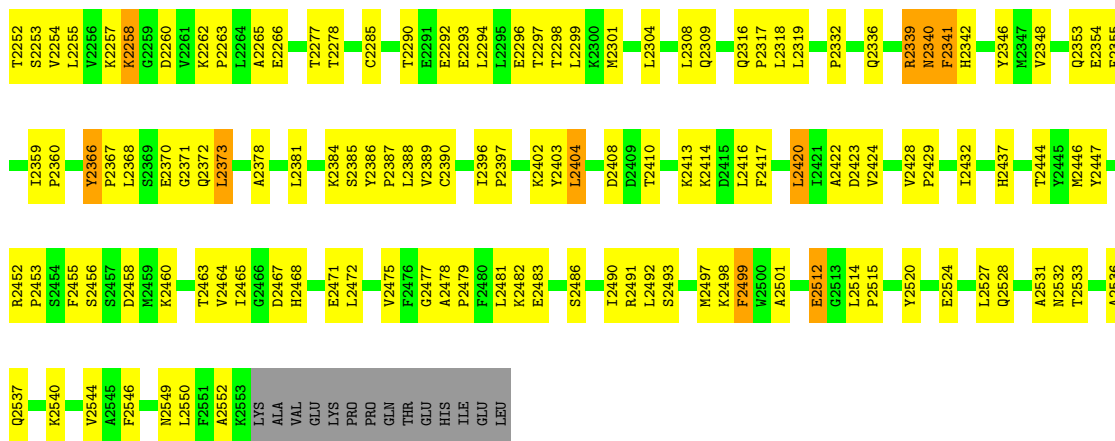
Continued on next page...

Continued from previous page...

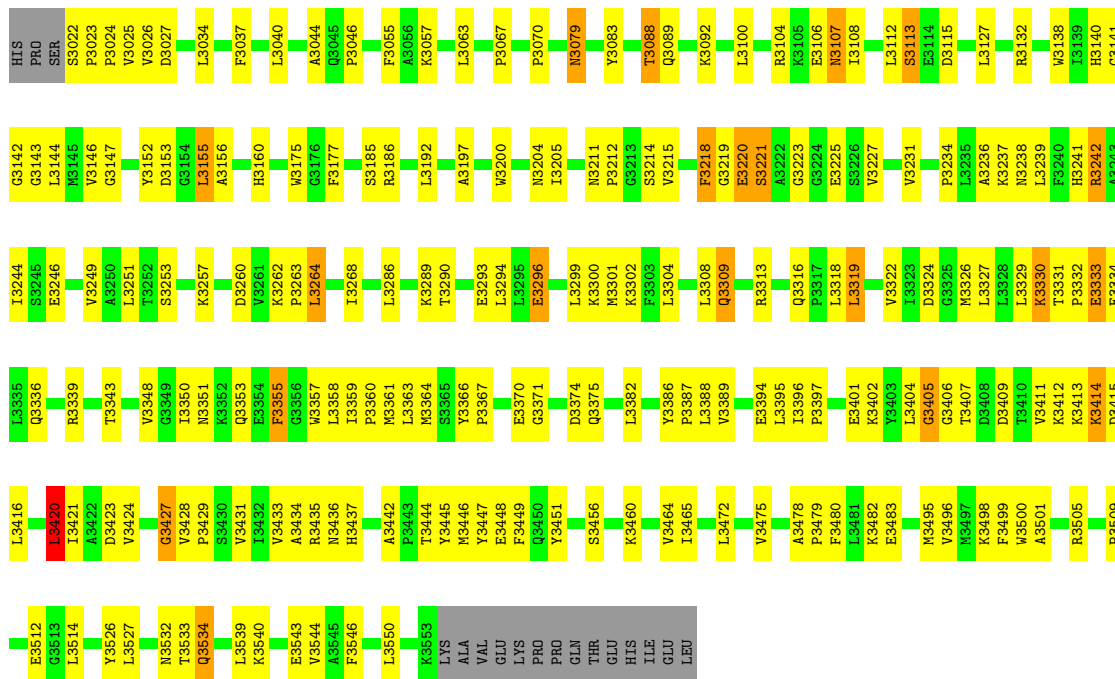
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	F	1	Total	C	N	O	0	0
			25	20	1	4		
3	G	1	Total	C	N	O	0	0
			25	20	1	4		
3	H	1	Total	C	N	O	0	0
			25	20	1	4		
3	I	1	Total	C	N	O	0	0
			25	20	1	4		
3	J	1	Total	C	N	O	0	0
			25	20	1	4		
3	K	1	Total	C	N	O	0	0
			25	20	1	4		
3	L	1	Total	C	N	O	0	0
			25	20	1	4		

- Molecule 4 is water.

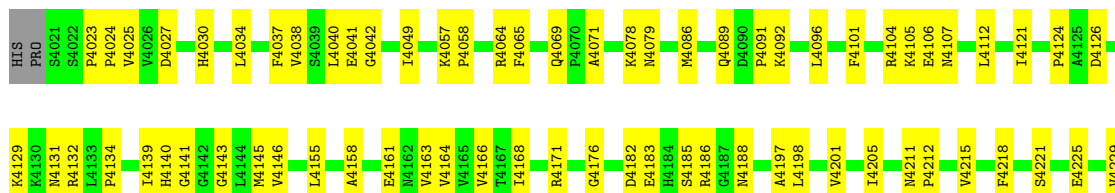
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	87	Total	O	0	0
			87	87		
4	B	120	Total	O	0	0
			120	120		
4	C	98	Total	O	0	0
			98	98		
4	D	119	Total	O	0	0
			119	119		
4	E	112	Total	O	0	0
			112	112		
4	F	91	Total	O	0	0
			91	91		
4	G	69	Total	O	0	0
			69	69		
4	H	95	Total	O	0	0
			95	95		
4	I	80	Total	O	0	0
			80	80		
4	J	110	Total	O	0	0
			110	110		
4	K	73	Total	O	0	0
			73	73		
4	L	75	Total	O	0	0
			75	75		

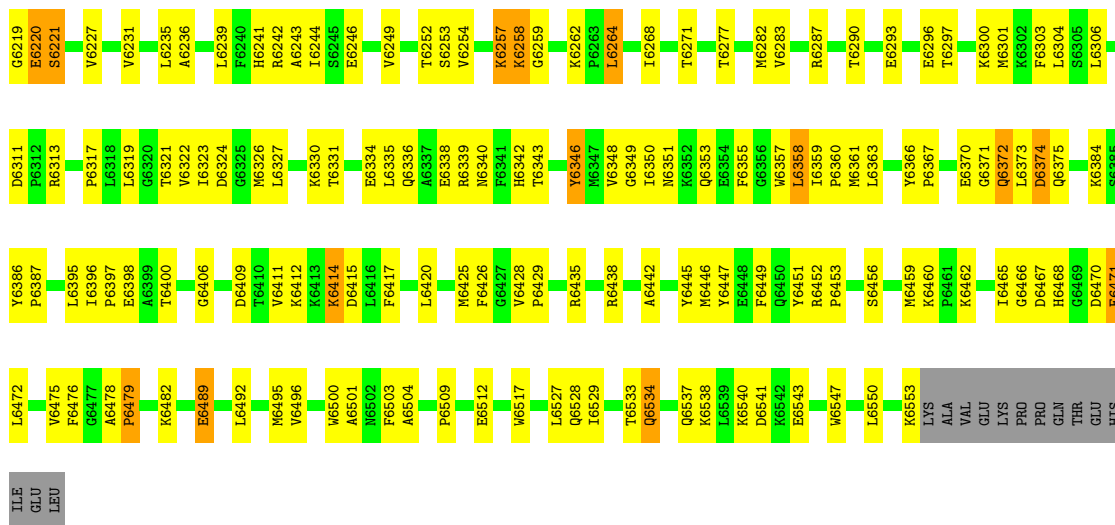


• Molecule 1: liver Carboxylesterase I

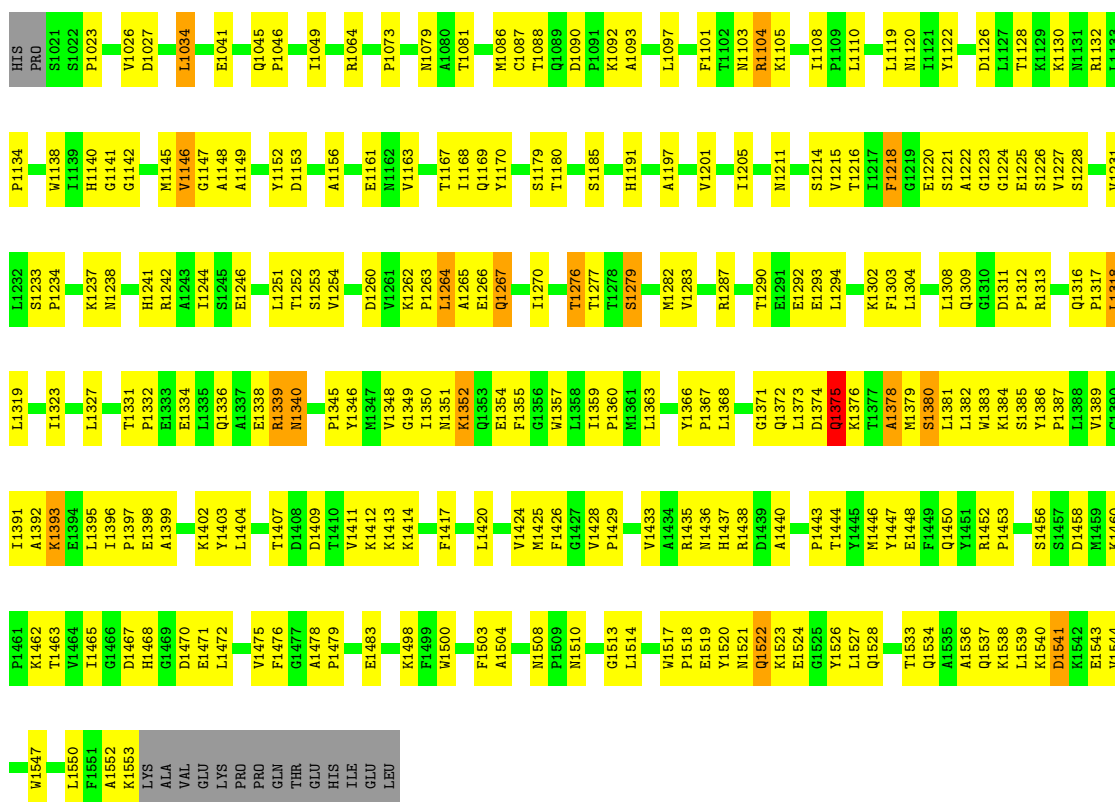


• Molecule 1: liver Carboxylesterase I



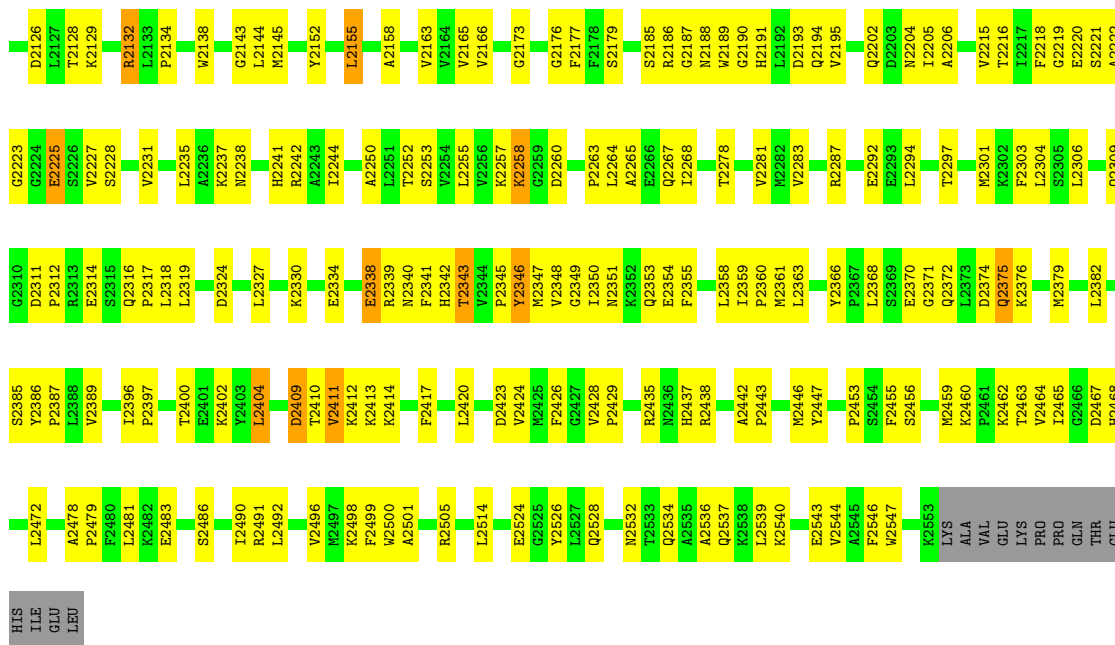


• Molecule 1: liver Carboxylesterase I

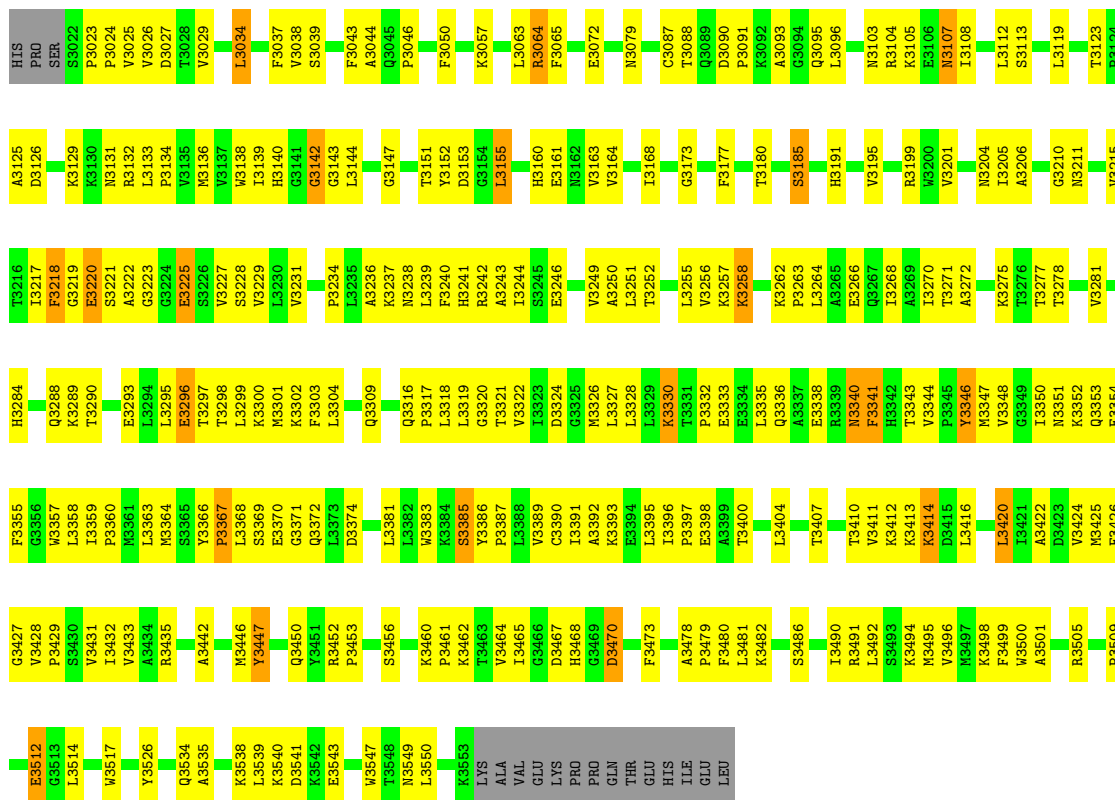


• Molecule 1: liver Carboxylesterase I





• Molecule 1: liver Carboxylesterase I



• Molecule 1: liver Carboxylesterase I



Chain L:  54% 40%

HIS	L6110	L6198	V6283	L6373	I6465	W6547
PRO	K6111	M6204	L6286	D6374	R6468	T6546
SER	L6112	M6205	K6289	Q6375	L6471	M6549
S6022	S6113	A6206	T6290	A6378	E6471	L6550
P6023	E6114	S6207	E6291	L6382	L6472	K6553
P6024	D6115	V6215	E6292	W6383	Y6475	LYS
V6095	I6121	T6216	E6293	Y6386	L6478	ALA
V6026	Y6122	I6217	T6297	P6387	P6478	VAL
V6029	T6123	F6218	K6302	L6480	F6479	GLU
V6030	A6125	G6219	F6303	L6481	P6480	LYS
G6031	D6126	E6220	L6304	E6394	L6481	PRO
K6032	L6127	S6221	L6304	I6395	G6484	PRO
Y6035	T6128	G6222	D6311	I6396	A6485	GLN
L6034	I6129	G6223	F6312	L6400	E6486	THR
F6037	R6130	E6224	R6313	E6401	E6487	GLU
L6040	L6133	E6225	Q6316	D6409	L6492	LEU
E6041	L6134	S6226	L6317	T6410	S6493	
A6048	Y6135	V6227	P6318	V6411	V6496	
L6051	Y6137	S6233	L6318	K6412	M6497	
P6054	Y6138	L6235	L6319	K6413	K6498	
L6060	L6139	A6236	V6322	K6414	R6499	
R6064	H6140	K6237	I6323	D6415	W6500	
P6067	G6141	M6238	D6324	L6416	A6501	
P6073	G6142	H6241	Y6325	F6417	A6504	
V6077	L6143	R6242	L6326	L6418	P6509	
K6078	L6144	L6327	L6327	D6419	W6517	
Y6083	M6145	E6244	E6333	L6420	Y6520	
P6085	A6149	S6245	Q6336	F6426	K6523	
M6086	L6155	E6246	L6339	G6427	E6524	
C6087	A6156	L6251	H6342	V6428	G6525	
D6090	E6161	T6252	M6347	P6429	Y6526	
P6091	Y6162	S6253	Y6348	I6432	L6527	
K6092	V6163	L6255	G6349	V6433	Q6528	
A6093	V6169	V6256	L6350	A6434	M6529	
L6096	Y6170	K6257	M6351	R6435	G6530	
L6097	R6171	G6258	F6355	D6439	A6531	
S6098	D6182	D6260	G6356	T6444	M6532	
E6099	E6183	V6261	V6357	Y6445	T6533	
R6104	H6184	K6262	L6358	M6446	Q6534	
K6105	A6185	P6263	I6359	Y6447	A6535	
E6106	S6185	L6264	L6360	R6452	A6536	
M6107	R6186	A6265	M6361	P6453	Q6537	
P6109	R6187	E6266	L6363	S6456	M6538	
	M6188	I6268	Y6366	M6459	L6539	
	Q6194	T6271	P6367	K6460	K6540	
		T6278	G6371	T6463	D6541	
		S6279	Q6372	V6464	V6544	
		A6280			A6545	
					F6546	

4 Data and refinement statistics

Xtrriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	91.17Å 120.71Å 177.02Å 90.28° 89.32° 99.22°	Depositor
Resolution (Å)	29.82 – 2.90	Depositor
% Data completeness (in resolution range)	95.7 (29.82-2.90)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	CNS 1.0	Depositor
R, R_{free}	0.214 , 0.280	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	51134	wwPDB-VP
Average B, all atoms (Å ²)	44.0	wwPDB-VP

5 Model quality i

5.1 Standard geometry i

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

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	0.38	0/4236	0.62	0/5754
1	B	0.41	0/4236	0.66	2/5754 (0.0%)
1	C	0.42	0/4230	0.65	2/5746 (0.0%)
1	D	0.41	0/4241	0.63	0/5761
1	E	0.40	0/4230	0.64	1/5746 (0.0%)
1	F	0.38	0/4230	0.62	0/5746
1	G	0.36	0/4236	0.60	0/5754
1	H	0.39	0/4230	0.63	0/5746
1	I	0.36	0/4230	0.61	0/5746
1	J	0.39	0/4236	0.62	0/5754
1	K	0.36	0/4230	0.60	0/5746
1	L	0.37	0/4230	0.63	1/5746 (0.0%)
All	All	0.39	0/50795	0.63	6/68999 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	E	0	1

There are no bond length outliers.

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	3420	LEU	CA-CB-CG	5.80	128.63	115.30
1	C	3388	LEU	CB-CG-CD2	-5.50	101.66	111.00
1	B	2339	ARG	N-CA-C	5.37	125.50	111.00
1	B	2075	SER	N-CA-C	5.33	125.41	111.00

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	L	6140	HIS	N-CA-C	5.01	124.53	111.00

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	E	5118	TYR	Sidechain

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4130	0	4132	231	0
1	B	4130	0	4132	182	0
1	C	4124	0	4127	180	0
1	D	4135	0	4134	165	0
1	E	4124	0	4127	200	0
1	F	4124	0	4127	192	0
1	G	4130	0	4132	237	0
1	H	4124	0	4127	194	0
1	I	4124	0	4127	232	0
1	J	4130	0	4134	216	0
1	K	4124	0	4127	226	0
1	L	4124	0	4127	244	0
2	A	28	0	26	3	0
2	B	14	0	13	4	0
2	C	14	0	13	0	0
2	D	14	0	13	4	0
2	E	14	0	13	2	0
2	F	14	0	13	0	0
2	G	14	0	13	4	0
2	H	14	0	13	1	0
2	I	14	0	13	1	0
2	J	14	0	13	7	0
2	K	14	0	13	1	0
2	L	14	0	13	0	0
3	A	25	0	23	20	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	25	0	23	21	0
3	C	25	0	19	27	0
3	D	25	0	24	15	0
3	E	25	0	24	18	0
3	F	25	0	21	23	0
3	G	25	0	23	12	0
3	H	25	0	23	30	0
3	I	25	0	24	19	0
3	J	25	0	24	20	0
3	K	25	0	24	18	0
3	L	25	0	24	23	0
4	A	87	0	0	9	0
4	B	120	0	0	12	0
4	C	98	0	0	10	0
4	D	119	0	0	9	0
4	E	112	0	0	16	0
4	F	91	0	0	8	0
4	G	69	0	0	10	0
4	H	95	0	0	10	0
4	I	80	0	0	10	0
4	J	110	0	0	8	0
4	K	73	0	0	11	0
4	L	75	0	0	15	0
All	All	51134	0	49998	2453	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 25.

The worst 5 of 2453 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)
3:C:3:NLX:N1	3:C:3:NLX:C9	1.69	1.56
3:C:3:NLX:C9	3:C:3:NLX:C14	1.78	1.55
1:D:4343:THR:HB	1:D:4442:ALA:HB2	1.17	1.13
1:H:2304:LEU:HB3	3:H:2:NLX:H201	1.28	1.11
1:C:3364:MET:CE	3:C:3:NLX:H181	1.83	1.08

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 X-ray entries followed by that with respect to entries of similar resolution.

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	530/548 (97%)	480 (91%)	41 (8%)	9 (2%)	9	31
1	B	530/548 (97%)	476 (90%)	48 (9%)	6 (1%)	14	42
1	C	529/548 (96%)	489 (92%)	33 (6%)	7 (1%)	12	37
1	D	531/548 (97%)	491 (92%)	36 (7%)	4 (1%)	19	51
1	E	529/548 (96%)	482 (91%)	40 (8%)	7 (1%)	12	37
1	F	529/548 (96%)	477 (90%)	44 (8%)	8 (2%)	10	34
1	G	530/548 (97%)	467 (88%)	55 (10%)	8 (2%)	10	34
1	H	529/548 (96%)	470 (89%)	52 (10%)	7 (1%)	12	37
1	I	529/548 (96%)	466 (88%)	56 (11%)	7 (1%)	12	37
1	J	530/548 (97%)	484 (91%)	40 (8%)	6 (1%)	14	42
1	K	529/548 (96%)	475 (90%)	48 (9%)	6 (1%)	14	42
1	L	529/548 (96%)	467 (88%)	53 (10%)	9 (2%)	9	31
All	All	6354/6576 (97%)	5724 (90%)	546 (9%)	84 (1%)	12	37

5 of 84 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1253	SER
1	B	2342	HIS
1	C	3253	SER
1	D	4185	SER
1	D	4253	SER

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 X-ray entries followed by that with respect to entries of similar resolution.

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	448/463 (97%)	435 (97%)	13 (3%)	42	76
1	B	448/463 (97%)	431 (96%)	17 (4%)	33	67
1	C	447/463 (96%)	420 (94%)	27 (6%)	19	49
1	D	448/463 (97%)	423 (94%)	25 (6%)	21	52
1	E	447/463 (96%)	422 (94%)	25 (6%)	21	52
1	F	447/463 (96%)	426 (95%)	21 (5%)	26	59
1	G	448/463 (97%)	419 (94%)	29 (6%)	17	45
1	H	447/463 (96%)	427 (96%)	20 (4%)	27	61
1	I	447/463 (96%)	418 (94%)	29 (6%)	17	45
1	J	448/463 (97%)	426 (95%)	22 (5%)	25	57
1	K	447/463 (96%)	421 (94%)	26 (6%)	20	50
1	L	447/463 (96%)	433 (97%)	14 (3%)	40	74
All	All	5369/5556 (97%)	5101 (95%)	268 (5%)	24	57

5 of 268 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	K	5128	THR
1	K	5299	LEU
1	L	6264	LEU
1	E	5319	LEU
1	E	5266	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 177 such sidechains are listed below:

Mol	Chain	Res	Type
1	H	2267	GLN
1	J	4238	ASN
1	H	2372	GLN
1	I	3336	GLN
1	J	4375	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

25 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	NLX	L	6	-	26,29,29	3.35	15 (57%)	45,49,49	2.19	15 (33%)
3	NLX	F	6	-	26,29,29	3.41	17 (65%)	45,49,49	5.27	22 (48%)
2	NAG	G	179	-	14,14,15	0.55	0	17,19,21	0.58	0
3	NLX	B	2	-	26,29,29	2.96	15 (57%)	45,49,49	2.04	14 (31%)
2	NAG	L	679	-	14,14,15	0.60	0	17,19,21	0.65	0
2	NAG	F	679	-	14,14,15	0.51	0	17,19,21	0.76	1 (5%)
2	NAG	A	180	-	14,14,15	0.60	0	17,19,21	0.66	0
2	NAG	H	279	-	14,14,15	0.48	0	17,19,21	0.66	0
2	NAG	E	579	-	14,14,15	0.51	0	17,19,21	0.76	1 (5%)
2	NAG	I	379	-	14,14,15	0.47	0	17,19,21	0.78	1 (5%)
2	NAG	K	579	-	14,14,15	0.52	0	17,19,21	0.75	1 (5%)
3	NLX	H	2	-	26,29,29	3.28	15 (57%)	45,49,49	2.46	15 (33%)
2	NAG	B	279	-	14,14,15	0.49	0	17,19,21	0.59	0
3	NLX	C	3	-	26,29,29	4.40	18 (69%)	45,49,49	5.14	19 (42%)
3	NLX	J	4	-	26,29,29	3.41	14 (53%)	45,49,49	2.06	12 (26%)
2	NAG	C	379	-	14,14,15	0.48	0	17,19,21	0.73	0
3	NLX	G	1	-	26,29,29	3.39	15 (57%)	45,49,49	2.22	14 (31%)
3	NLX	I	3	-	26,29,29	3.16	17 (65%)	45,49,49	2.36	15 (33%)
3	NLX	D	4	-	26,29,29	3.29	17 (65%)	45,49,49	2.30	15 (33%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	NLX	E	5	-	26,29,29	3.07	17 (65%)	45,49,49	2.05	14 (31%)
2	NAG	A	179	-	14,14,15	0.63	0	17,19,21	0.65	0
3	NLX	A	1	-	26,29,29	3.68	16 (61%)	45,49,49	2.20	16 (35%)
3	NLX	K	5	-	26,29,29	3.15	15 (57%)	45,49,49	2.09	15 (33%)
2	NAG	D	479	-	14,14,15	0.45	0	17,19,21	0.61	0
2	NAG	J	479	-	14,14,15	0.55	0	17,19,21	0.65	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
3	NLX	L	6	-	1/1/6/7	0/4/62/62	0/6/5/5
3	NLX	F	6	-	1/1/6/7	2/4/62/62	0/6/5/5
2	NAG	G	179	-	-	5/6/23/26	0/1/1/1
3	NLX	B	2	-	1/1/6/7	0/4/62/62	0/6/5/5
2	NAG	L	679	-	-	2/6/23/26	0/1/1/1
2	NAG	F	679	-	-	3/6/23/26	0/1/1/1
2	NAG	A	180	-	-	3/6/23/26	0/1/1/1
2	NAG	H	279	-	-	4/6/23/26	0/1/1/1
2	NAG	E	579	-	-	0/6/23/26	0/1/1/1
2	NAG	I	379	-	-	4/6/23/26	0/1/1/1
3	NLX	H	2	-	1/1/6/7	0/4/62/62	0/6/5/5
2	NAG	K	579	-	-	4/6/23/26	0/1/1/1
3	NLX	C	3	-	1/1/6/7	1/4/62/62	0/6/5/5
2	NAG	B	279	-	-	2/6/23/26	0/1/1/1
3	NLX	J	4	-	1/1/6/7	0/4/62/62	0/6/5/5
2	NAG	C	379	-	-	2/6/23/26	0/1/1/1
3	NLX	G	1	-	1/1/6/7	1/4/62/62	0/6/5/5
3	NLX	I	3	-	1/1/6/7	0/4/62/62	0/6/5/5
3	NLX	D	4	-	1/1/6/7	0/4/62/62	0/6/5/5
2	NAG	A	179	-	-	4/6/23/26	0/1/1/1
3	NLX	E	5	-	1/1/6/7	0/4/62/62	0/6/5/5
3	NLX	A	1	-	1/1/6/7	0/4/62/62	0/6/5/5
3	NLX	K	5	-	1/1/6/7	0/4/62/62	0/6/5/5
2	NAG	D	479	-	-	2/6/23/26	0/1/1/1
2	NAG	J	479	-	-	3/6/23/26	0/1/1/1

The worst 5 of 191 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	3	NLX	C14-C9	14.77	1.78	1.55
3	D	4	NLX	C14-C9	10.24	1.71	1.55
3	H	2	NLX	C14-C9	9.99	1.71	1.55
3	J	4	NLX	C14-C9	9.64	1.70	1.55
3	A	1	NLX	C14-C9	9.52	1.70	1.55

The worst 5 of 190 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	3	NLX	C20-N1-C17	-23.54	63.74	108.50
3	F	6	NLX	C20-N1-C17	-22.28	66.14	108.50
3	C	3	NLX	C20-N1-C16	-17.31	68.71	108.64
3	F	6	NLX	C20-N1-C16	-15.98	71.79	108.64
3	C	3	NLX	C16-N1-C17	10.17	131.74	109.05

5 of 12 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
3	A	1	NLX	N1
3	B	2	NLX	N1
3	C	3	NLX	N1
3	D	4	NLX	N1
3	E	5	NLX	N1

5 of 42 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	179	NAG	C8-C7-N2-C2
2	A	179	NAG	O7-C7-N2-C2
2	A	180	NAG	C8-C7-N2-C2
2	A	180	NAG	O7-C7-N2-C2
2	B	279	NAG	C8-C7-N2-C2

There are no ring outliers.

22 monomers are involved in 273 short contacts:

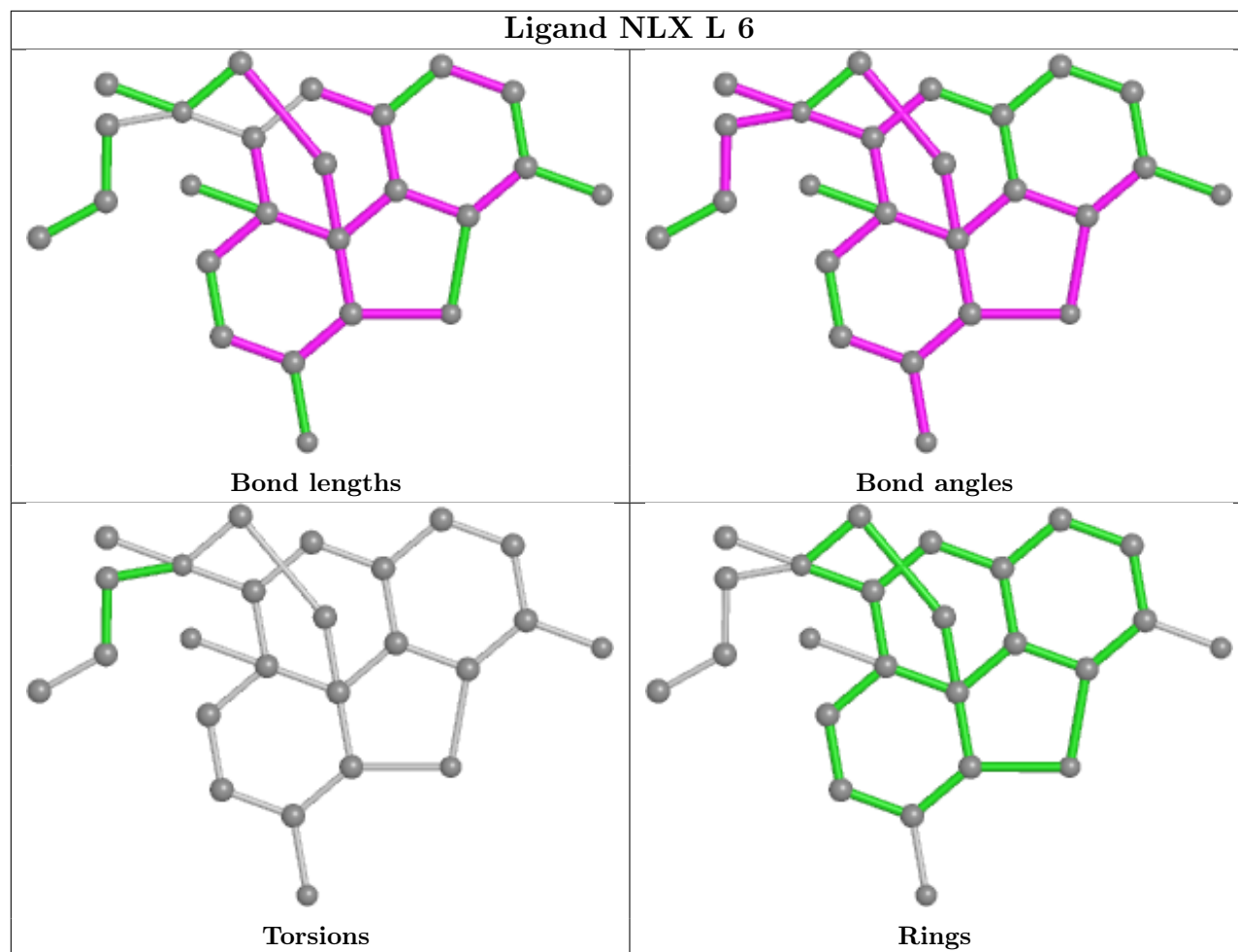
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	L	6	NLX	23	0
3	F	6	NLX	23	0
2	G	179	NAG	4	0
3	B	2	NLX	21	0

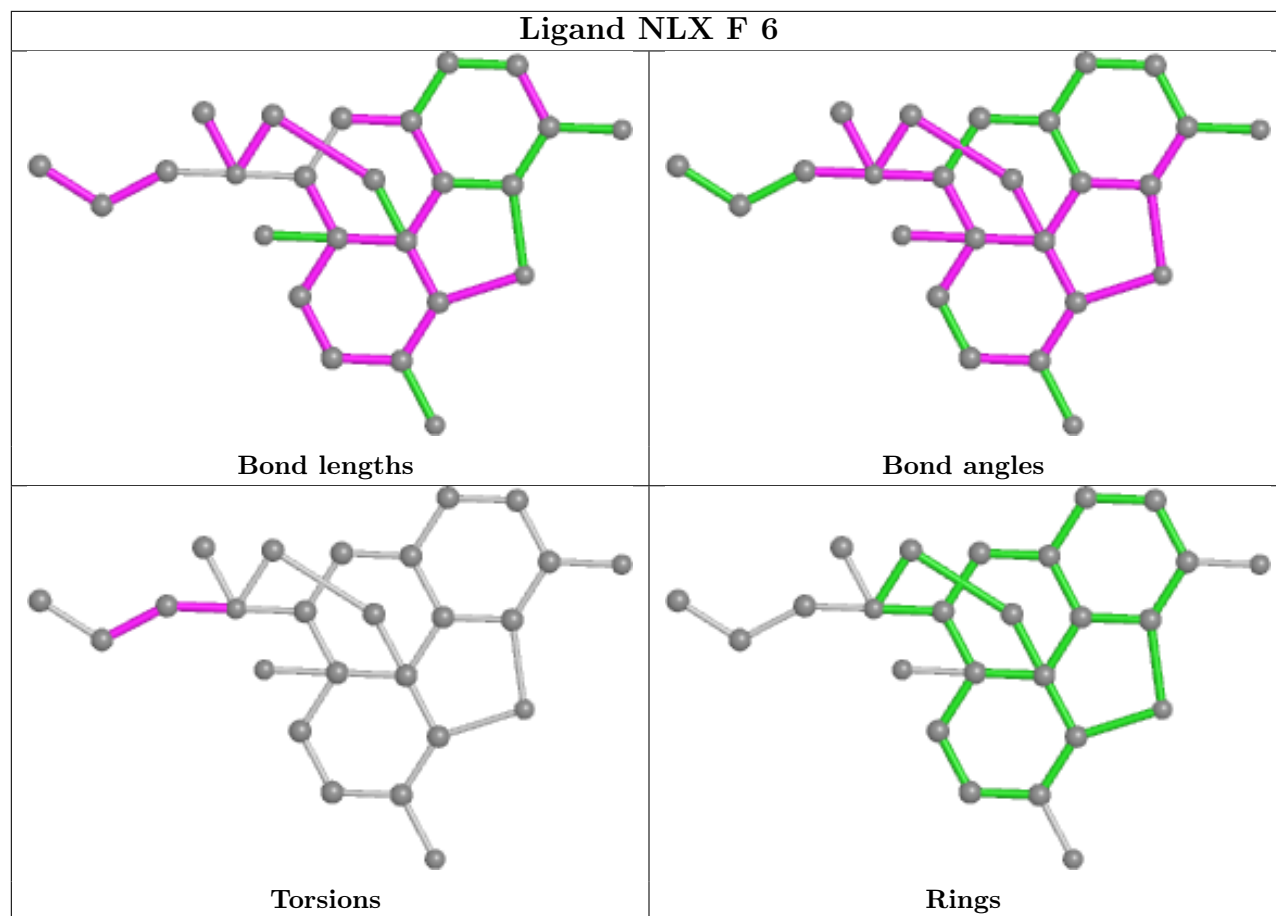
Continued on next page...

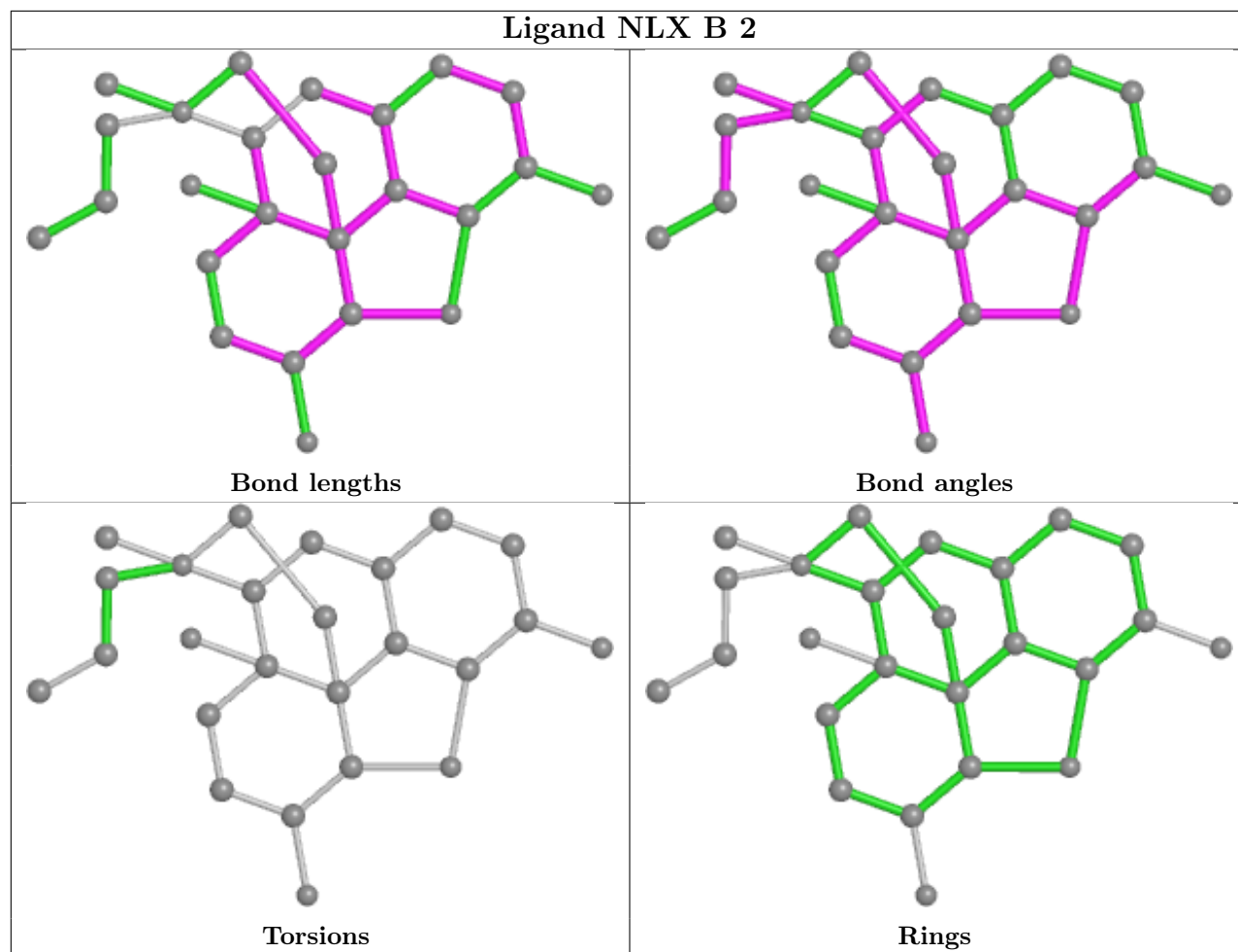
Continued from previous page...

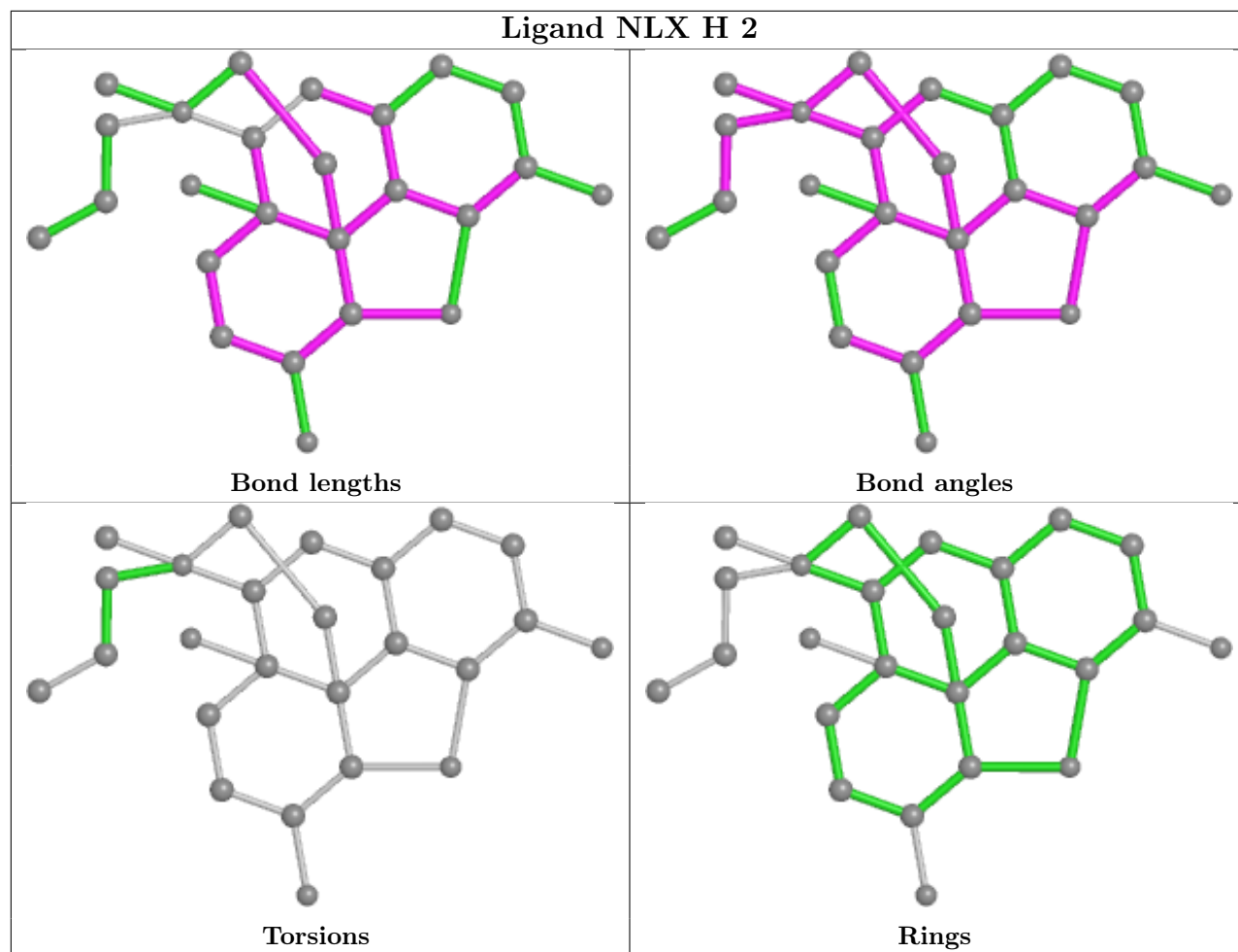
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	180	NAG	1	0
2	H	279	NAG	1	0
2	E	579	NAG	2	0
2	I	379	NAG	1	0
2	K	579	NAG	1	0
3	H	2	NLX	30	0
2	B	279	NAG	4	0
3	C	3	NLX	27	0
3	J	4	NLX	20	0
3	G	1	NLX	12	0
3	I	3	NLX	19	0
3	D	4	NLX	15	0
3	E	5	NLX	18	0
2	A	179	NAG	3	0
3	A	1	NLX	20	0
3	K	5	NLX	18	0
2	D	479	NAG	4	0
2	J	479	NAG	7	0

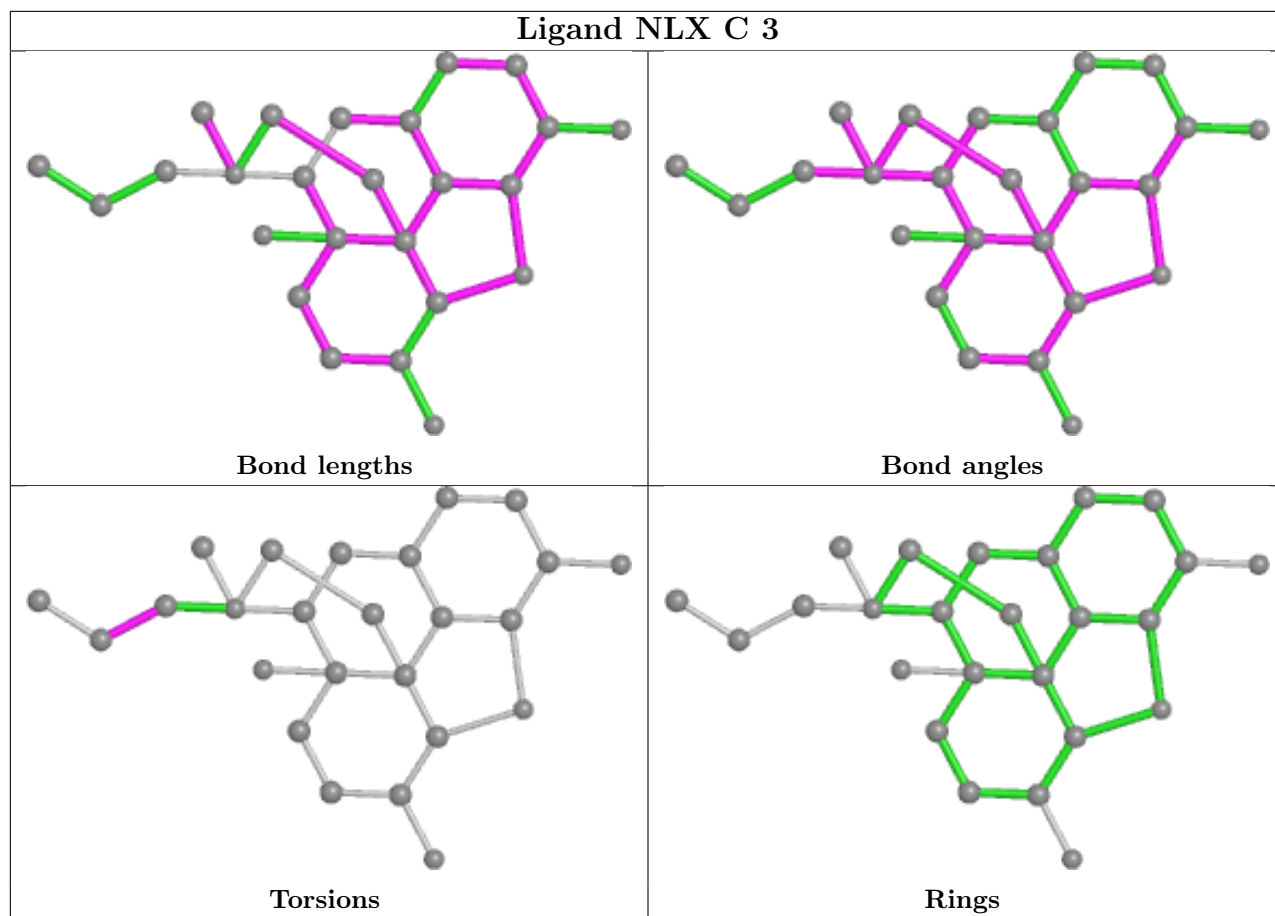
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

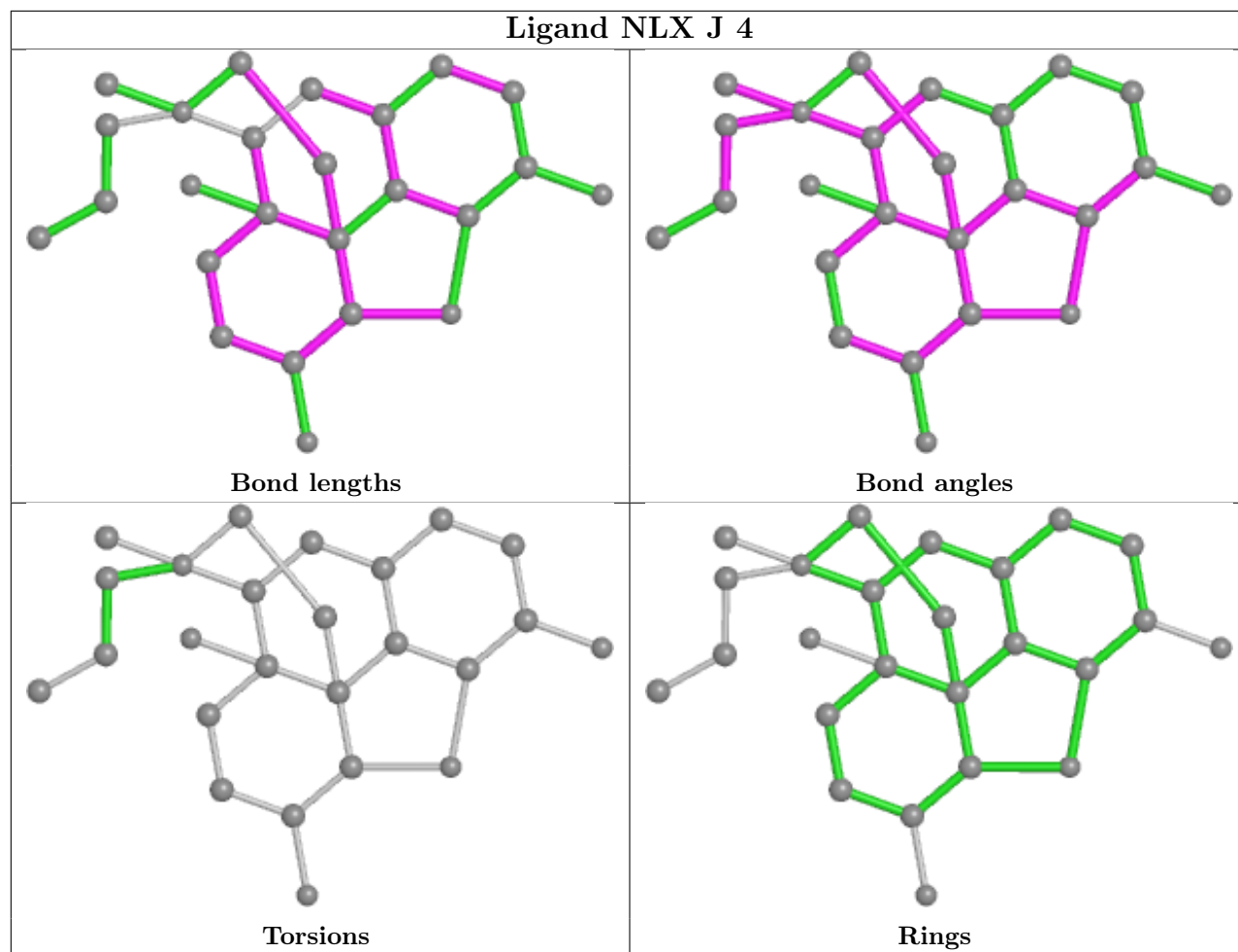


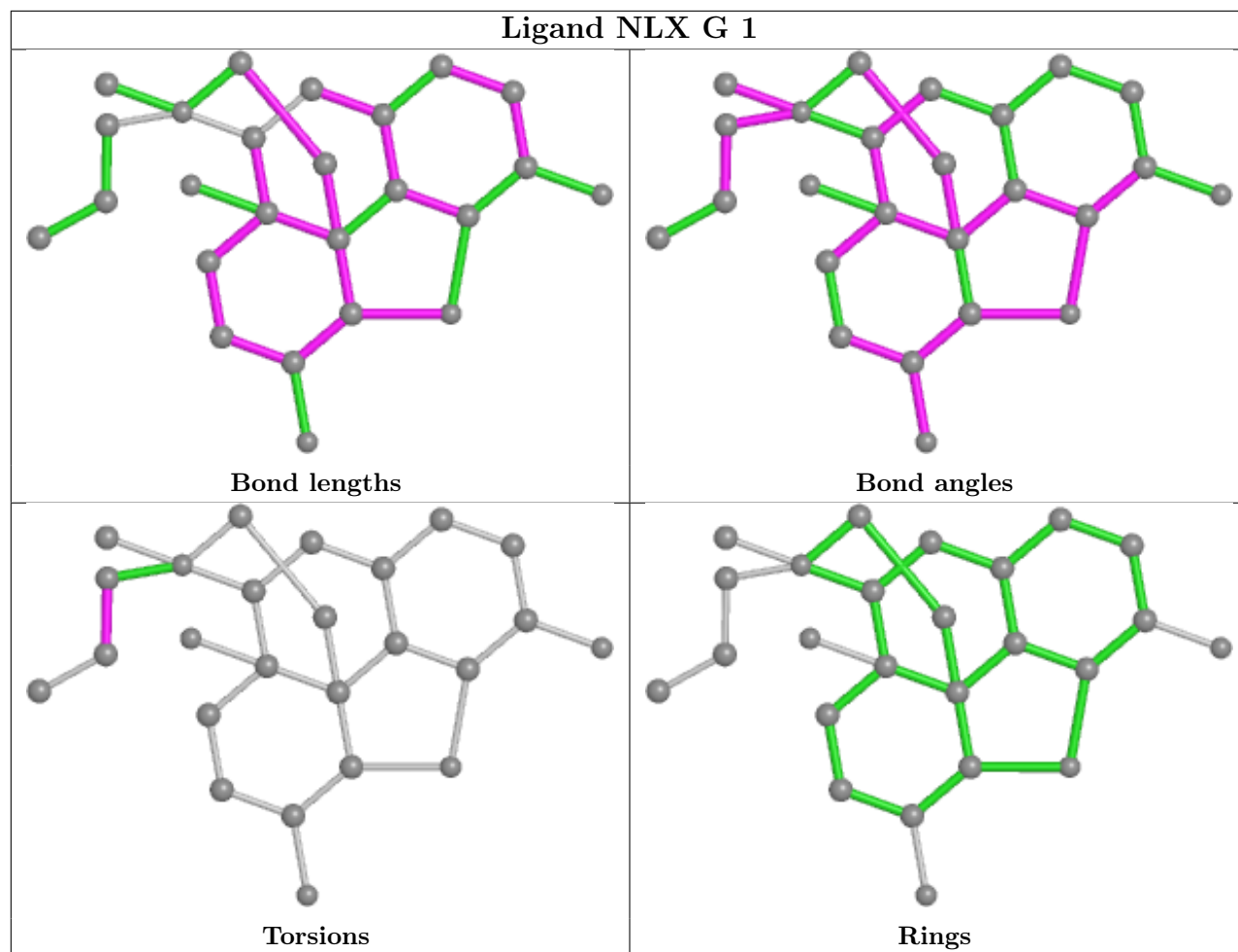


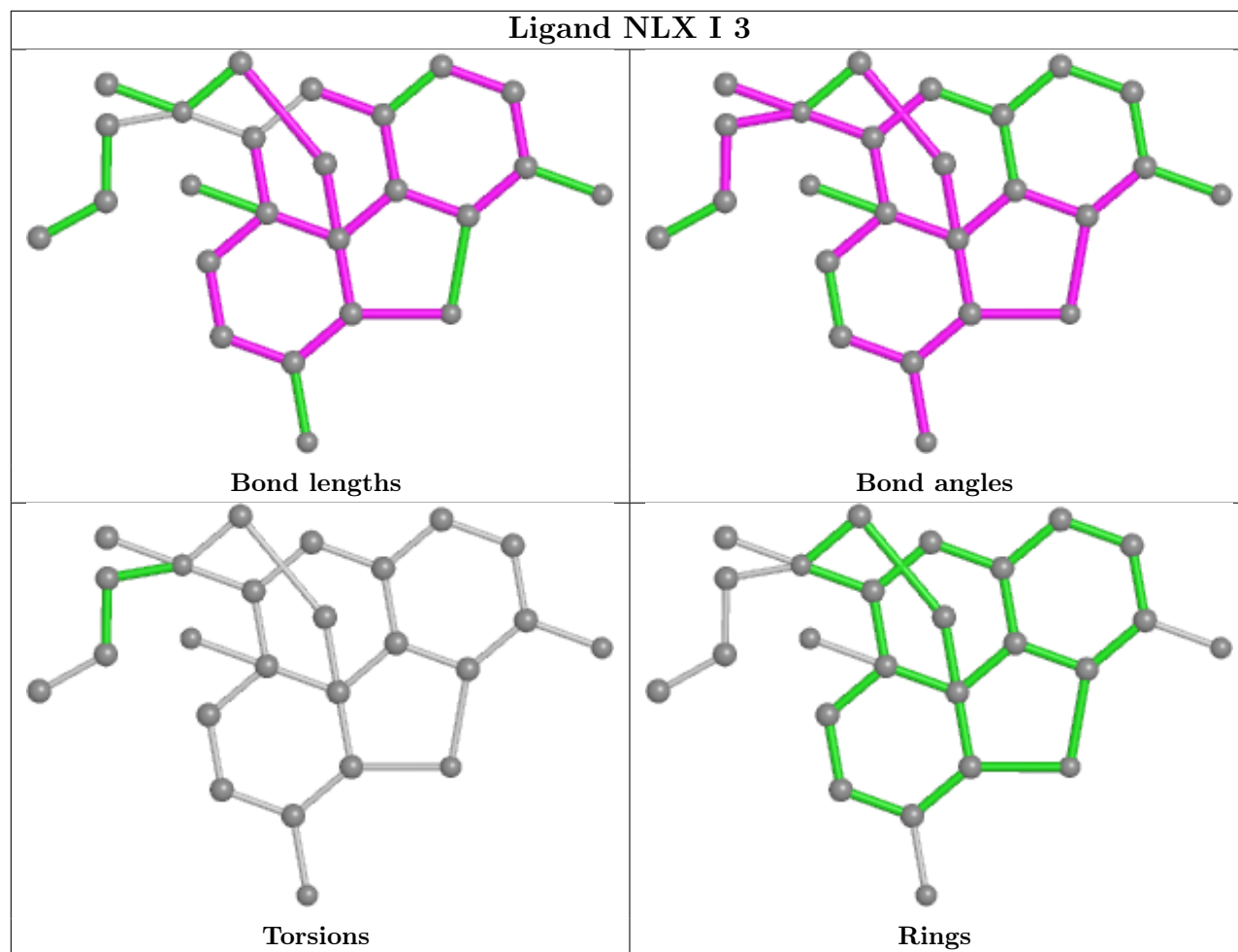


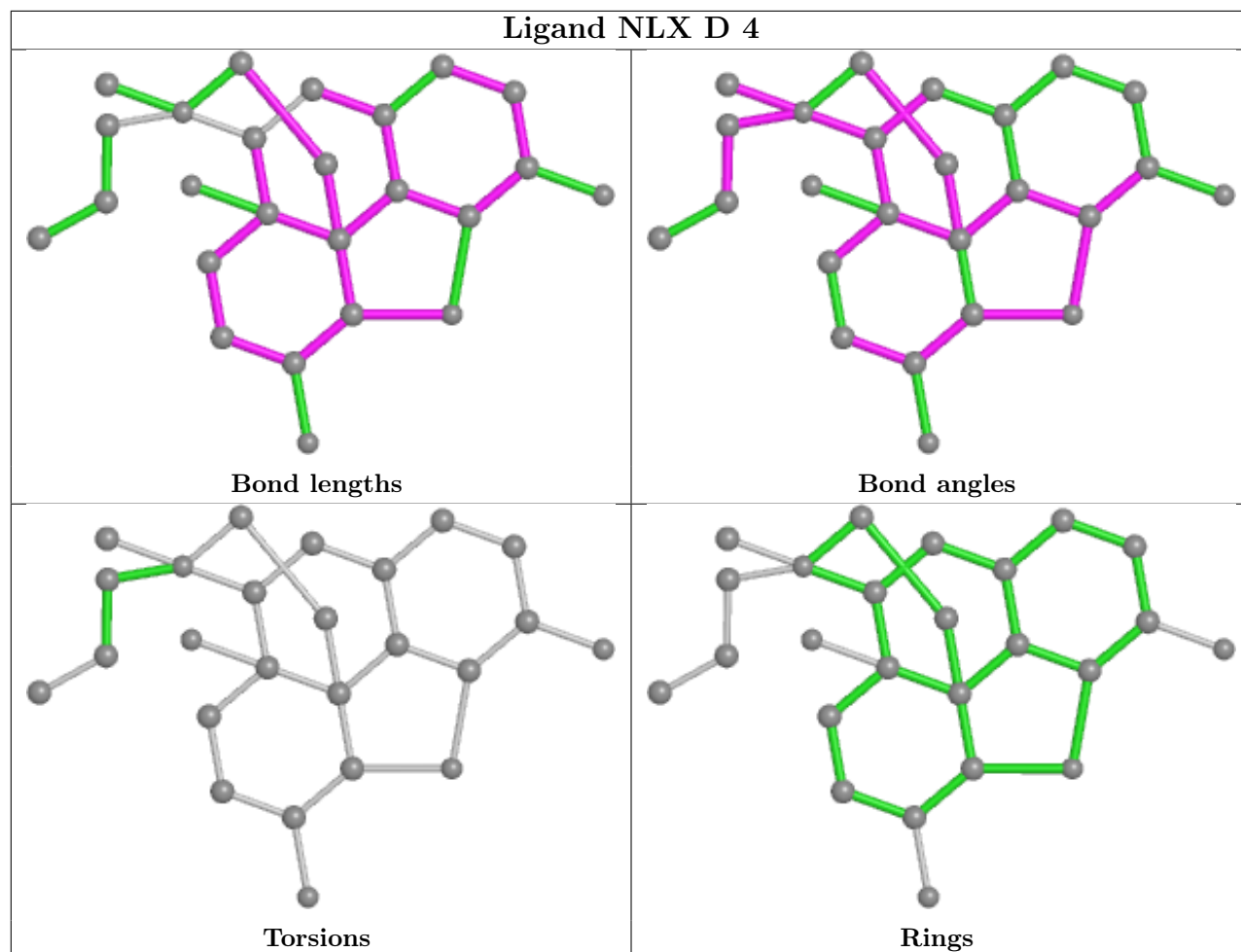


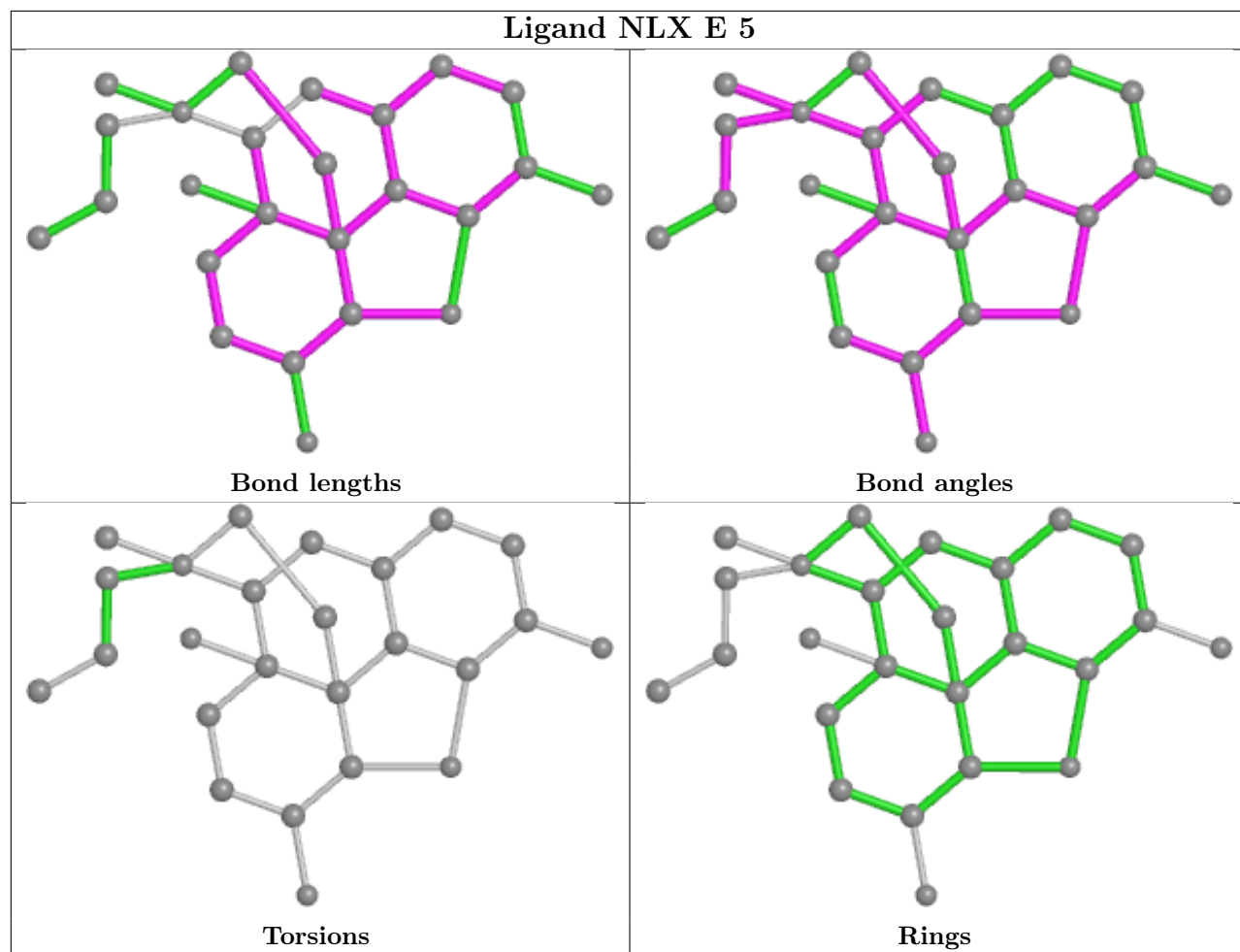


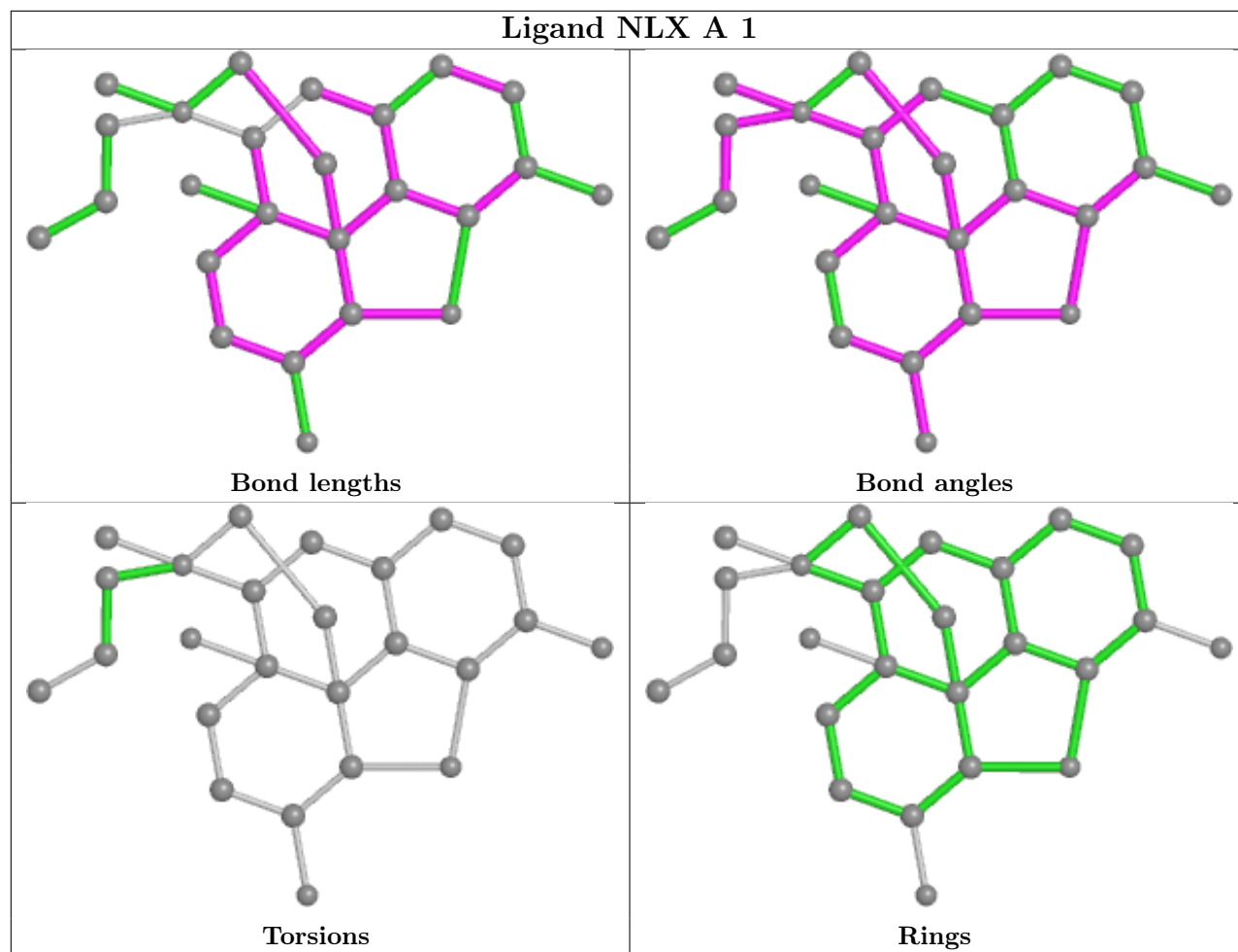


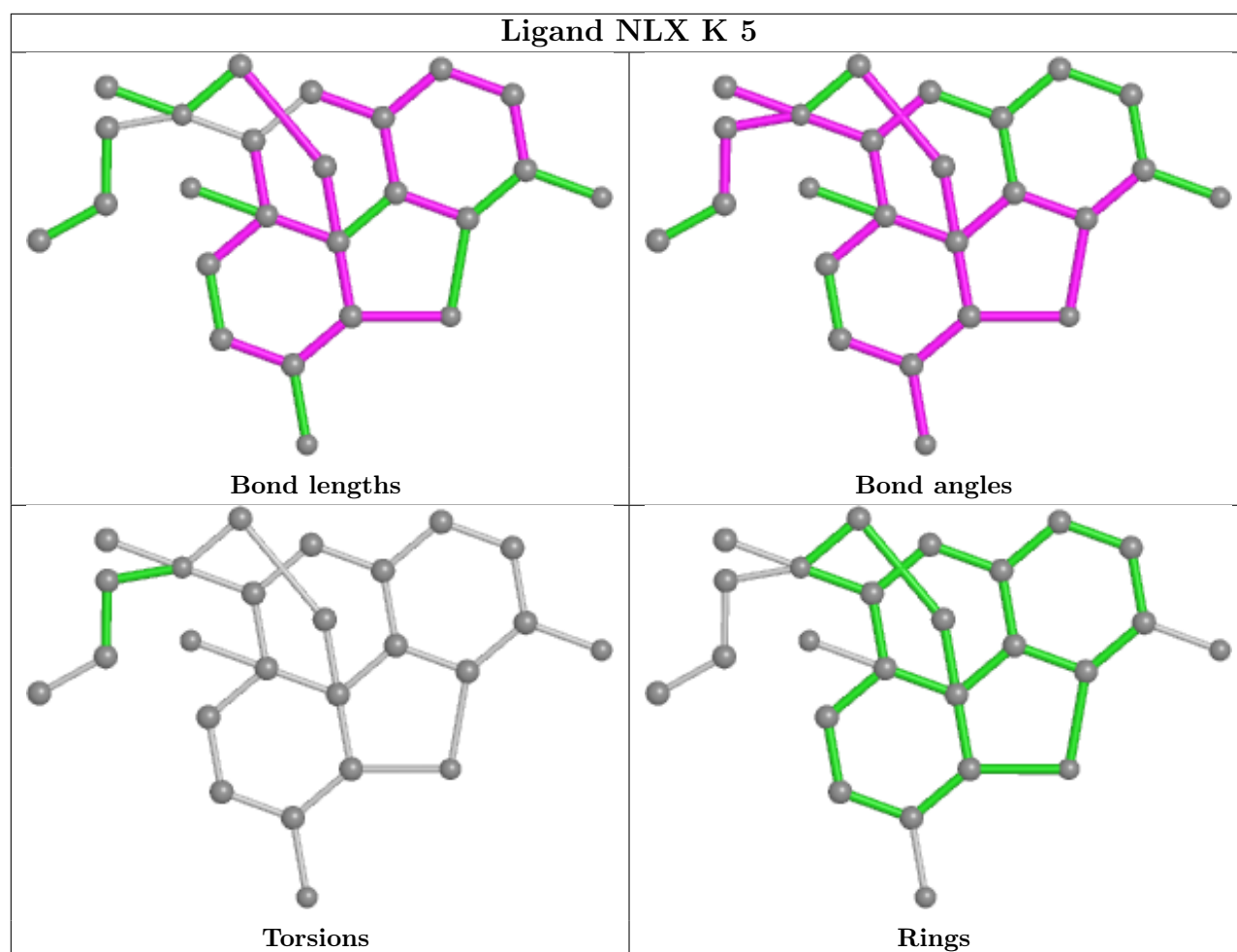












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates [i](#)

EDS was not executed - this section is therefore empty.

6.4 Ligands [i](#)

EDS was not executed - this section is therefore empty.

6.5 Other polymers [i](#)

EDS was not executed - this section is therefore empty.