



# wwPDB X-ray Structure Validation Summary Report ⓘ

Oct 26, 2023 – 04:52 pm BST

PDB ID : 8BAP  
Title : Eugenol Oxidase (EUGO) from *Rhodococcus jostii* RHA1, eightfold mutant active on propanol syringol  
Authors : Alvigini, L.; Mattevi, A.  
Deposited on : 2022-10-11  
Resolution : 2.30 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](mailto: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>.

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

MolProbity : 4.02b-467  
Mogul : 1.8.4, CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.36  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

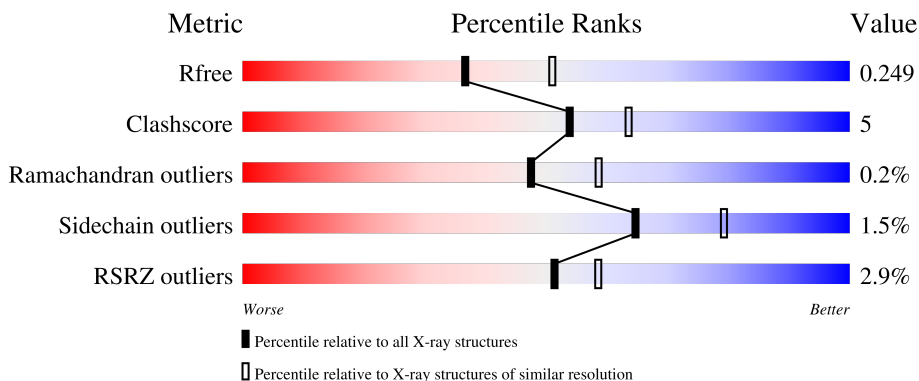
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.30 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))
$R_{free}$	130704	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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  $\geq 3$ , 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  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	526	
1	B	526	
1	C	526	
1	D	526	
1	E	526	

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Mol	Chain	Length	Quality of chain
1	F	526	<p>% 90% 10%</p>
1	G	526	<p>% 88% 12%</p>
1	H	526	<p>% 89% 10%</p>
1	I	526	<p>% 89% 10%</p>
1	J	526	<p>% 87% 11%</p>
1	K	526	<p>2% 90% 9%</p>
1	L	526	<p>5% 87% 12%</p>
1	M	526	<p>4% 83% 16%</p>
1	N	526	<p>3% 87% 12%</p>
1	O	526	<p>10% 86% 13%</p>
1	P	526	<p>13% 77% 22%</p>

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 68547 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 Probable vanillyl-alcohol oxidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	525	4135	2635	702	774	24	0	0	0
1	B	525	4135	2635	702	774	24	0	0	0
1	C	525	4135	2635	702	774	24	0	0	0
1	D	525	4135	2635	702	774	24	0	0	0
1	E	525	4135	2635	702	774	24	0	0	0
1	F	525	4135	2635	702	774	24	0	0	0
1	G	525	4135	2635	702	774	24	0	0	0
1	H	525	4135	2635	702	774	24	0	0	0
1	I	525	4135	2635	702	774	24	0	0	0
1	J	525	4135	2635	702	774	24	0	0	0
1	K	525	4135	2635	702	774	24	0	0	0
1	L	525	4135	2635	702	774	24	0	0	0
1	M	525	4135	2635	702	774	24	0	0	0
1	N	525	4135	2635	702	774	24	0	0	0
1	O	525	4135	2635	702	774	24	0	0	0
1	P	525	4135	2635	702	774	24	0	0	0

There are 128 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	81	HIS	SER	engineered mutation	UNP Q0SBK1
A	381	GLN	LEU	engineered mutation	UNP Q0SBK1
A	394	VAL	SER	engineered mutation	UNP Q0SBK1
A	423	MET	ALA	engineered mutation	UNP Q0SBK1
A	427	VAL	ILE	engineered mutation	UNP Q0SBK1
A	434	TYR	HIS	engineered mutation	UNP Q0SBK1
A	445	ASP	ILE	engineered mutation	UNP Q0SBK1
A	518	PRO	SER	engineered mutation	UNP Q0SBK1
B	81	HIS	SER	engineered mutation	UNP Q0SBK1
B	381	GLN	LEU	engineered mutation	UNP Q0SBK1
B	394	VAL	SER	engineered mutation	UNP Q0SBK1
B	423	MET	ALA	engineered mutation	UNP Q0SBK1
B	427	VAL	ILE	engineered mutation	UNP Q0SBK1
B	434	TYR	HIS	engineered mutation	UNP Q0SBK1
B	445	ASP	ILE	engineered mutation	UNP Q0SBK1
B	518	PRO	SER	engineered mutation	UNP Q0SBK1
C	81	HIS	SER	engineered mutation	UNP Q0SBK1
C	381	GLN	LEU	engineered mutation	UNP Q0SBK1
C	394	VAL	SER	engineered mutation	UNP Q0SBK1
C	423	MET	ALA	engineered mutation	UNP Q0SBK1
C	427	VAL	ILE	engineered mutation	UNP Q0SBK1
C	434	TYR	HIS	engineered mutation	UNP Q0SBK1
C	445	ASP	ILE	engineered mutation	UNP Q0SBK1
C	518	PRO	SER	engineered mutation	UNP Q0SBK1
D	81	HIS	SER	engineered mutation	UNP Q0SBK1
D	381	GLN	LEU	engineered mutation	UNP Q0SBK1
D	394	VAL	SER	engineered mutation	UNP Q0SBK1
D	423	MET	ALA	engineered mutation	UNP Q0SBK1
D	427	VAL	ILE	engineered mutation	UNP Q0SBK1
D	434	TYR	HIS	engineered mutation	UNP Q0SBK1
D	445	ASP	ILE	engineered mutation	UNP Q0SBK1
D	518	PRO	SER	engineered mutation	UNP Q0SBK1
E	81	HIS	SER	engineered mutation	UNP Q0SBK1
E	381	GLN	LEU	engineered mutation	UNP Q0SBK1
E	394	VAL	SER	engineered mutation	UNP Q0SBK1
E	423	MET	ALA	engineered mutation	UNP Q0SBK1
E	427	VAL	ILE	engineered mutation	UNP Q0SBK1
E	434	TYR	HIS	engineered mutation	UNP Q0SBK1
E	445	ASP	ILE	engineered mutation	UNP Q0SBK1
E	518	PRO	SER	engineered mutation	UNP Q0SBK1
F	81	HIS	SER	engineered mutation	UNP Q0SBK1
F	381	GLN	LEU	engineered mutation	UNP Q0SBK1

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Chain	Residue	Modelled	Actual	Comment	Reference
F	394	VAL	SER	engineered mutation	UNP Q0SBK1
F	423	MET	ALA	engineered mutation	UNP Q0SBK1
F	427	VAL	ILE	engineered mutation	UNP Q0SBK1
F	434	TYR	HIS	engineered mutation	UNP Q0SBK1
F	445	ASP	ILE	engineered mutation	UNP Q0SBK1
F	518	PRO	SER	engineered mutation	UNP Q0SBK1
G	81	HIS	SER	engineered mutation	UNP Q0SBK1
G	381	GLN	LEU	engineered mutation	UNP Q0SBK1
G	394	VAL	SER	engineered mutation	UNP Q0SBK1
G	423	MET	ALA	engineered mutation	UNP Q0SBK1
G	427	VAL	ILE	engineered mutation	UNP Q0SBK1
G	434	TYR	HIS	engineered mutation	UNP Q0SBK1
G	445	ASP	ILE	engineered mutation	UNP Q0SBK1
G	518	PRO	SER	engineered mutation	UNP Q0SBK1
H	81	HIS	SER	engineered mutation	UNP Q0SBK1
H	381	GLN	LEU	engineered mutation	UNP Q0SBK1
H	394	VAL	SER	engineered mutation	UNP Q0SBK1
H	423	MET	ALA	engineered mutation	UNP Q0SBK1
H	427	VAL	ILE	engineered mutation	UNP Q0SBK1
H	434	TYR	HIS	engineered mutation	UNP Q0SBK1
H	445	ASP	ILE	engineered mutation	UNP Q0SBK1
H	518	PRO	SER	engineered mutation	UNP Q0SBK1
I	81	HIS	SER	engineered mutation	UNP Q0SBK1
I	381	GLN	LEU	engineered mutation	UNP Q0SBK1
I	394	VAL	SER	engineered mutation	UNP Q0SBK1
I	423	MET	ALA	engineered mutation	UNP Q0SBK1
I	427	VAL	ILE	engineered mutation	UNP Q0SBK1
I	434	TYR	HIS	engineered mutation	UNP Q0SBK1
I	445	ASP	ILE	engineered mutation	UNP Q0SBK1
I	518	PRO	SER	engineered mutation	UNP Q0SBK1
J	81	HIS	SER	engineered mutation	UNP Q0SBK1
J	381	GLN	LEU	engineered mutation	UNP Q0SBK1
J	394	VAL	SER	engineered mutation	UNP Q0SBK1
J	423	MET	ALA	engineered mutation	UNP Q0SBK1
J	427	VAL	ILE	engineered mutation	UNP Q0SBK1
J	434	TYR	HIS	engineered mutation	UNP Q0SBK1
J	445	ASP	ILE	engineered mutation	UNP Q0SBK1
J	518	PRO	SER	engineered mutation	UNP Q0SBK1
K	81	HIS	SER	engineered mutation	UNP Q0SBK1
K	381	GLN	LEU	engineered mutation	UNP Q0SBK1
K	394	VAL	SER	engineered mutation	UNP Q0SBK1
K	423	MET	ALA	engineered mutation	UNP Q0SBK1

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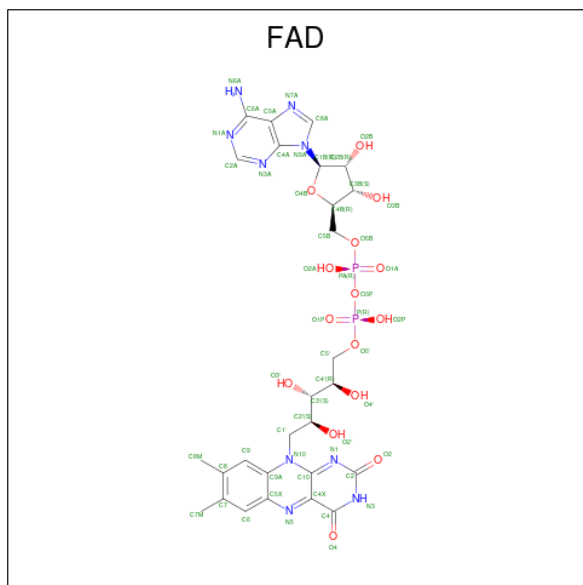
Chain	Residue	Modelled	Actual	Comment	Reference
K	427	VAL	ILE	engineered mutation	UNP Q0SBK1
K	434	TYR	HIS	engineered mutation	UNP Q0SBK1
K	445	ASP	ILE	engineered mutation	UNP Q0SBK1
K	518	PRO	SER	engineered mutation	UNP Q0SBK1
L	81	HIS	SER	engineered mutation	UNP Q0SBK1
L	381	GLN	LEU	engineered mutation	UNP Q0SBK1
L	394	VAL	SER	engineered mutation	UNP Q0SBK1
L	423	MET	ALA	engineered mutation	UNP Q0SBK1
L	427	VAL	ILE	engineered mutation	UNP Q0SBK1
L	434	TYR	HIS	engineered mutation	UNP Q0SBK1
L	445	ASP	ILE	engineered mutation	UNP Q0SBK1
L	518	PRO	SER	engineered mutation	UNP Q0SBK1
M	81	HIS	SER	engineered mutation	UNP Q0SBK1
M	381	GLN	LEU	engineered mutation	UNP Q0SBK1
M	394	VAL	SER	engineered mutation	UNP Q0SBK1
M	423	MET	ALA	engineered mutation	UNP Q0SBK1
M	427	VAL	ILE	engineered mutation	UNP Q0SBK1
M	434	TYR	HIS	engineered mutation	UNP Q0SBK1
M	445	ASP	ILE	engineered mutation	UNP Q0SBK1
M	518	PRO	SER	engineered mutation	UNP Q0SBK1
N	81	HIS	SER	engineered mutation	UNP Q0SBK1
N	381	GLN	LEU	engineered mutation	UNP Q0SBK1
N	394	VAL	SER	engineered mutation	UNP Q0SBK1
N	423	MET	ALA	engineered mutation	UNP Q0SBK1
N	427	VAL	ILE	engineered mutation	UNP Q0SBK1
N	434	TYR	HIS	engineered mutation	UNP Q0SBK1
N	445	ASP	ILE	engineered mutation	UNP Q0SBK1
N	518	PRO	SER	engineered mutation	UNP Q0SBK1
O	81	HIS	SER	engineered mutation	UNP Q0SBK1
O	381	GLN	LEU	engineered mutation	UNP Q0SBK1
O	394	VAL	SER	engineered mutation	UNP Q0SBK1
O	423	MET	ALA	engineered mutation	UNP Q0SBK1
O	427	VAL	ILE	engineered mutation	UNP Q0SBK1
O	434	TYR	HIS	engineered mutation	UNP Q0SBK1
O	445	ASP	ILE	engineered mutation	UNP Q0SBK1
O	518	PRO	SER	engineered mutation	UNP Q0SBK1
P	81	HIS	SER	engineered mutation	UNP Q0SBK1
P	381	GLN	LEU	engineered mutation	UNP Q0SBK1
P	394	VAL	SER	engineered mutation	UNP Q0SBK1
P	423	MET	ALA	engineered mutation	UNP Q0SBK1
P	427	VAL	ILE	engineered mutation	UNP Q0SBK1
P	434	TYR	HIS	engineered mutation	UNP Q0SBK1

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Chain	Residue	Modelled	Actual	Comment	Reference
P	445	ASP	ILE	engineered mutation	UNP Q0SBK1
P	518	PRO	SER	engineered mutation	UNP Q0SBK1

- Molecule 2 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula:  $C_{27}H_{33}N_9O_{15}P_2$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
2	A	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	B	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	C	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	D	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	E	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	F	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	G	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	H	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	I	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	J	1	Total	C	N	O	P	0	0
			53	27	9	15	2		

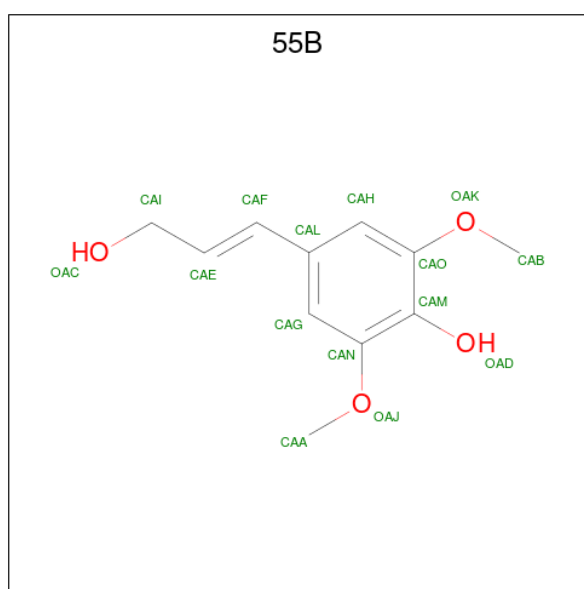
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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	K	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	L	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	M	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	N	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	O	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	P	1	Total	C	N	O	P	0	0
			53	27	9	15	2		

- Molecule 3 is 4-[(1E)-3-hydroxyprop-1-en-1-yl]-2,6-dimethoxyphenol (three-letter code: 55B) (formula: C<sub>11</sub>H<sub>14</sub>O<sub>4</sub>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			15	11	4		
3	B	1	Total	C	O	0	0
			15	11	4		
3	C	1	Total	C	O	0	0
			15	11	4		
3	D	1	Total	C	O	0	0
			15	11	4		
3	E	1	Total	C	O	0	0
			15	11	4		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	F	1	Total	C	O	0	0
			15	11	4		
3	G	1	Total	C	O	0	0
			15	11	4		
3	H	1	Total	C	O	0	0
			15	11	4		
3	I	1	Total	C	O	0	0
			15	11	4		
3	J	1	Total	C	O	0	0
			15	11	4		
3	K	1	Total	C	O	0	0
			15	11	4		
3	L	1	Total	C	O	0	0
			15	11	4		
3	M	1	Total	C	O	0	0
			15	11	4		
3	N	1	Total	C	O	0	0
			15	11	4		
3	O	1	Total	C	O	0	0
			15	11	4		
3	P	1	Total	C	O	0	0
			15	11	4		

- Molecule 4 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	2	Total	Ca	0	0
			2	2		
4	B	1	Total	Ca	0	0
			1	1		
4	C	1	Total	Ca	0	0
			1	1		
4	D	1	Total	Ca	0	0
			1	1		
4	E	1	Total	Ca	0	0
			1	1		
4	F	1	Total	Ca	0	0
			1	1		
4	J	1	Total	Ca	0	0
			1	1		
4	L	1	Total	Ca	0	0
			1	1		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	M	1	Total Ca 1 1	0	0
4	N	1	Total Ca 1 1	0	0
4	O	1	Total Ca 1 1	0	0

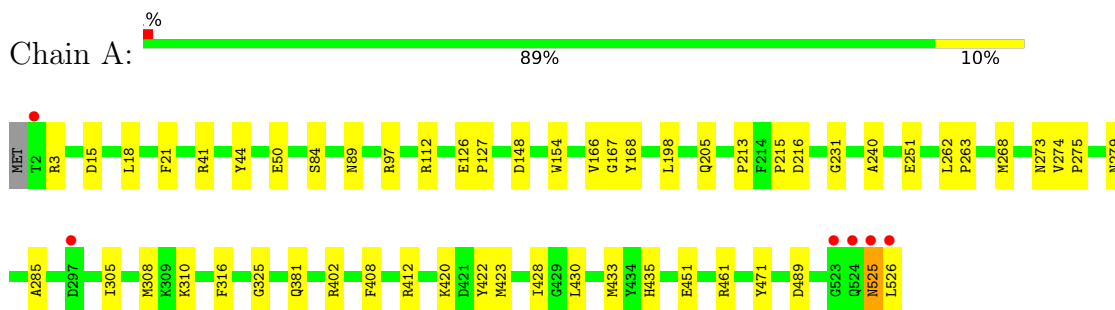
- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	90	Total O 90 90	0	0
5	B	118	Total O 118 118	0	0
5	C	110	Total O 110 110	0	0
5	D	108	Total O 108 108	0	0
5	E	68	Total O 68 68	0	0
5	F	111	Total O 111 111	0	0
5	G	87	Total O 87 87	0	0
5	H	105	Total O 105 105	0	0
5	I	95	Total O 95 95	0	0
5	J	72	Total O 72 72	0	0
5	K	71	Total O 71 71	0	0
5	L	72	Total O 72 72	0	0
5	M	51	Total O 51 51	0	0
5	N	61	Total O 61 61	0	0
5	O	41	Total O 41 41	0	0
5	P	27	Total O 27 27	0	0

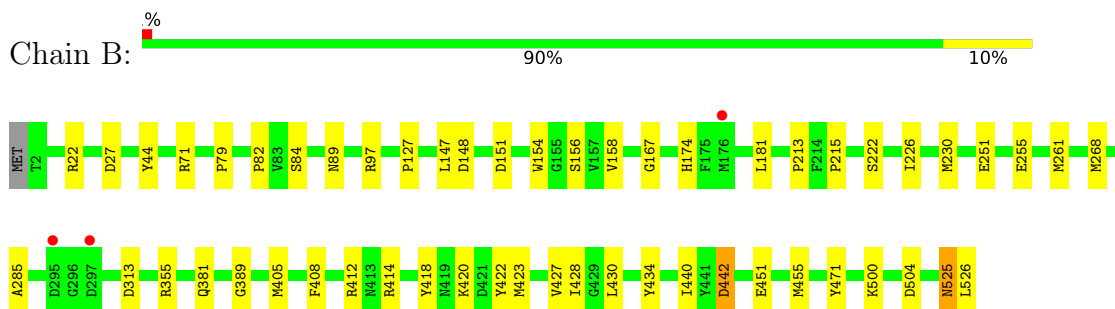
### 3 Residue-property plots [i](#)

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

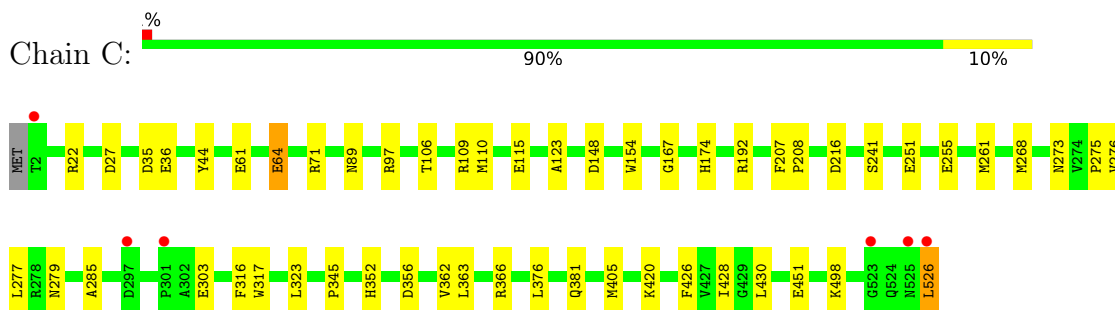
- Molecule 1: Probable vanillyl-alcohol oxidase



- Molecule 1: Probable vanillyl-alcohol oxidase

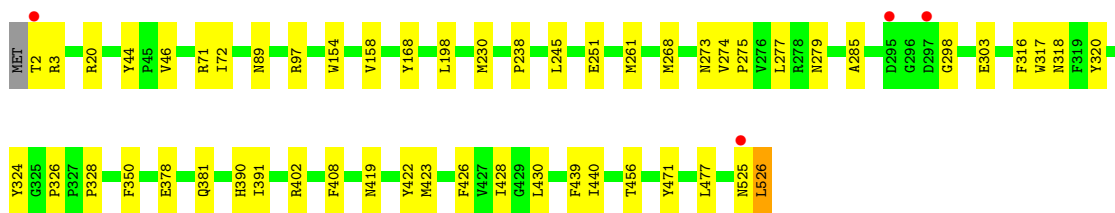


- Molecule 1: Probable vanillyl-alcohol oxidase

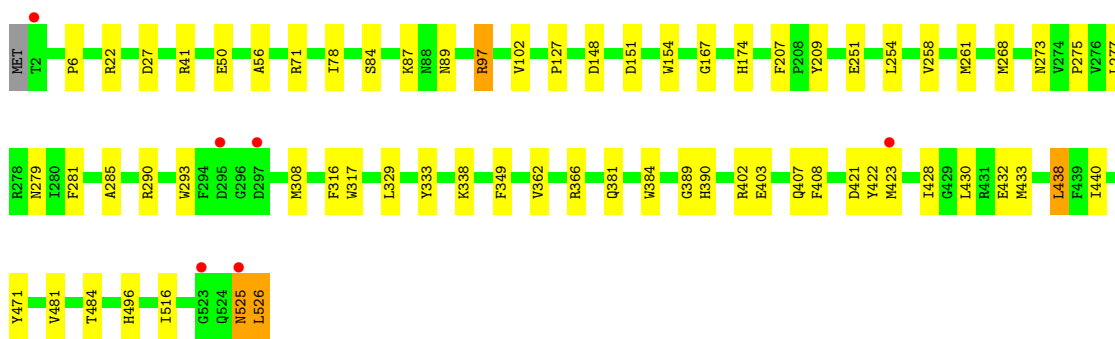
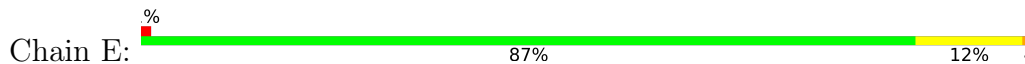


- Molecule 1: Probable vanillyl-alcohol oxidase

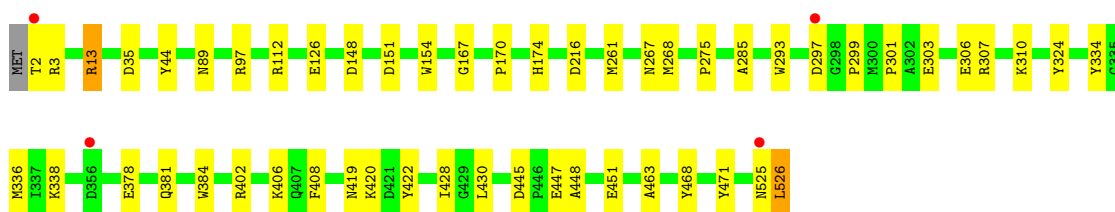




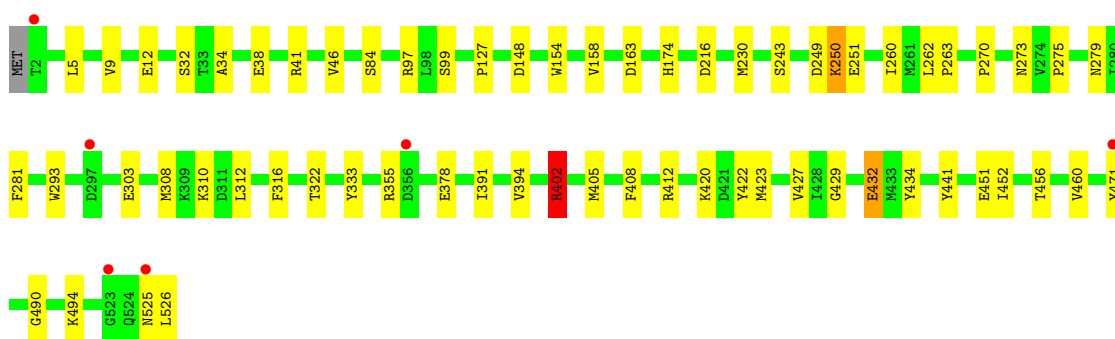
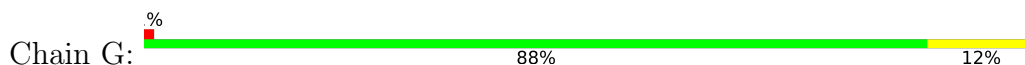
● Molecule 1: Probable vanillyl-alcohol oxidase



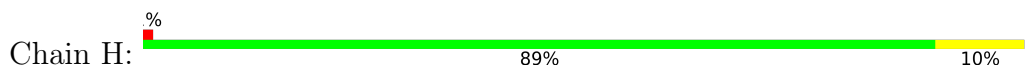
● Molecule 1: Probable vanillyl-alcohol oxidase

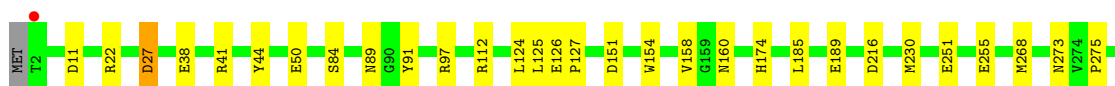


● Molecule 1: Probable vanillyl-alcohol oxidase

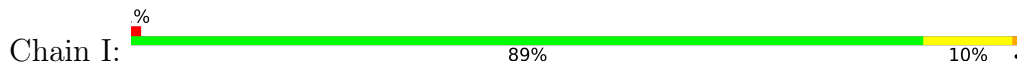


● Molecule 1: Probable vanillyl-alcohol oxidase

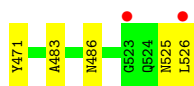
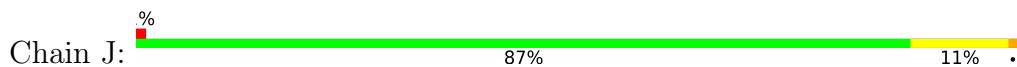




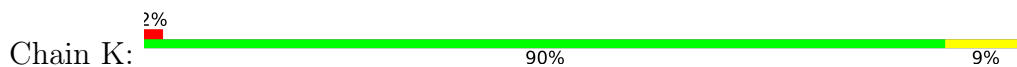
- Molecule 1: Probable vanillyl-alcohol oxidase



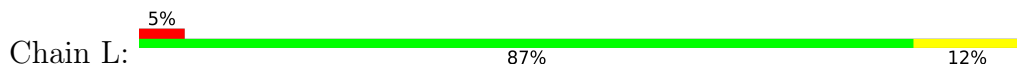
- Molecule 1: Probable vanillyl-alcohol oxidase

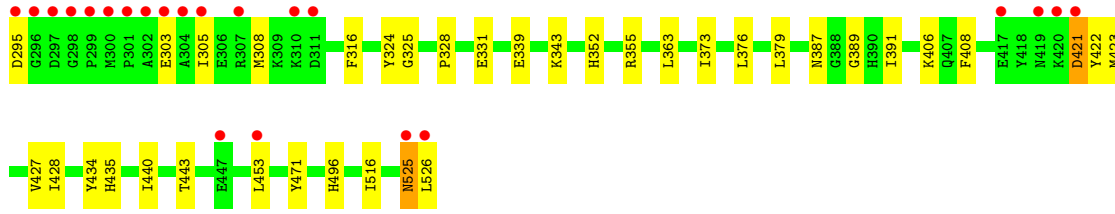


- Molecule 1: Probable vanillyl-alcohol oxidase

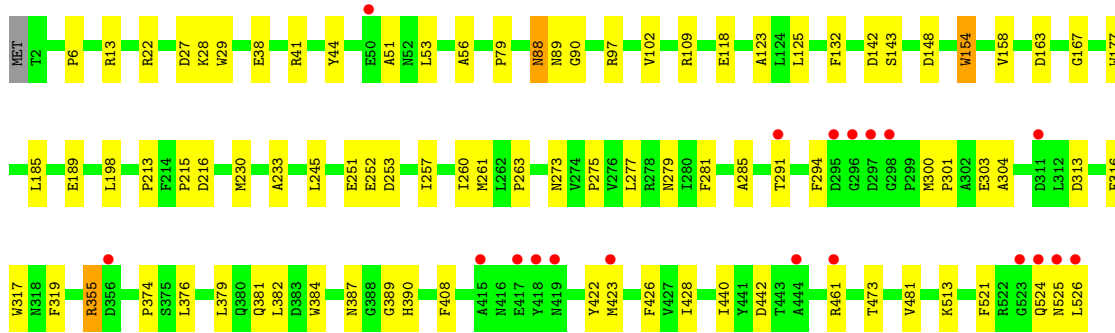
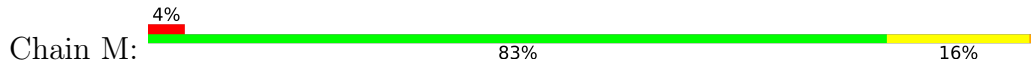


- Molecule 1: Probable vanillyl-alcohol oxidase

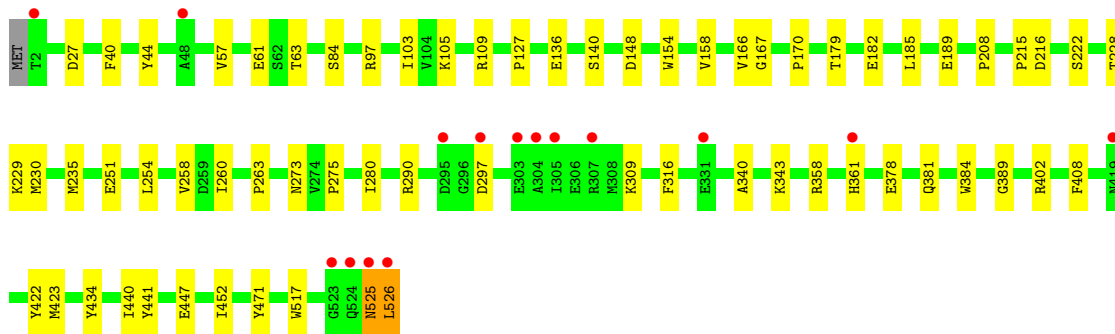
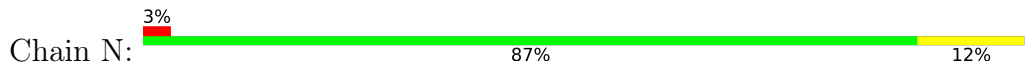




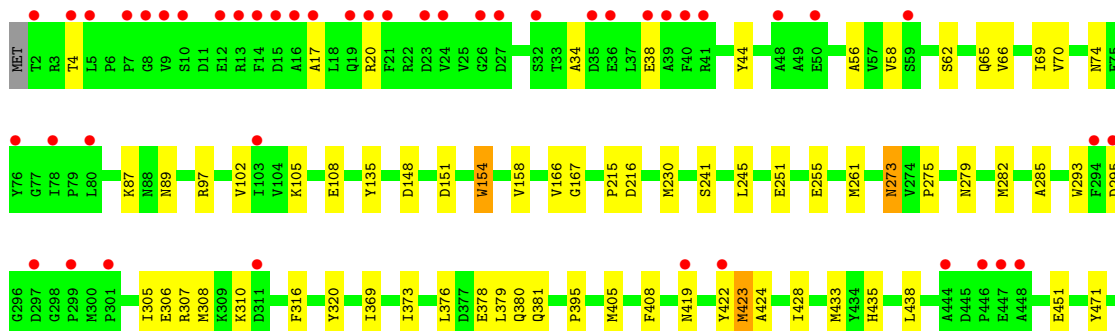
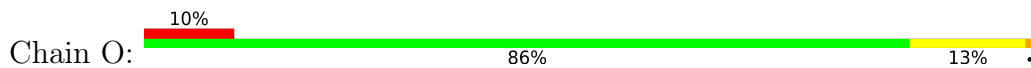
● Molecule 1: Probable vanillyl-alcohol oxidase

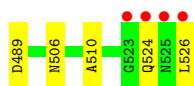


● Molecule 1: Probable vanillyl-alcohol oxidase

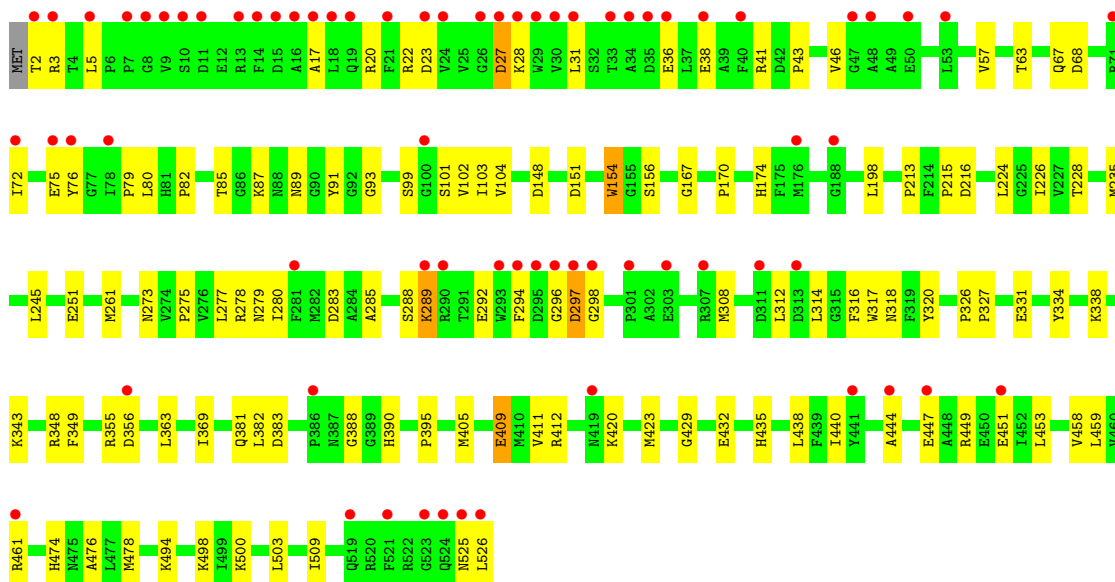
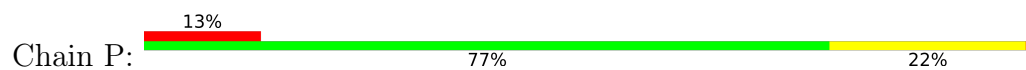


● Molecule 1: Probable vanillyl-alcohol oxidase





● Molecule 1: Probable vanillyl-alcohol oxidase





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	113.56Å 143.00Å 154.60Å 114.87° 97.00° 93.28°	Depositor
Resolution (Å)	49.04 – 2.30 49.04 – 2.30	Depositor EDS
% Data completeness (in resolution range)	98.2 (49.04-2.30) 98.2 (49.04-2.30)	Depositor EDS
$R_{merge}$	0.14	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.32 (at 2.29Å)	Xtrriage
Refinement program	PHENIX 1.16_3546	Depositor
R, $R_{free}$	0.193 , 0.249 0.193 , 0.249	Depositor DCC
$R_{free}$ test set	18986 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	29.9	Xtrriage
Anisotropy	0.072	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 39.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	68547	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	34.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.44% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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.

## 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: 55B, FAD, CA

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	0.49	0/4244	0.60	0/5760
1	B	0.50	0/4244	0.62	2/5760 (0.0%)
1	C	0.52	1/4244 (0.0%)	0.65	6/5760 (0.1%)
1	D	0.50	0/4244	0.62	1/5760 (0.0%)
1	E	0.48	0/4244	0.63	2/5760 (0.0%)
1	F	0.54	4/4244 (0.1%)	0.70	10/5760 (0.2%)
1	G	0.47	1/4244 (0.0%)	0.61	2/5760 (0.0%)
1	H	0.51	0/4244	0.64	2/5760 (0.0%)
1	I	0.48	2/4244 (0.0%)	0.62	0/5760
1	J	0.52	3/4244 (0.1%)	0.63	2/5760 (0.0%)
1	K	0.45	1/4244 (0.0%)	0.59	0/5760
1	L	0.44	0/4244	0.58	0/5760
1	M	0.42	0/4244	0.58	1/5760 (0.0%)
1	N	0.43	0/4244	0.59	2/5760 (0.0%)
1	O	0.39	0/4244	0.55	0/5760
1	P	0.39	0/4244	0.57	0/5760
All	All	0.47	12/67904 (0.0%)	0.61	30/92160 (0.0%)

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	402	ARG	CZ-NH1	-8.87	1.21	1.33
1	F	402	ARG	CG-CD	-8.38	1.31	1.51
1	F	13	ARG	CG-CD	-7.34	1.33	1.51
1	J	358	ARG	CB-CG	7.21	1.72	1.52
1	F	13	ARG	CB-CG	-7.18	1.33	1.52

The worst 5 of 30 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	F	13	ARG	NE-CZ-NH1	14.62	127.61	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	526	LEU	CB-CG-CD2	-11.72	91.08	111.00
1	C	71	ARG	NE-CZ-NH1	-11.10	114.75	120.30
1	F	13	ARG	CB-CG-CD	-10.97	83.09	111.60
1	N	526	LEU	CB-CG-CD2	-10.64	92.91	111.00

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4135	0	4000	38	0
1	B	4135	0	4000	36	1
1	C	4135	0	4000	33	0
1	D	4135	0	4000	38	0
1	E	4135	0	4000	52	0
1	F	4135	0	4000	35	1
1	G	4135	0	4000	45	0
1	H	4135	0	4000	36	0
1	I	4135	0	4000	42	0
1	J	4135	0	4000	40	2
1	K	4135	0	4000	29	0
1	L	4135	0	4000	37	0
1	M	4135	0	4000	53	1
1	N	4135	0	4000	41	1
1	O	4135	0	4000	45	0
1	P	4135	0	4000	99	0
2	A	53	0	29	1	0
2	B	53	0	29	1	0
2	C	53	0	29	1	0
2	D	53	0	29	1	0
2	E	53	0	29	1	0
2	F	53	0	29	1	0
2	G	53	0	29	1	0
2	H	53	0	30	1	0
2	I	53	0	29	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	J	53	0	30	3	0
2	K	53	0	30	1	0
2	L	53	0	29	1	0
2	M	53	0	30	3	0
2	N	53	0	30	1	0
2	O	53	0	29	0	0
2	P	53	0	31	4	0
3	A	15	0	13	1	0
3	B	15	0	13	1	0
3	C	15	0	14	0	0
3	D	15	0	13	2	0
3	E	15	0	13	2	0
3	F	15	0	13	2	0
3	G	15	0	13	3	0
3	H	15	0	13	2	0
3	I	15	0	13	4	0
3	J	15	0	14	0	0
3	K	15	0	14	0	0
3	L	15	0	14	0	0
3	M	15	0	13	0	0
3	N	15	0	14	0	0
3	O	15	0	13	5	0
3	P	15	0	13	1	0
4	A	2	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
4	E	1	0	0	0	0
4	F	1	0	0	0	0
4	J	1	0	0	0	0
4	L	1	0	0	0	0
4	M	1	0	0	0	0
4	N	1	0	0	0	0
4	O	1	0	0	0	0
5	A	90	0	0	2	0
5	B	118	0	0	0	0
5	C	110	0	0	1	0
5	D	108	0	0	0	0
5	E	68	0	0	0	0
5	F	111	0	0	2	0
5	G	87	0	0	0	0
5	H	105	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	I	95	0	0	4	0
5	J	72	0	0	4	0
5	K	71	0	0	0	0
5	L	72	0	0	0	0
5	M	51	0	0	1	0
5	N	61	0	0	0	0
5	O	41	0	0	2	0
5	P	27	0	0	0	0
All	All	68547	0	64684	703	3

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 5.

The worst 5 of 703 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:P:87:LYS:NZ	1:P:154:TRP:CZ2	1.94	1.35
1:D:525:ASN:O	1:D:526:LEU:HD12	1.38	1.20
1:I:394:VAL:HG11	1:I:471:TYR:CE1	1.79	1.18
1:P:87:LYS:HE3	1:P:154:TRP:CE2	1.80	1.15
1:G:394:VAL:HG11	1:G:471:TYR:HE1	1.05	1.13

All (3) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:442:ASP:OD2	1:M:13:ARG:NH2[1_544]	1.85	0.35
1:J:68:ASP:OD1	1:N:402:ARG:NH2[1_455]	1.95	0.25
1:F:13:ARG:NH2	1:J:342:GLY:O[1_565]	2.02	0.18

## 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	523/526 (99%)	510 (98%)	13 (2%)	0	100	100
1	B	523/526 (99%)	511 (98%)	11 (2%)	1 (0%)	47	58
1	C	523/526 (99%)	511 (98%)	12 (2%)	0	100	100
1	D	523/526 (99%)	509 (97%)	14 (3%)	0	100	100
1	E	523/526 (99%)	507 (97%)	16 (3%)	0	100	100
1	F	523/526 (99%)	508 (97%)	15 (3%)	0	100	100
1	G	523/526 (99%)	505 (97%)	17 (3%)	1 (0%)	47	58
1	H	523/526 (99%)	510 (98%)	13 (2%)	0	100	100
1	I	523/526 (99%)	505 (97%)	18 (3%)	0	100	100
1	J	523/526 (99%)	504 (96%)	17 (3%)	2 (0%)	34	42
1	K	523/526 (99%)	500 (96%)	23 (4%)	0	100	100
1	L	523/526 (99%)	507 (97%)	14 (3%)	2 (0%)	34	42
1	M	523/526 (99%)	507 (97%)	15 (3%)	1 (0%)	47	58
1	N	523/526 (99%)	504 (96%)	17 (3%)	2 (0%)	34	42
1	O	523/526 (99%)	494 (94%)	25 (5%)	4 (1%)	19	23
1	P	523/526 (99%)	488 (93%)	32 (6%)	3 (1%)	25	31
All	All	8368/8416 (99%)	8080 (97%)	272 (3%)	16 (0%)	47	58

5 of 16 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	P	297	ASP
1	J	342	GLY
1	J	343	LYS
1	B	525	ASN
1	L	525	ASN

### 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	434/435 (100%)	428 (99%)	6 (1%)	67	81
1	B	434/435 (100%)	429 (99%)	5 (1%)	71	84
1	C	434/435 (100%)	432 (100%)	2 (0%)	88	95
1	D	434/435 (100%)	430 (99%)	4 (1%)	78	89
1	E	434/435 (100%)	428 (99%)	6 (1%)	67	81
1	F	434/435 (100%)	431 (99%)	3 (1%)	84	92
1	G	434/435 (100%)	427 (98%)	7 (2%)	62	78
1	H	434/435 (100%)	427 (98%)	7 (2%)	62	78
1	I	434/435 (100%)	427 (98%)	7 (2%)	62	78
1	J	434/435 (100%)	427 (98%)	7 (2%)	62	78
1	K	434/435 (100%)	427 (98%)	7 (2%)	62	78
1	L	434/435 (100%)	422 (97%)	12 (3%)	43	60
1	M	434/435 (100%)	428 (99%)	6 (1%)	67	81
1	N	434/435 (100%)	425 (98%)	9 (2%)	53	70
1	O	434/435 (100%)	425 (98%)	9 (2%)	53	70
1	P	434/435 (100%)	424 (98%)	10 (2%)	50	67
All	All	6944/6960 (100%)	6837 (98%)	107 (2%)	65	79

5 of 107 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	K	356	ASP
1	L	421	ASP
1	P	154	TRP
1	K	432	GLU
1	L	273	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 25 such sidechains are listed below:

Mol	Chain	Res	Type
1	K	519	GLN
1	M	205	GLN
1	P	474	HIS
1	L	419	ASN
1	M	419	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 44 ligands modelled in this entry, 12 are monoatomic - leaving 32 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	55B	A	602	-	15,15,15	2.01	2 (13%)	19,19,19	2.42	7 (36%)
2	FAD	F	601	-	53,58,58	0.55	0	68,89,89	0.65	1 (1%)
2	FAD	C	601	-	53,58,58	0.70	1 (1%)	68,89,89	0.55	1 (1%)
3	55B	G	602	-	15,15,15	2.08	4 (26%)	19,19,19	2.48	6 (31%)
2	FAD	L	601	-	53,58,58	0.55	0	68,89,89	0.59	2 (2%)
2	FAD	N	601	-	53,58,58	0.59	1 (1%)	68,89,89	0.55	1 (1%)
2	FAD	K	601	-	53,58,58	0.50	0	68,89,89	0.64	1 (1%)
3	55B	D	602	-	15,15,15	2.07	3 (20%)	19,19,19	2.18	5 (26%)
3	55B	E	602	-	15,15,15	1.93	2 (13%)	19,19,19	2.84	7 (36%)
3	55B	M	602	-	15,15,15	1.97	3 (20%)	19,19,19	2.83	6 (31%)
3	55B	F	602	-	15,15,15	1.93	2 (13%)	19,19,19	2.86	7 (36%)
2	FAD	J	601	-	53,58,58	0.60	0	68,89,89	0.70	2 (2%)
2	FAD	E	601	-	53,58,58	0.59	2 (3%)	68,89,89	0.70	3 (4%)
3	55B	I	602	-	15,15,15	2.02	3 (20%)	19,19,19	2.13	3 (15%)



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	55B	C	602	-	15,15,15	2.11	4 (26%)	19,19,19	2.33	4 (21%)
2	FAD	D	601	-	53,58,58	0.63	0	68,89,89	0.72	2 (2%)
2	FAD	I	601	-	53,58,58	0.58	0	68,89,89	0.73	4 (5%)
2	FAD	M	601	-	53,58,58	0.54	0	68,89,89	0.62	1 (1%)
2	FAD	H	601	-	53,58,58	0.55	0	68,89,89	0.66	1 (1%)
2	FAD	P	601	-	53,58,58	0.54	0	68,89,89	0.70	2 (2%)
3	55B	J	602	-	15,15,15	2.01	3 (20%)	19,19,19	2.34	5 (26%)
3	55B	K	602	-	15,15,15	1.95	2 (13%)	19,19,19	2.26	6 (31%)
3	55B	O	602	-	15,15,15	1.94	2 (13%)	19,19,19	3.21	6 (31%)
2	FAD	B	601	-	53,58,58	0.60	0	68,89,89	0.59	1 (1%)
2	FAD	O	601	-	53,58,58	0.55	0	68,89,89	0.65	2 (2%)
3	55B	P	602	-	15,15,15	2.03	2 (13%)	19,19,19	2.45	6 (31%)
2	FAD	A	601	-	53,58,58	0.60	0	68,89,89	0.70	1 (1%)
2	FAD	G	601	-	53,58,58	0.56	0	68,89,89	0.61	1 (1%)
3	55B	B	602	-	15,15,15	2.05	3 (20%)	19,19,19	2.54	7 (36%)
3	55B	N	602	-	15,15,15	1.93	2 (13%)	19,19,19	2.75	4 (21%)
3	55B	L	602	-	15,15,15	1.95	2 (13%)	19,19,19	2.46	5 (26%)
3	55B	H	602	-	15,15,15	1.85	2 (13%)	19,19,19	2.44	5 (26%)

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	55B	A	602	-	-	0/8/8/8	0/1/1/1
2	FAD	F	601	-	-	6/30/50/50	0/6/6/6
2	FAD	C	601	-	-	8/30/50/50	0/6/6/6
3	55B	G	602	-	-	0/8/8/8	0/1/1/1
2	FAD	L	601	-	-	8/30/50/50	0/6/6/6
2	FAD	N	601	-	-	6/30/50/50	0/6/6/6
2	FAD	K	601	-	-	7/30/50/50	0/6/6/6
3	55B	D	602	-	-	0/8/8/8	0/1/1/1
3	55B	E	602	-	-	1/8/8/8	0/1/1/1
3	55B	M	602	-	-	0/8/8/8	0/1/1/1
3	55B	F	602	-	-	1/8/8/8	0/1/1/1
2	FAD	J	601	-	-	5/30/50/50	0/6/6/6

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	FAD	E	601	-	-	5/30/50/50	0/6/6/6
3	55B	I	602	-	-	0/8/8/8	0/1/1/1
3	55B	C	602	-	-	1/8/8/8	0/1/1/1
2	FAD	D	601	-	-	7/30/50/50	0/6/6/6
2	FAD	I	601	-	-	6/30/50/50	0/6/6/6
2	FAD	M	601	-	-	9/30/50/50	0/6/6/6
2	FAD	H	601	-	-	5/30/50/50	0/6/6/6
2	FAD	P	601	-	-	9/30/50/50	0/6/6/6
3	55B	J	602	-	-	1/8/8/8	0/1/1/1
3	55B	K	602	-	-	0/8/8/8	0/1/1/1
3	55B	O	602	-	-	0/8/8/8	0/1/1/1
2	FAD	B	601	-	-	4/30/50/50	0/6/6/6
2	FAD	O	601	-	-	10/30/50/50	0/6/6/6
3	55B	P	602	-	-	1/8/8/8	0/1/1/1
2	FAD	A	601	-	-	5/30/50/50	0/6/6/6
2	FAD	G	601	-	-	8/30/50/50	0/6/6/6
3	55B	B	602	-	-	1/8/8/8	0/1/1/1
3	55B	N	602	-	-	0/8/8/8	0/1/1/1
3	55B	L	602	-	-	1/8/8/8	0/1/1/1
3	55B	H	602	-	-	1/8/8/8	0/1/1/1

The worst 5 of 45 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	602	55B	CAF-CAE	6.90	1.53	1.31
3	P	602	55B	CAF-CAE	6.75	1.53	1.31
3	B	602	55B	CAF-CAE	6.75	1.53	1.31
3	C	602	55B	CAF-CAE	6.69	1.52	1.31
3	J	602	55B	CAF-CAE	6.65	1.52	1.31

The worst 5 of 115 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	O	602	55B	CAA-OAJ-CAN	-9.10	103.79	117.53
3	M	602	55B	CAA-OAJ-CAN	-8.07	105.35	117.53
3	N	602	55B	CAA-OAJ-CAN	-7.86	105.67	117.53
3	E	602	55B	CAA-OAJ-CAN	-7.50	106.20	117.53
3	F	602	55B	CAA-OAJ-CAN	-6.84	107.20	117.53

There are no chirality outliers.

5 of 116 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	M	601	FAD	N10-C1'-C2'-O2'
2	M	601	FAD	N10-C1'-C2'-C3'
2	O	601	FAD	C2'-C3'-C4'-C5'
2	O	601	FAD	O3'-C3'-C4'-O4'
2	O	601	FAD	O3'-C3'-C4'-C5'

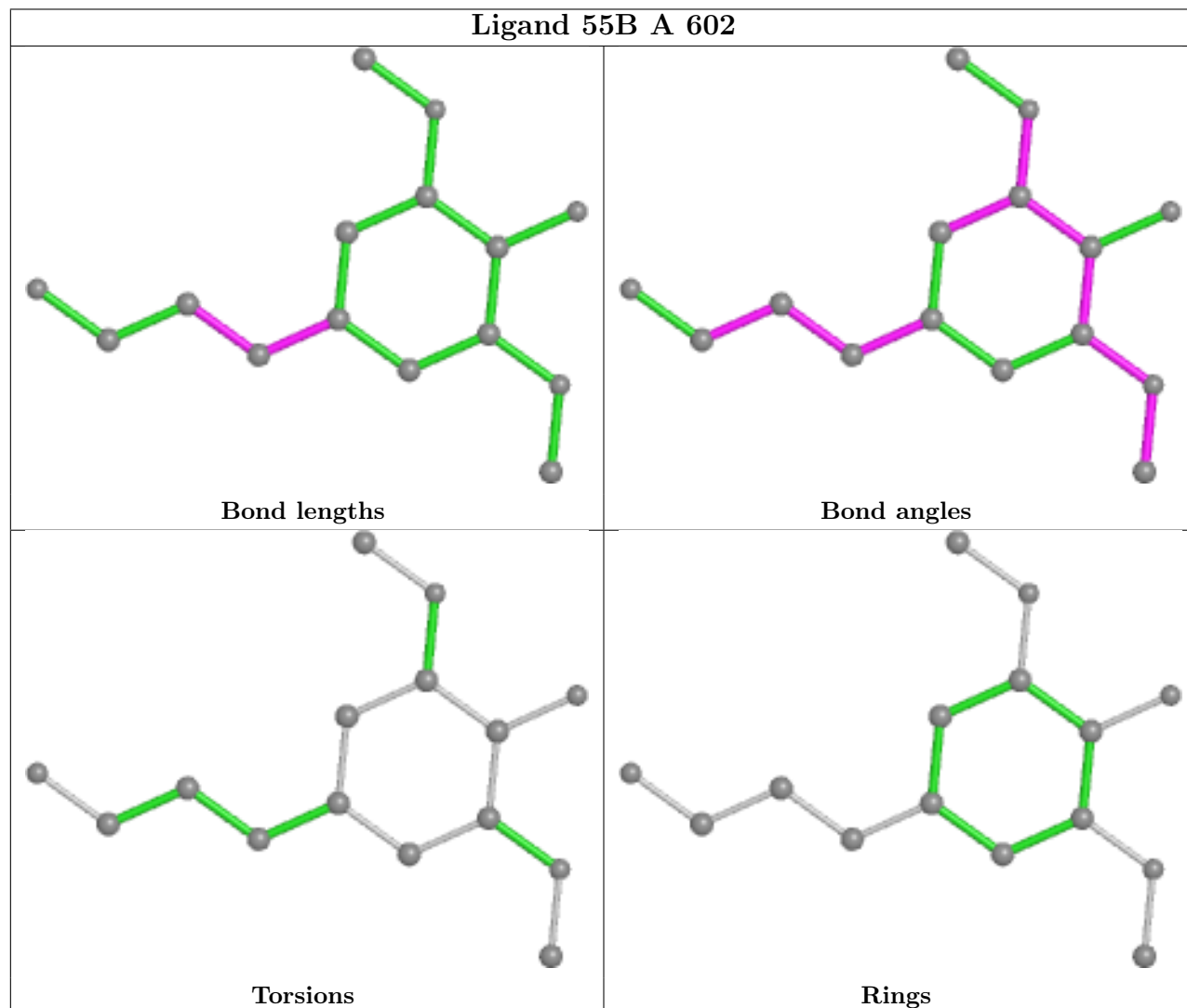
There are no ring outliers.

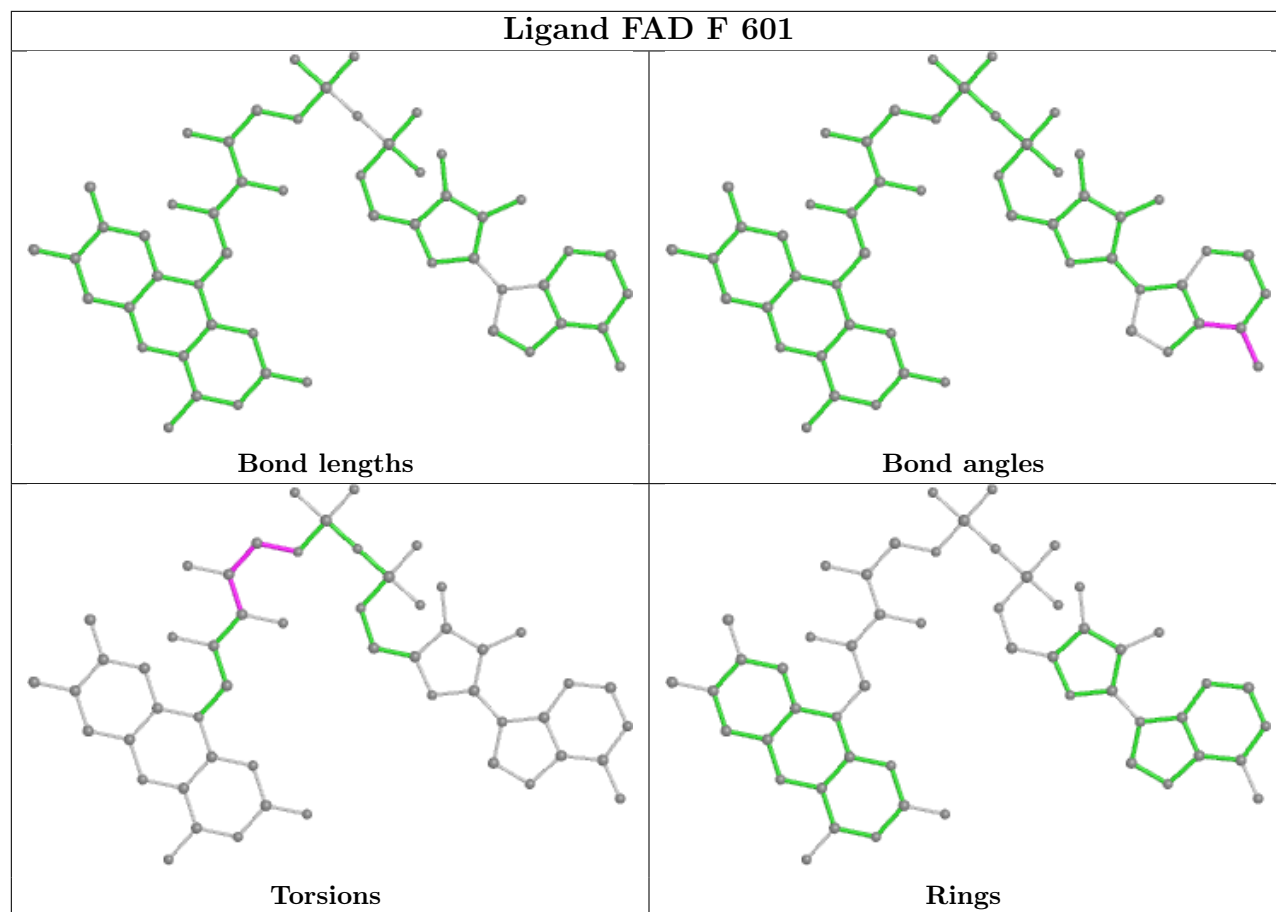
25 monomers are involved in 45 short contacts:

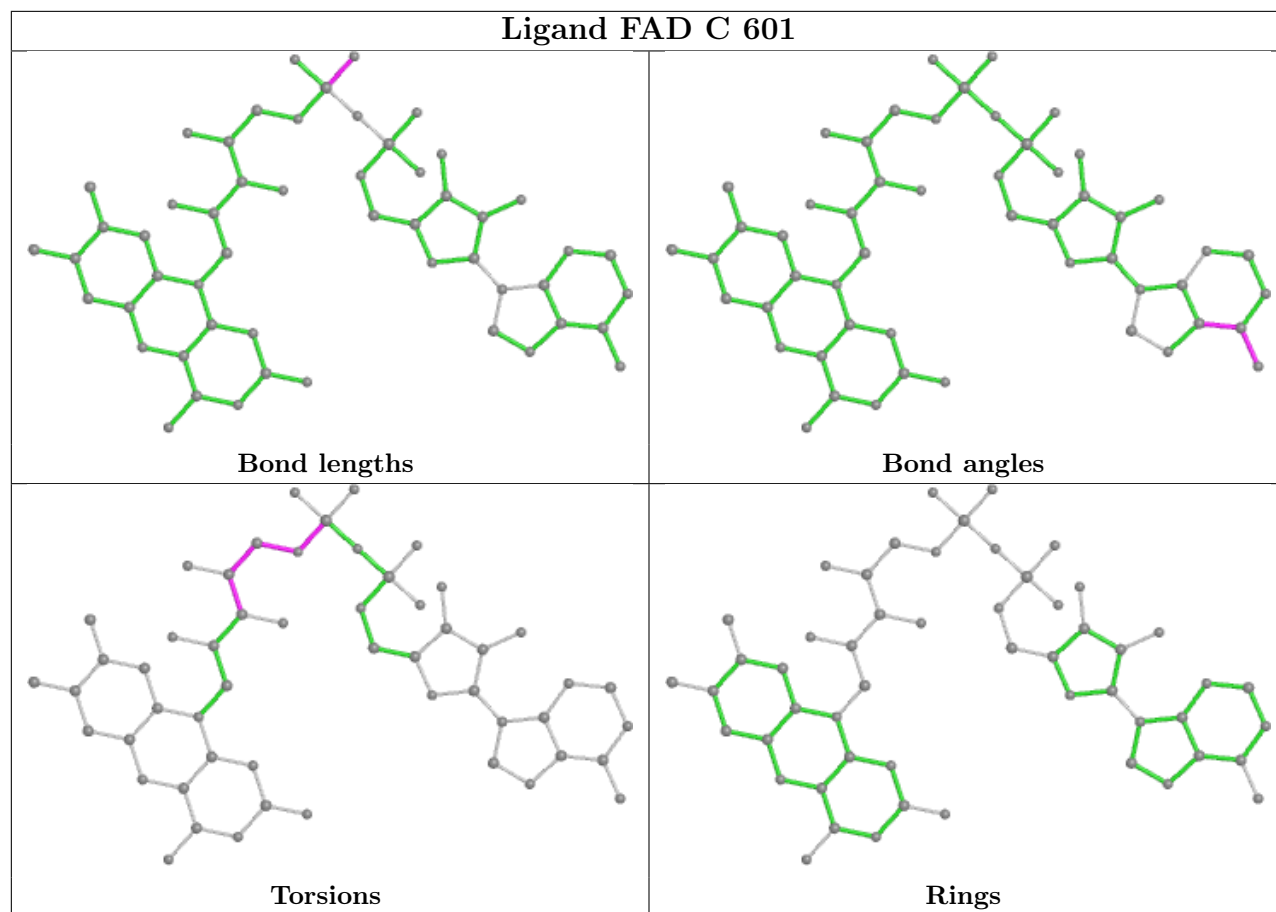
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	602	55B	1	0
2	F	601	FAD	1	0
2	C	601	FAD	1	0
3	G	602	55B	3	0
2	L	601	FAD	1	0
2	N	601	FAD	1	0
2	K	601	FAD	1	0
3	D	602	55B	2	0
3	E	602	55B	2	0
3	F	602	55B	2	0
2	J	601	FAD	3	0
2	E	601	FAD	1	0
3	I	602	55B	4	0
2	D	601	FAD	1	0
2	I	601	FAD	1	0
2	M	601	FAD	3	0
2	H	601	FAD	1	0
2	P	601	FAD	4	0
3	O	602	55B	5	0
2	B	601	FAD	1	0
3	P	602	55B	1	0
2	A	601	FAD	1	0
2	G	601	FAD	1	0
3	B	602	55B	1	0
3	H	602	55B	2	0

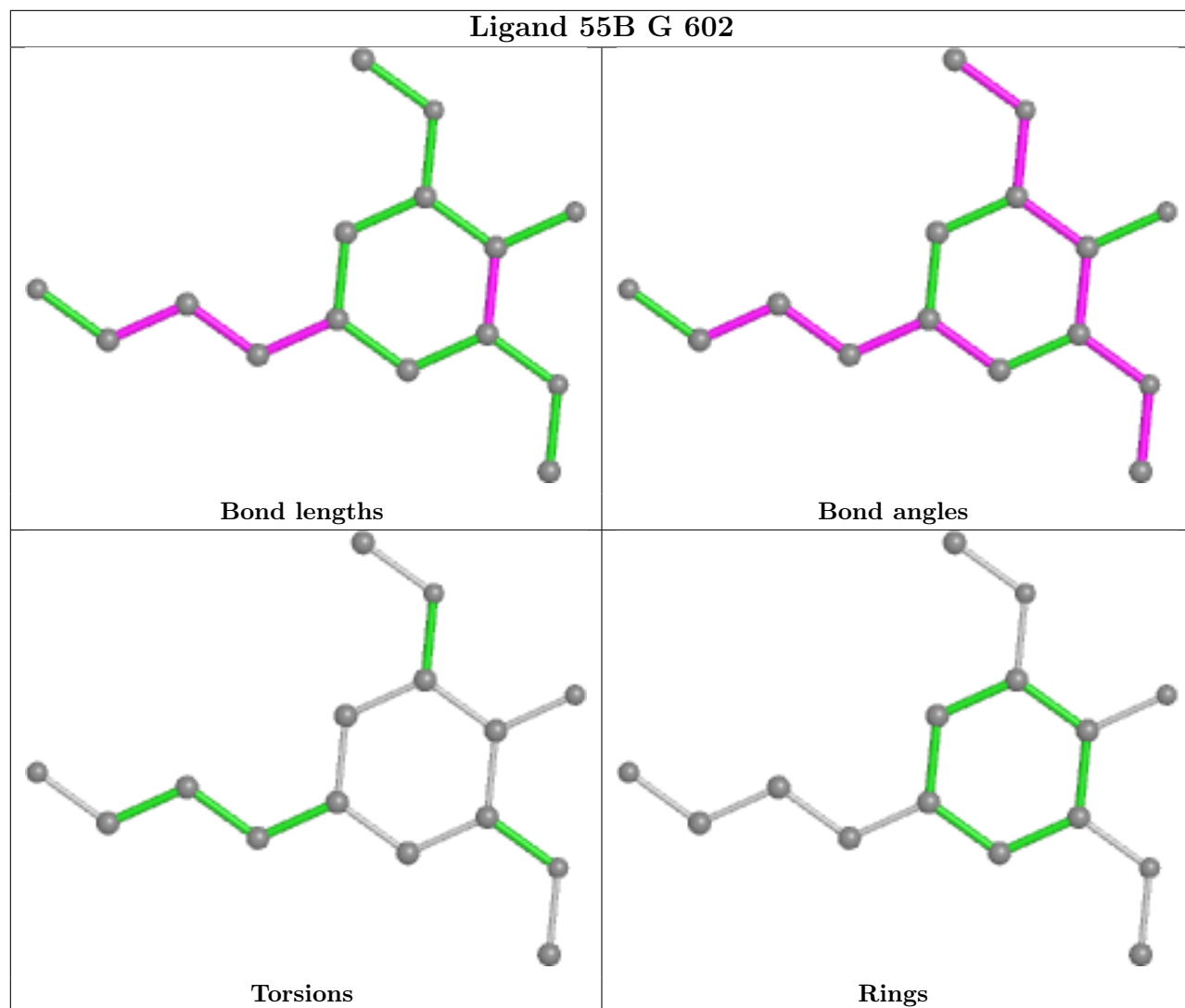
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be

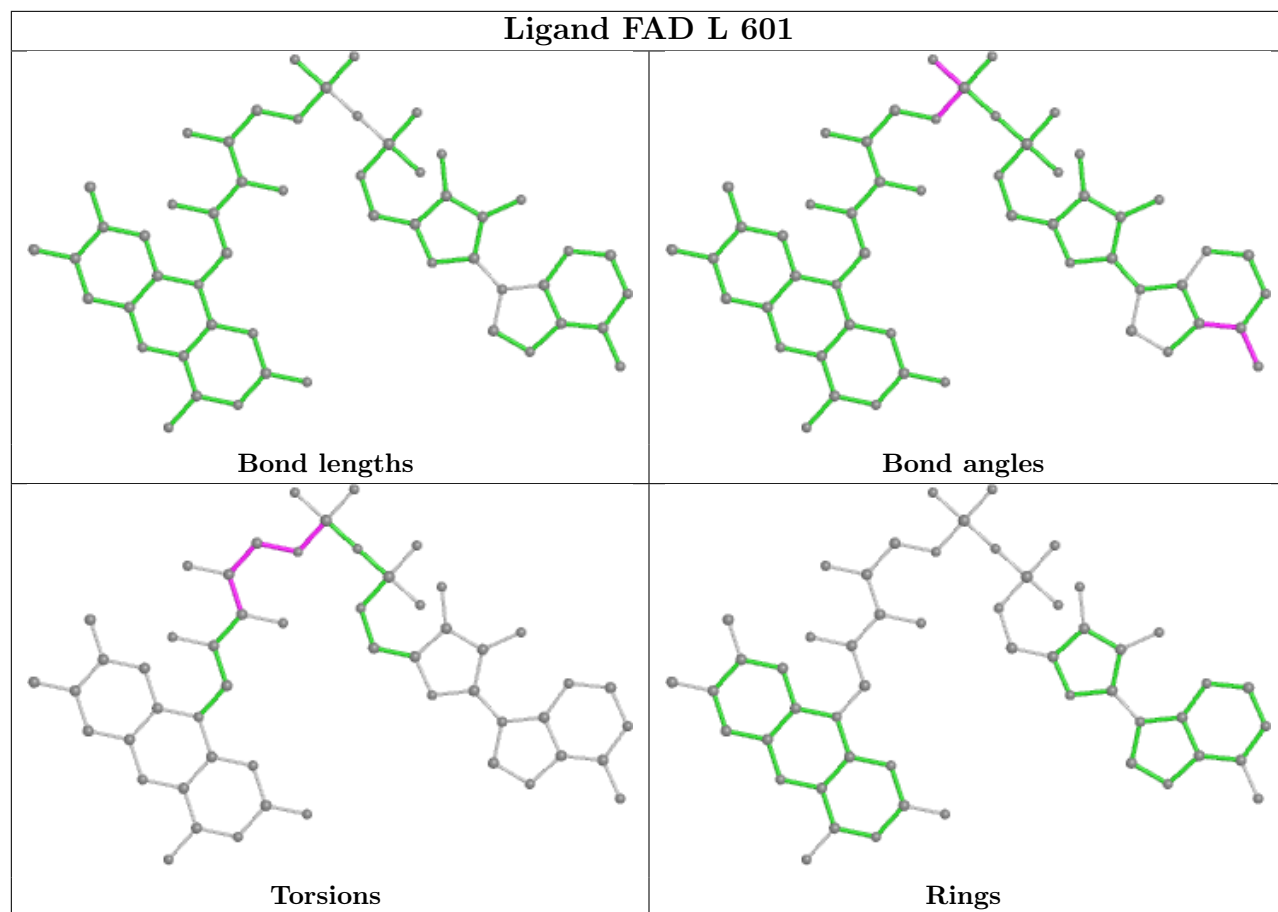
highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



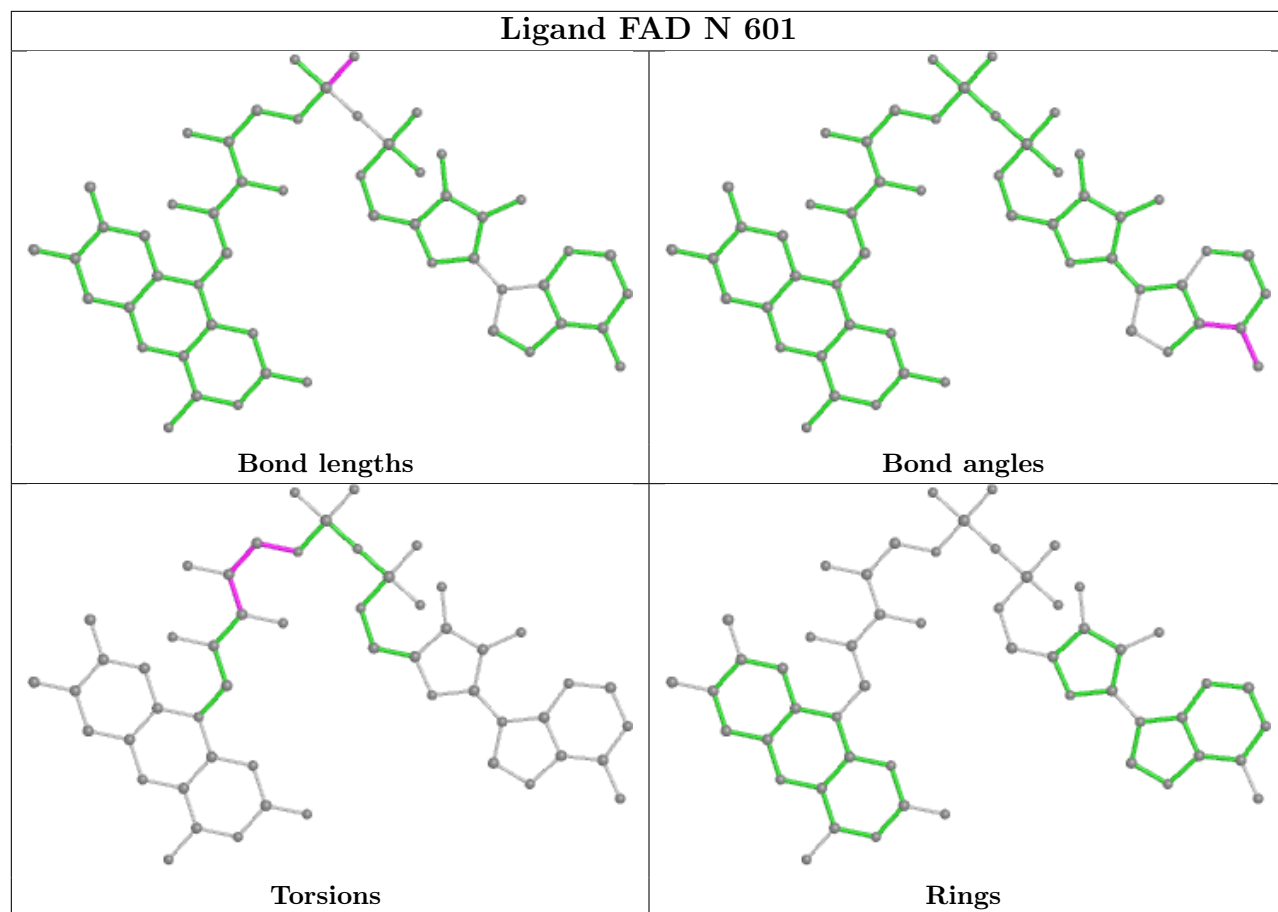


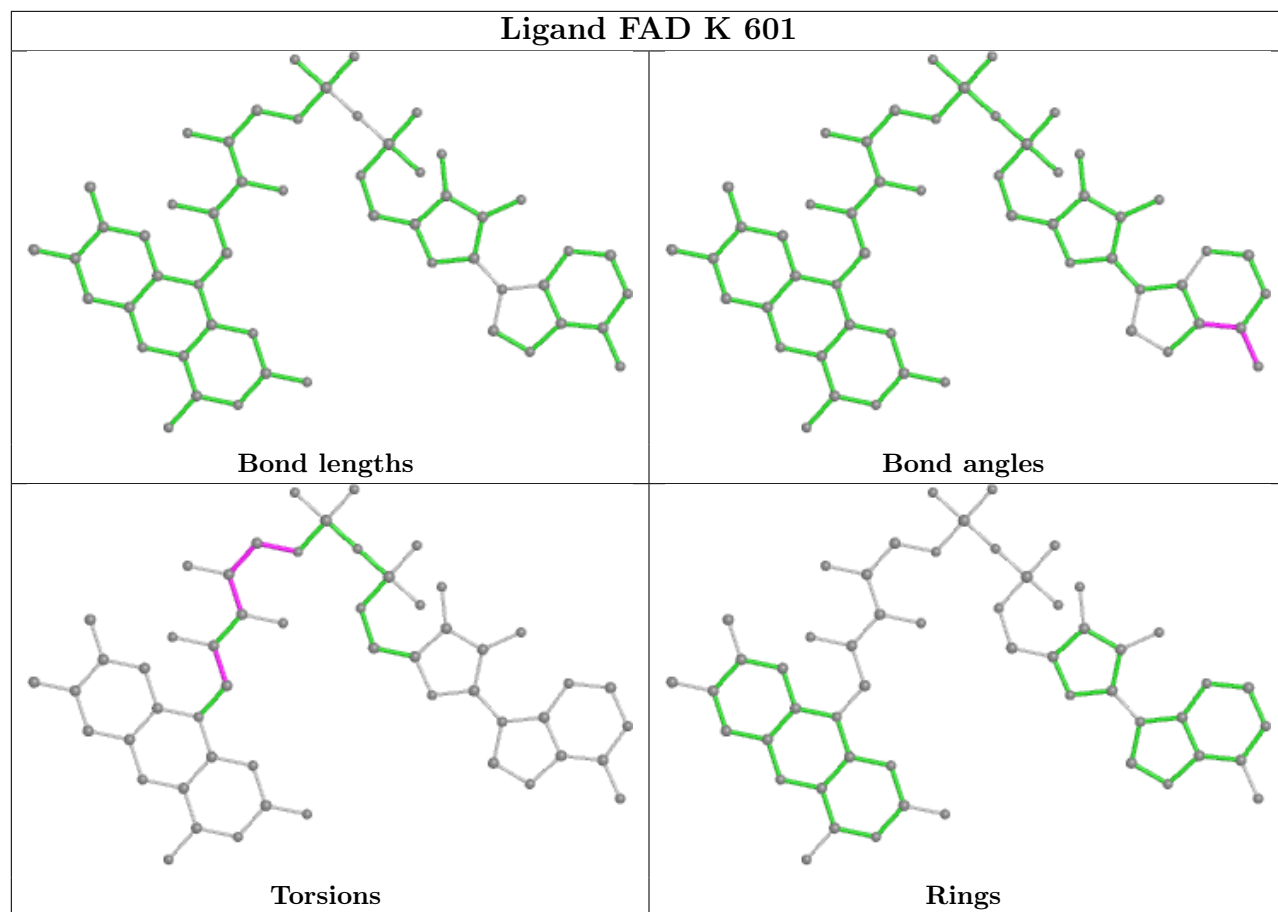


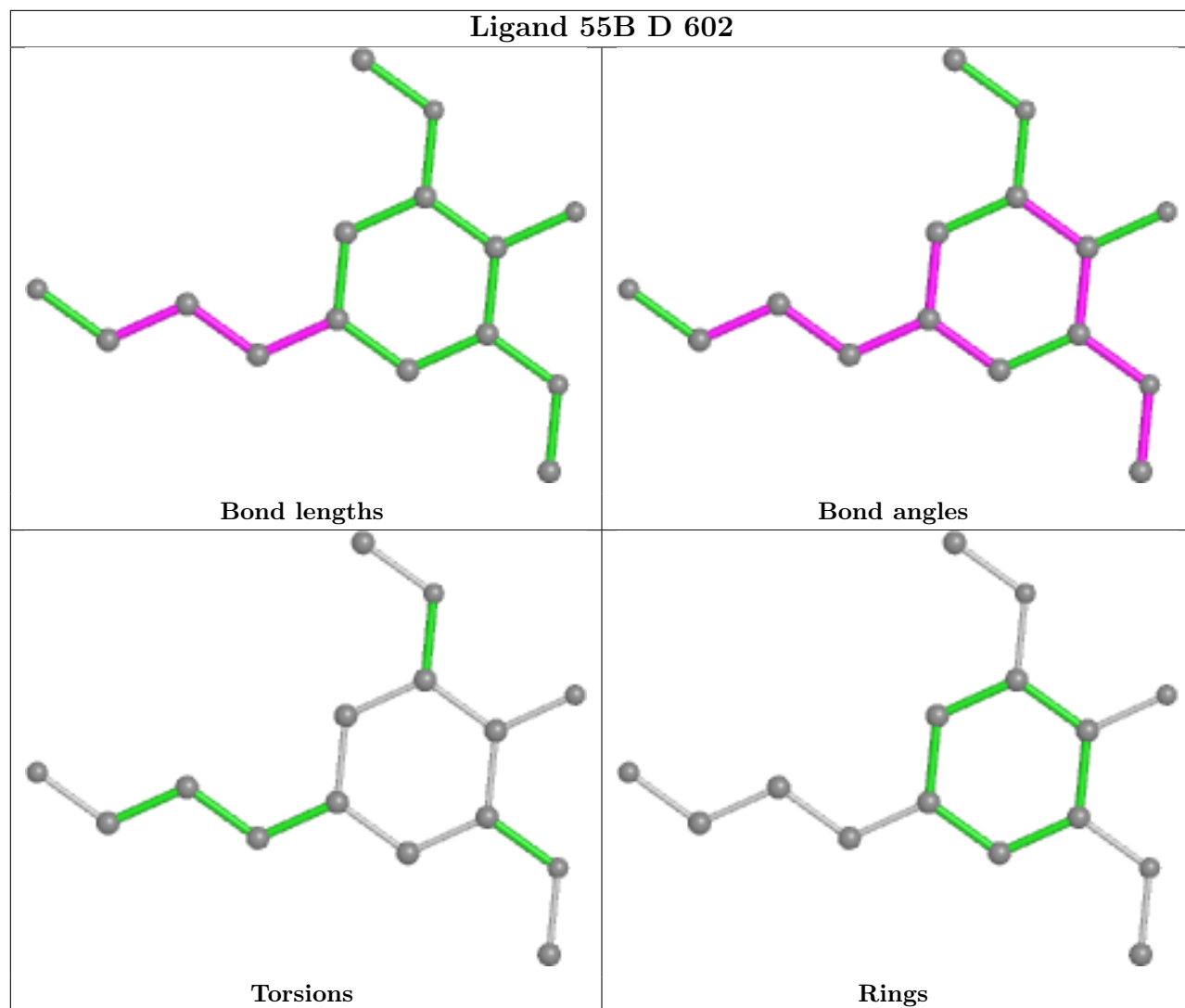


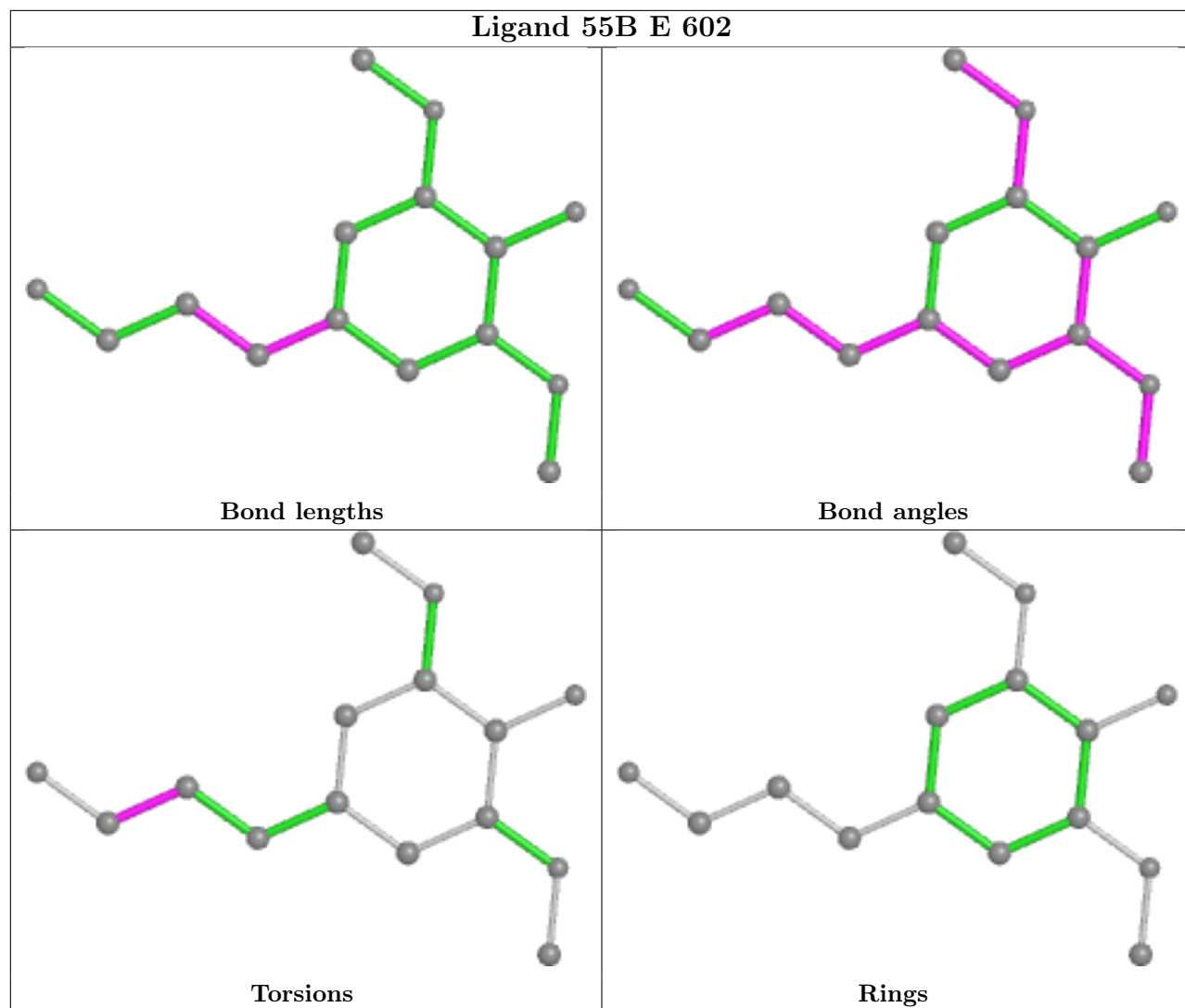


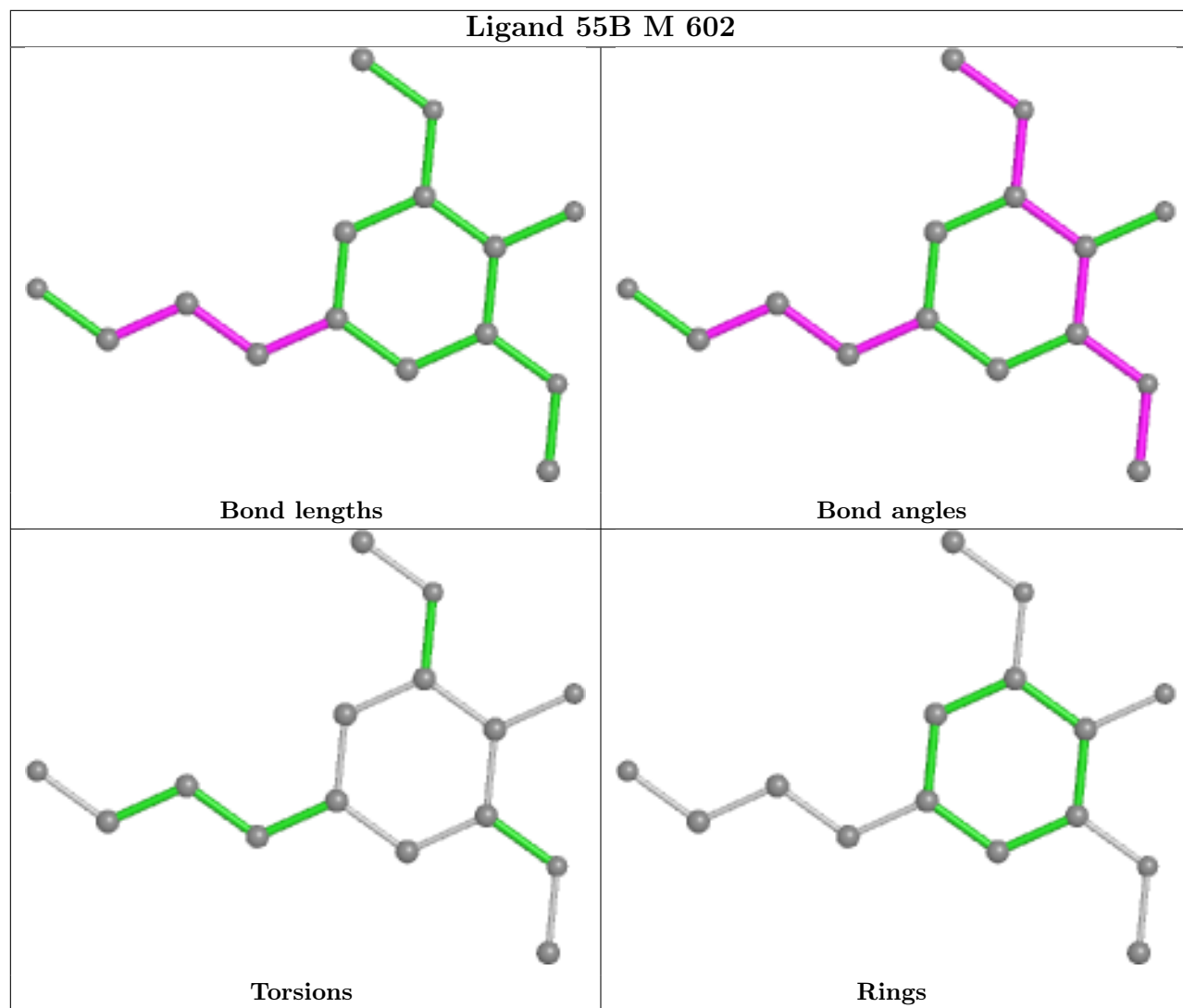


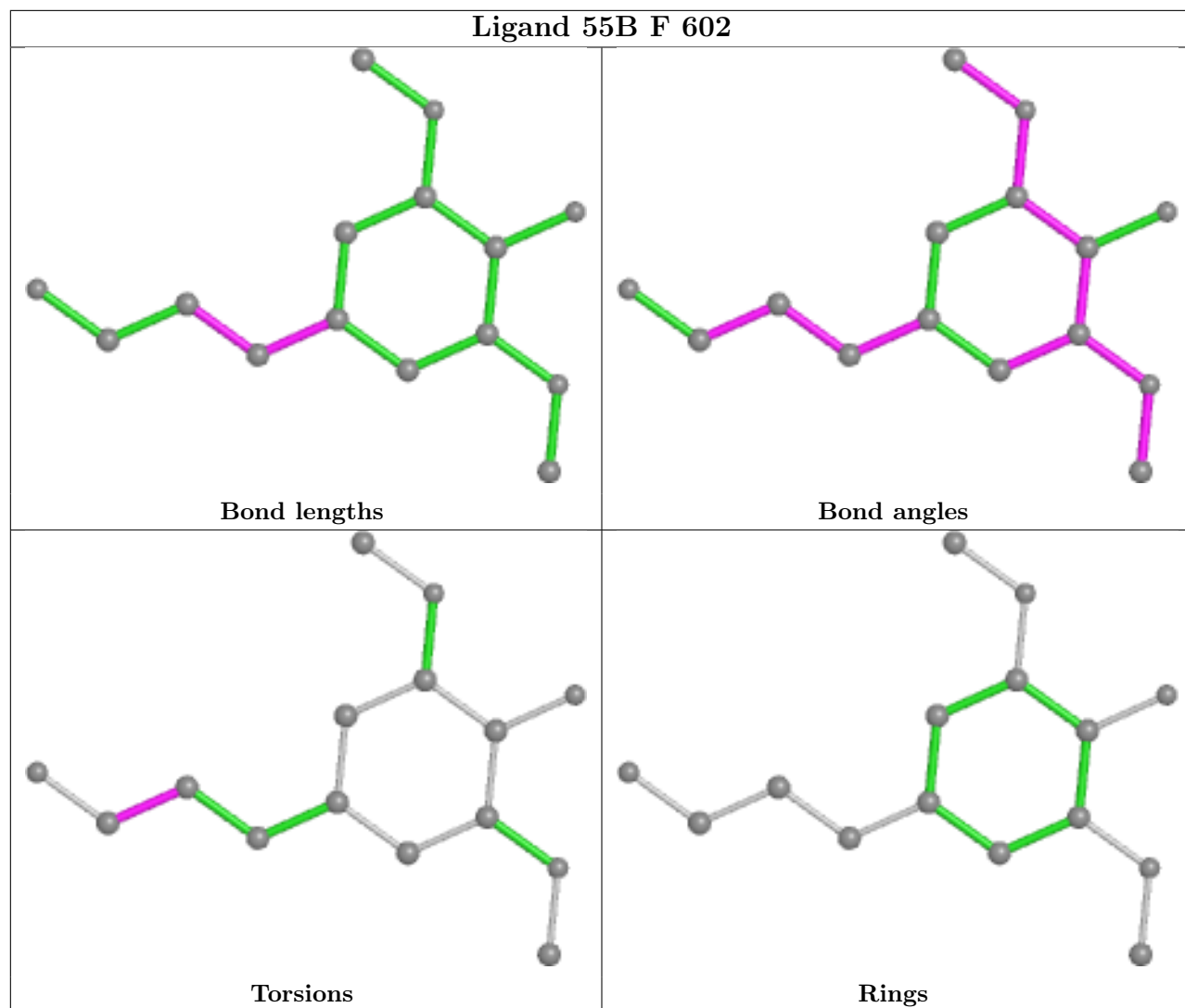


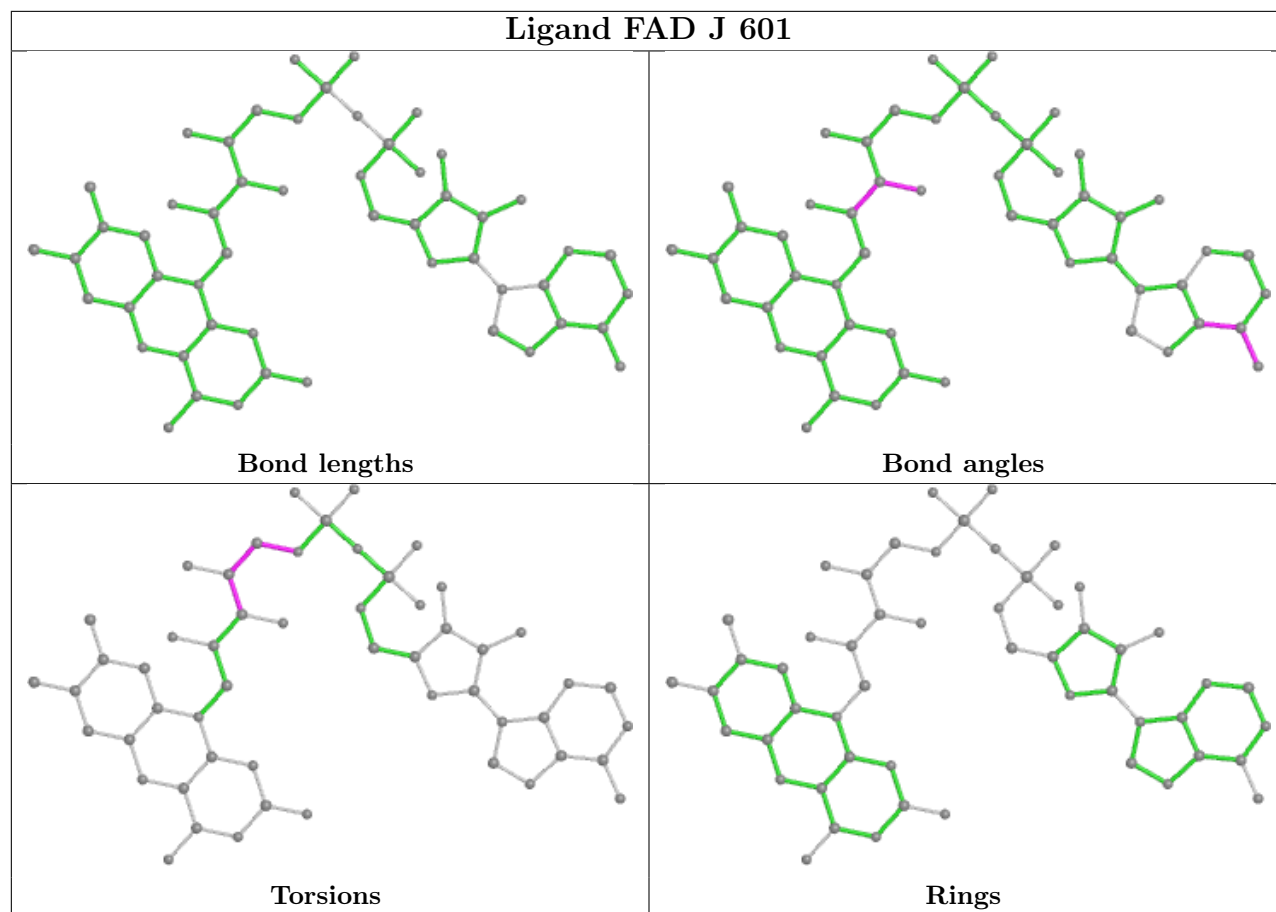


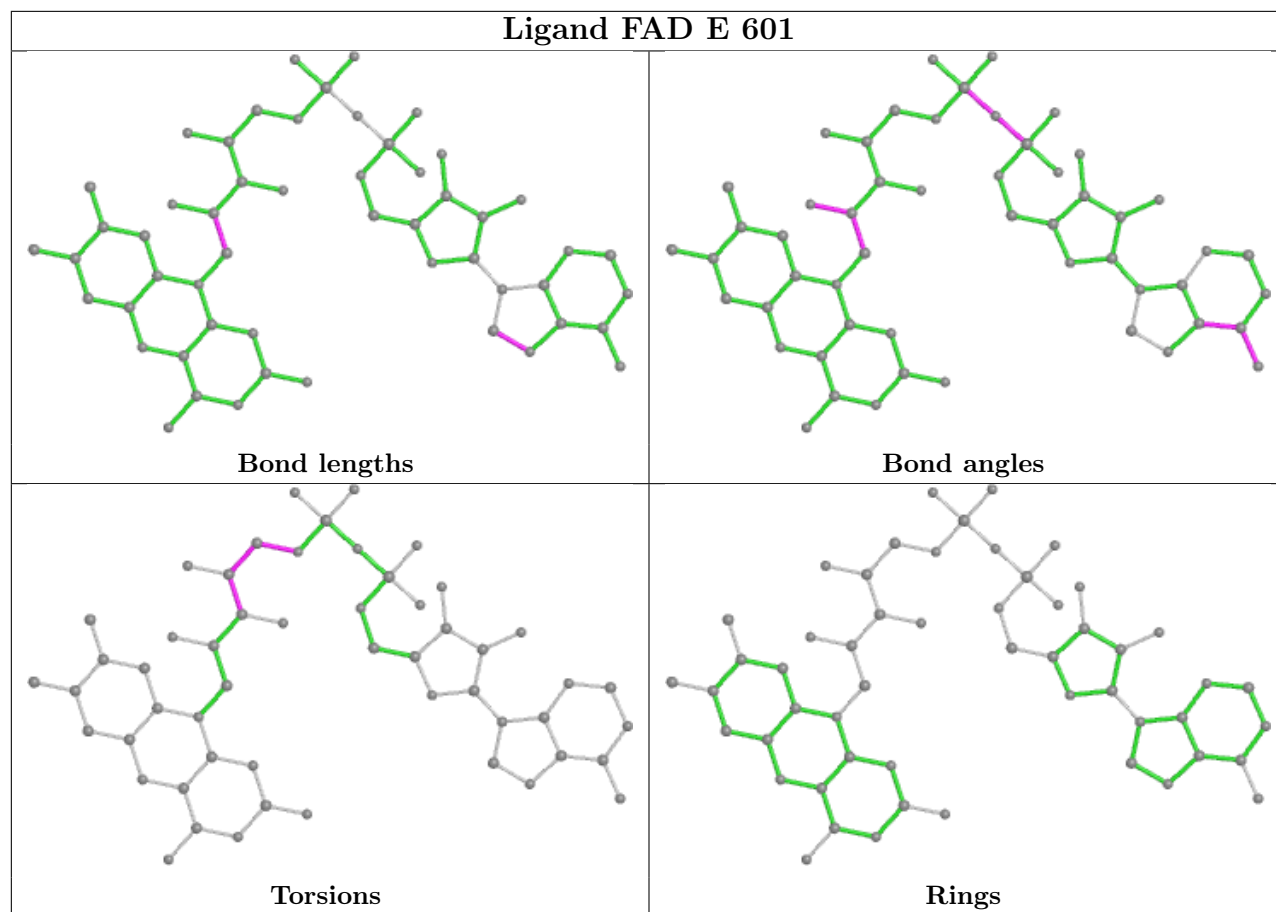




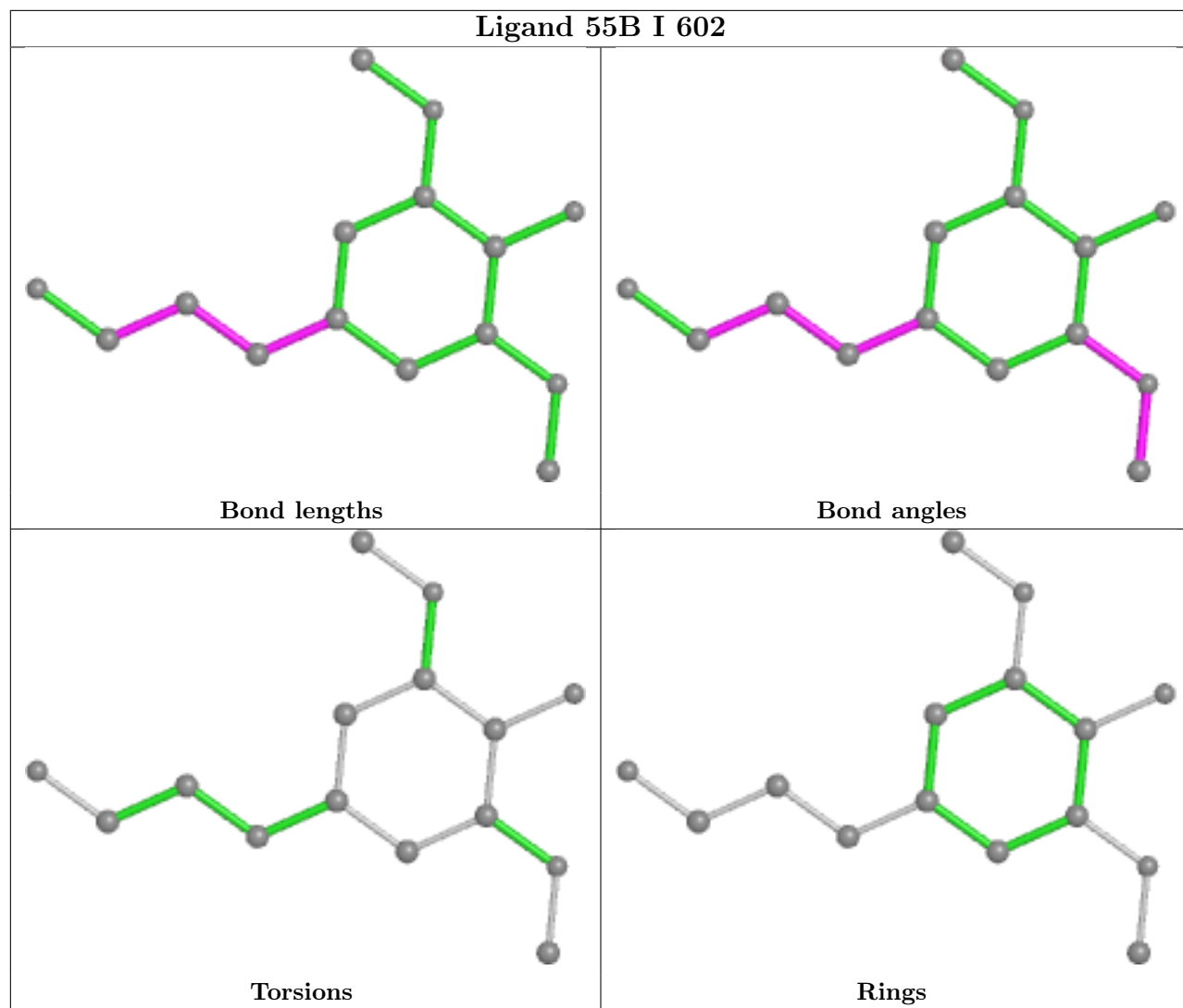


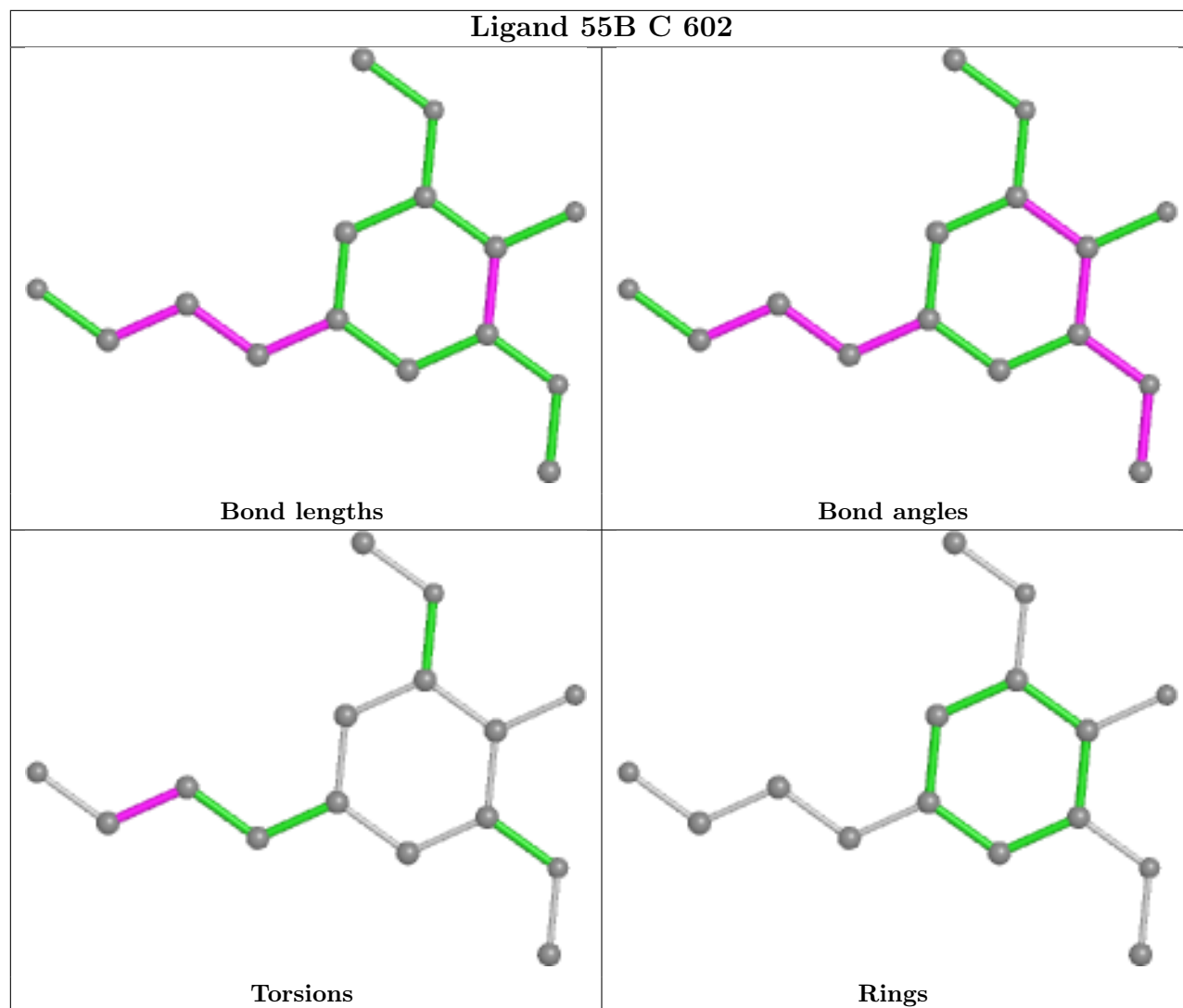


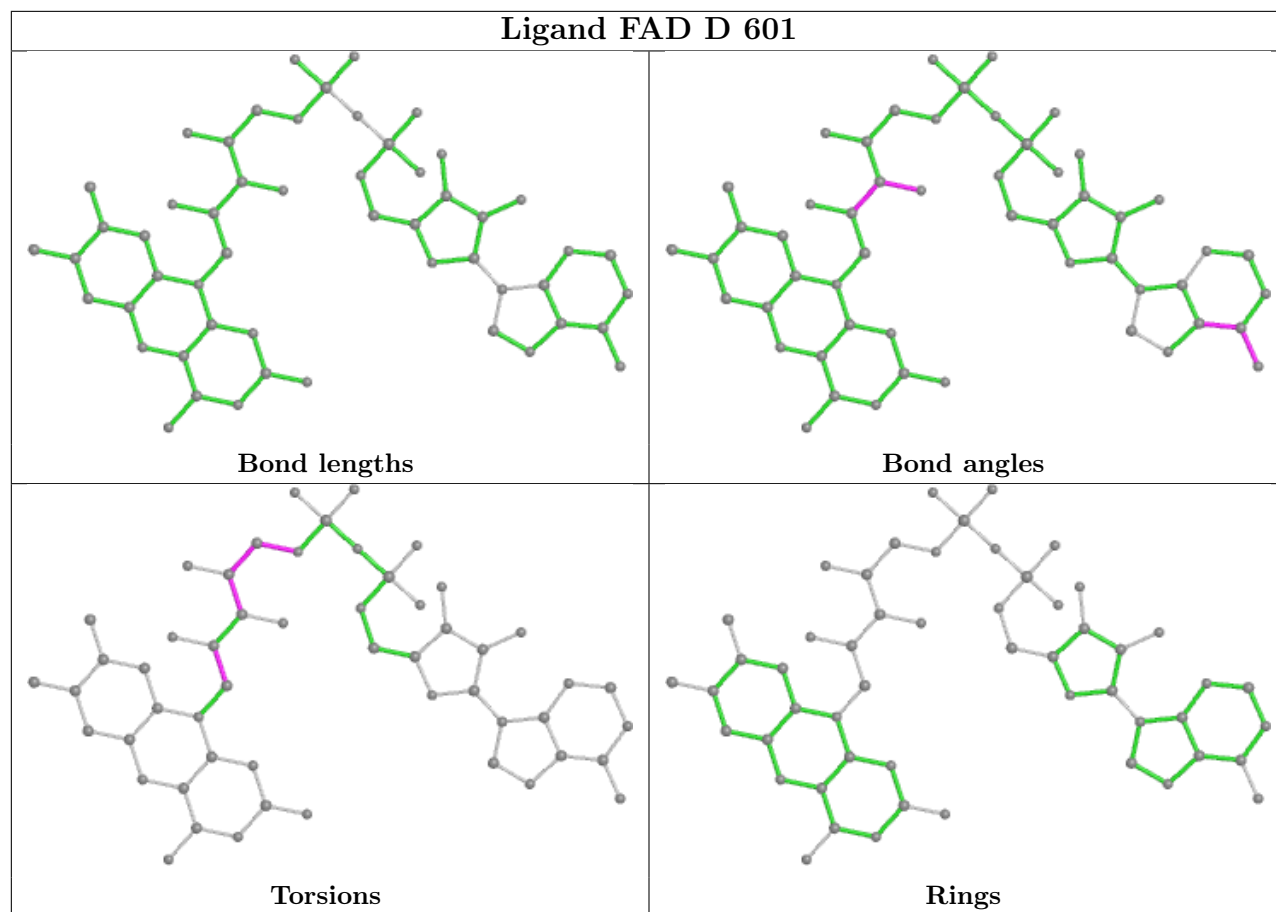


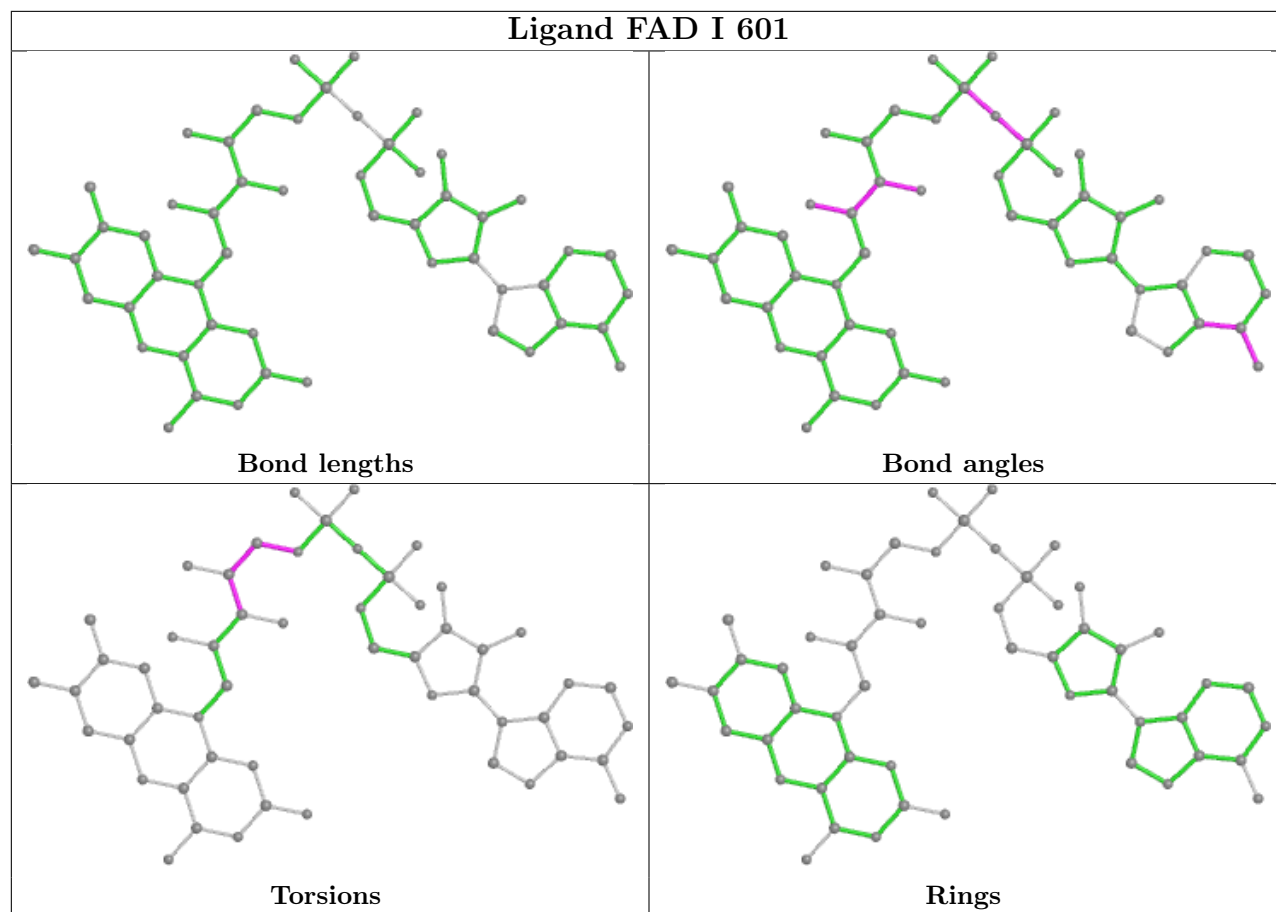


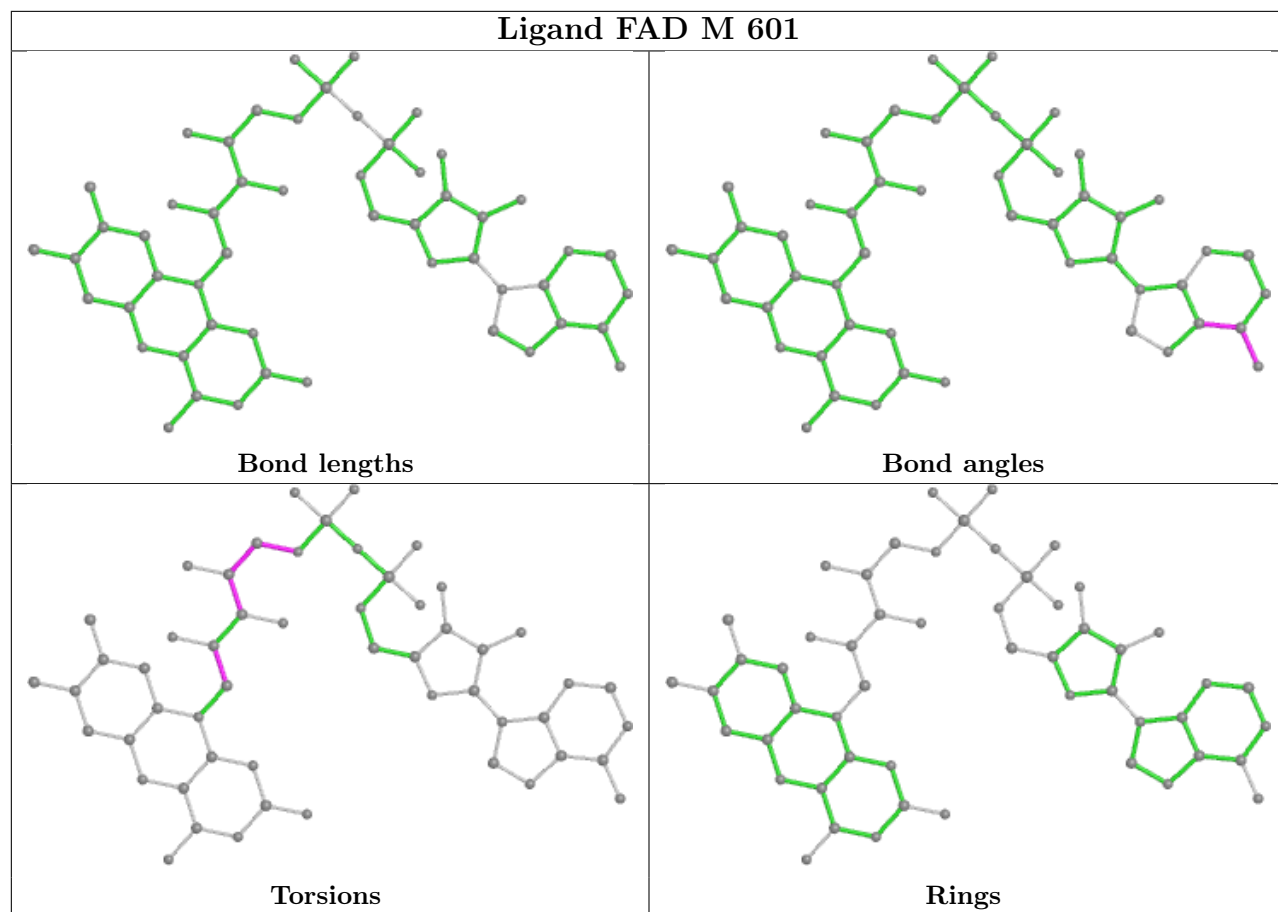


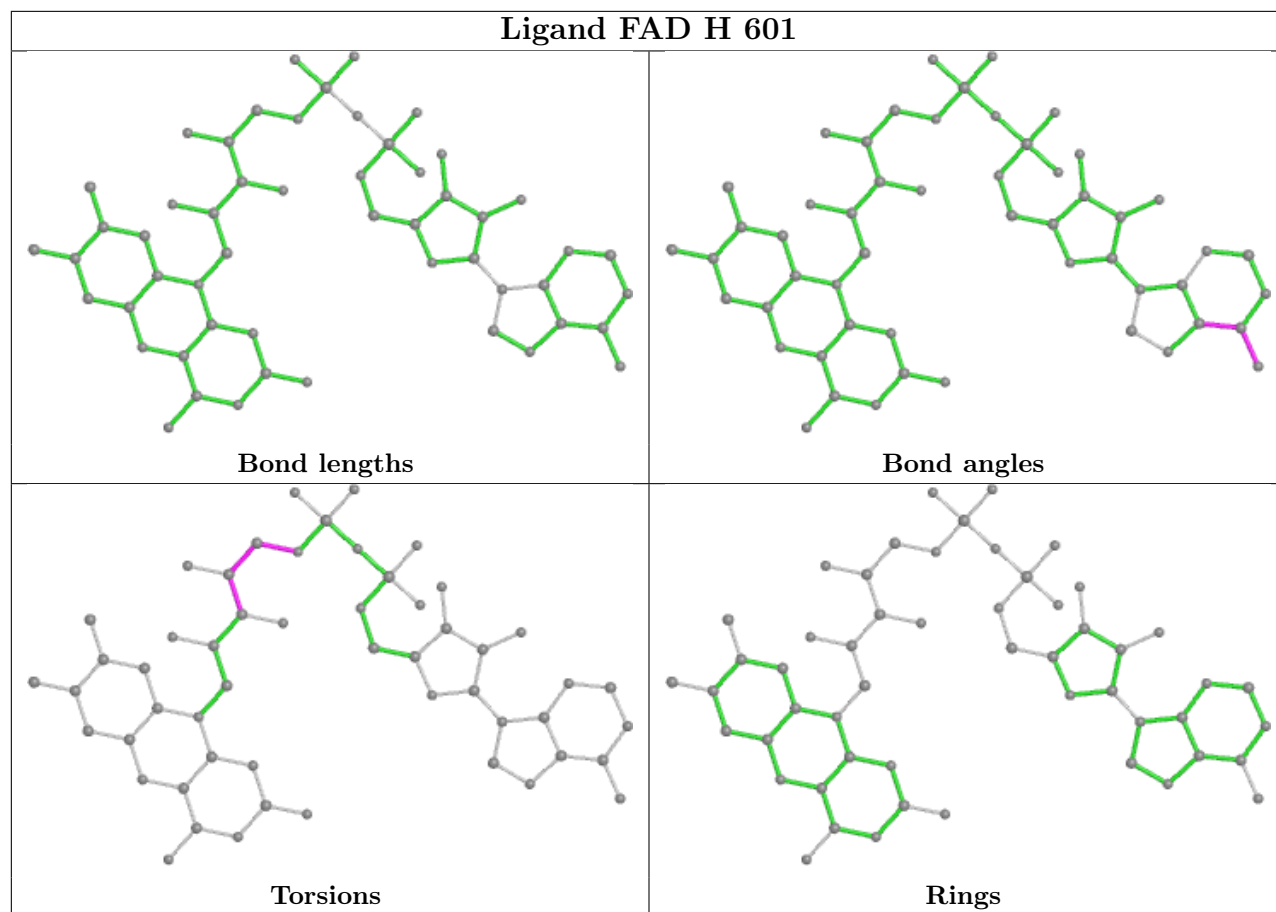


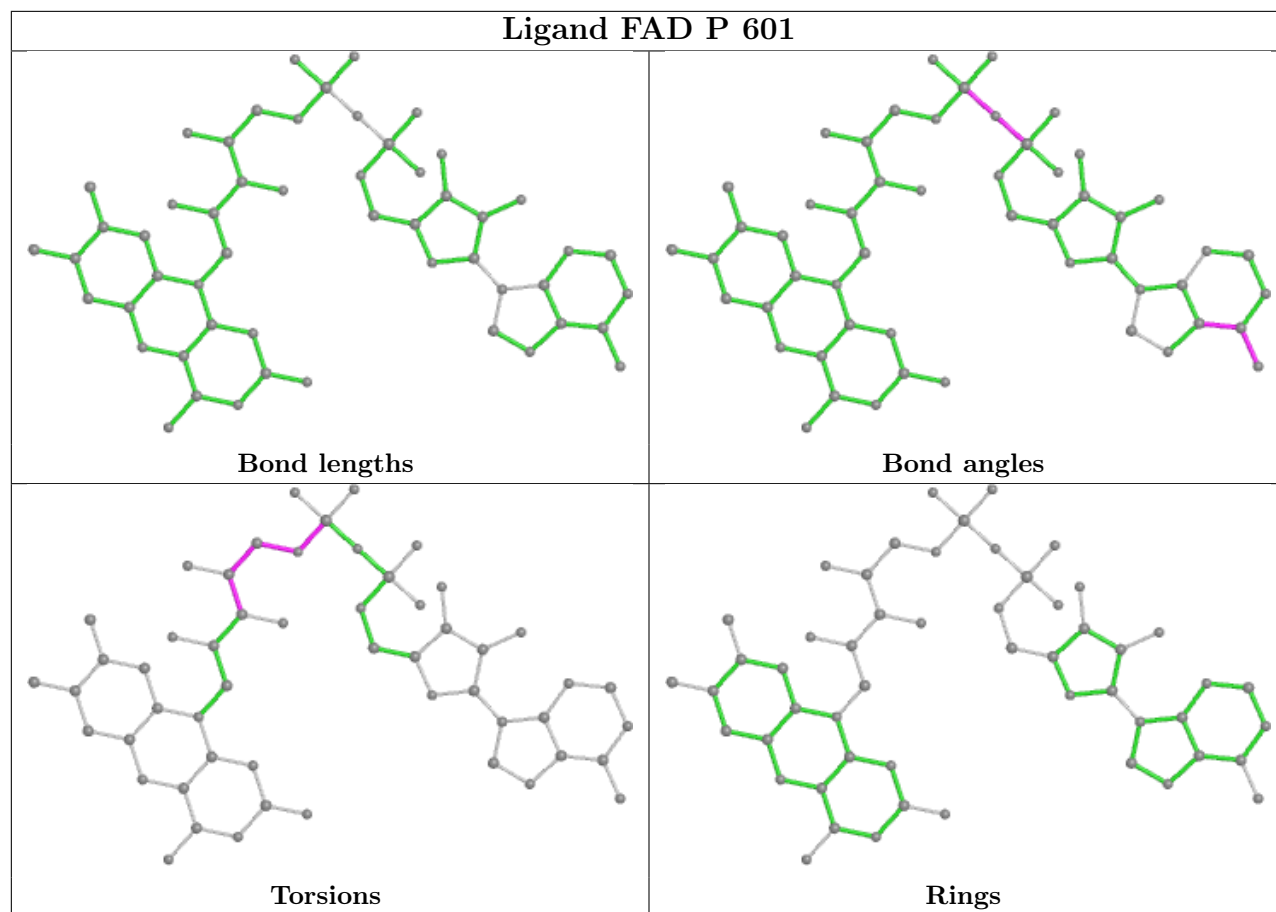


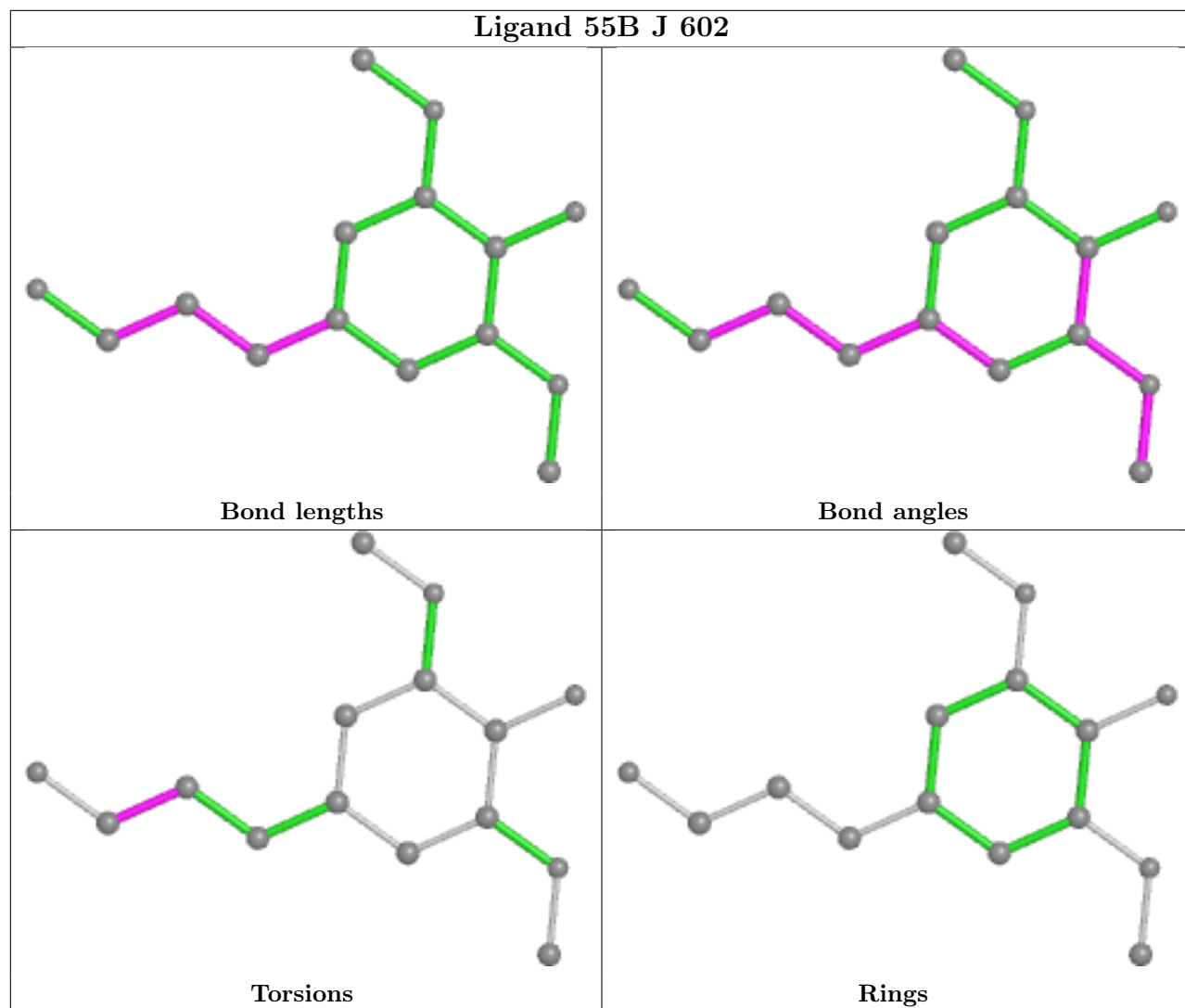




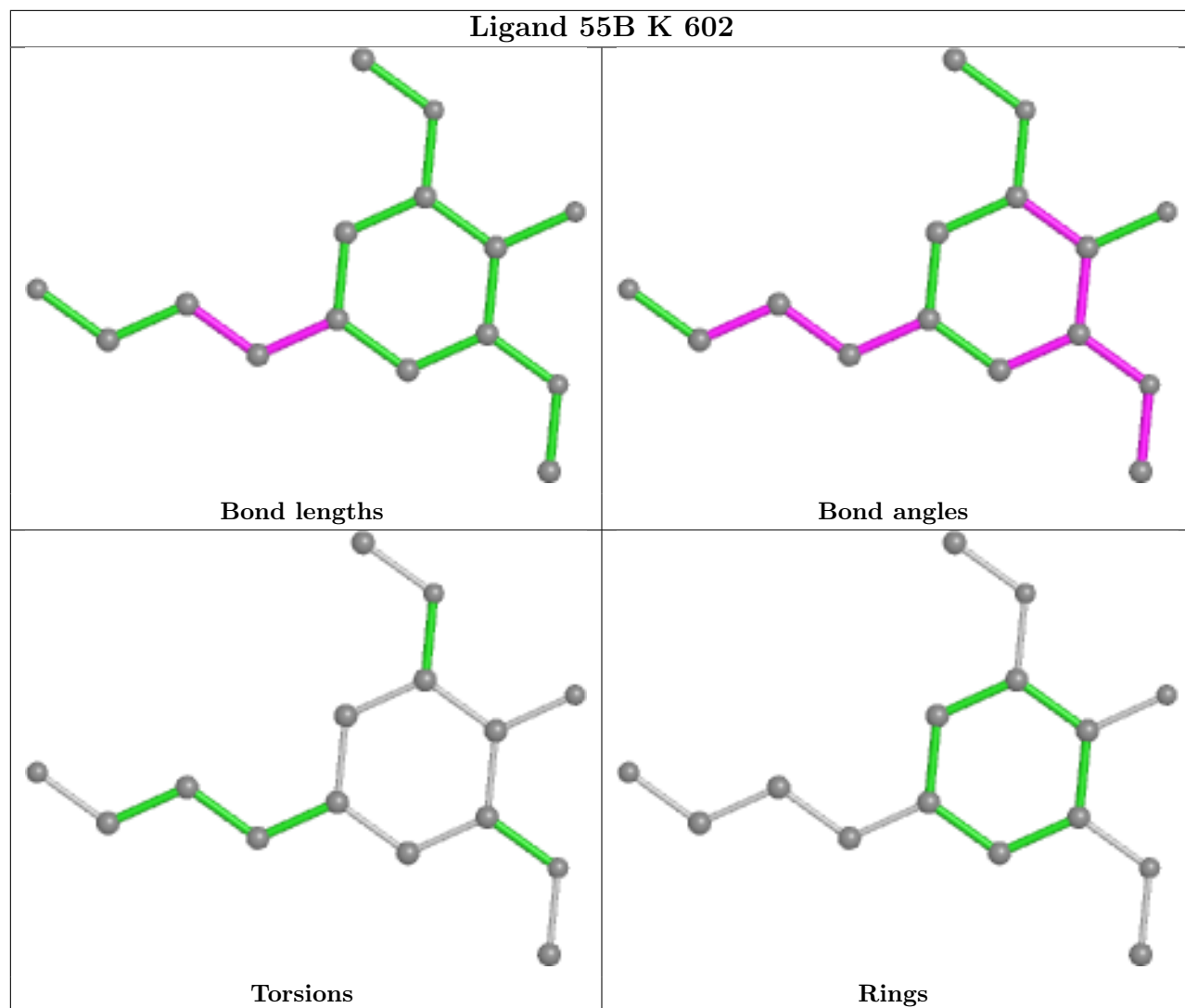


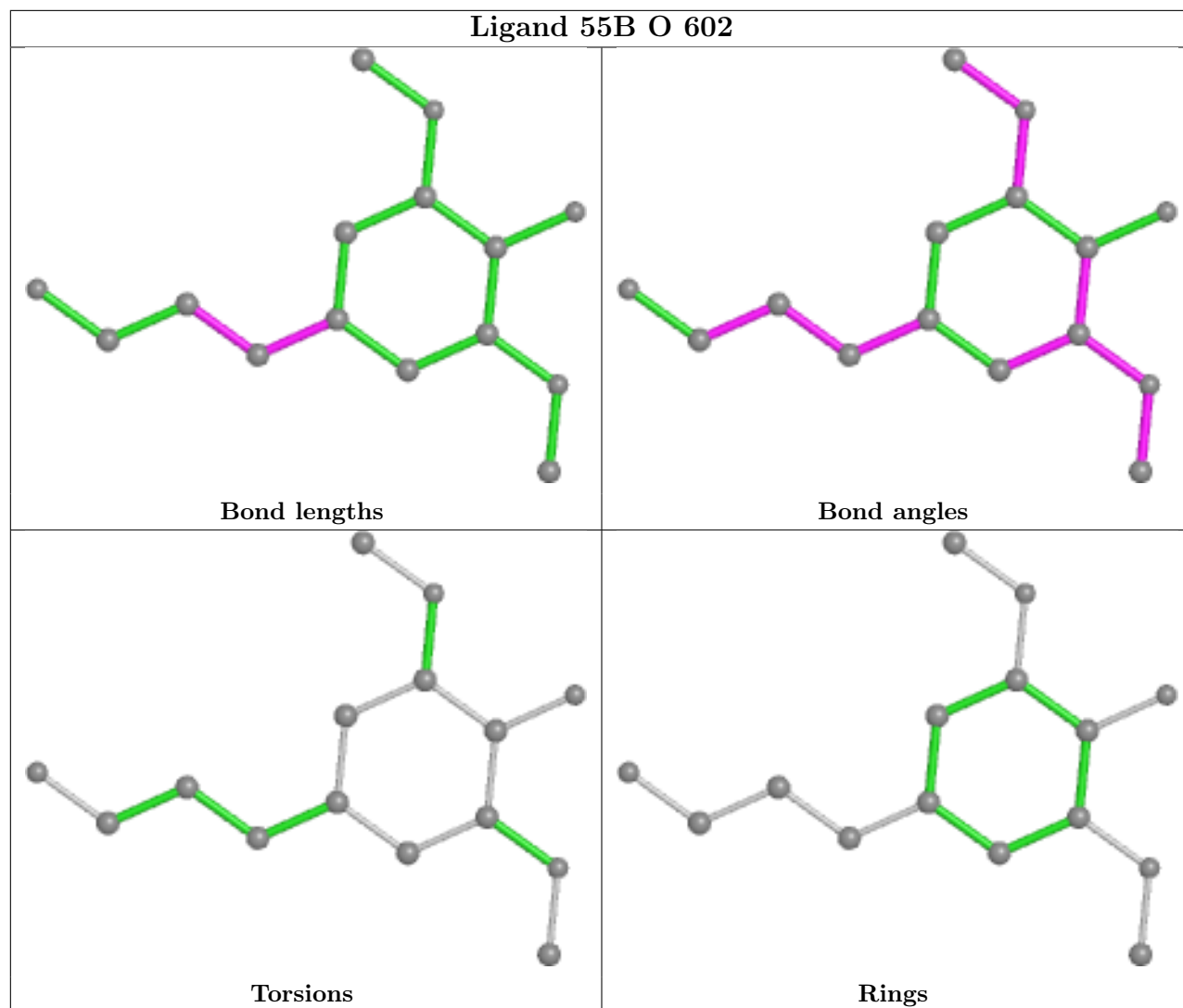


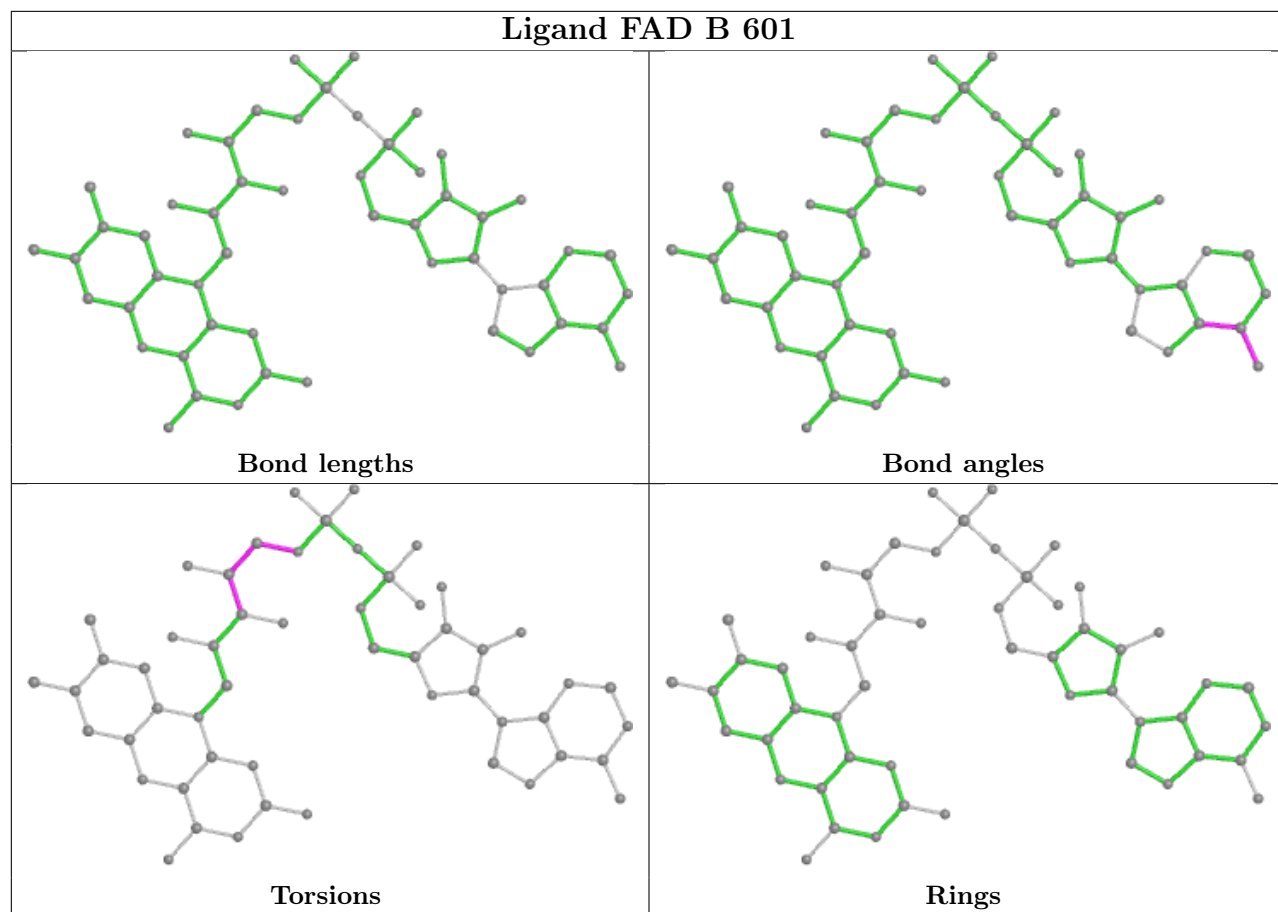


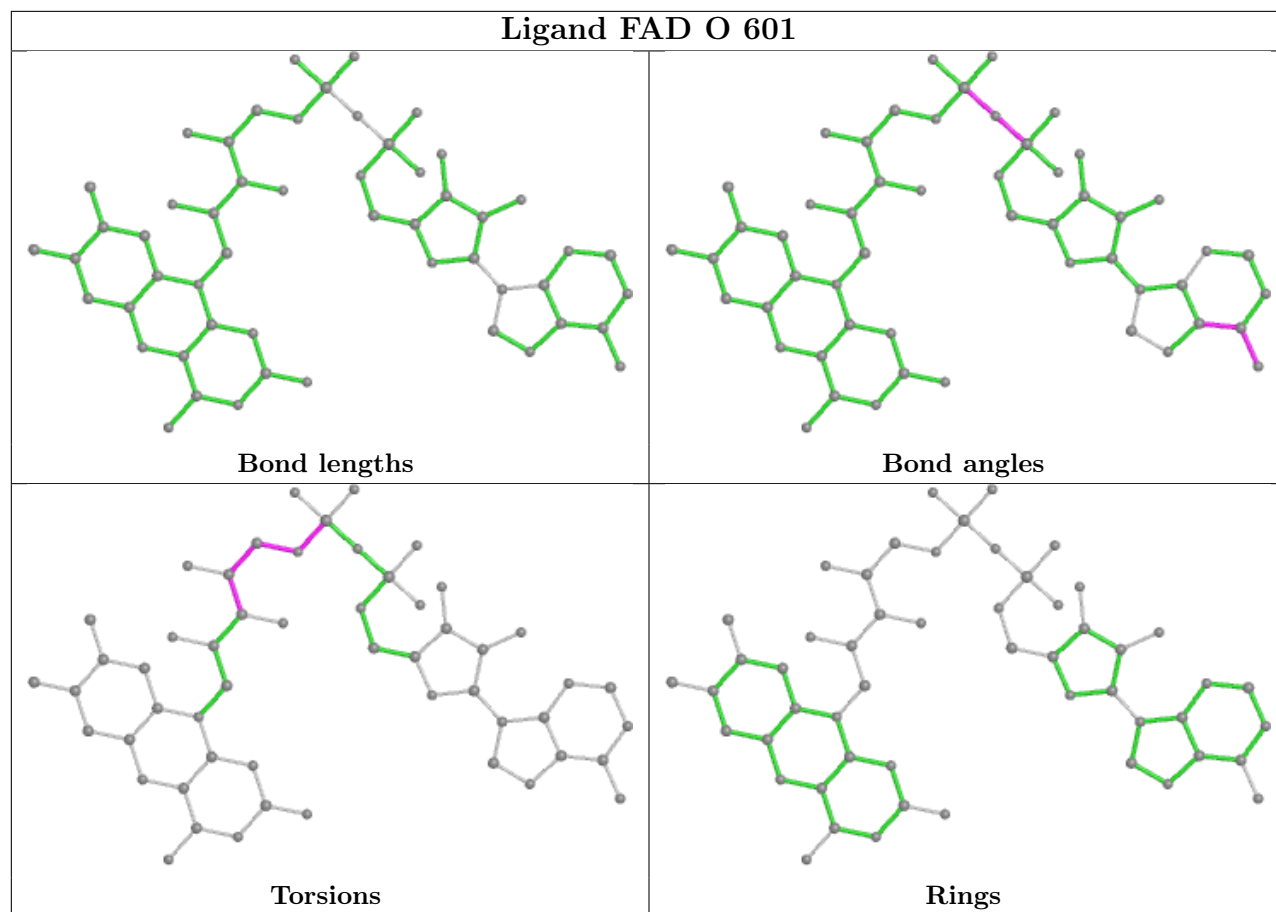


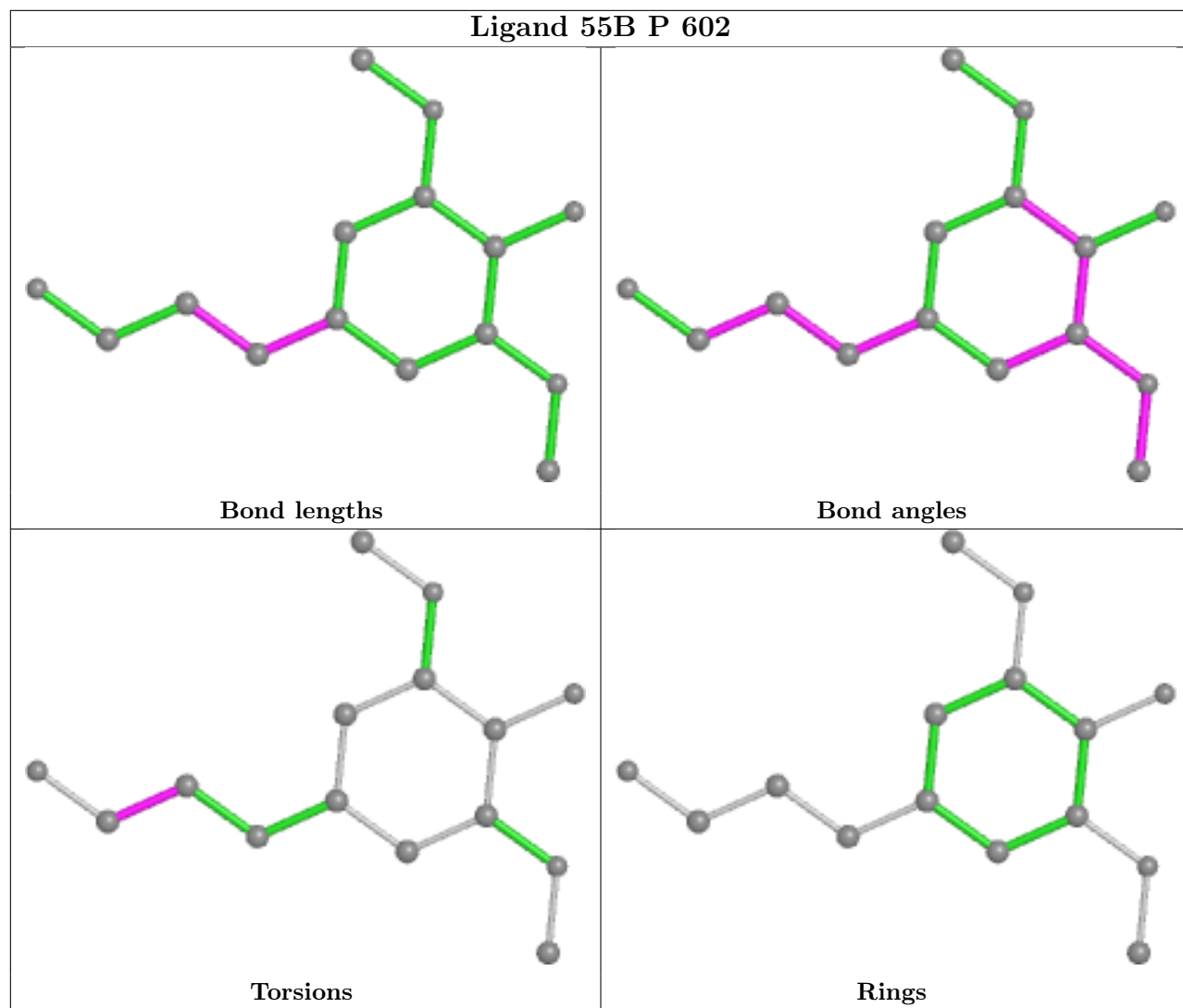


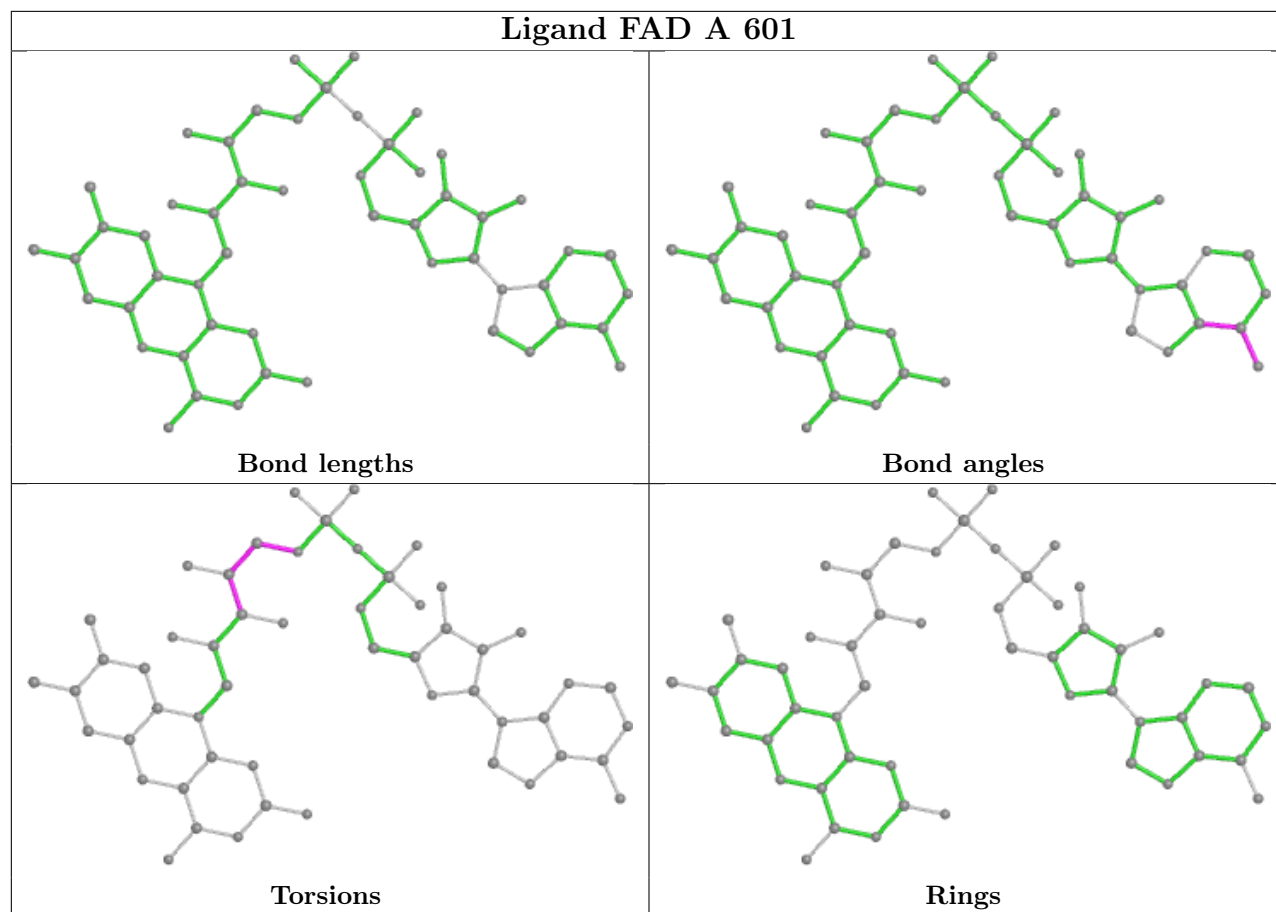


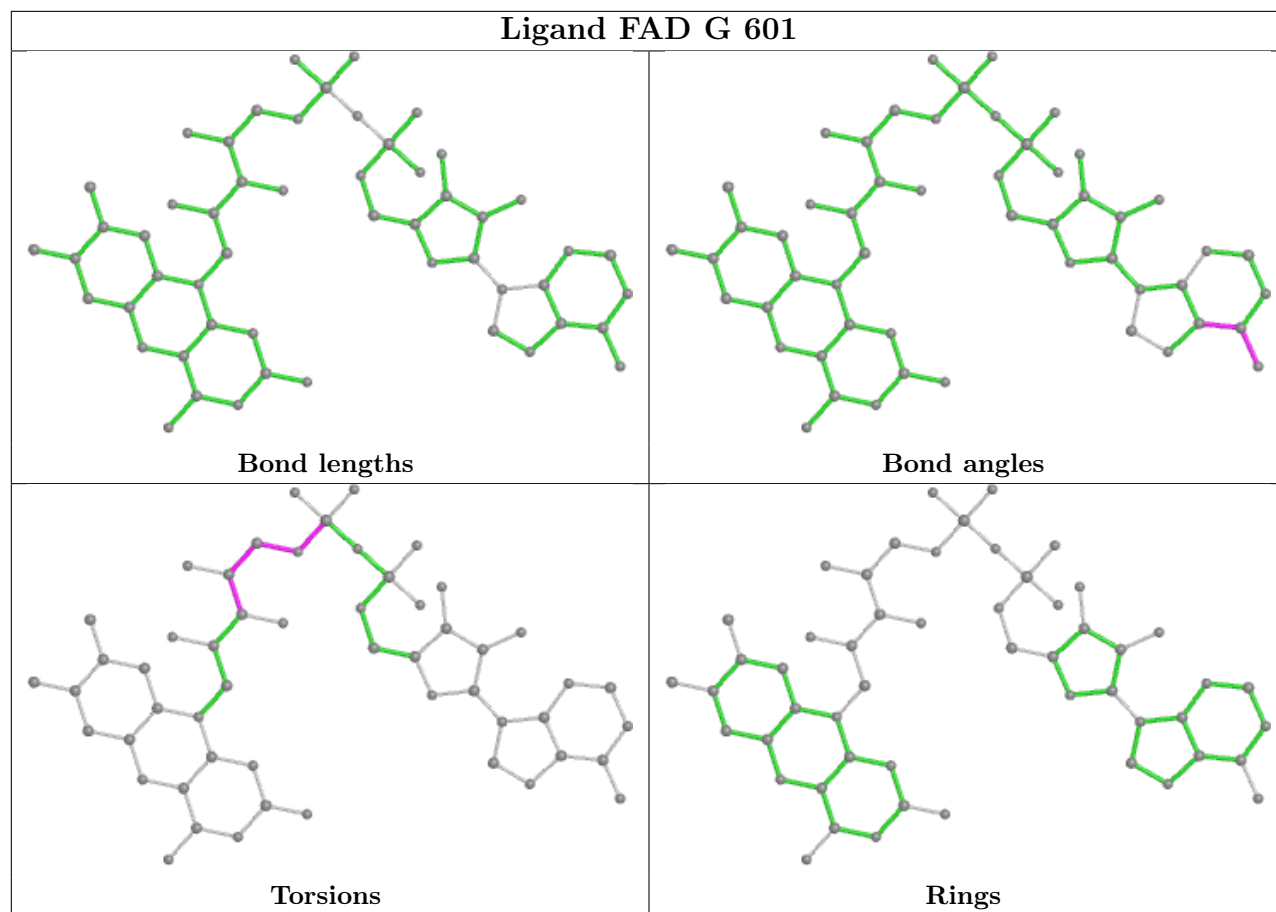


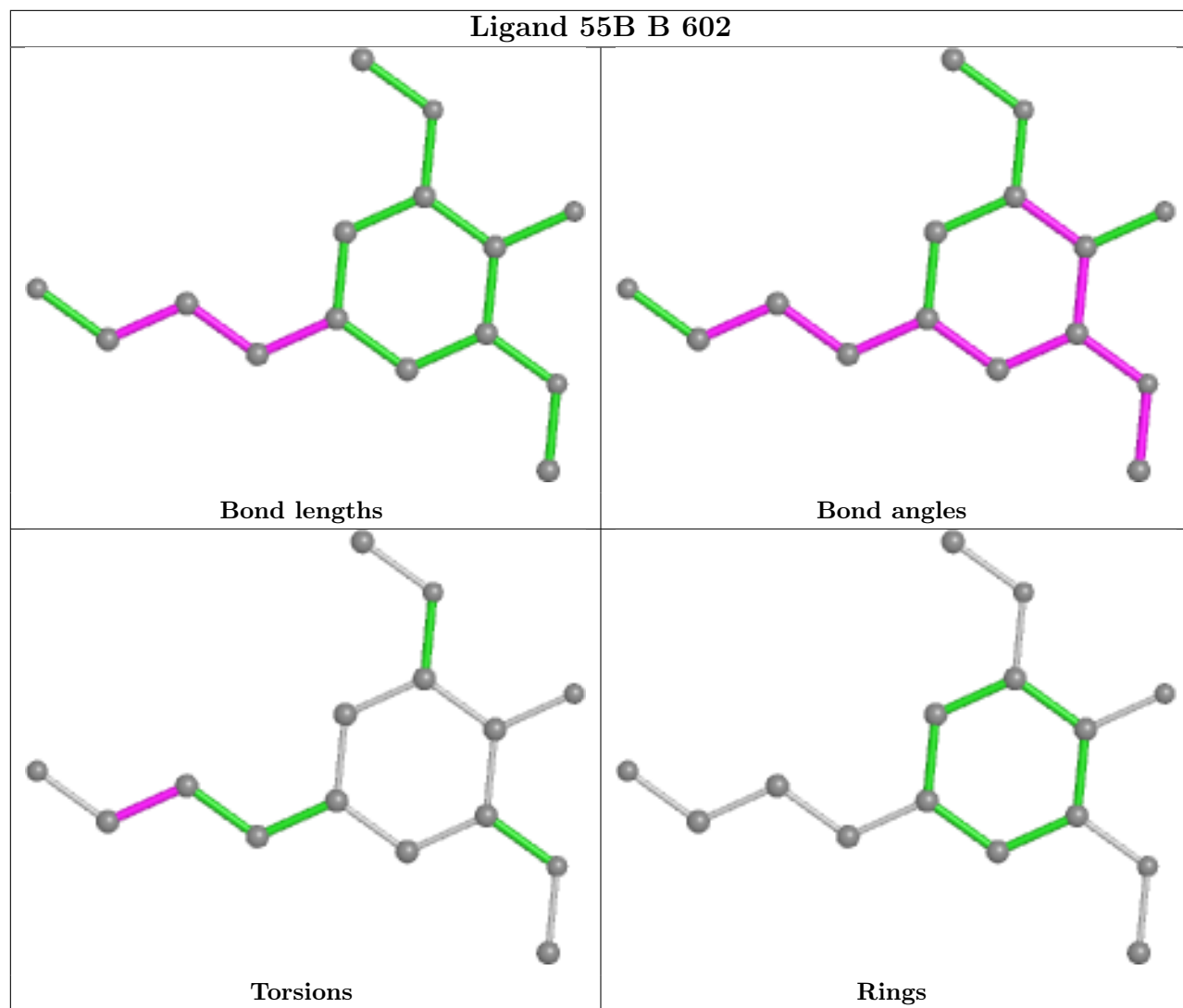




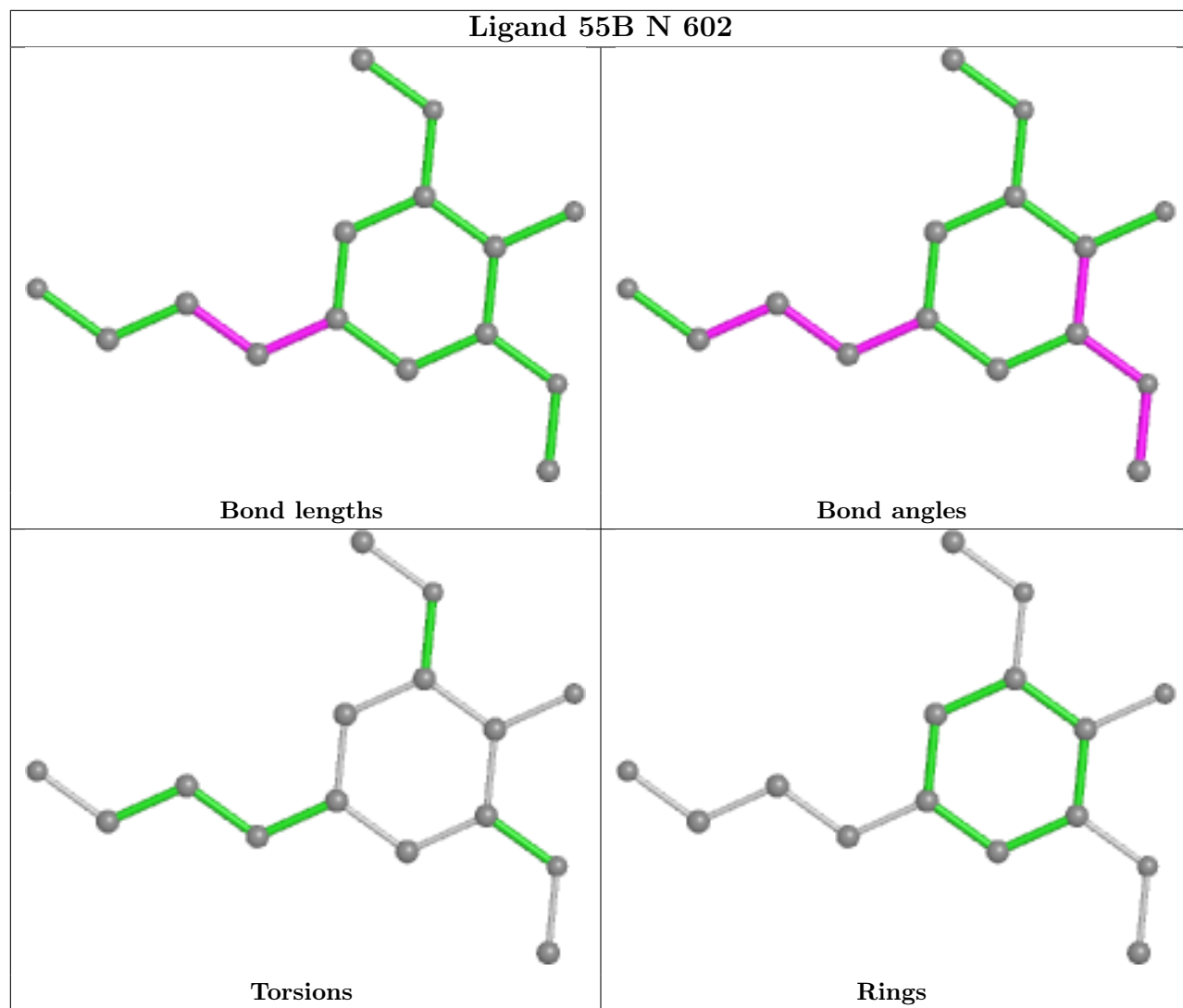


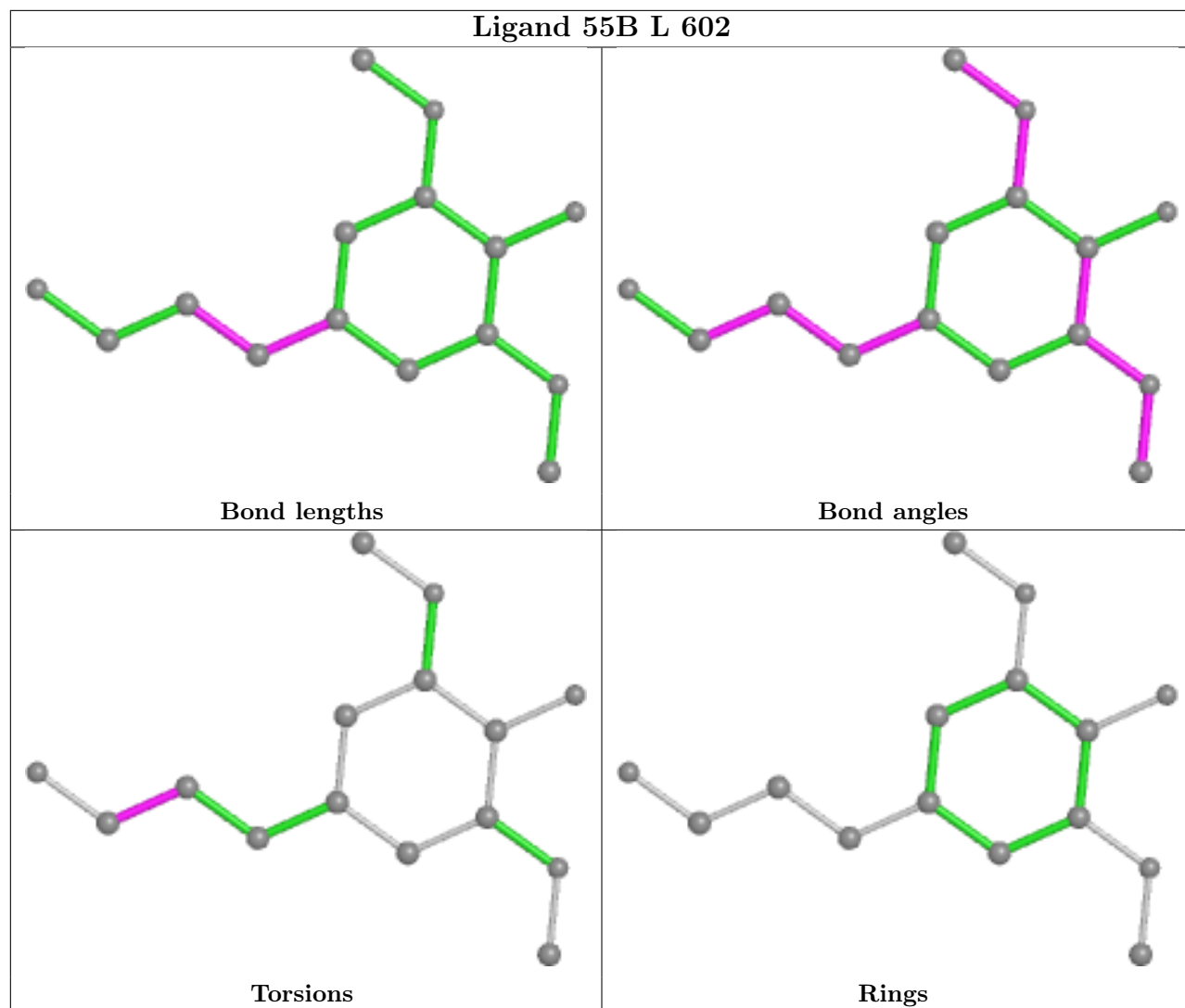


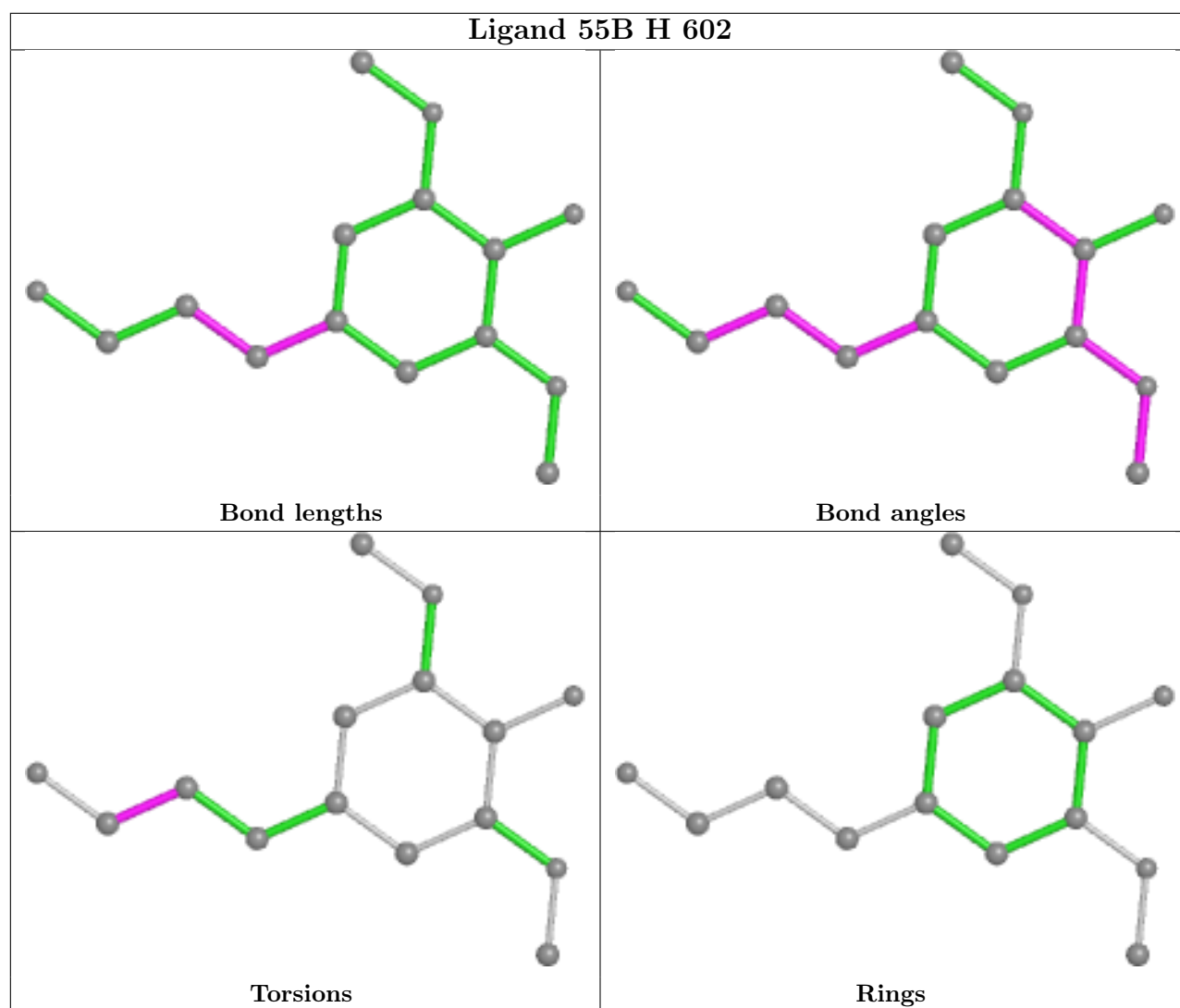












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	525/526 (99%)	-0.21	6 (1%) 80 85	17, 25, 43, 71	0
1	B	525/526 (99%)	-0.24	3 (0%) 89 92	16, 24, 40, 77	0
1	C	525/526 (99%)	-0.26	6 (1%) 80 85	15, 24, 41, 79	0
1	D	525/526 (99%)	-0.29	4 (0%) 86 89	16, 25, 44, 70	0
1	E	525/526 (99%)	-0.16	6 (1%) 80 85	17, 27, 44, 85	0
1	F	525/526 (99%)	-0.21	4 (0%) 86 89	18, 28, 48, 85	0
1	G	525/526 (99%)	-0.14	6 (1%) 80 85	18, 31, 50, 79	0
1	H	525/526 (99%)	-0.22	7 (1%) 77 81	17, 24, 42, 70	0
1	I	525/526 (99%)	-0.19	7 (1%) 77 81	16, 29, 46, 84	0
1	J	525/526 (99%)	-0.15	6 (1%) 80 85	18, 29, 51, 80	0
1	K	525/526 (99%)	0.07	12 (2%) 60 67	21, 34, 54, 89	0
1	L	525/526 (99%)	0.15	26 (4%) 28 35	20, 36, 64, 98	0
1	M	525/526 (99%)	0.19	19 (3%) 42 49	24, 41, 61, 96	0
1	N	525/526 (99%)	0.05	15 (2%) 51 58	24, 39, 58, 101	0
1	O	525/526 (99%)	0.52	50 (9%) 8 11	28, 48, 73, 91	0
1	P	525/526 (99%)	0.76	70 (13%) 3 4	26, 51, 79, 109	0
All	All	8400/8416 (99%)	-0.02	247 (2%) 51 58	15, 31, 59, 109	0

The worst 5 of 247 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	P	297	ASP	12.5
1	N	525	ASN	7.7
1	J	297	ASP	7.3
1	K	297	ASP	7.3
1	E	297	ASP	6.8

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

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

## 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
4	CA	L	603	1/1	0.82	0.09	37,37,37,37	0
3	55B	P	602	15/15	0.92	0.18	40,44,56,61	0
3	55B	M	602	15/15	0.92	0.15	37,43,50,57	0
3	55B	O	602	15/15	0.93	0.18	49,52,63,66	0
3	55B	K	602	15/15	0.93	0.15	29,33,45,58	0
4	CA	F	603	1/1	0.93	0.12	35,35,35,35	0
3	55B	N	602	15/15	0.93	0.14	33,40,49,58	0
2	FAD	M	601	53/53	0.94	0.13	31,38,46,51	0
3	55B	L	602	15/15	0.94	0.16	30,32,47,56	0
2	FAD	O	601	53/53	0.94	0.14	36,46,57,61	0
2	FAD	P	601	53/53	0.94	0.15	36,43,50,53	0
3	55B	A	602	15/15	0.95	0.16	22,27,36,44	0
3	55B	D	602	15/15	0.95	0.13	19,26,35,44	0
3	55B	E	602	15/15	0.95	0.14	27,29,34,39	0
3	55B	F	602	15/15	0.95	0.13	23,28,39,49	0
3	55B	I	602	15/15	0.95	0.16	22,25,35,50	0
4	CA	A	603	1/1	0.95	0.14	42,42,42,42	0
3	55B	J	602	15/15	0.95	0.12	28,30,36,42	0
4	CA	J	603	1/1	0.95	0.17	39,39,39,39	0
2	FAD	N	601	53/53	0.95	0.12	31,37,40,42	0
4	CA	N	603	1/1	0.95	0.14	51,51,51,51	0
3	55B	B	602	15/15	0.96	0.13	21,24,37,44	0
3	55B	C	602	15/15	0.96	0.14	23,26,33,38	0
2	FAD	B	601	53/53	0.96	0.13	17,22,26,55	0
2	FAD	J	601	53/53	0.97	0.12	17,24,28,32	0
3	55B	G	602	15/15	0.97	0.14	19,24,35,40	0
3	55B	H	602	15/15	0.97	0.16	21,25,28,39	0

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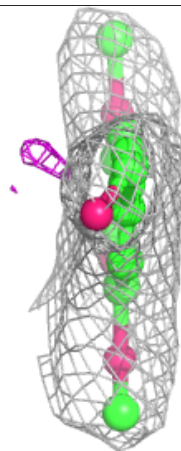
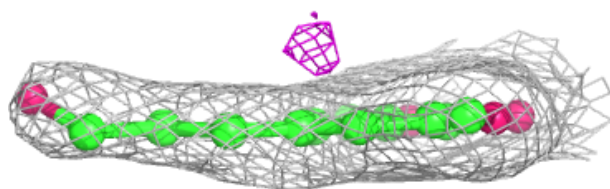
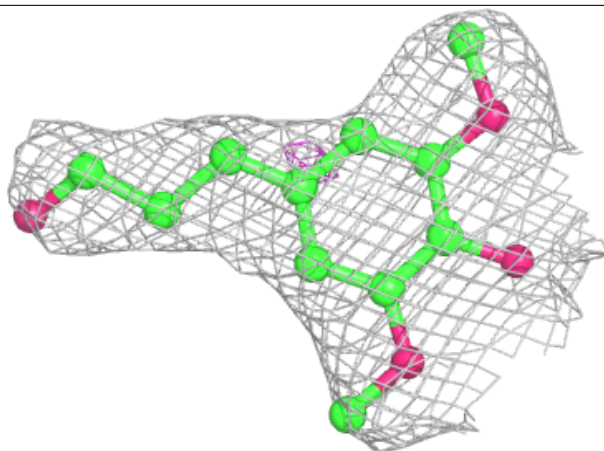
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	FAD	K	601	53/53	0.97	0.13	22,27,33,36	0
4	CA	B	603	1/1	0.97	0.12	32,32,32,32	0
4	CA	C	603	1/1	0.97	0.09	32,32,32,32	0
4	CA	D	603	1/1	0.97	0.15	33,33,33,33	0
4	CA	E	603	1/1	0.97	0.12	31,31,31,31	0
2	FAD	L	601	53/53	0.97	0.12	18,29,36,40	0
2	FAD	A	601	53/53	0.97	0.12	17,22,27,30	0
2	FAD	E	601	53/53	0.97	0.12	17,23,27,28	0
2	FAD	F	601	53/53	0.97	0.11	19,23,26,30	0
2	FAD	D	601	53/53	0.98	0.12	15,21,26,29	0
2	FAD	G	601	53/53	0.98	0.11	15,23,28,33	0
2	FAD	H	601	53/53	0.98	0.13	15,21,25,27	0
4	CA	A	604	1/1	0.98	0.11	32,32,32,32	0
2	FAD	I	601	53/53	0.98	0.12	18,22,26,27	0
2	FAD	C	601	53/53	0.98	0.12	15,20,27,30	0
4	CA	O	603	1/1	0.98	0.10	38,38,38,38	0
4	CA	M	603	1/1	0.99	0.15	41,41,41,41	0

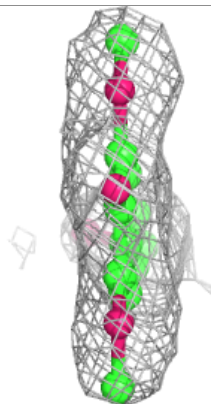
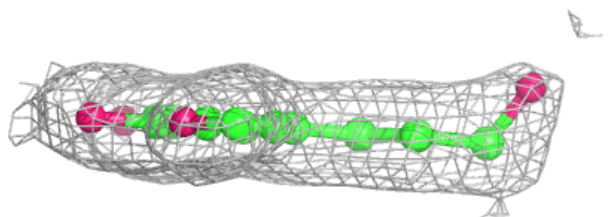
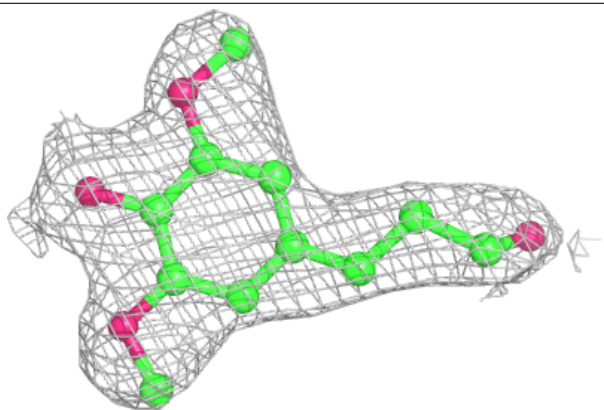
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

**Electron density around 55B P 602:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

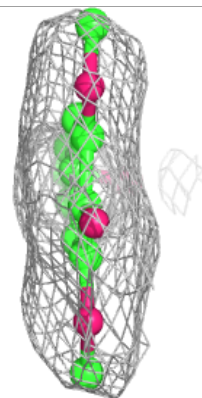
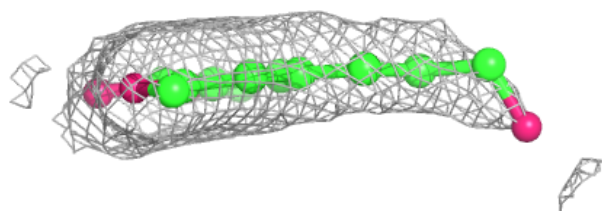
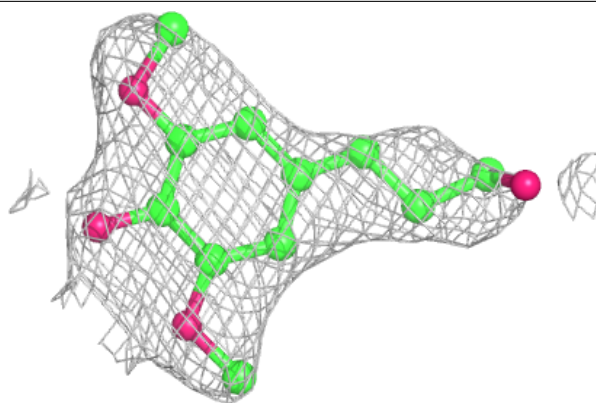
**Electron density around 55B M 602:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

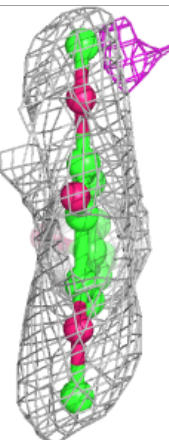
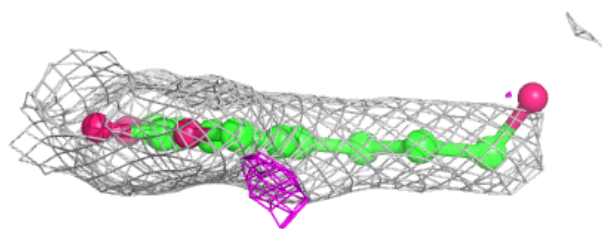
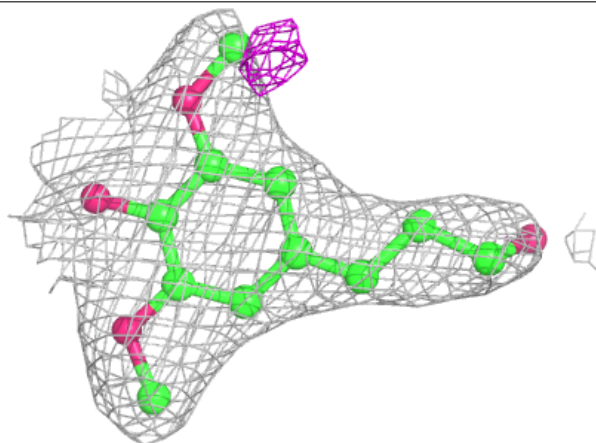


**Electron density around 55B O 602:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around 55B K 602:**

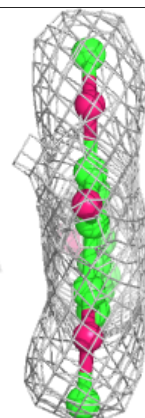
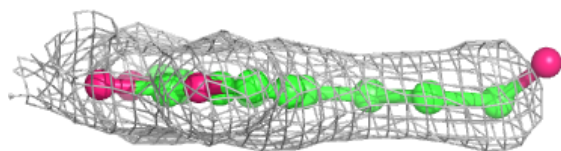
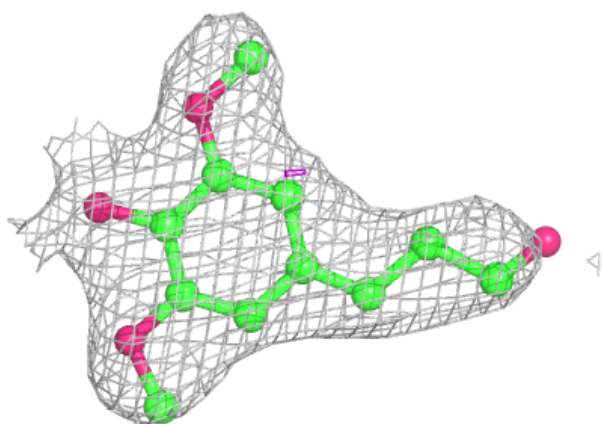
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



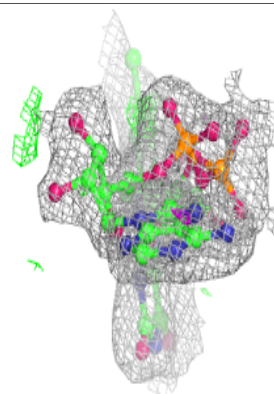
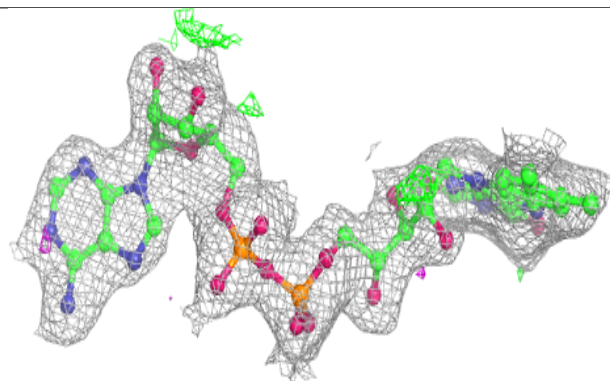
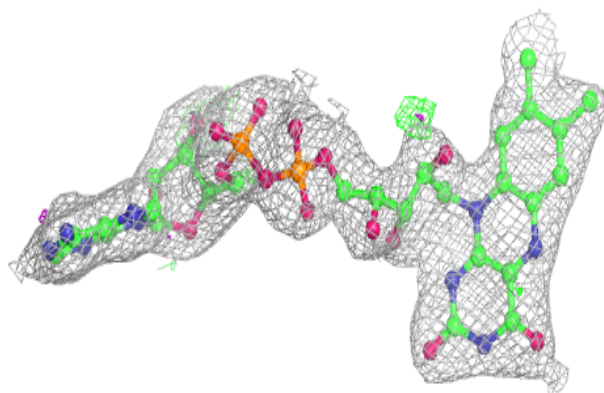


**Electron density around 55B N 602:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

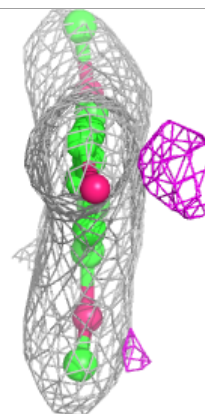
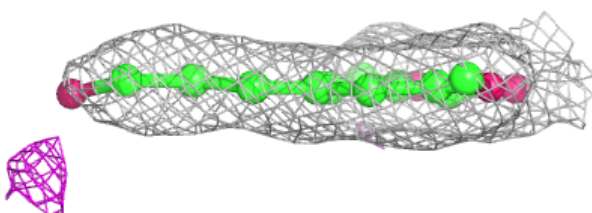
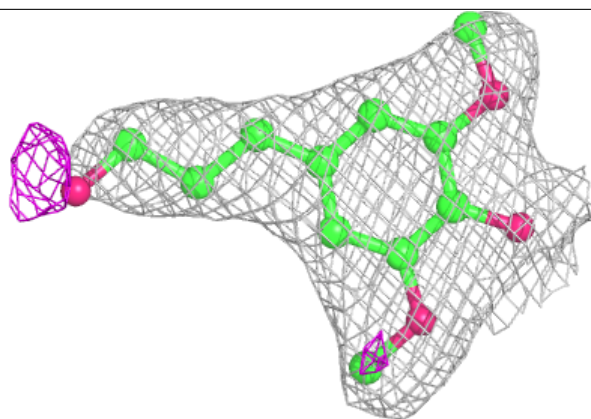
**Electron density around FAD M 601:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

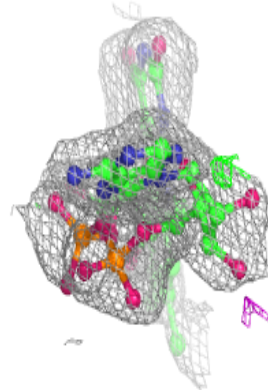
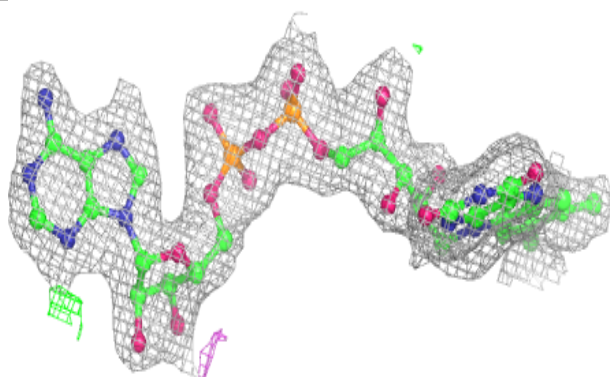
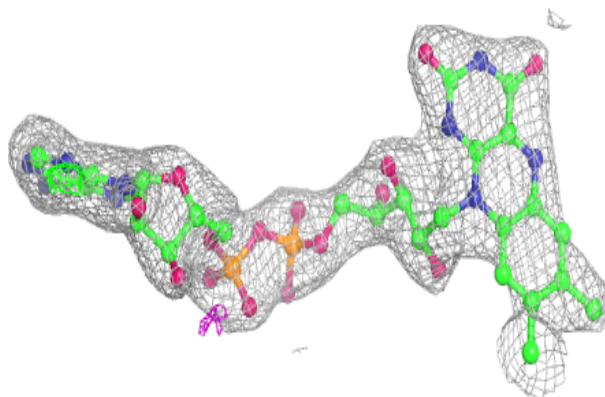


**Electron density around 55B L 602:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

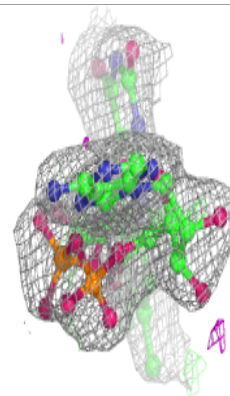
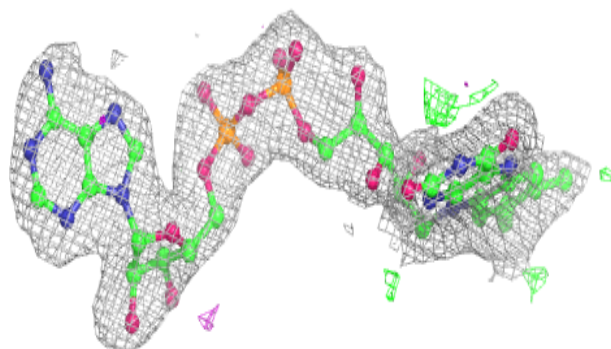
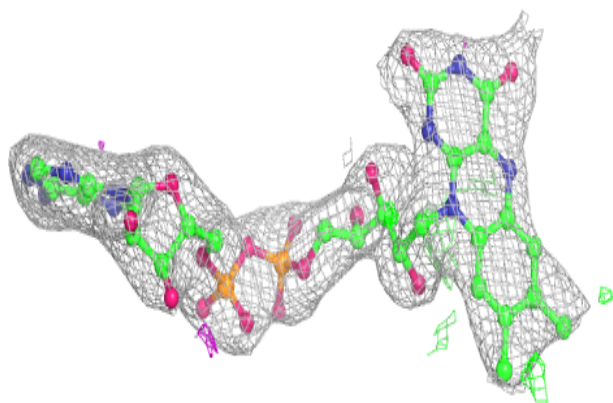
**Electron density around FAD O 601:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



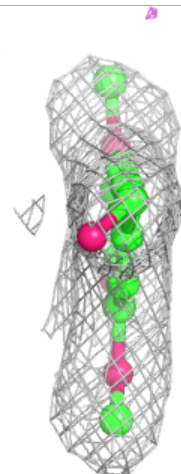
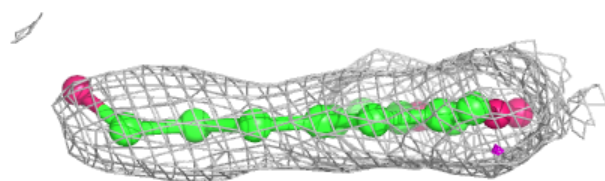
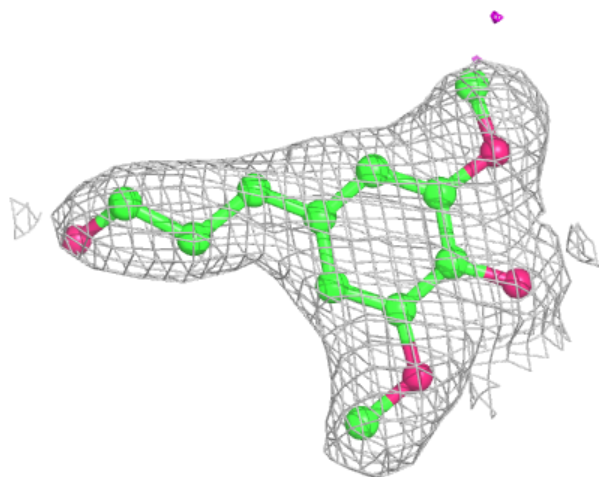
**Electron density around FAD P 601:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



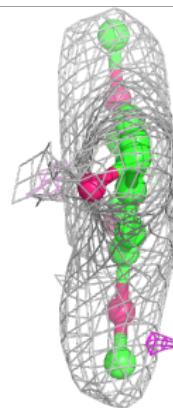
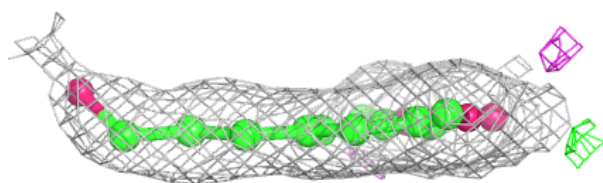
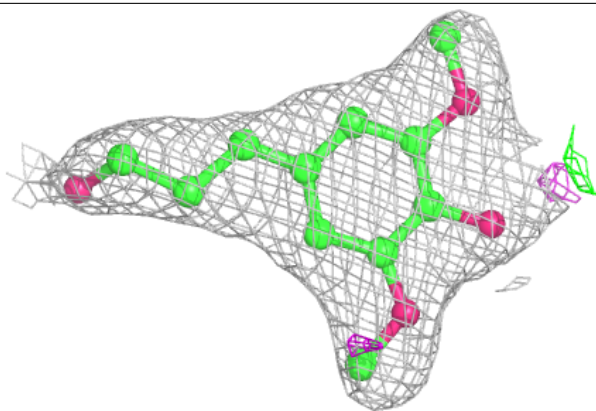
**Electron density around 55B A 602:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

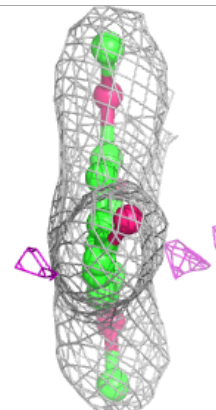
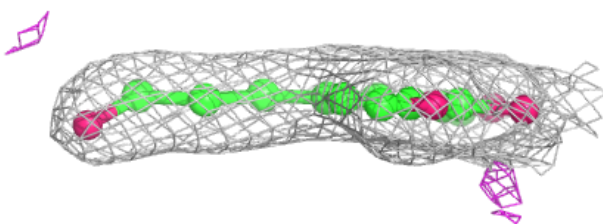
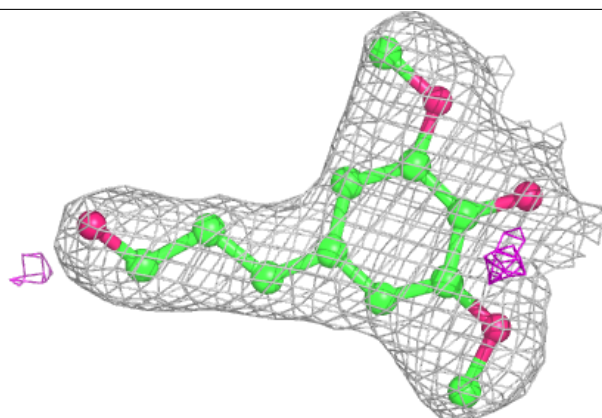


**Electron density around 55B D 602:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

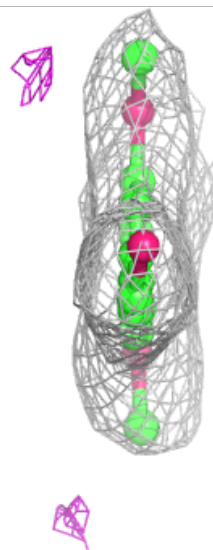
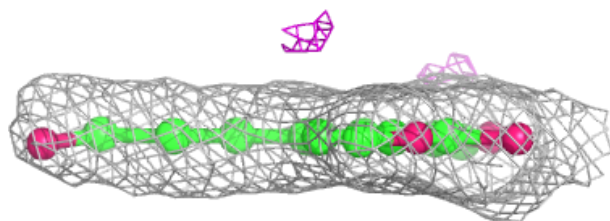
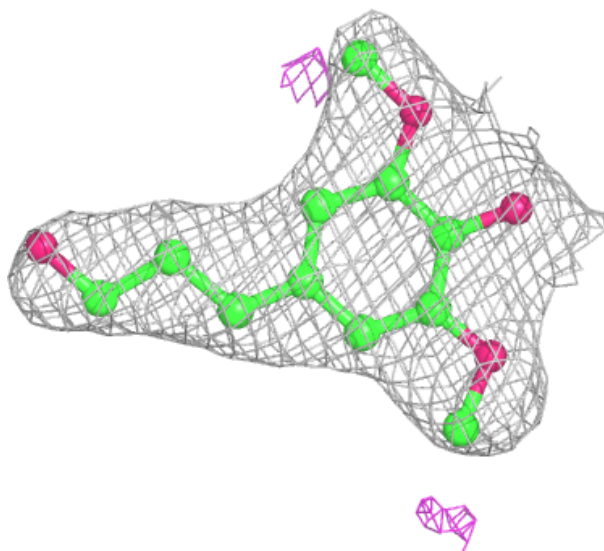
**Electron density around 55B E 602:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



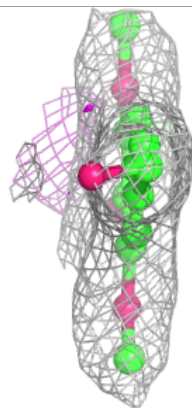
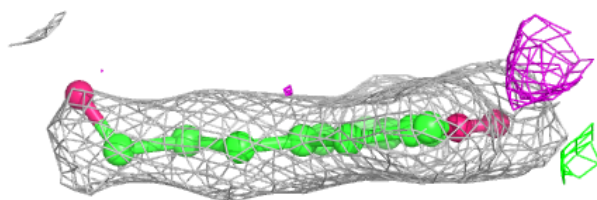
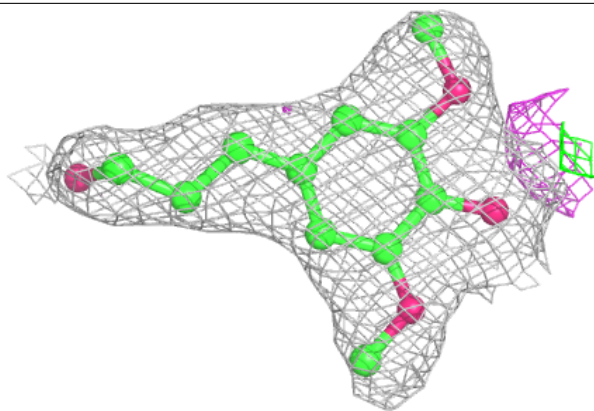
**Electron density around 55B F 602:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

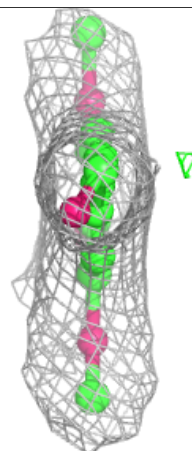
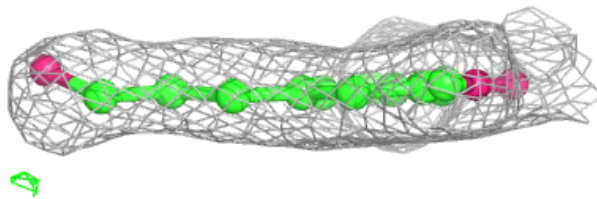
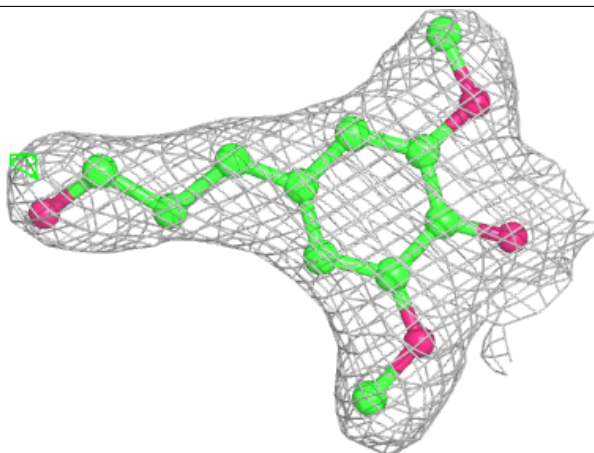


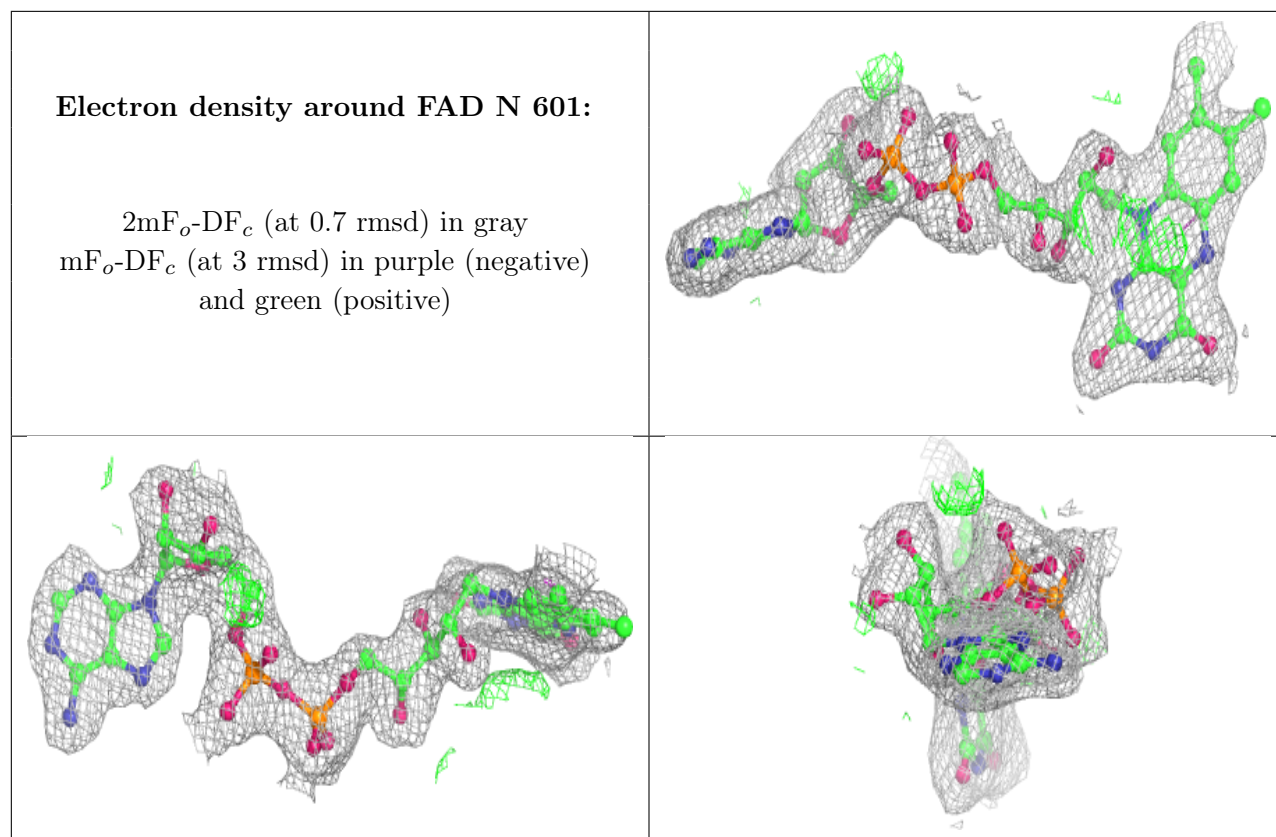
**Electron density around 55B I 602:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around 55B J 602:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

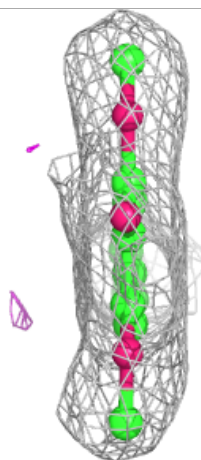
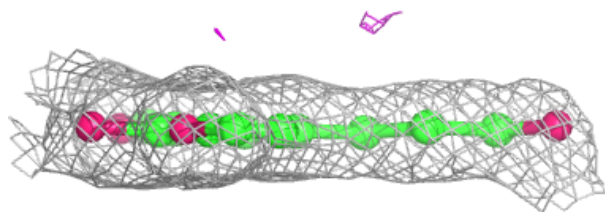
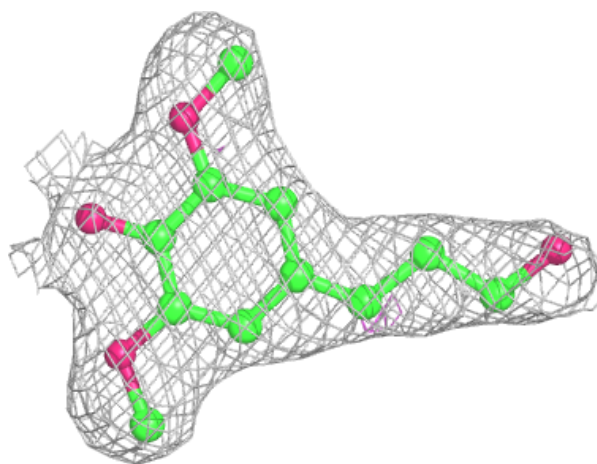






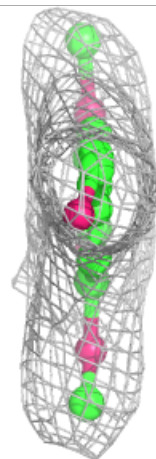
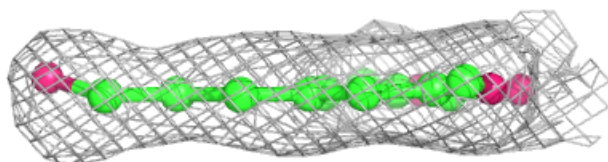
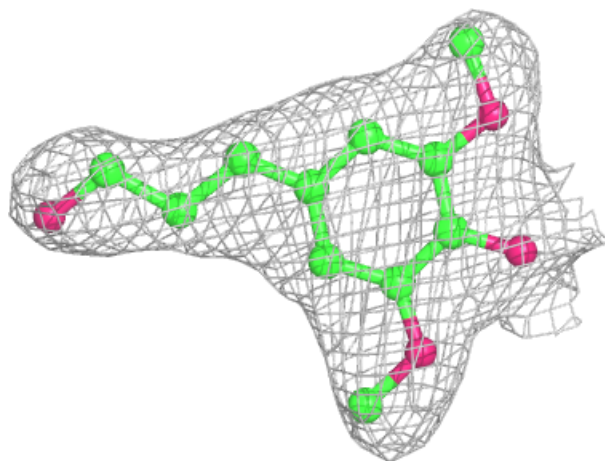
**Electron density around 55B B 602:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



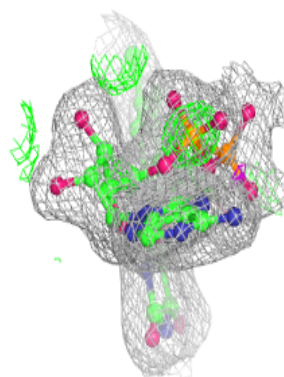
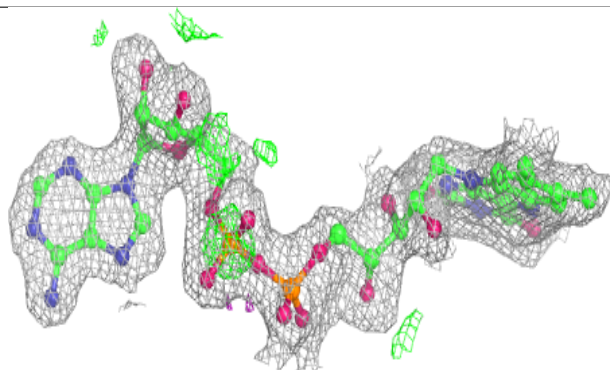
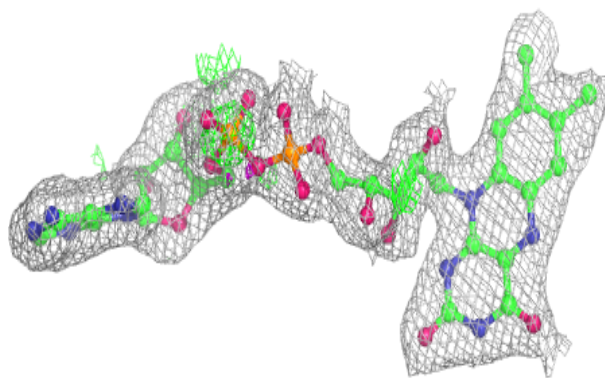
**Electron density around 55B C 602:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

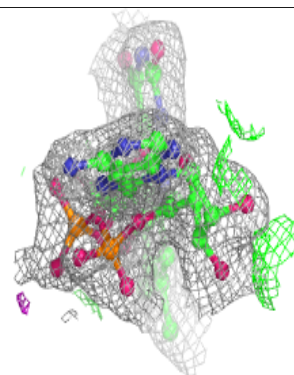
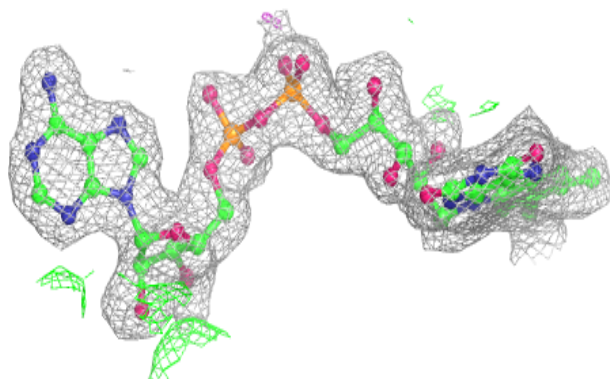
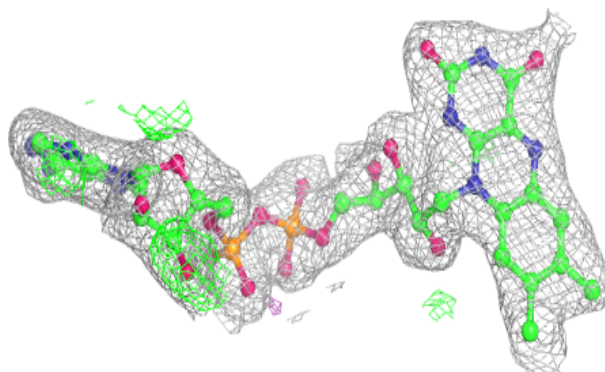


**Electron density around FAD B 601:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

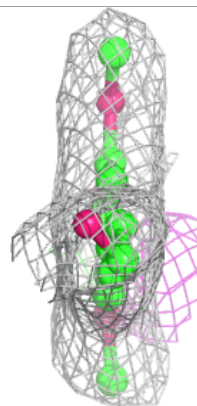
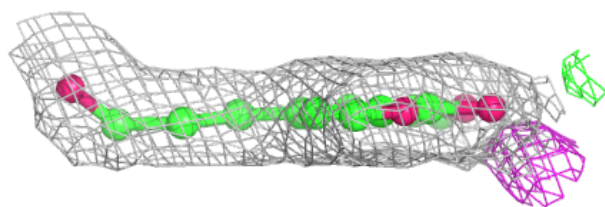
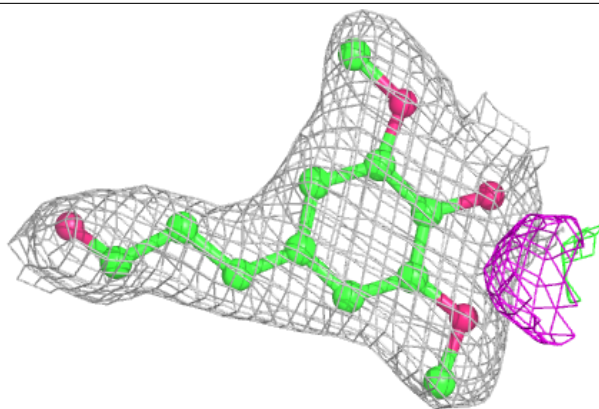
**Electron density around FAD J 601:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



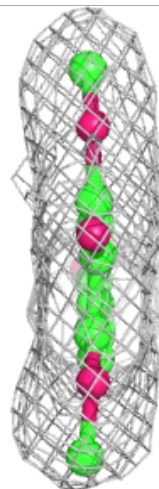
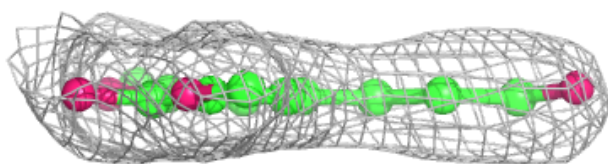
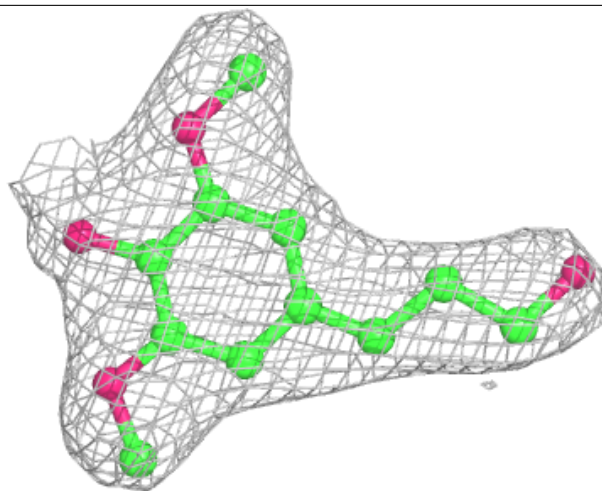
**Electron density around 55B G 602:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



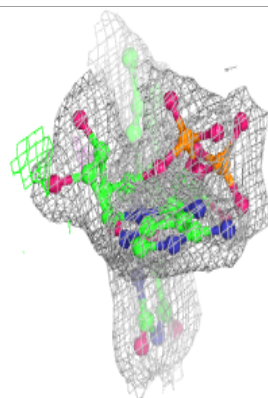
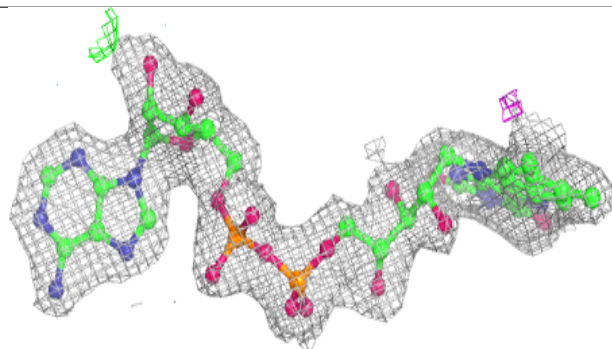
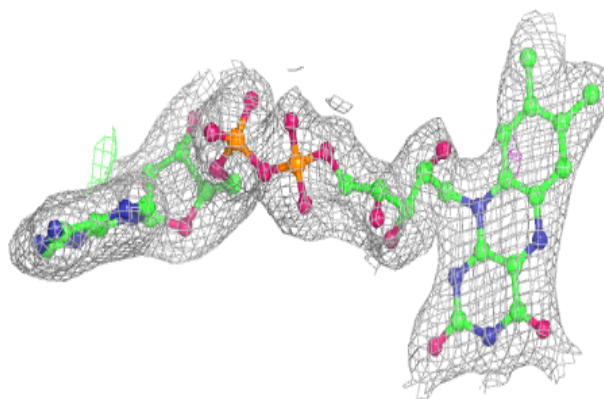
**Electron density around 55B H 602:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

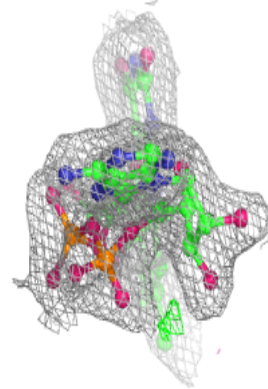
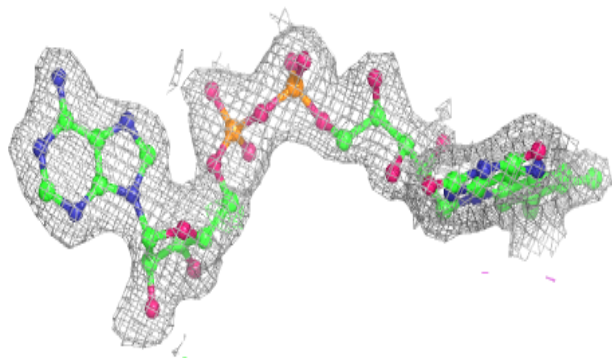
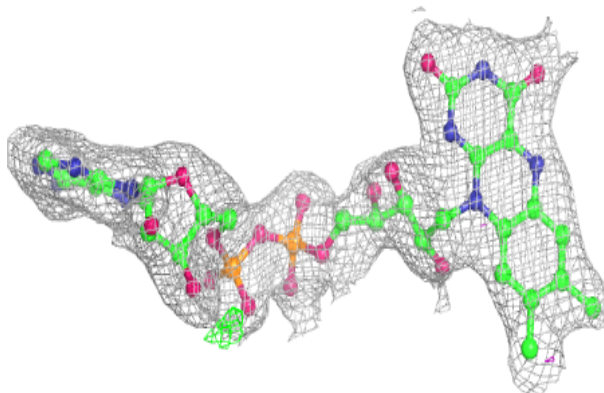


**Electron density around FAD K 601:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

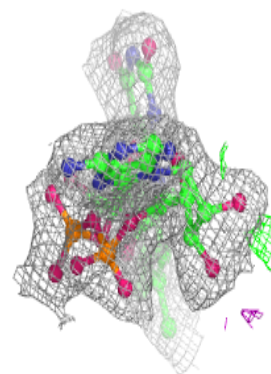
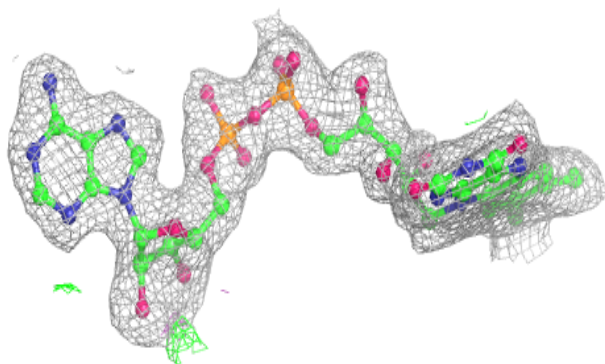
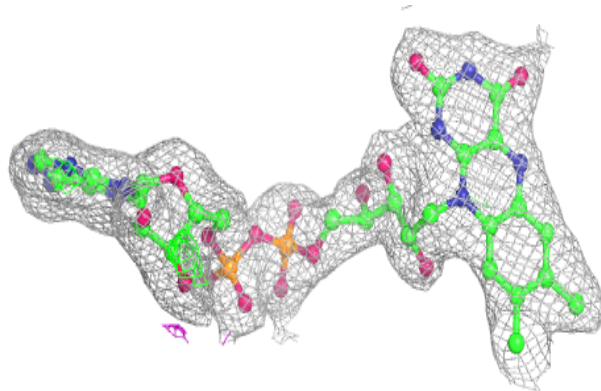
**Electron density around FAD L 601:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

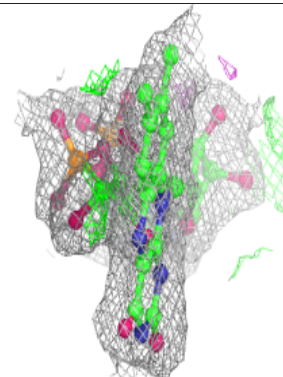
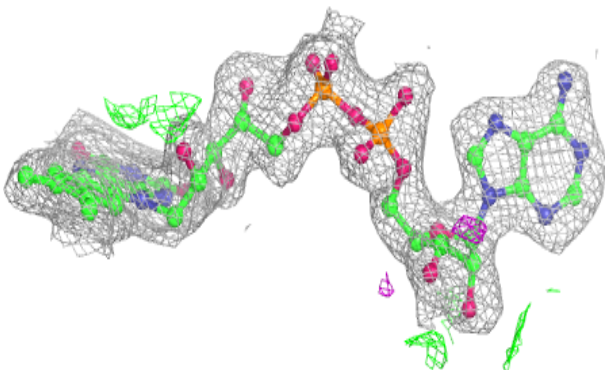
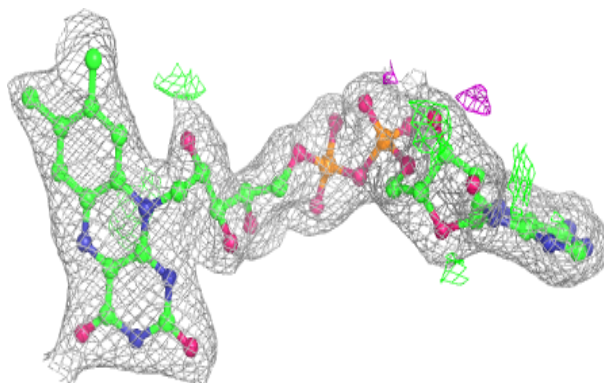


**Electron density around FAD A 601:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

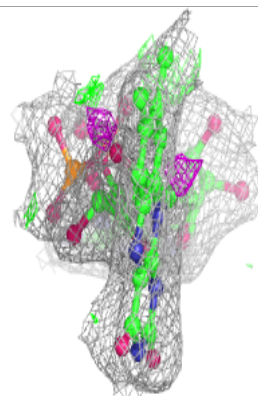
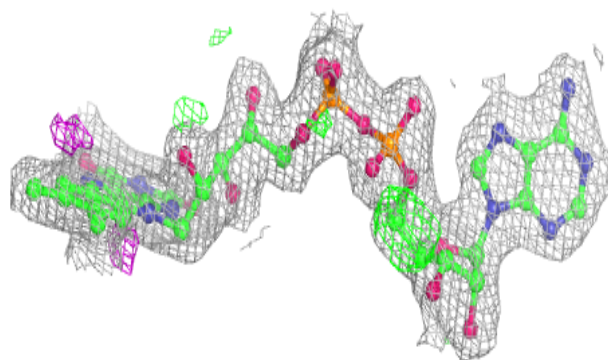
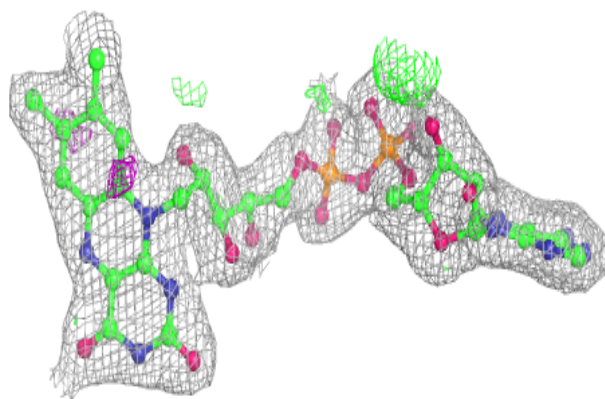
**Electron density around FAD E 601:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

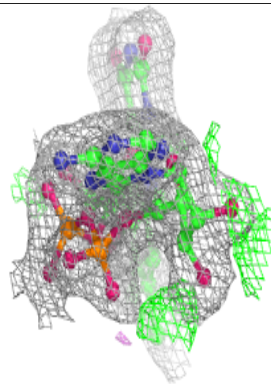
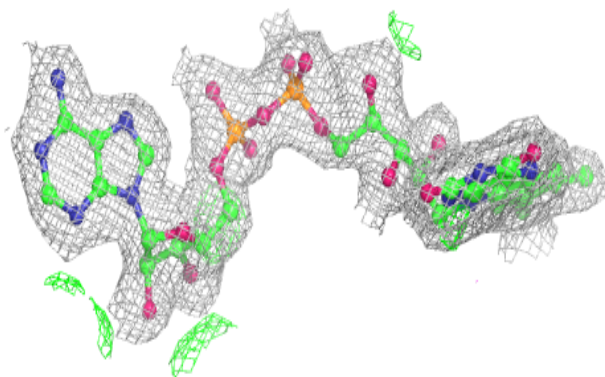
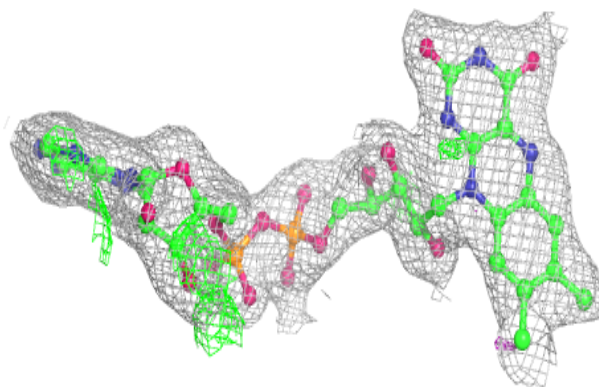


**Electron density around FAD F 601:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around FAD D 601:**

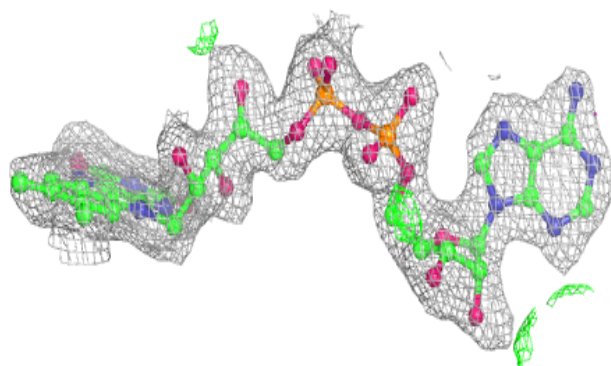
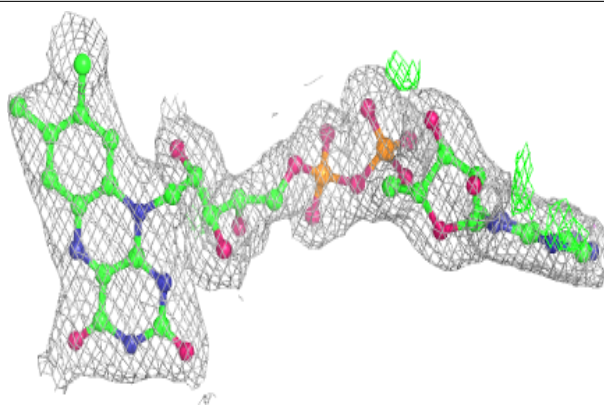
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



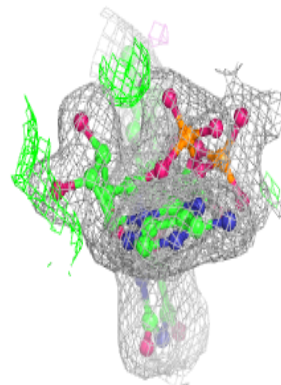
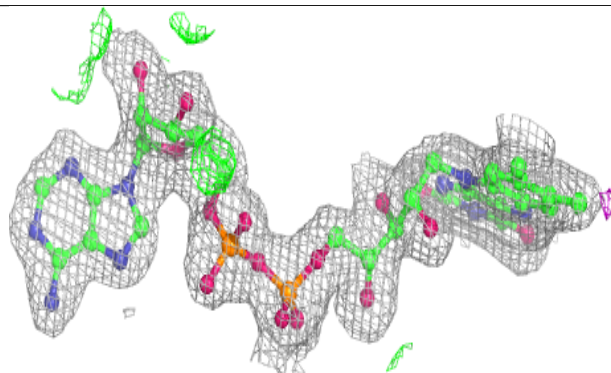
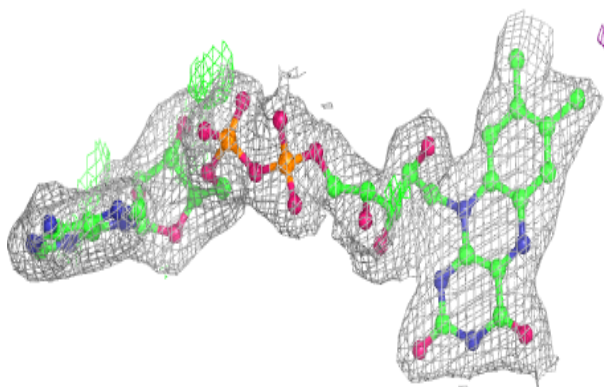


**Electron density around FAD G 601:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

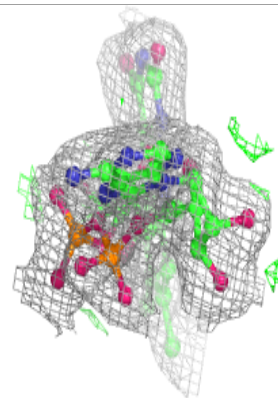
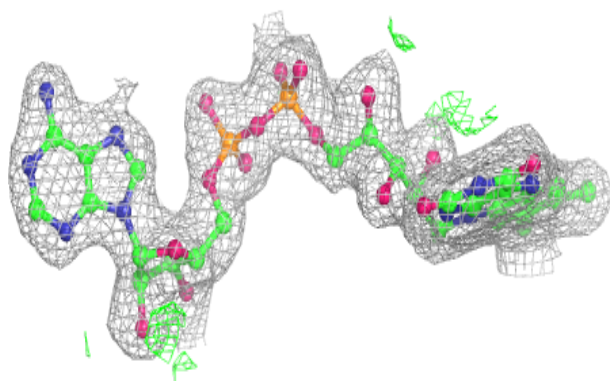
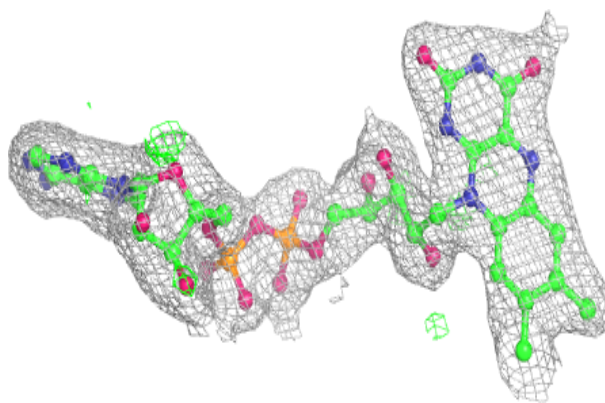
**Electron density around FAD H 601:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

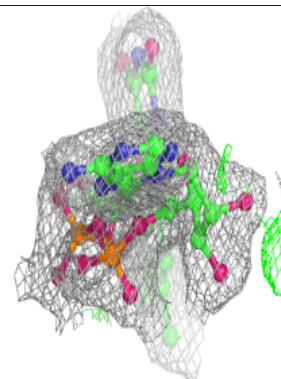
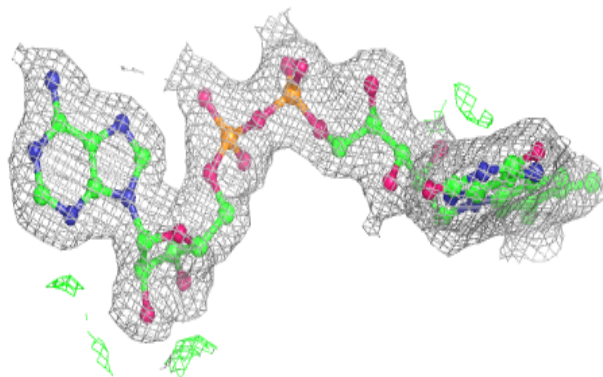
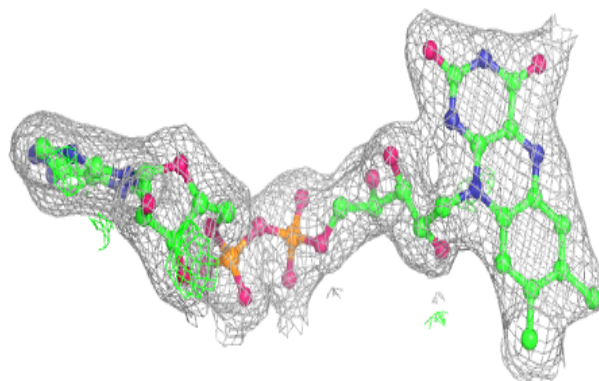


**Electron density around FAD I 601:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**Electron density around FAD C 601:**

$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



## 6.5 Other polymers [i](#)

There are no such residues in this entry.