



# wwPDB X-ray Structure Validation Summary Report ⓘ

May 13, 2020 – 11:52 pm BST

PDB ID : 3U9F  
Title : Structure of CATI in complex with chloramphenicol  
Authors : Biswas, T.; Garneau-Tsodikova, S.; Tsodikov, O.V.  
Deposited on : 2011-10-18  
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](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.

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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 : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.11  
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) : 2.11

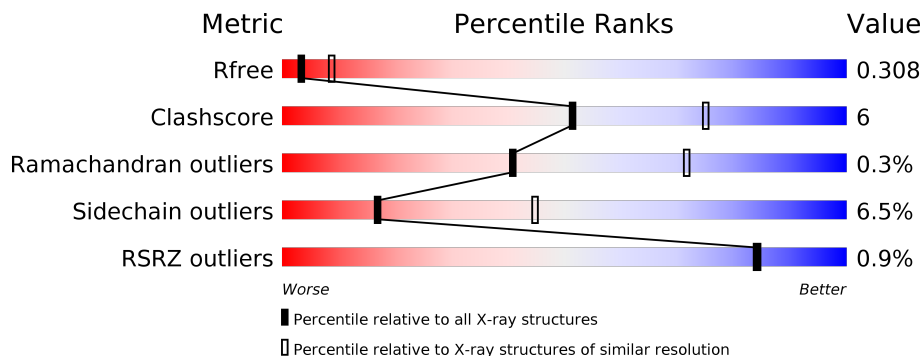
# 1 Overall quality at a glance

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))
$R_{free}$	130704	1957 (2.90-2.90)
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)
RSRZ outliers	127900	1906 (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 on 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	219	 82% 15%
1	B	219	 82% 14%
1	C	219	 79% 16%
1	D	219	 79% 16%
1	E	219	 79% 12% 5%
1	F	219	 84% 10%

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Mol	Chain	Length	Quality of chain
1	G	219	 % 81% 15% ..
1	H	219	 81% 15% ..
1	I	219	 82% 14% ..
1	J	219	 81% 16% ..
1	K	219	 79% 17% ..
1	L	219	 81% 16% ..
1	M	219	 79% 15% ..
1	N	219	 3% 80% 14% ..
1	O	219	 3% 81% 14% ..
1	P	219	 % 84% 13% ..
1	R	219	 % 81% 14% ..
1	S	219	 85% 11% ..

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 32549 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 Chloramphenicol acetyltransferase.

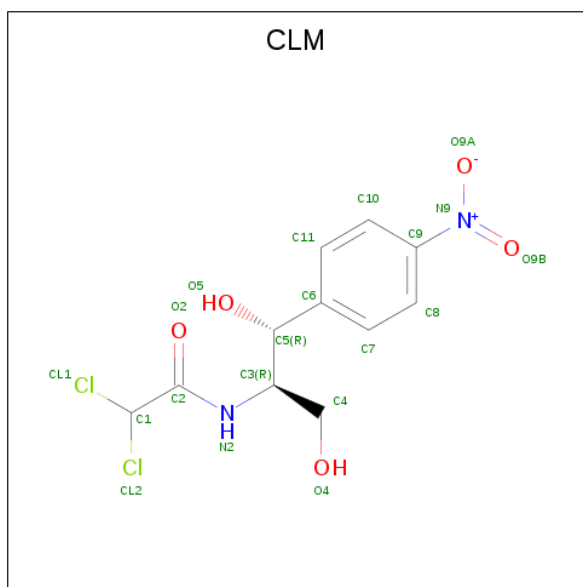
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	215	1780	1157	292	318	13	0	0	0
1	B	215	1786	1161	294	318	13	0	0	0
1	C	216	1784	1159	293	319	13	0	0	0
1	D	211	1752	1138	288	313	13	0	0	0
1	E	207	1716	1116	279	308	13	0	0	0
1	F	211	1752	1138	288	313	13	0	0	0
1	G	214	1774	1153	291	317	13	0	0	0
1	H	213	1767	1148	290	316	13	0	0	0
1	I	213	1767	1148	290	316	13	0	0	0
1	J	216	1788	1161	293	321	13	0	0	0
1	K	216	1788	1161	293	321	13	0	0	0
1	L	216	1784	1159	293	319	13	0	0	0
1	M	211	1752	1138	288	313	13	0	0	0
1	N	212	1759	1142	289	315	13	0	0	0
1	O	211	1752	1138	288	313	13	0	0	0
1	P	215	1780	1157	292	318	13	0	0	0

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	R	214	Total 1770	C 1151	N 291	O 315	S 13	0	0	0
1	S	214	Total 1774	C 1153	N 291	O 317	S 13	0	0	0

- Molecule 2 is CHLORAMPHENICOL (three-letter code: CLM) (formula:  $C_{11}H_{12}Cl_2N_2O_5$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	Cl	N	O		
2	A	1	Total 20	C 11	Cl 2	N 2	O 5	0	0
2	B	1	Total 20	C 11	Cl 2	N 2	O 5	0	0
2	C	1	Total 20	C 11	Cl 2	N 2	O 5	0	0
2	D	1	Total 20	C 11	Cl 2	N 2	O 5	0	0
2	E	1	Total 20	C 11	Cl 2	N 2	O 5	0	0
2	F	1	Total 20	C 11	Cl 2	N 2	O 5	0	0
2	G	1	Total 20	C 11	Cl 2	N 2	O 5	0	0
2	H	1	Total 20	C 11	Cl 2	N 2	O 5	0	0
2	I	1	Total 20	C 11	Cl 2	N 2	O 5	0	0

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
2	J	1	Total	C	Cl	N	O	0	0
			20	11	2	2	5		
2	K	1	Total	C	Cl	N	O	0	0
			20	11	2	2	5		
2	L	1	Total	C	Cl	N	O	0	0
			20	11	2	2	5		
2	M	1	Total	C	Cl	N	O	0	0
			20	11	2	2	5		
2	N	1	Total	C	Cl	N	O	0	0
			20	11	2	2	5		
2	O	1	Total	C	Cl	N	O	0	0
			20	11	2	2	5		
2	P	1	Total	C	Cl	N	O	0	0
			20	11	2	2	5		
2	R	1	Total	C	Cl	N	O	0	0
			20	11	2	2	5		
2	S	1	Total	C	Cl	N	O	0	0
			20	11	2	2	5		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	24	Total	O	0	0
			24	24		
3	B	24	Total	O	0	0
			24	24		
3	C	18	Total	O	0	0
			18	18		
3	D	19	Total	O	0	0
			19	19		
3	E	16	Total	O	0	0
			16	16		
3	F	28	Total	O	0	0
			28	28		
3	G	23	Total	O	0	0
			23	23		
3	H	19	Total	O	0	0
			19	19		
3	I	21	Total	O	0	0
			21	21		
3	J	25	Total	O	0	0
			25	25		

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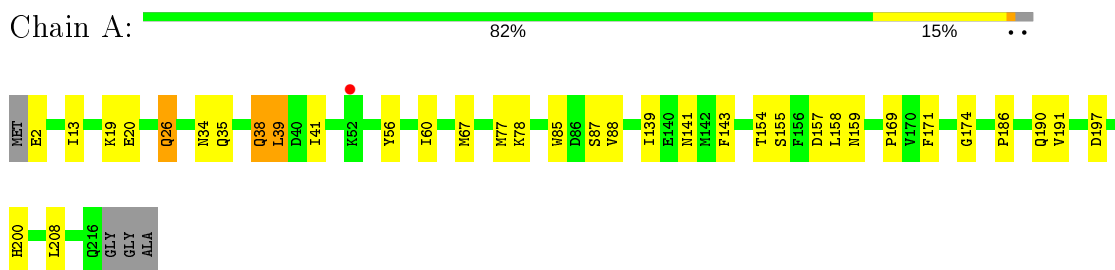
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<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>	<b>ZeroOcc</b>	<b>AltConf</b>
3	K	24	Total O 24 24	0	0
3	L	25	Total O 25 25	0	0
3	M	16	Total O 16 16	0	0
3	N	19	Total O 19 19	0	0
3	O	14	Total O 14 14	0	0
3	P	14	Total O 14 14	0	0
3	R	13	Total O 13 13	0	0
3	S	22	Total O 22 22	0	0

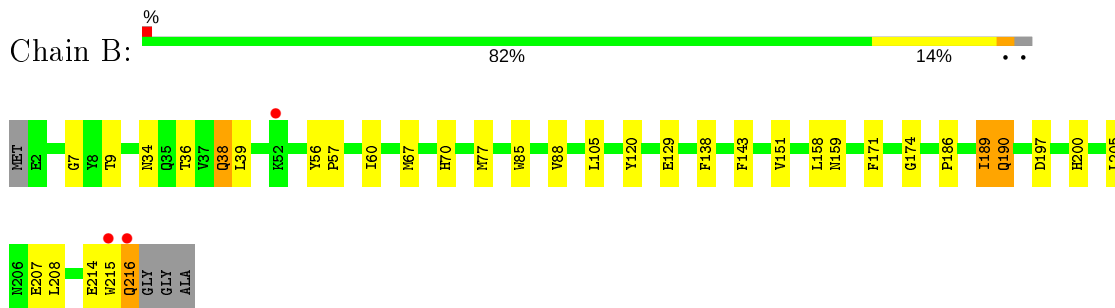
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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.

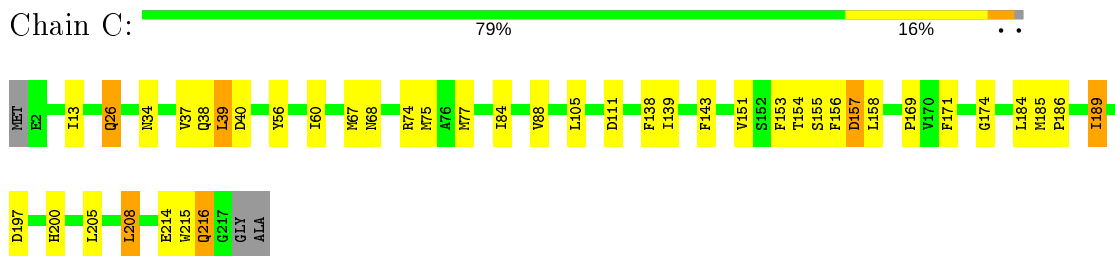
- Molecule 1: Chloramphenicol acetyltransferase



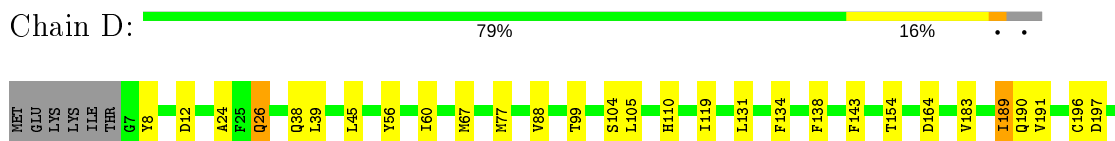
- Molecule 1: Chloramphenicol acetyltransferase



- Molecule 1: Chloramphenicol acetyltransferase



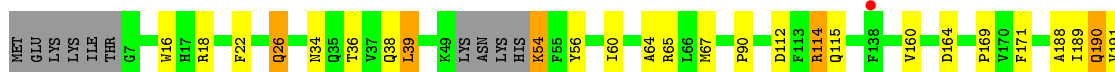
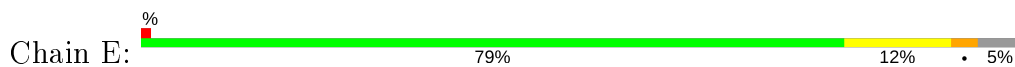
- Molecule 1: Chloramphenicol acetyltransferase



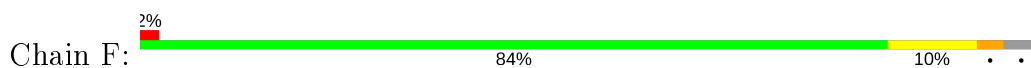




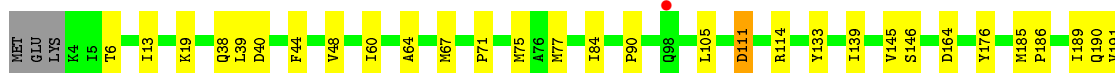
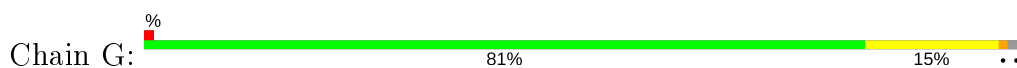
- Molecule 1: Chloramphenicol acetyltransferase



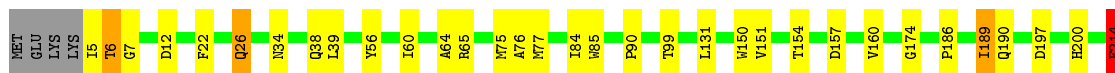
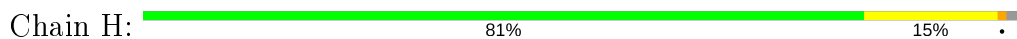
- Molecule 1: Chloramphenicol acetyltransferase



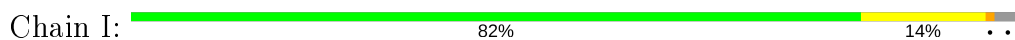
- Molecule 1: Chloramphenicol acetyltransferase

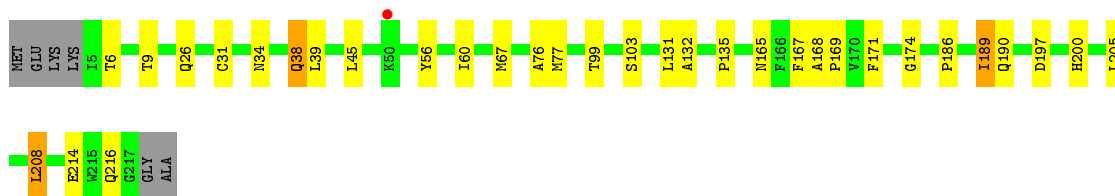


- Molecule 1: Chloramphenicol acetyltransferase



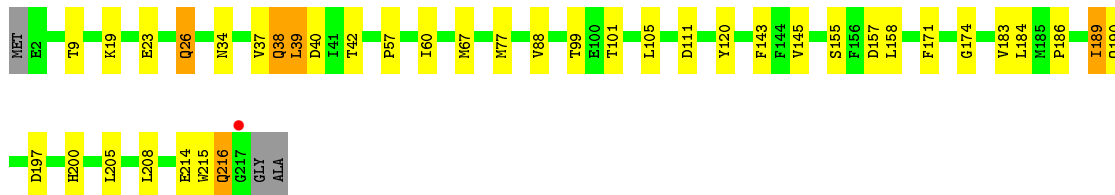
- Molecule 1: Chloramphenicol acetyltransferase





- Molecule 1: Chloramphenicol acetyltransferase

Chain J: 81% 16% ..



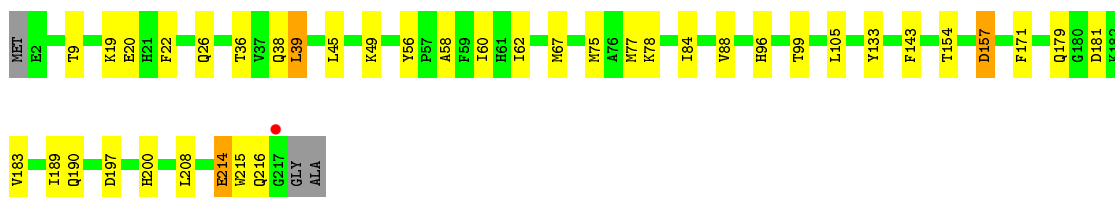
- Molecule 1: Chloramphenicol acetyltransferase

Chain K: 79% 17% ..



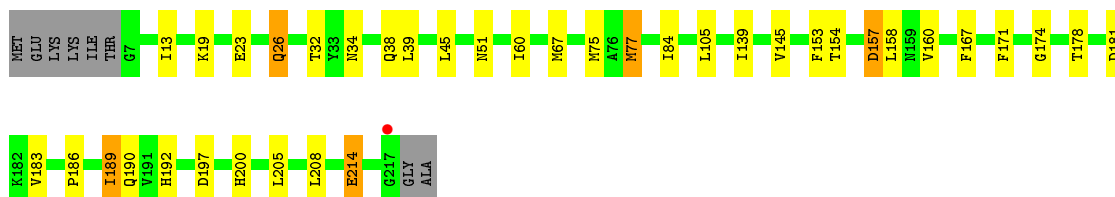
- Molecule 1: Chloramphenicol acetyltransferase

Chain L: 81% 16% ..

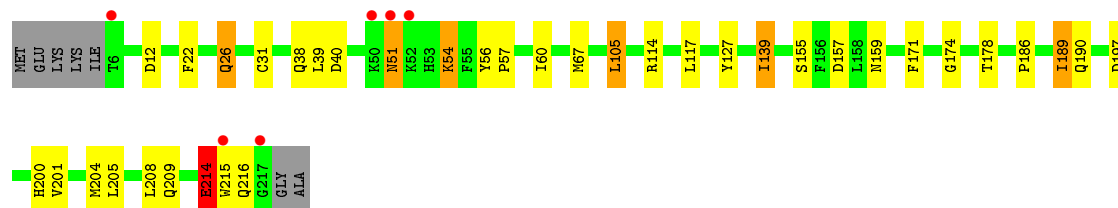
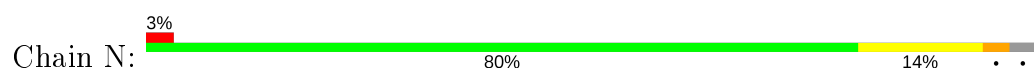


- Molecule 1: Chloramphenicol acetyltransferase

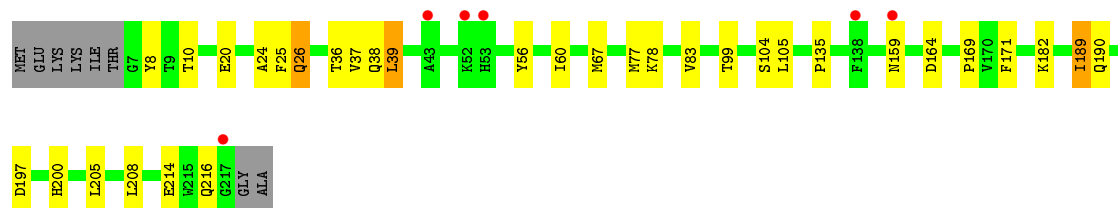
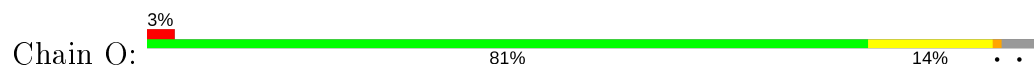
Chain M: 79% 15% ..



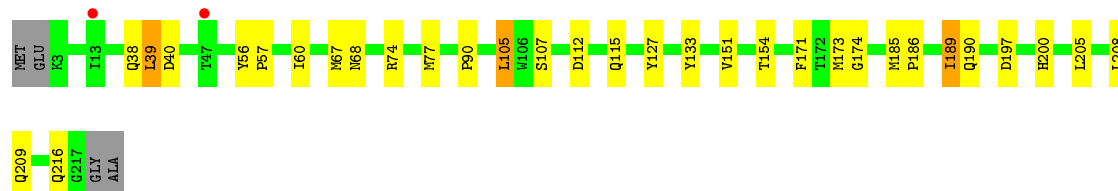
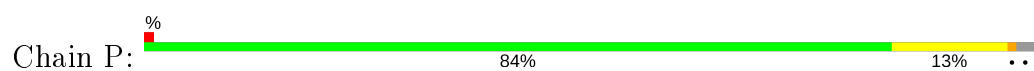
- Molecule 1: Chloramphenicol acetyltransferase



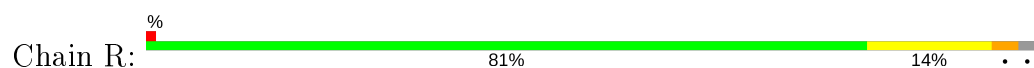
- Molecule 1: Chloramphenicol acetyltransferase



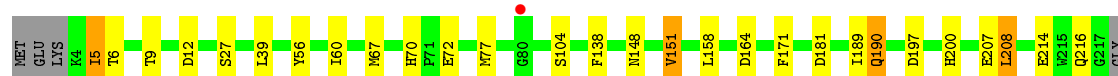
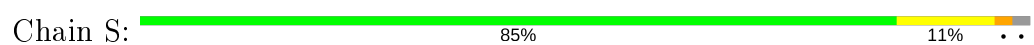
- Molecule 1: Chloramphenicol acetyltransferase



- Molecule 1: Chloramphenicol acetyltransferase



- Molecule 1: Chloramphenicol acetyltransferase



ALA

## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	107.34Å 114.43Å 114.37Å 119.97° 97.83° 98.64°	Depositor
Resolution (Å)	35.00 – 2.90 41.29 – 2.80	Depositor EDS
% Data completeness (in resolution range)	86.8 (35.00-2.90) 85.2 (41.29-2.80)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.38 (at 2.81Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, $R_{free}$	0.236 , 0.309 0.235 , 0.308	Depositor DCC
$R_{free}$ test set	4758 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	54.9	Xtriage
Anisotropy	0.929	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.27 , 39.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.51$ , $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	0.055 for -h,-l,-k	Xtriage
$F_o, F_c$ correlation	0.92	EDS
Total number of atoms	32549	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	71.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.50% 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: CLM

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	0.36	0/1839	0.49	0/2497
1	B	0.36	0/1845	0.50	0/2503
1	C	0.35	0/1843	0.50	0/2502
1	D	0.36	0/1811	0.50	1/2458 (0.0%)
1	E	0.36	0/1773	0.48	0/2407
1	F	0.35	0/1811	0.48	1/2458 (0.0%)
1	G	0.36	0/1833	0.48	1/2488 (0.0%)
1	H	0.35	0/1826	0.49	0/2479
1	I	0.35	0/1826	0.49	1/2479 (0.0%)
1	J	0.36	0/1847	0.50	0/2507
1	K	0.36	0/1847	0.48	0/2507
1	L	0.35	0/1843	0.49	0/2502
1	M	0.36	0/1811	0.48	0/2458
1	N	0.36	0/1818	0.50	0/2468
1	O	0.36	0/1811	0.50	0/2458
1	P	0.35	0/1839	0.47	0/2496
1	R	0.35	0/1829	0.51	0/2483
1	S	0.35	0/1833	0.50	1/2488 (0.0%)
All	All	0.35	0/32885	0.49	5/44638 (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	R	0	1

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	I	208	LEU	CA-CB-CG	6.11	129.35	115.30
1	G	208	LEU	CA-CB-CG	6.06	129.24	115.30
1	S	208	LEU	CA-CB-CG	5.33	127.56	115.30
1	D	208	LEU	CA-CB-CG	5.12	127.06	115.30
1	F	208	LEU	CA-CB-CG	5.03	126.87	115.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	R	8	TYR	Peptide

## 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	1780	0	1662	25	0
1	B	1786	0	1680	20	0
1	C	1784	0	1665	27	0
1	D	1752	0	1637	16	0
1	E	1716	0	1597	24	0
1	F	1752	0	1637	17	0
1	G	1774	0	1661	15	0
1	H	1767	0	1655	18	0
1	I	1767	0	1655	18	0
1	J	1788	0	1669	27	0
1	K	1788	0	1669	23	0
1	L	1784	0	1665	21	0
1	M	1752	0	1637	23	0
1	N	1759	0	1644	28	0
1	O	1752	0	1637	20	0
1	P	1780	0	1665	16	0
1	R	1770	0	1657	20	0
1	S	1774	0	1661	13	0
2	A	20	0	11	0	0
2	B	20	0	11	0	0
2	C	20	0	11	0	0
2	D	20	0	11	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	E	20	0	11	0	0
2	F	20	0	11	0	0
2	G	20	0	11	1	0
2	H	20	0	11	0	0
2	I	20	0	11	0	0
2	J	20	0	11	0	0
2	K	20	0	11	0	0
2	L	20	0	11	0	0
2	M	20	0	11	0	0
2	N	20	0	11	0	0
2	O	20	0	11	0	0
2	P	20	0	11	0	0
2	R	20	0	11	0	0
2	S	20	0	11	0	0
3	A	24	0	0	1	0
3	B	24	0	0	0	0
3	C	18	0	0	0	0
3	D	19	0	0	1	0
3	E	16	0	0	1	0
3	F	28	0	0	0	0
3	G	23	0	0	0	0
3	H	19	0	0	1	0
3	I	21	0	0	4	0
3	J	25	0	0	1	0
3	K	24	0	0	0	0
3	L	25	0	0	1	0
3	M	16	0	0	0	0
3	N	19	0	0	1	0
3	O	14	0	0	0	0
3	P	14	0	0	0	0
3	R	13	0	0	0	0
3	S	22	0	0	0	0
All	All	32549	0	29951	346	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 6.

The worst 5 of 346 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:S:5:ILE:HG23	1:S:6:THR:H	1.00	1.07

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:S:5:ILE:HG23	1:S:6:THR:N	1.76	0.97
1:M:197:ASP:H	1:M:200:HIS:HD2	1.14	0.96
1:R:197:ASP:H	1:R:200:HIS:HD2	1.12	0.96
1:S:5:ILE:CG2	1:S:6:THR:H	1.78	0.96

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	213/219 (97%)	201 (94%)	11 (5%)	1 (0%)	29	61
1	B	213/219 (97%)	206 (97%)	7 (3%)	0	100	100
1	C	214/219 (98%)	204 (95%)	10 (5%)	0	100	100
1	D	209/219 (95%)	199 (95%)	10 (5%)	0	100	100
1	E	203/219 (93%)	194 (96%)	9 (4%)	0	100	100
1	F	209/219 (95%)	201 (96%)	7 (3%)	1 (0%)	29	61
1	G	212/219 (97%)	207 (98%)	5 (2%)	0	100	100
1	H	211/219 (96%)	202 (96%)	8 (4%)	1 (0%)	29	61
1	I	211/219 (96%)	200 (95%)	11 (5%)	0	100	100
1	J	214/219 (98%)	209 (98%)	5 (2%)	0	100	100
1	K	214/219 (98%)	201 (94%)	12 (6%)	1 (0%)	29	61
1	L	214/219 (98%)	202 (94%)	11 (5%)	1 (0%)	29	61
1	M	209/219 (95%)	201 (96%)	7 (3%)	1 (0%)	29	61
1	N	210/219 (96%)	200 (95%)	9 (4%)	1 (0%)	29	61
1	O	209/219 (95%)	200 (96%)	8 (4%)	1 (0%)	29	61
1	P	213/219 (97%)	202 (95%)	11 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	R	212/219 (97%)	202 (95%)	9 (4%)	1 (0%)	29 61
1	S	212/219 (97%)	203 (96%)	7 (3%)	2 (1%)	17 48
All	All	3802/3942 (96%)	3634 (96%)	157 (4%)	11 (0%)	41 71

5 of 11 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	78	LYS
1	F	214	GLU
1	L	78	LYS
1	S	5	ILE
1	H	214	GLU

### 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	190/194 (98%)	182 (96%)	8 (4%)	30 63
1	B	192/194 (99%)	180 (94%)	12 (6%)	18 46
1	C	190/194 (98%)	176 (93%)	14 (7%)	13 38
1	D	188/194 (97%)	171 (91%)	17 (9%)	9 29
1	E	184/194 (95%)	175 (95%)	9 (5%)	25 57
1	F	188/194 (97%)	178 (95%)	10 (5%)	22 54
1	G	190/194 (98%)	174 (92%)	16 (8%)	11 31
1	H	190/194 (98%)	177 (93%)	13 (7%)	16 42
1	I	190/194 (98%)	180 (95%)	10 (5%)	22 54
1	J	191/194 (98%)	181 (95%)	10 (5%)	23 55
1	K	191/194 (98%)	180 (94%)	11 (6%)	20 50
1	L	190/194 (98%)	177 (93%)	13 (7%)	16 42
1	M	188/194 (97%)	176 (94%)	12 (6%)	17 45
1	N	189/194 (97%)	174 (92%)	15 (8%)	12 34

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	O	188/194 (97%)	175 (93%)	13 (7%)	15	41
1	P	190/194 (98%)	181 (95%)	9 (5%)	26	59
1	R	189/194 (97%)	175 (93%)	14 (7%)	13	38
1	S	190/194 (98%)	176 (93%)	14 (7%)	13	38
All	All	3408/3492 (98%)	3188 (94%)	220 (6%)	17	45

5 of 220 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	I	6	THR
1	K	97	GLU
1	R	191	VAL
1	I	39	LEU
1	J	38	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 115 such sidechains are listed below:

Mol	Chain	Res	Type
1	I	70	HIS
1	K	51	ASN
1	R	159	ASN
1	I	159	ASN
1	J	38	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 carbohydrates in this entry.

## 5.6 Ligand geometry

18 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	CLM	F	221	-	19,20,20	0.92	0	23,27,27	0.73	0
2	CLM	S	221	-	19,20,20	0.93	0	23,27,27	0.61	0
2	CLM	D	221	-	19,20,20	0.98	1 (5%)	23,27,27	0.90	0
2	CLM	B	221	-	19,20,20	0.90	0	23,27,27	0.63	0
2	CLM	O	221	-	19,20,20	0.94	1 (5%)	23,27,27	0.80	0
2	CLM	M	221	-	19,20,20	0.90	0	23,27,27	0.78	0
2	CLM	K	221	-	19,20,20	0.94	0	23,27,27	0.82	0
2	CLM	I	221	-	19,20,20	0.91	0	23,27,27	0.86	1 (4%)
2	CLM	G	221	-	19,20,20	0.93	1 (5%)	23,27,27	0.78	0
2	CLM	E	221	-	19,20,20	0.94	2 (10%)	23,27,27	1.02	0
2	CLM	C	221	-	19,20,20	0.92	0	23,27,27	0.66	0
2	CLM	A	221	-	19,20,20	0.93	0	23,27,27	0.74	0
2	CLM	R	221	-	19,20,20	0.93	0	23,27,27	0.85	0
2	CLM	P	221	-	19,20,20	0.95	1 (5%)	23,27,27	0.98	0
2	CLM	N	221	-	19,20,20	0.93	1 (5%)	23,27,27	0.77	0
2	CLM	L	221	-	19,20,20	0.94	0	23,27,27	0.68	0
2	CLM	J	221	-	19,20,20	0.93	0	23,27,27	0.96	0
2	CLM	H	221	-	19,20,20	0.92	0	23,27,27	0.80	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	CLM	F	221	-	-	4/20/22/22	0/1/1/1
2	CLM	S	221	-	-	7/20/22/22	0/1/1/1
2	CLM	D	221	-	-	2/20/22/22	0/1/1/1
2	CLM	B	221	-	-	6/20/22/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	CLM	O	221	-	-	5/20/22/22	0/1/1/1
2	CLM	M	221	-	-	6/20/22/22	0/1/1/1
2	CLM	K	221	-	-	5/20/22/22	0/1/1/1
2	CLM	I	221	-	-	4/20/22/22	0/1/1/1
2	CLM	G	221	-	-	2/20/22/22	0/1/1/1
2	CLM	E	221	-	-	6/20/22/22	0/1/1/1
2	CLM	C	221	-	-	4/20/22/22	0/1/1/1
2	CLM	A	221	-	-	2/20/22/22	0/1/1/1
2	CLM	R	221	-	-	4/20/22/22	0/1/1/1
2	CLM	P	221	-	-	6/20/22/22	0/1/1/1
2	CLM	N	221	-	-	6/20/22/22	0/1/1/1
2	CLM	L	221	-	-	3/20/22/22	0/1/1/1
2	CLM	J	221	-	-	8/20/22/22	0/1/1/1
2	CLM	H	221	-	-	4/20/22/22	0/1/1/1

The worst 5 of 7 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	221	CLM	C1-C2	-2.49	1.49	1.53
2	O	221	CLM	C6-C5	-2.16	1.48	1.51
2	N	221	CLM	C1-C2	-2.12	1.49	1.53
2	E	221	CLM	C9-N9	-2.11	1.40	1.45
2	G	221	CLM	C6-C5	-2.04	1.48	1.51

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	I	221	CLM	C10-C9-N9	2.09	120.95	119.38

There are no chirality outliers.

5 of 84 torsion outliers are listed below:

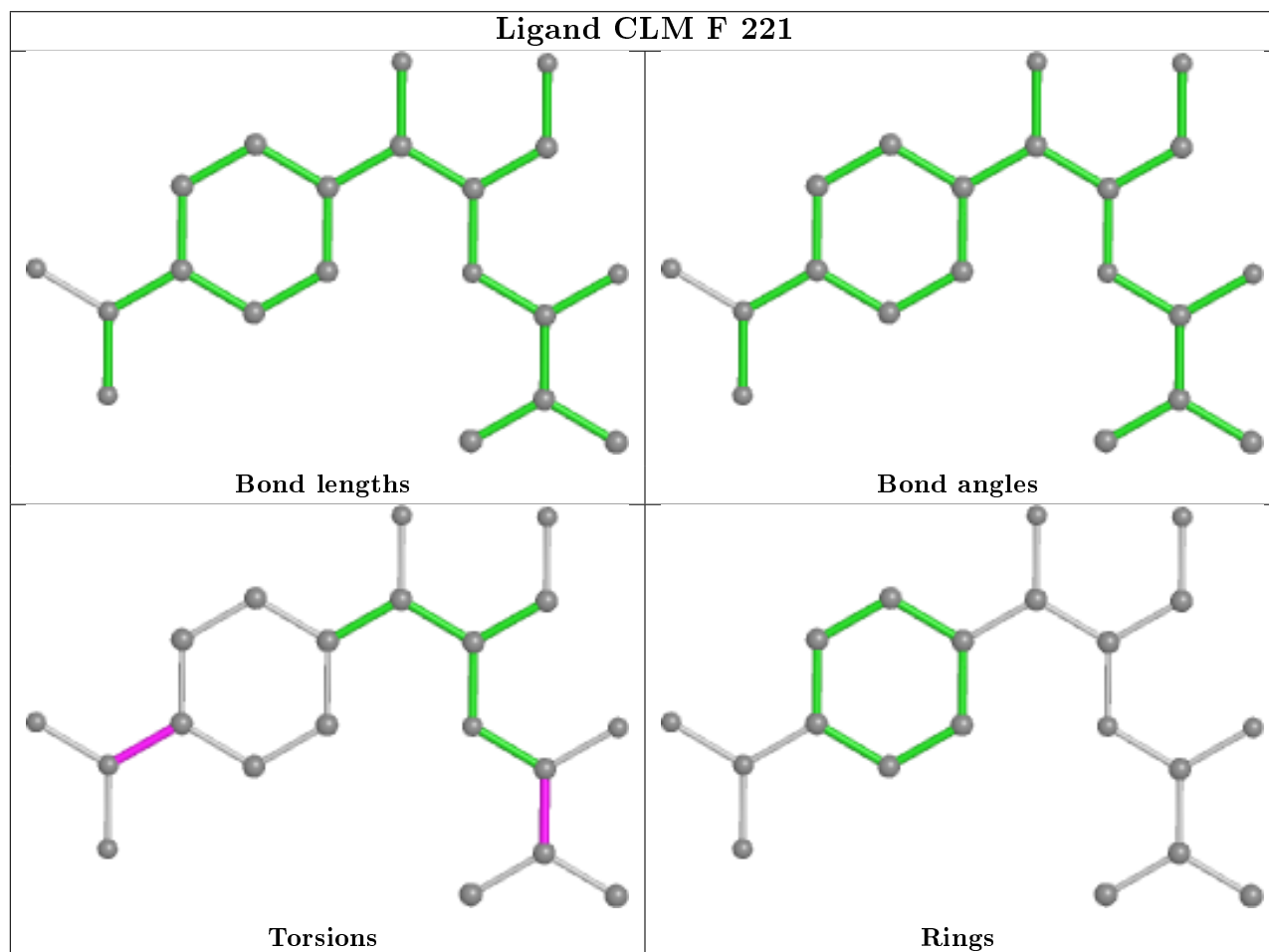
Mol	Chain	Res	Type	Atoms
2	F	221	CLM	C8-C9-N9-O9B
2	F	221	CLM	C10-C9-N9-O9B
2	S	221	CLM	C8-C9-N9-O9B
2	S	221	CLM	C10-C9-N9-O9B
2	B	221	CLM	C5-C3-C4-O4

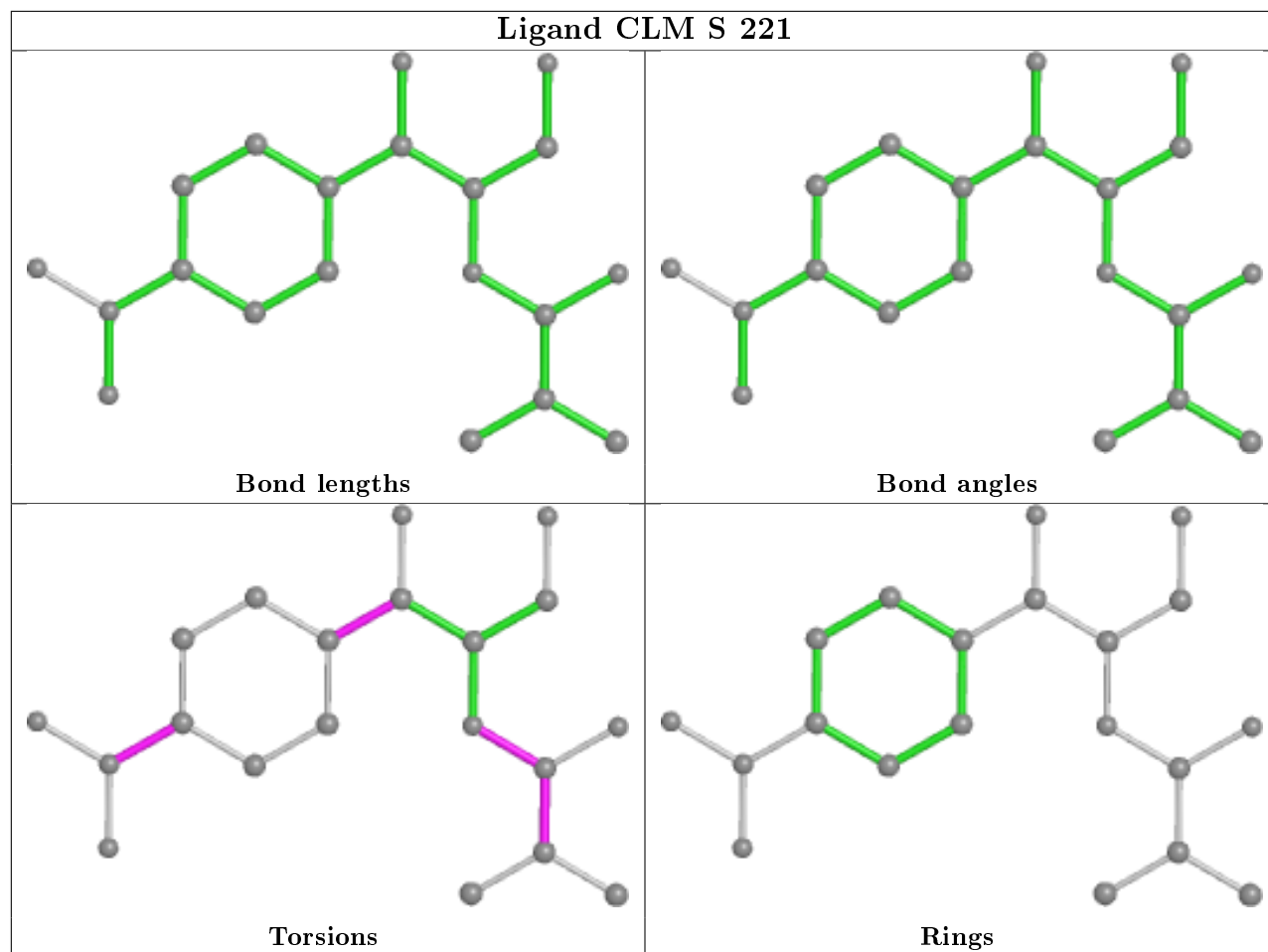
There are no ring outliers.

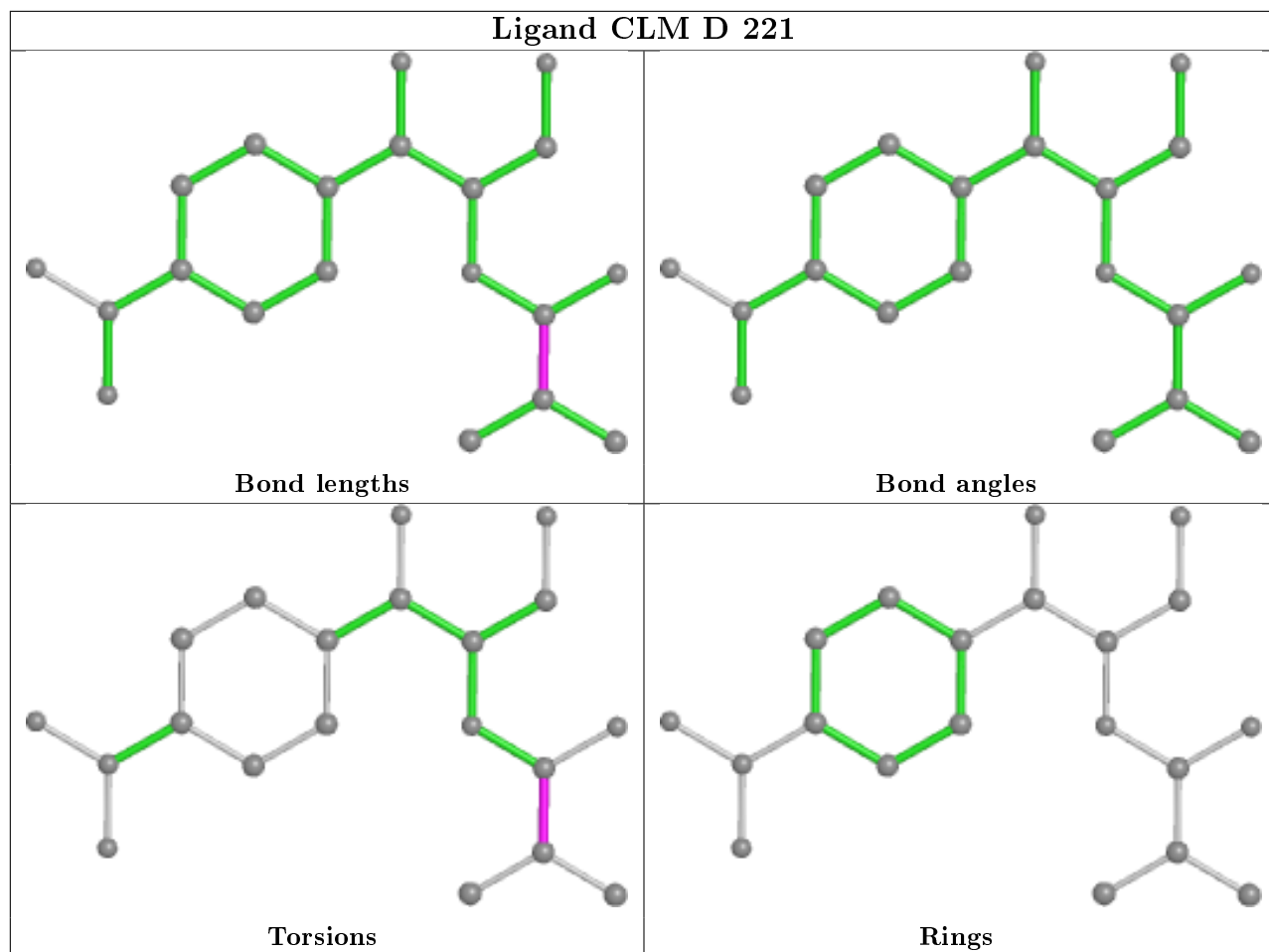
1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	G	221	CLM	1	0

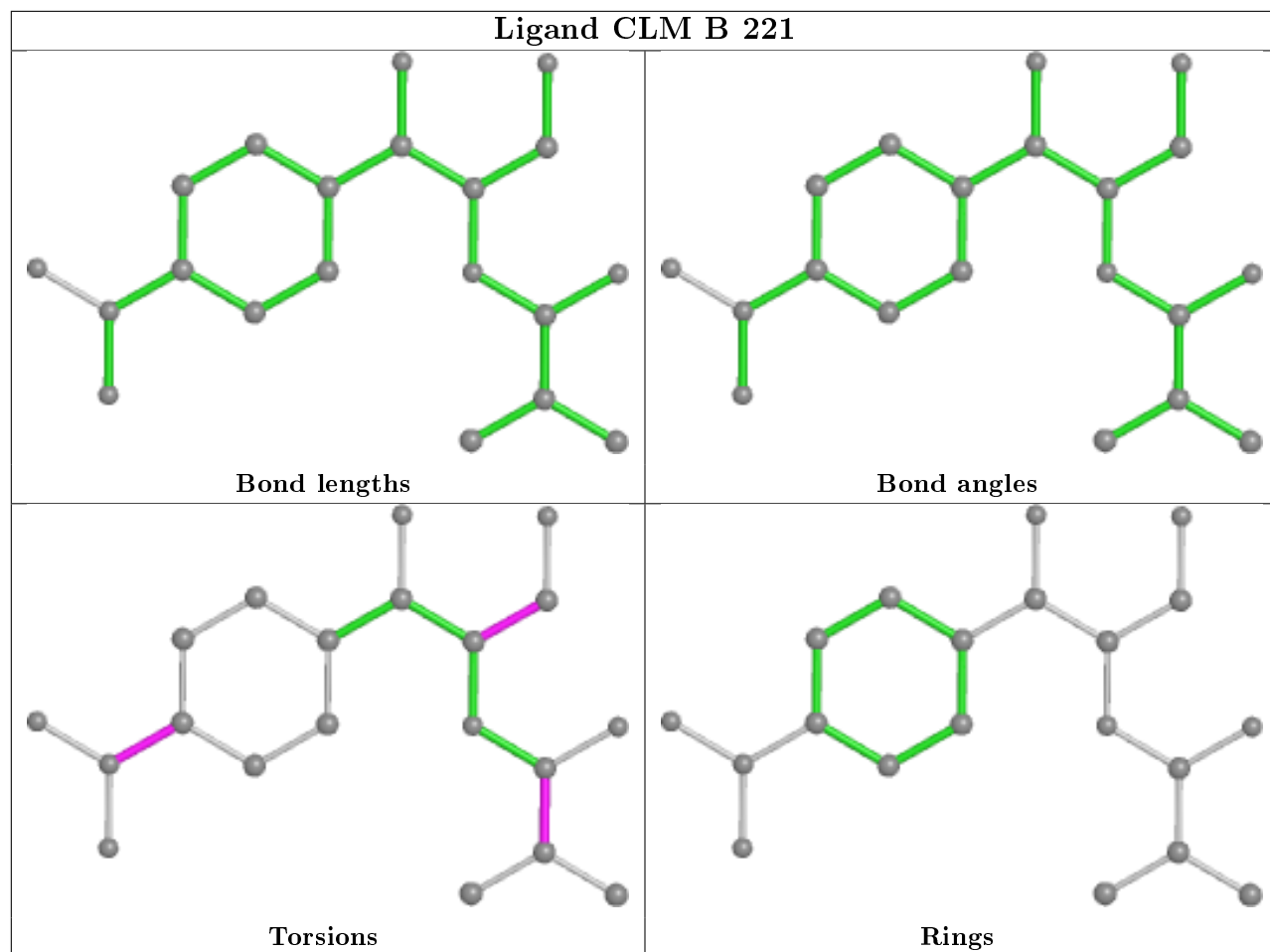
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

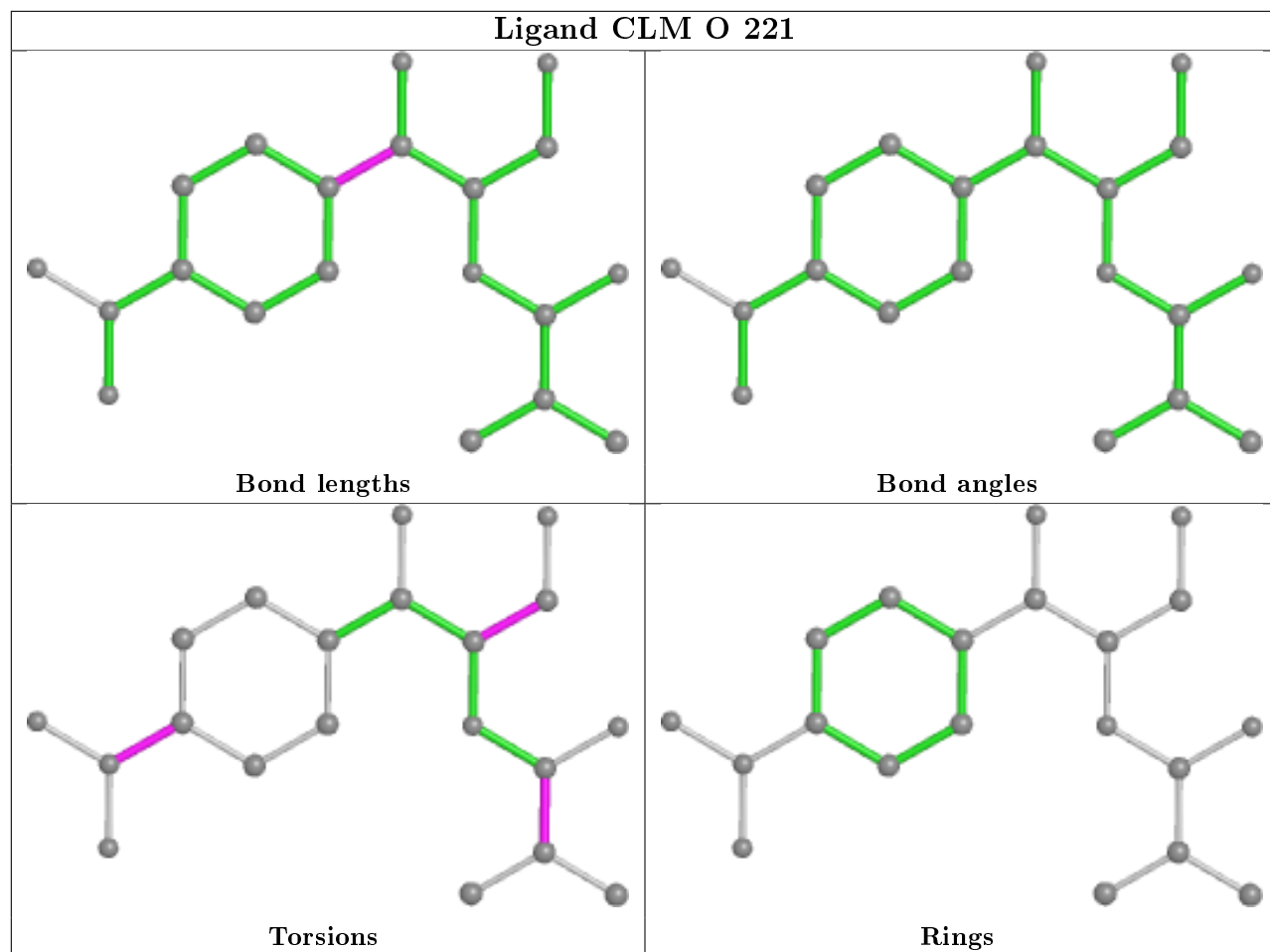


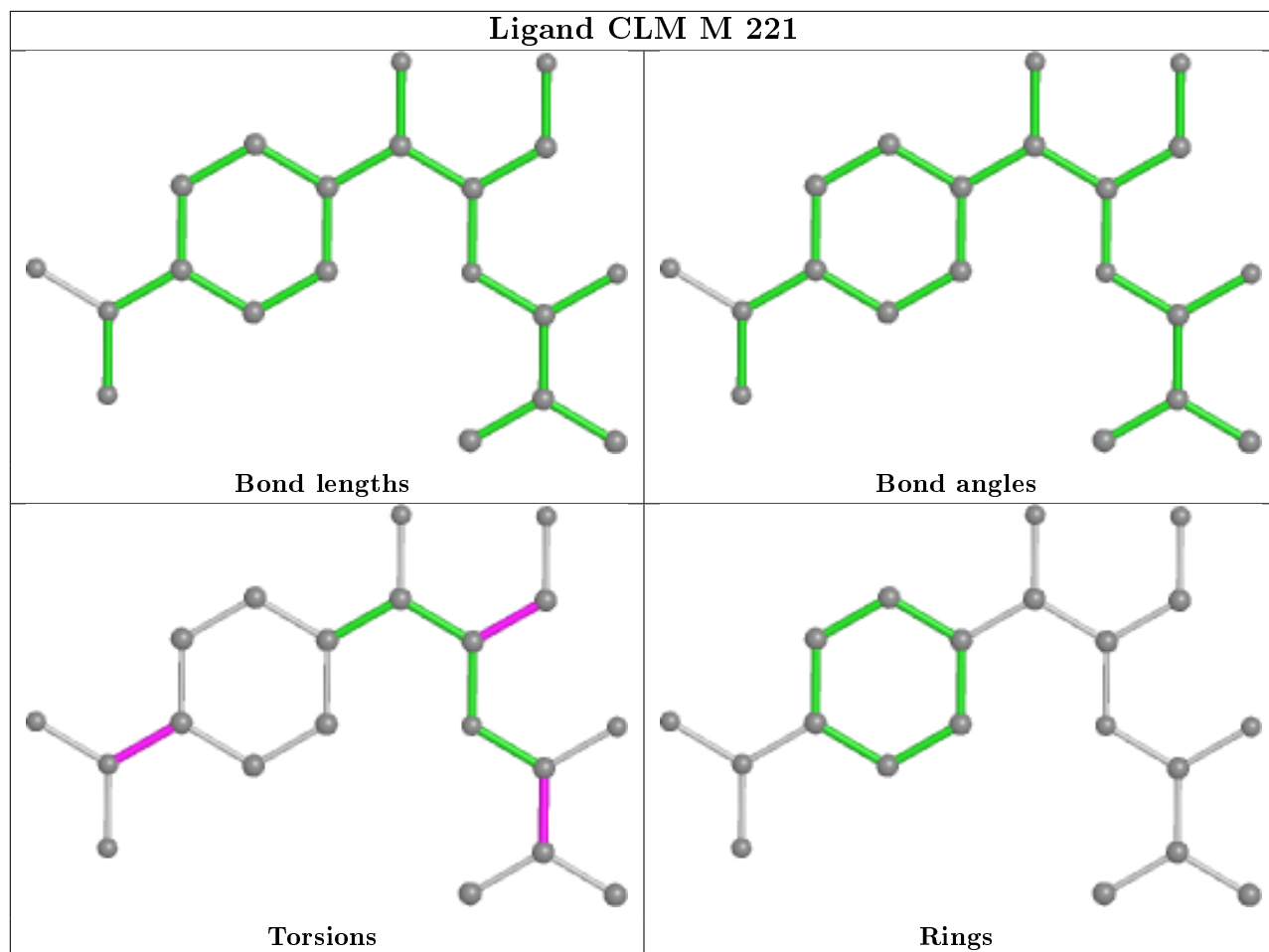


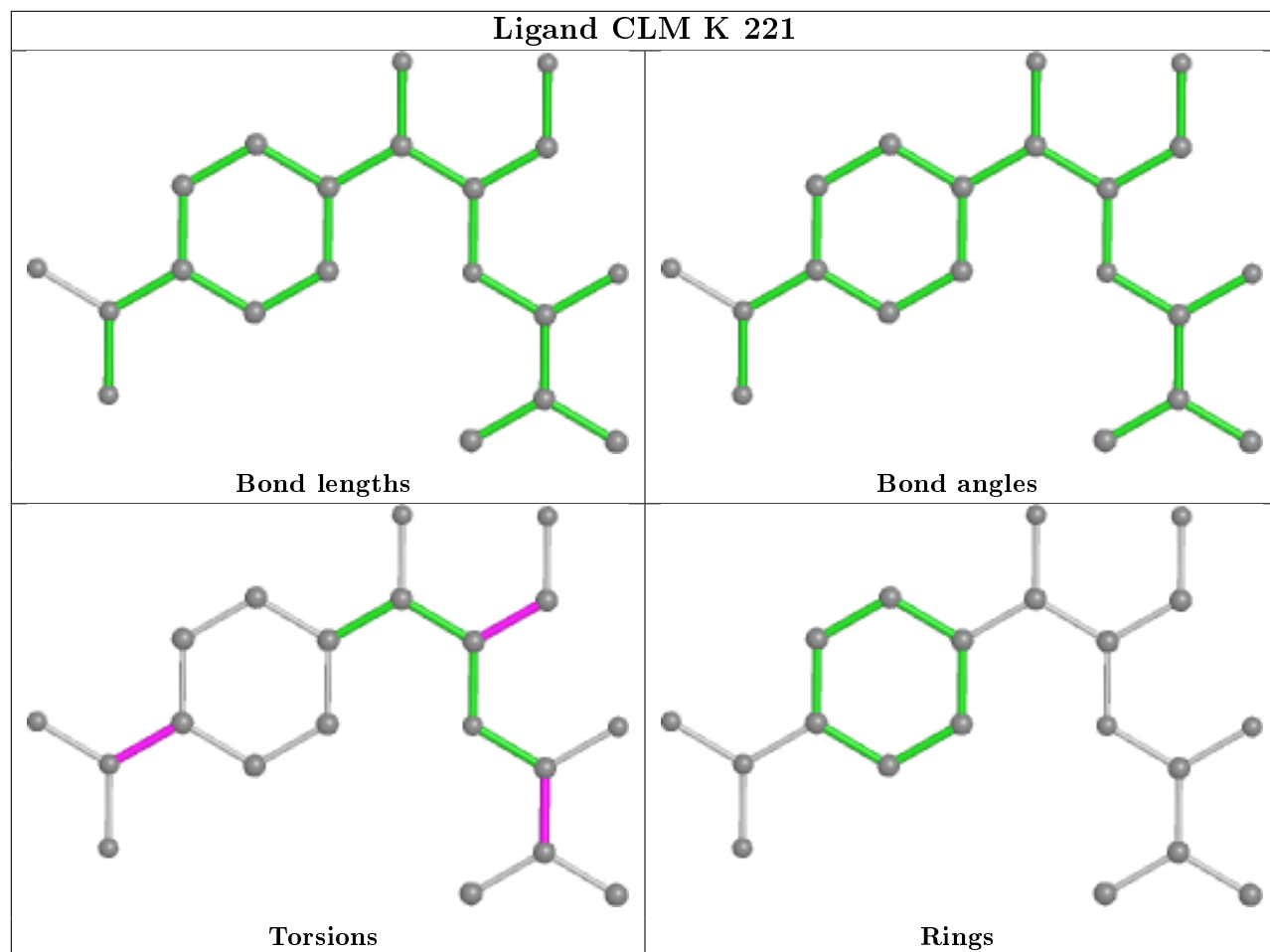


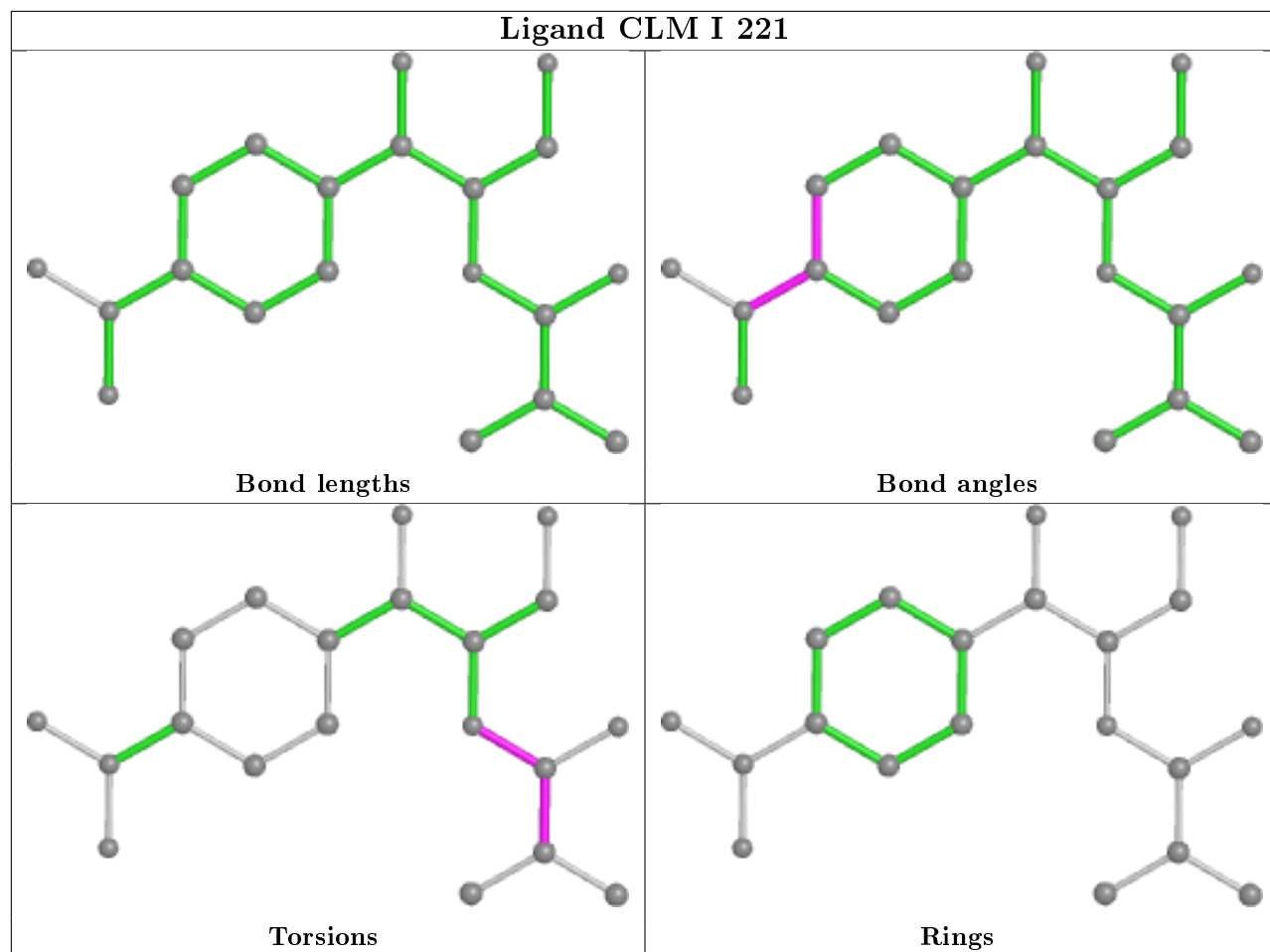


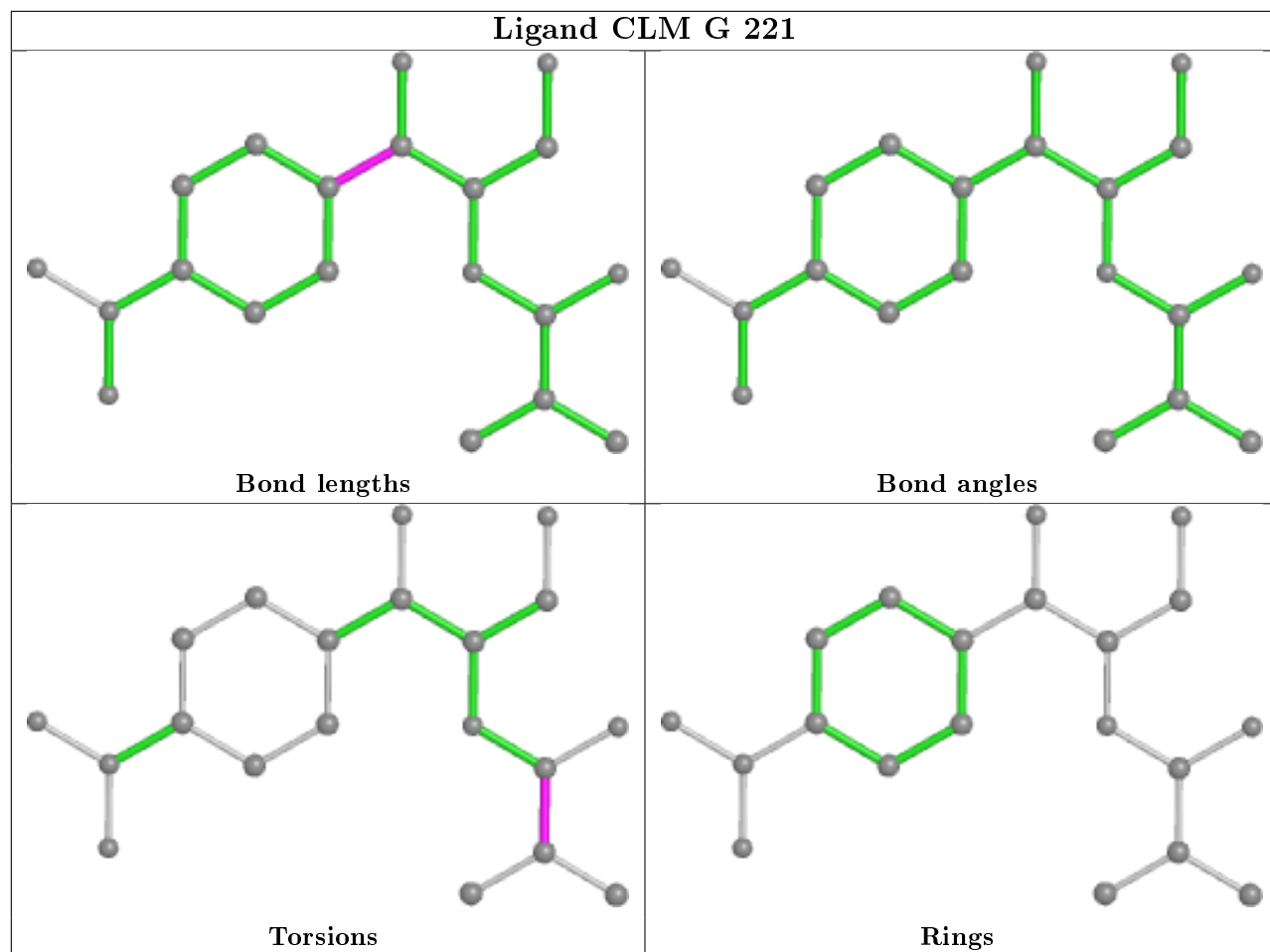


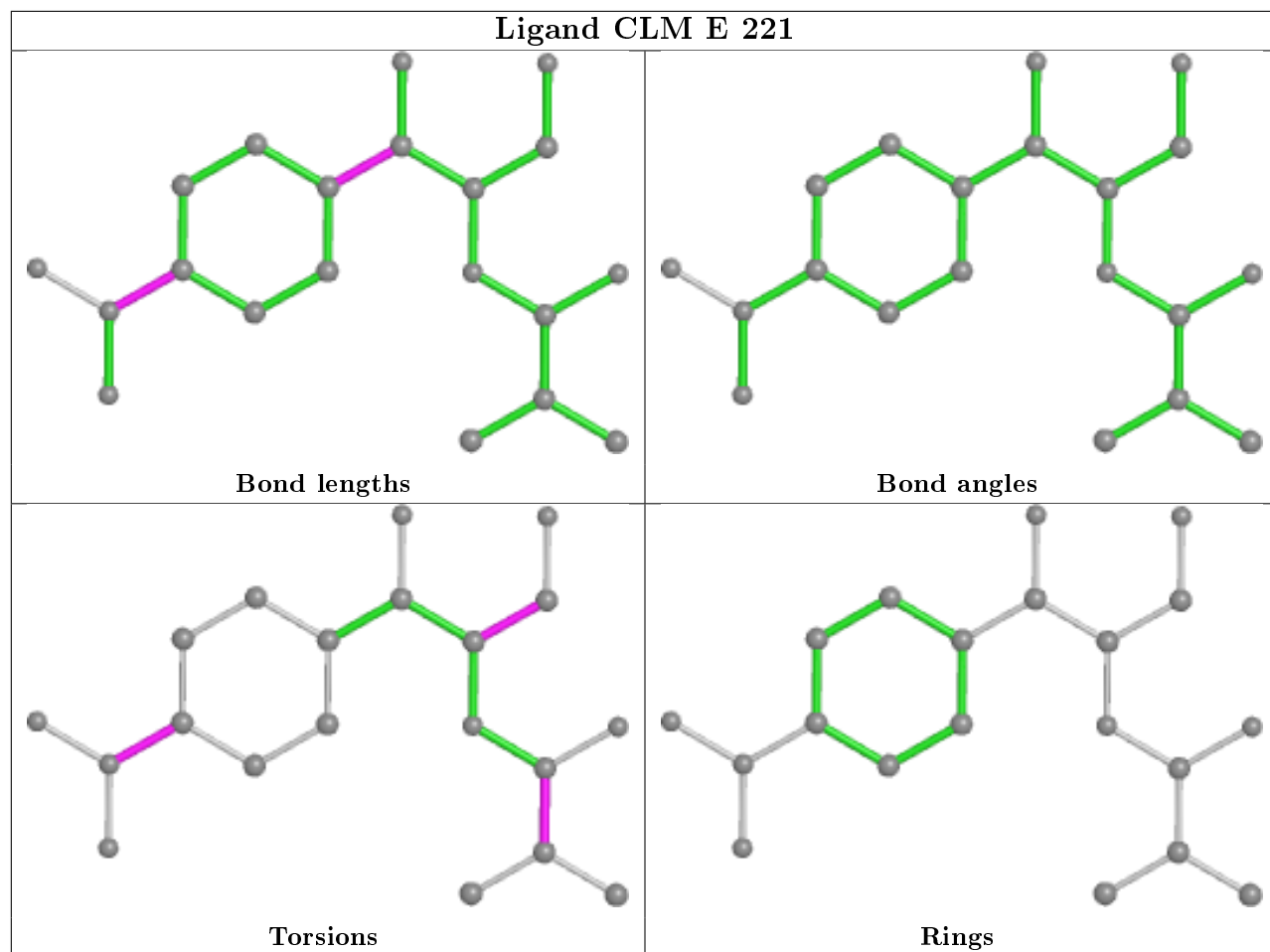


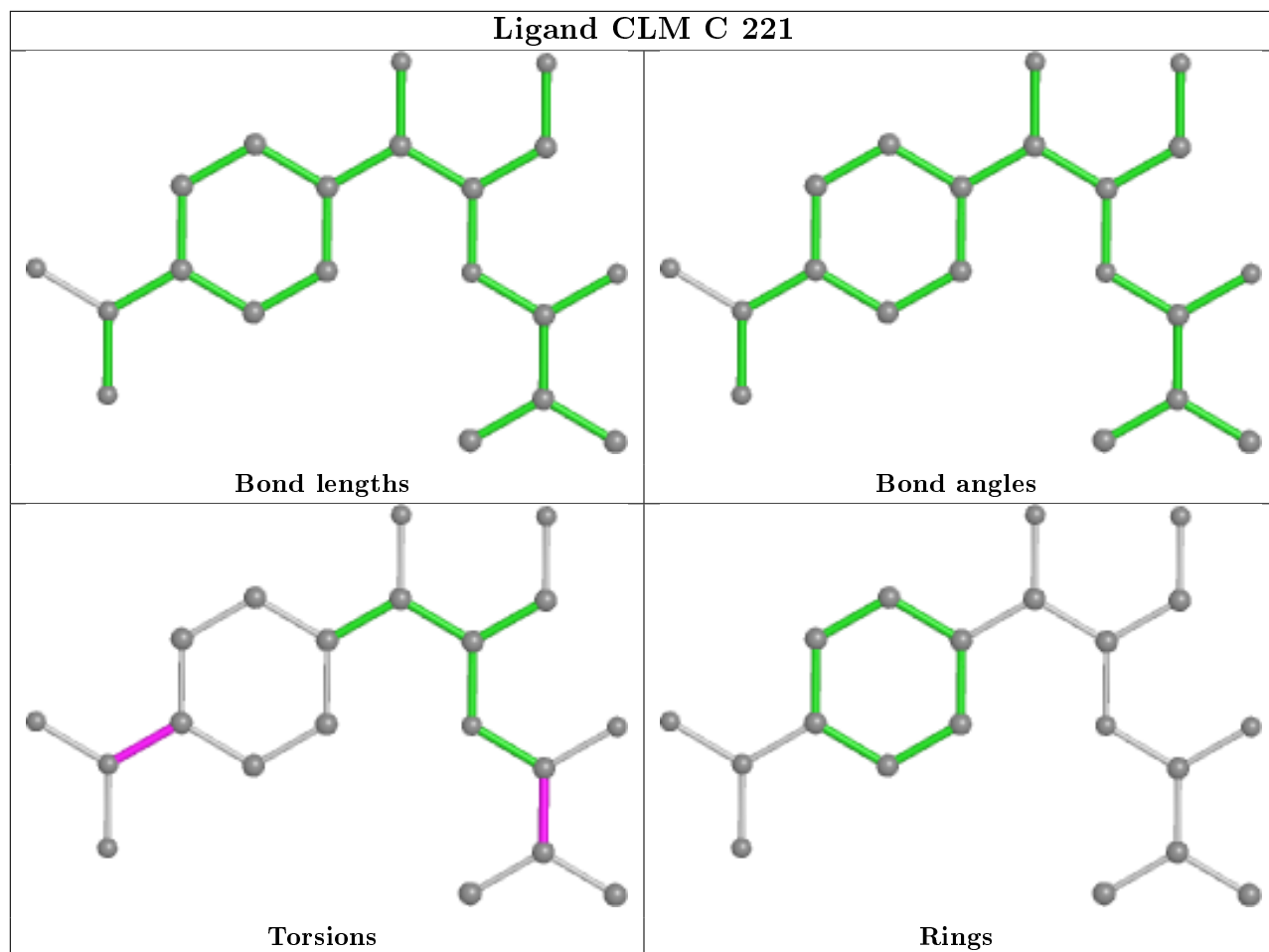




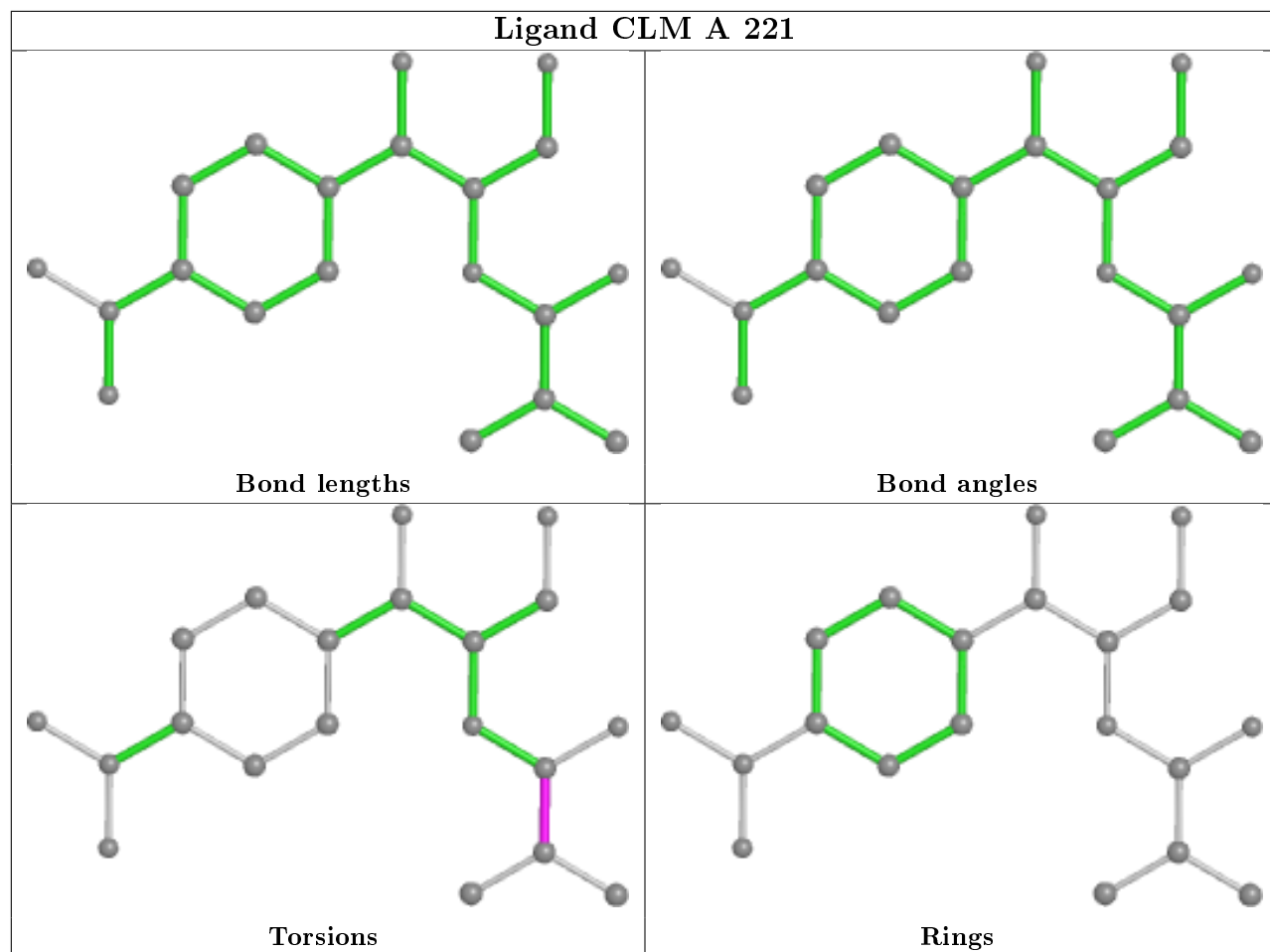


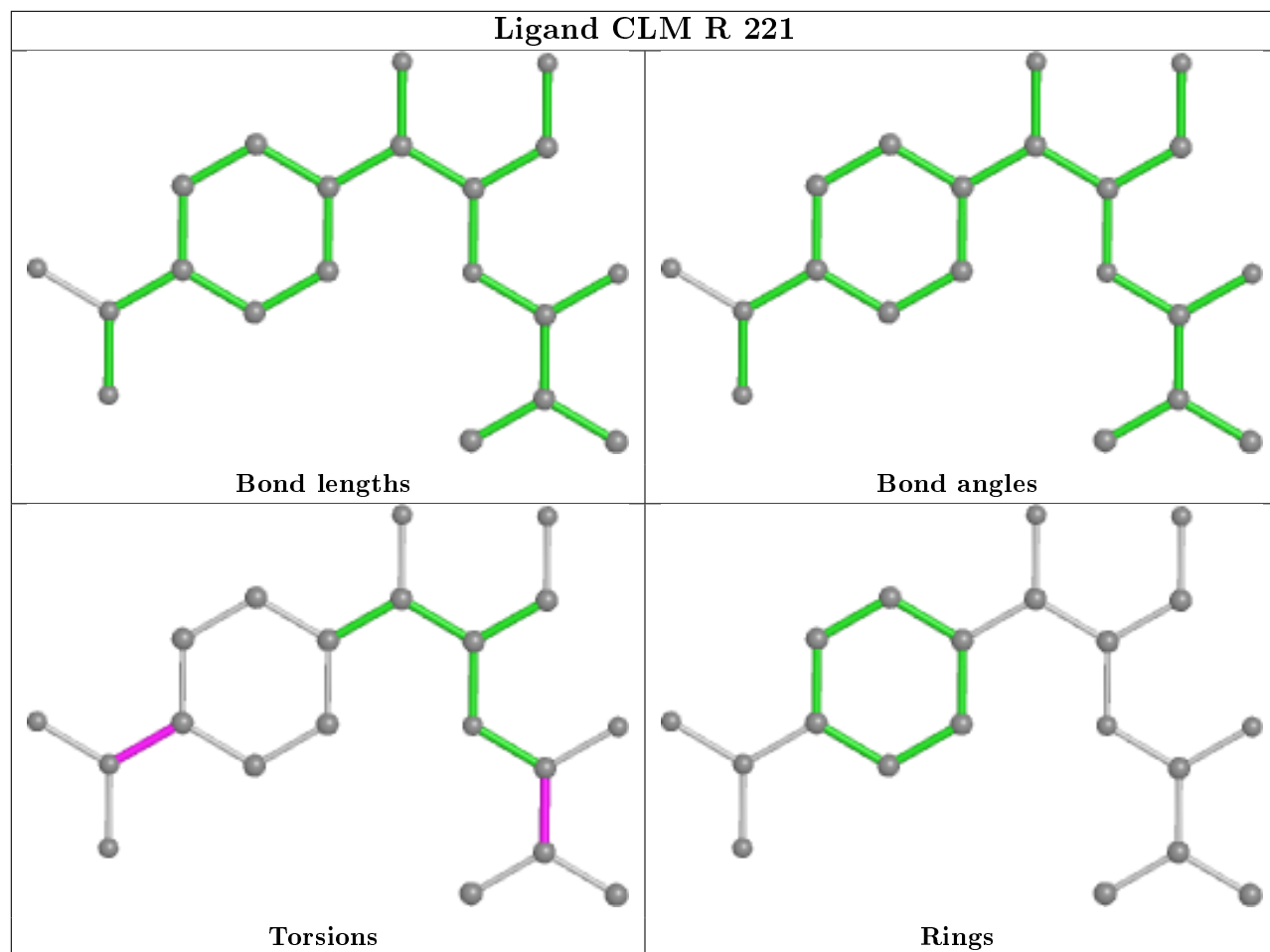


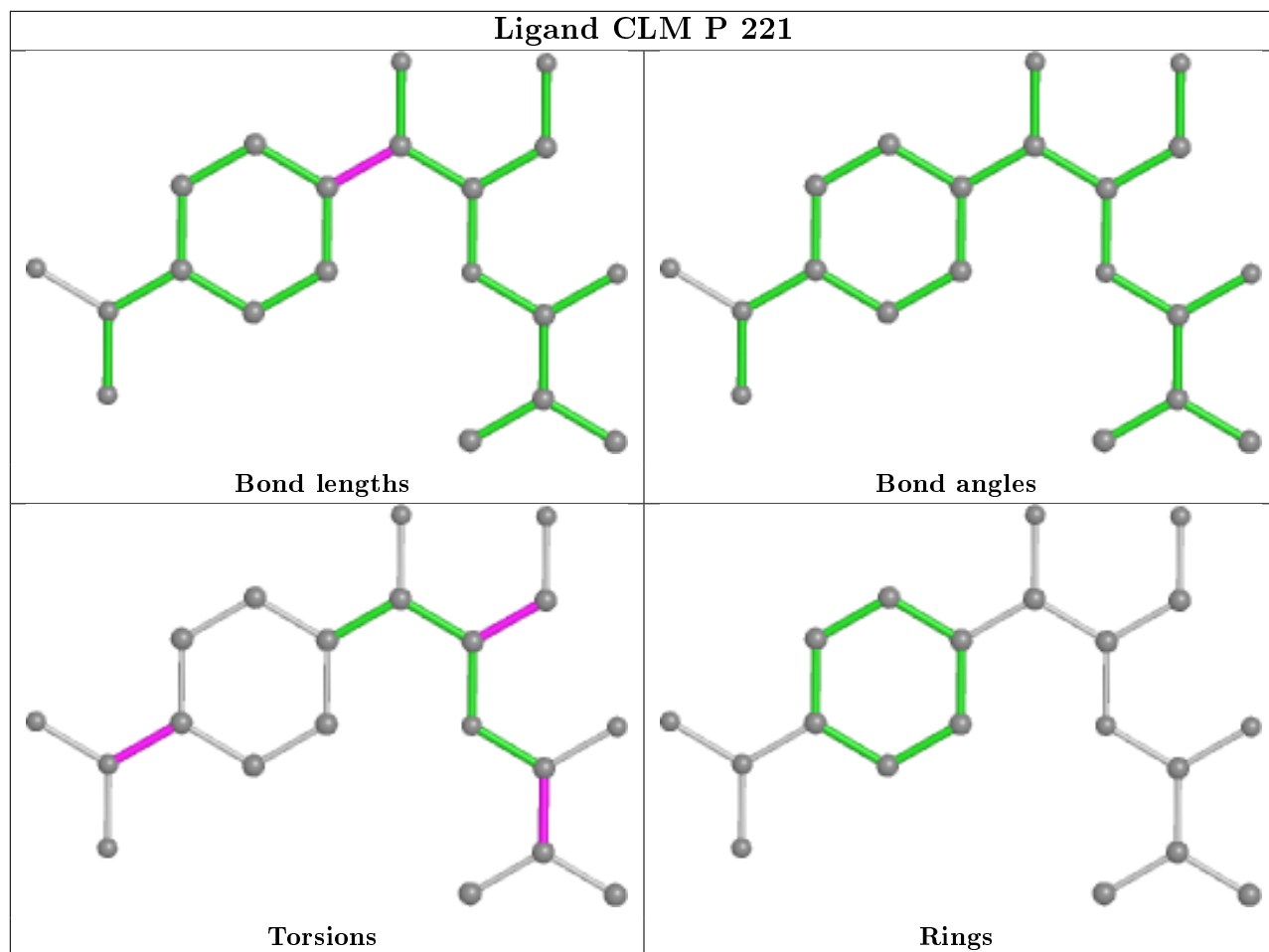


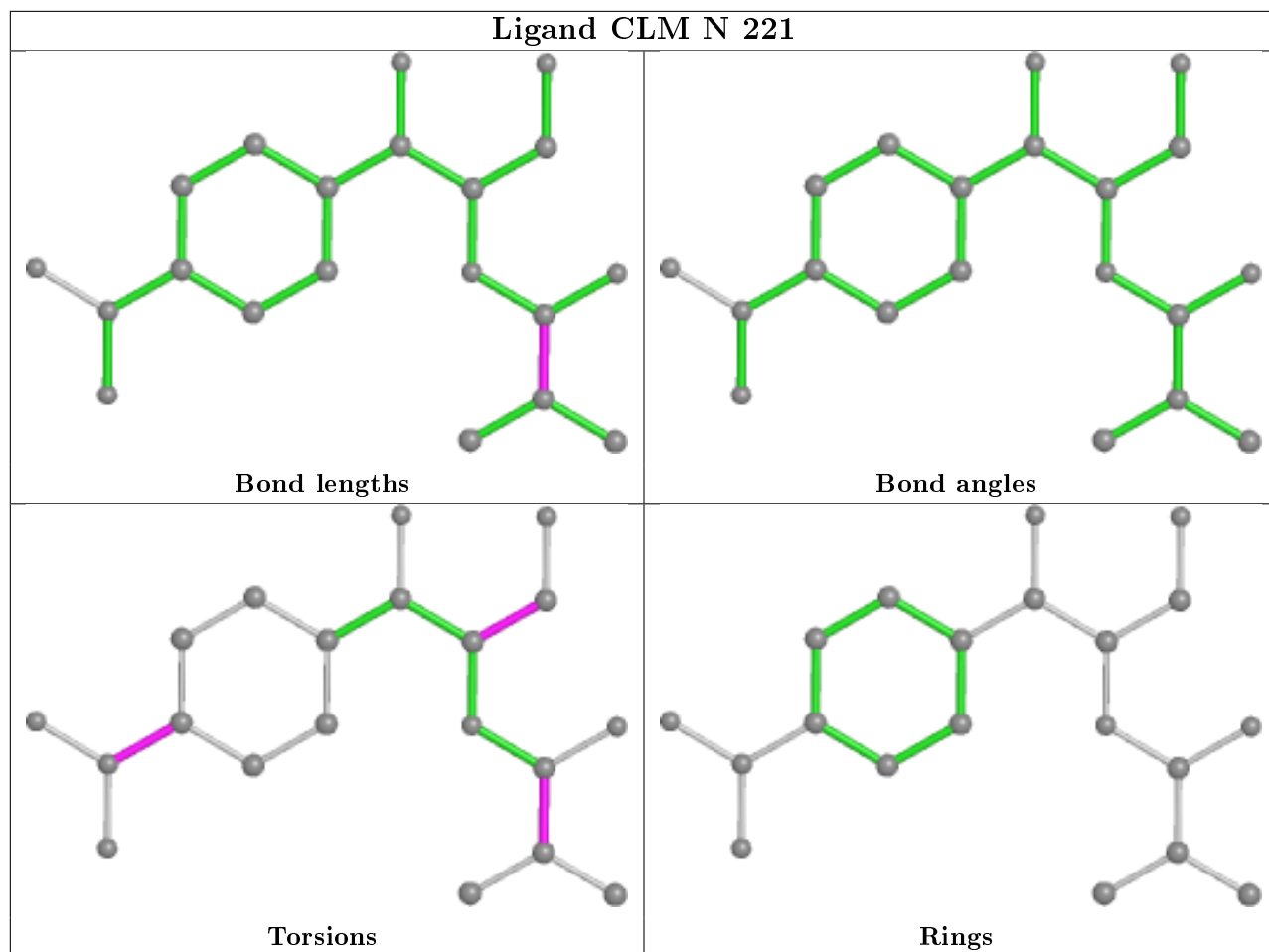


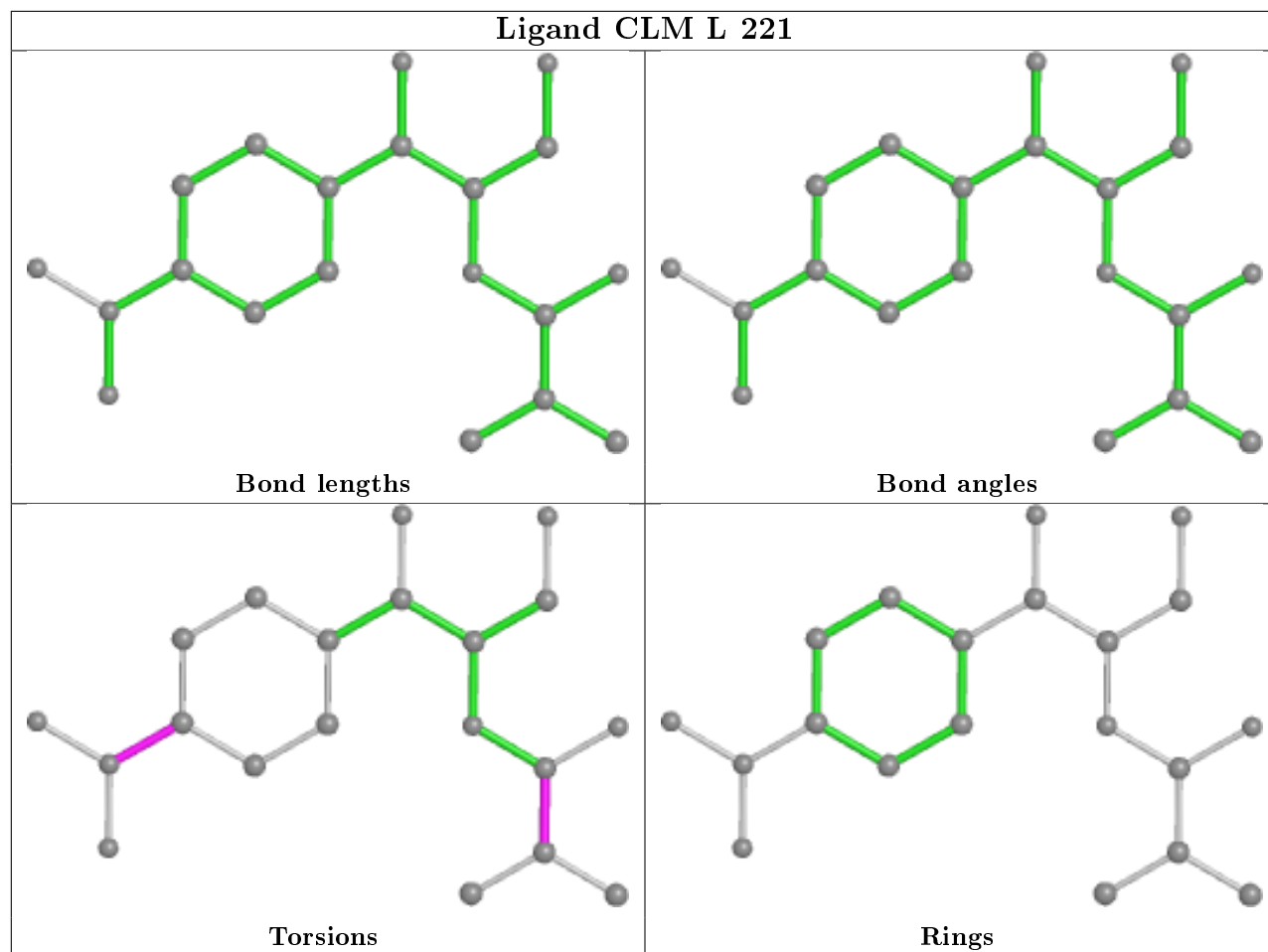


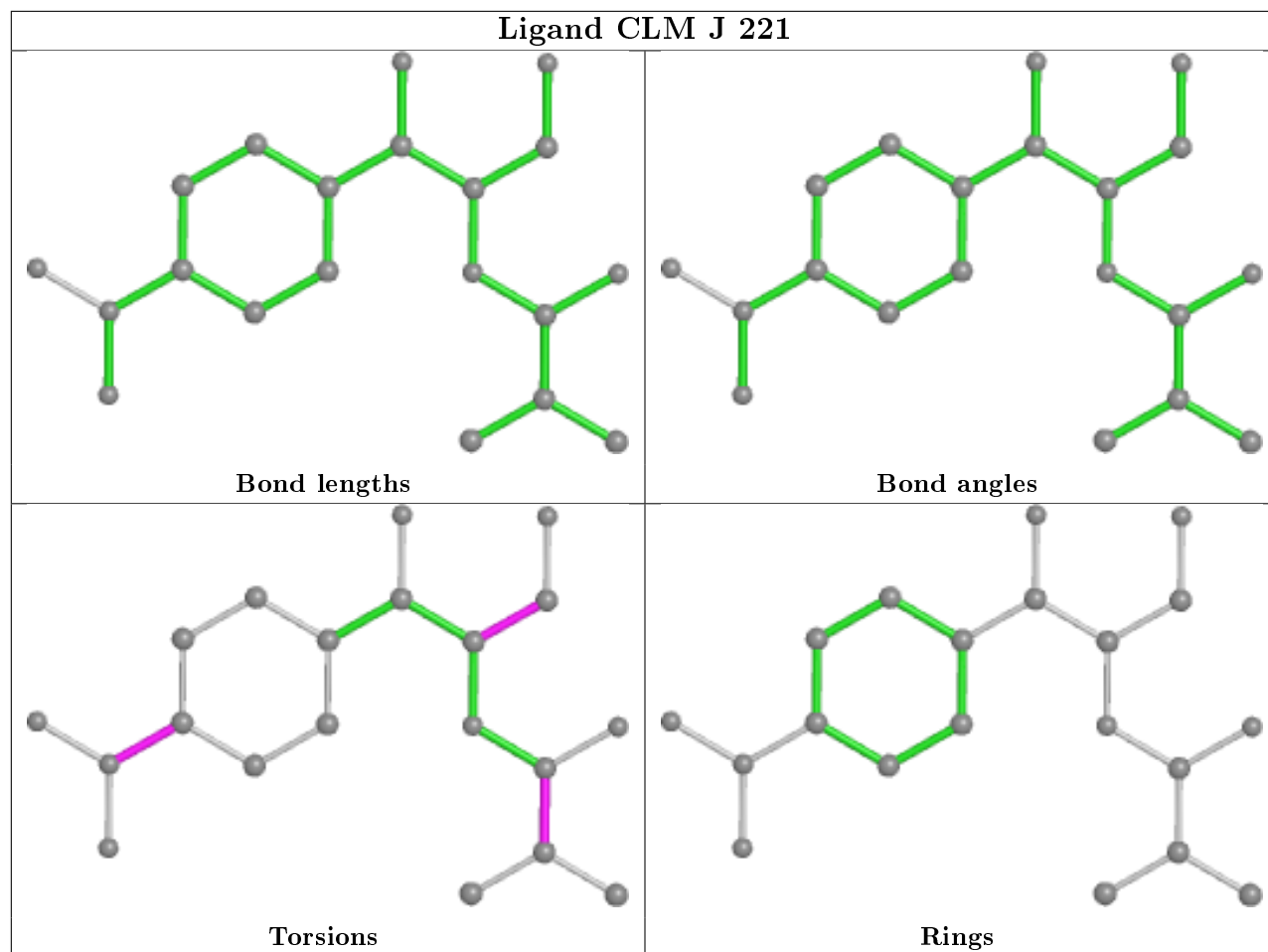


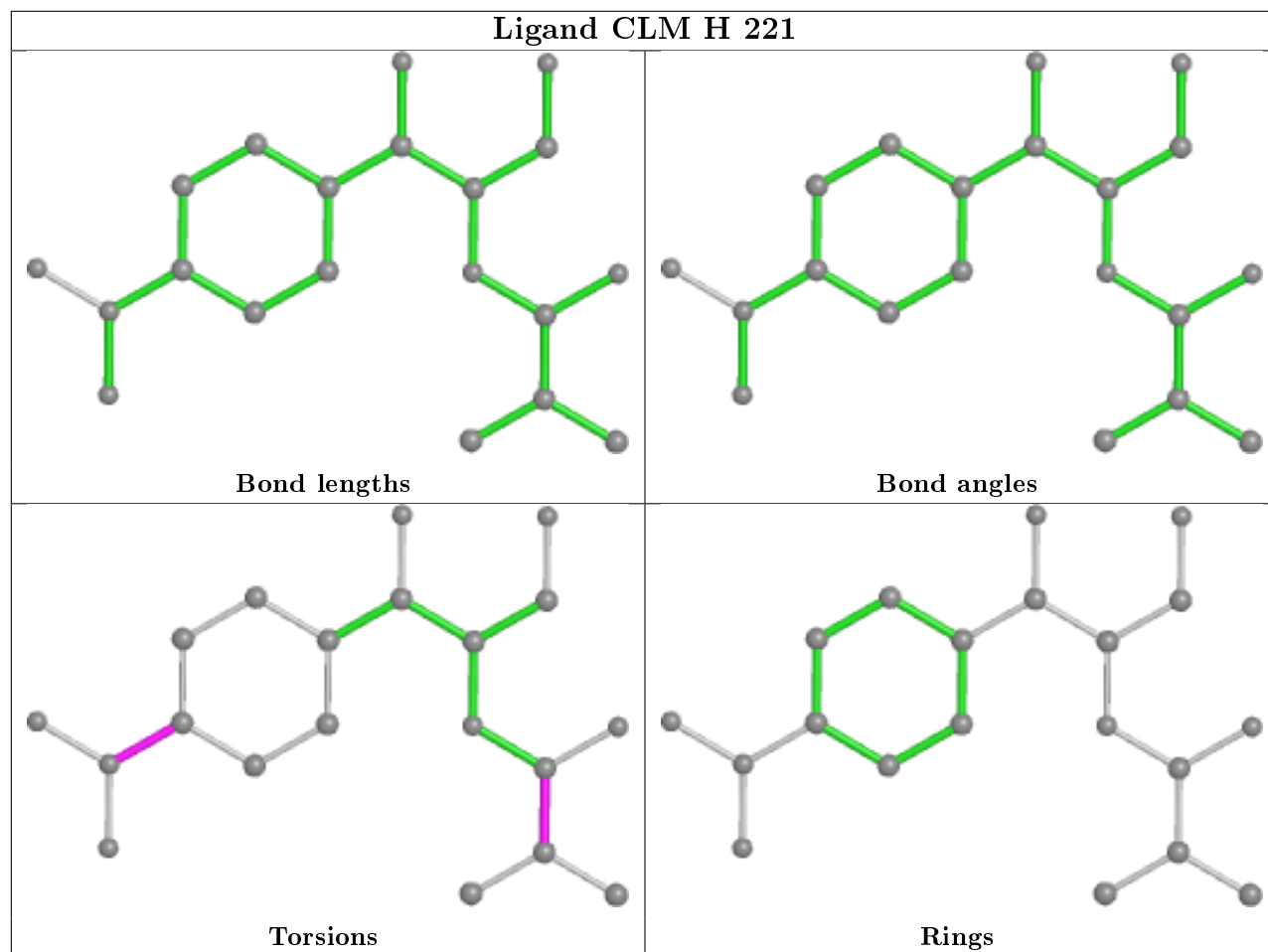












## 5.7 Other polymers [i](#)

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	215/219 (98%)	-0.33	1 (0%) 91 91	47, 65, 90, 107	0
1	B	215/219 (98%)	-0.25	3 (1%) 75 75	44, 64, 89, 103	0
1	C	216/219 (98%)	-0.32	0 100 100	44, 61, 85, 99	0
1	D	211/219 (96%)	-0.14	1 (0%) 91 91	48, 71, 102, 116	0
1	E	207/219 (94%)	-0.29	2 (0%) 82 82	47, 64, 91, 110	0
1	F	211/219 (96%)	-0.13	4 (1%) 66 65	52, 72, 100, 114	0
1	G	214/219 (97%)	-0.10	2 (0%) 84 84	60, 77, 99, 111	0
1	H	213/219 (97%)	-0.12	1 (0%) 91 91	62, 80, 101, 110	0
1	I	213/219 (97%)	-0.15	1 (0%) 91 91	60, 77, 94, 104	0
1	J	216/219 (98%)	-0.31	1 (0%) 91 91	43, 59, 81, 94	0
1	K	216/219 (98%)	-0.19	1 (0%) 91 91	43, 68, 92, 105	0
1	L	216/219 (98%)	-0.40	1 (0%) 91 91	43, 63, 91, 101	0
1	M	211/219 (96%)	-0.28	1 (0%) 91 91	49, 67, 96, 110	0
1	N	212/219 (96%)	-0.26	6 (2%) 53 49	42, 63, 91, 111	0
1	O	211/219 (96%)	-0.01	6 (2%) 53 49	53, 75, 107, 121	0
1	P	215/219 (98%)	-0.08	2 (0%) 84 84	62, 77, 98, 109	0
1	R	214/219 (97%)	-0.19	2 (0%) 84 84	58, 74, 95, 105	0
1	S	214/219 (97%)	-0.11	1 (0%) 91 91	60, 75, 93, 104	0
All	All	3840/3942 (97%)	-0.20	36 (0%) 84 84	42, 70, 96, 121	0

The worst 5 of 36 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	217	GLY	5.1
1	K	217	GLY	5.0
1	N	52	LYS	5.0

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Mol	Chain	Res	Type	RSRZ
1	D	217	GLY	4.7
1	N	51	ASN	4.5

## 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 carbohydrates in this entry.

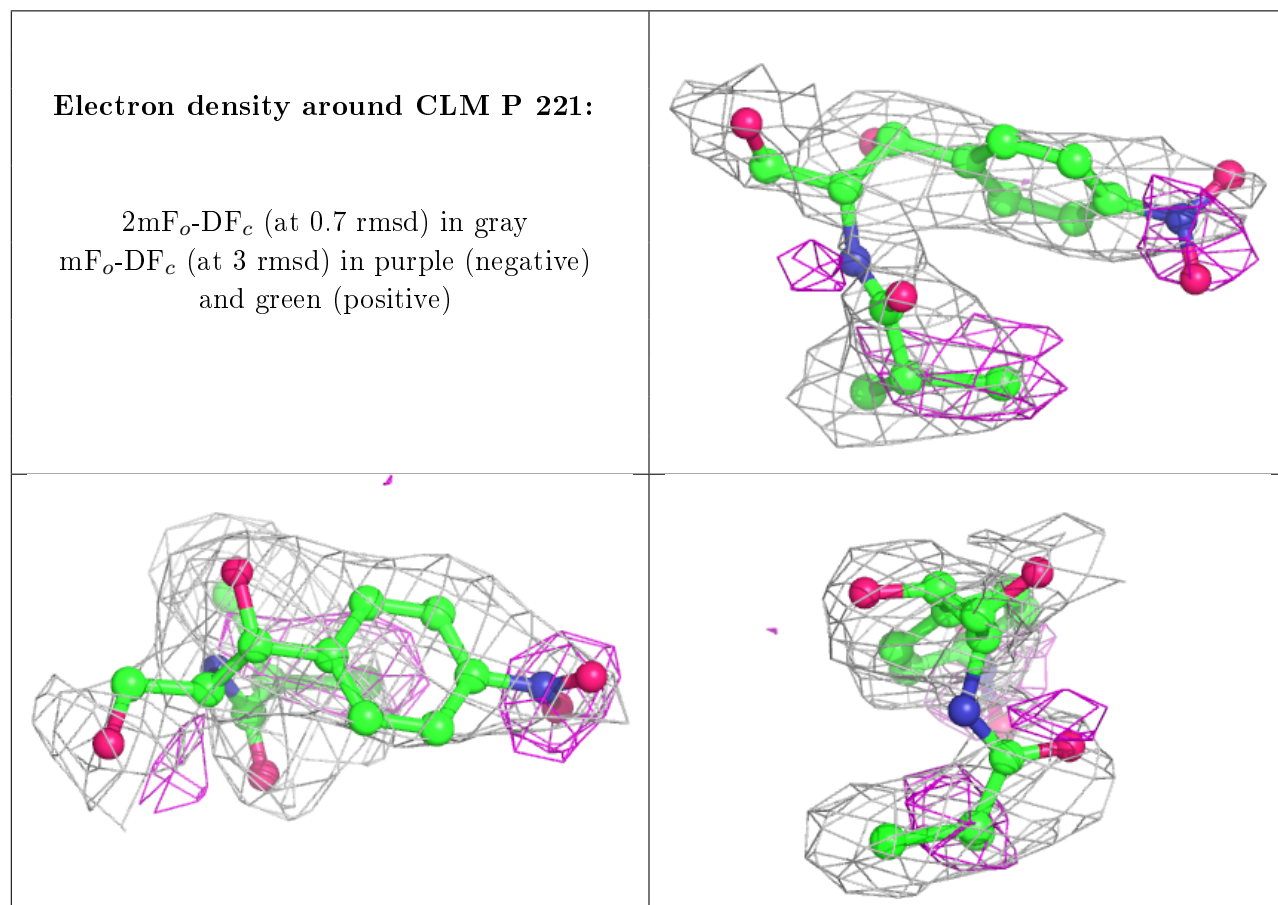
## 6.4 Ligands [i](#)

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
2	CLM	P	221	20/20	0.79	0.27	65,67,74,76	0
2	CLM	H	221	20/20	0.87	0.23	66,67,75,77	0
2	CLM	C	221	20/20	0.89	0.19	62,64,70,73	0
2	CLM	O	221	20/20	0.90	0.17	58,60,71,71	0
2	CLM	N	221	20/20	0.90	0.21	56,58,65,67	0
2	CLM	R	221	20/20	0.90	0.17	57,59,64,67	0
2	CLM	S	221	20/20	0.91	0.23	62,63,71,74	0
2	CLM	M	221	20/20	0.91	0.20	57,59,66,67	0
2	CLM	K	221	20/20	0.91	0.16	61,64,70,73	0
2	CLM	I	221	20/20	0.91	0.19	62,64,70,72	0
2	CLM	J	221	20/20	0.91	0.20	59,62,65,68	0
2	CLM	G	221	20/20	0.91	0.20	62,65,69,73	0
2	CLM	F	221	20/20	0.92	0.15	58,60,67,69	0
2	CLM	E	221	20/20	0.92	0.22	54,56,65,67	0
2	CLM	L	221	20/20	0.93	0.14	53,54,57,60	0
2	CLM	A	221	20/20	0.93	0.18	66,68,71,74	0
2	CLM	D	221	20/20	0.93	0.15	53,56,64,65	0
2	CLM	B	221	20/20	0.95	0.14	52,55,59,62	0

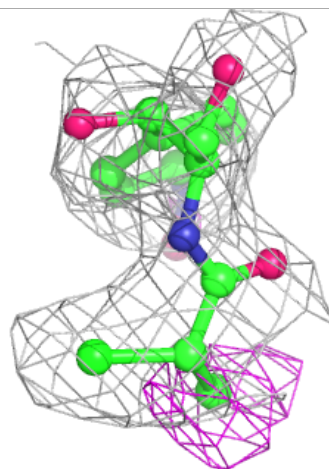
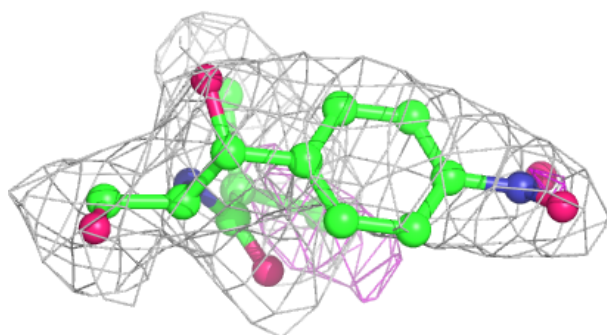
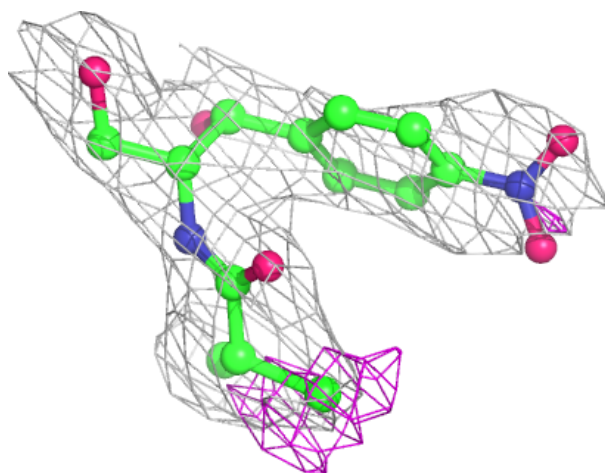
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers

as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.



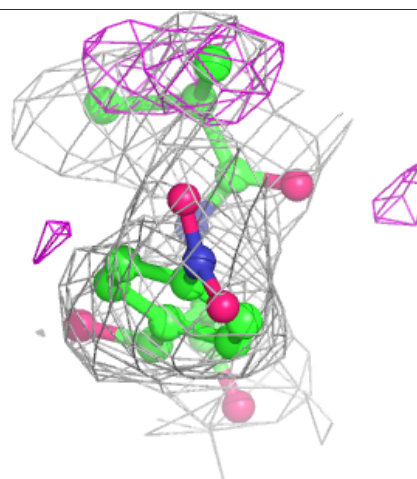
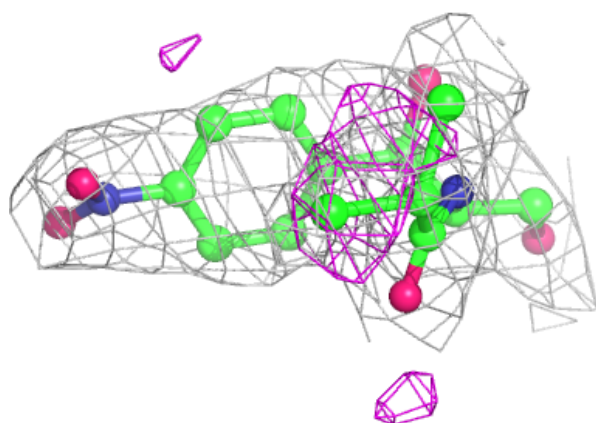
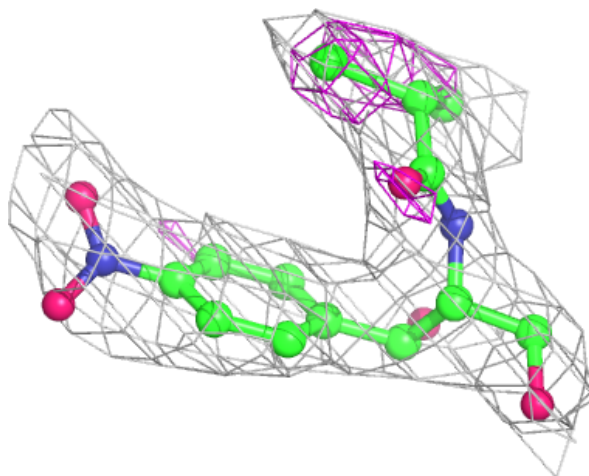
**Electron density around CLM H 221:**

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



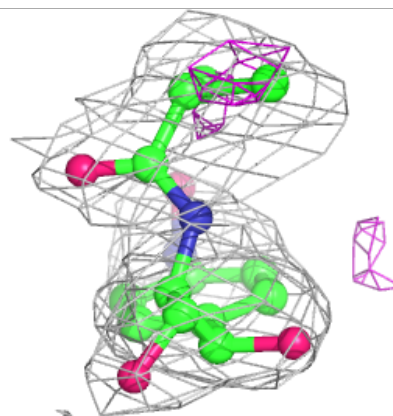
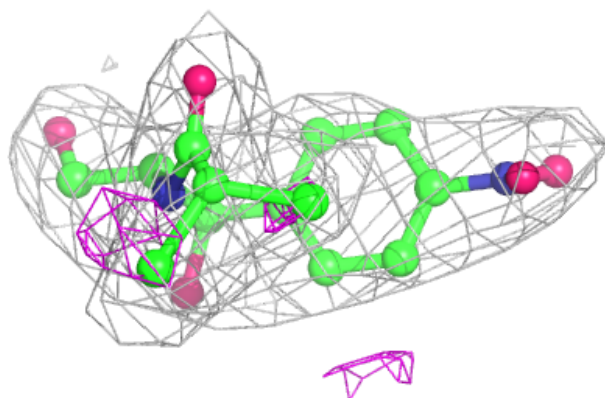
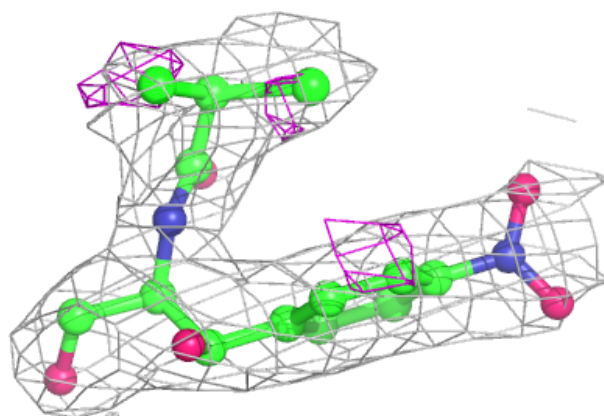
**Electron density around CLM C 221:**

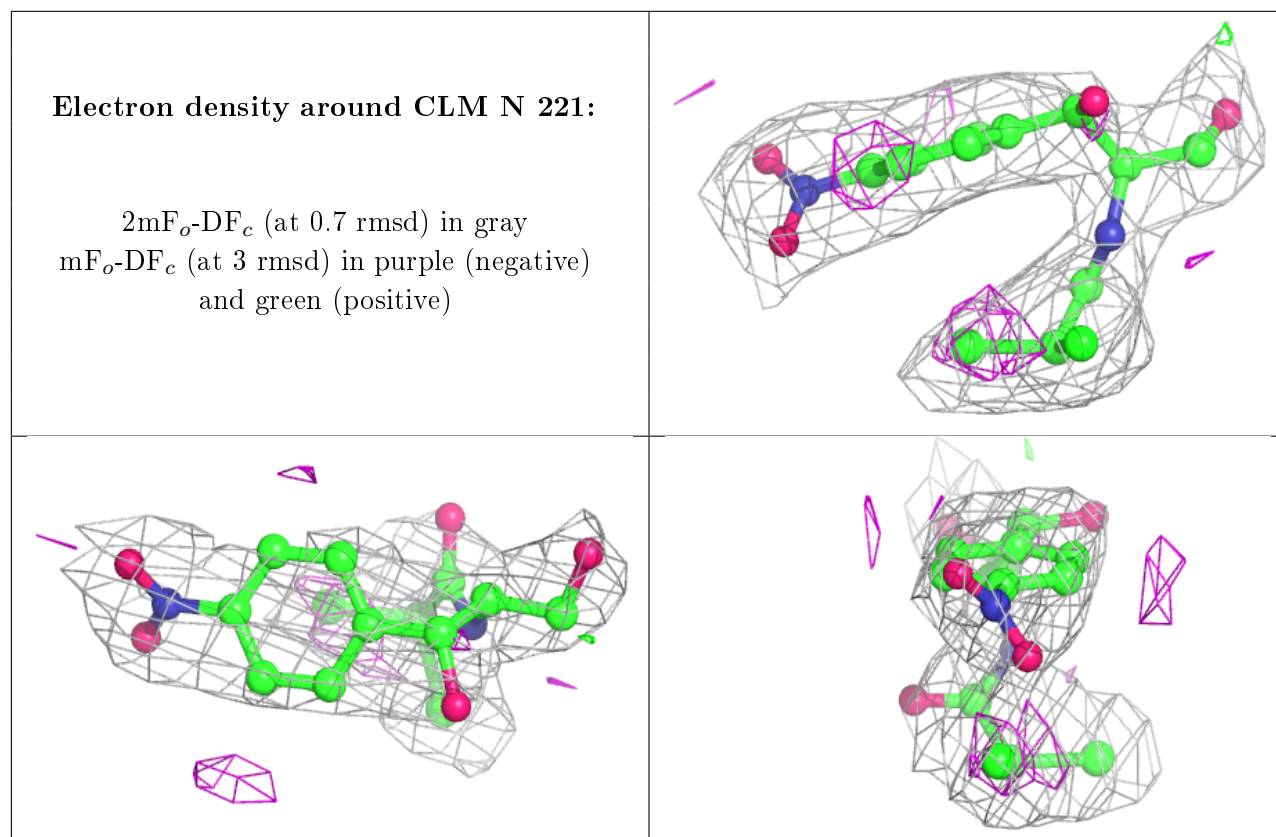
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around CLM O 221:**

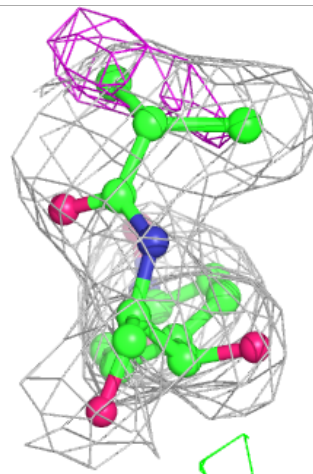
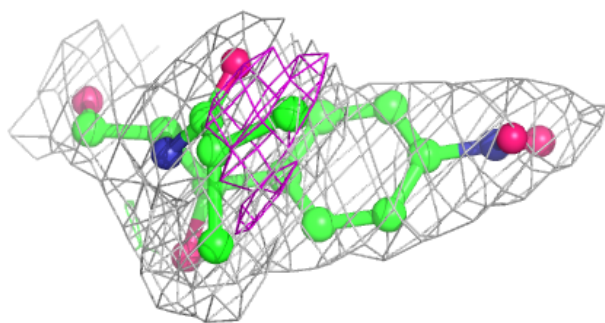
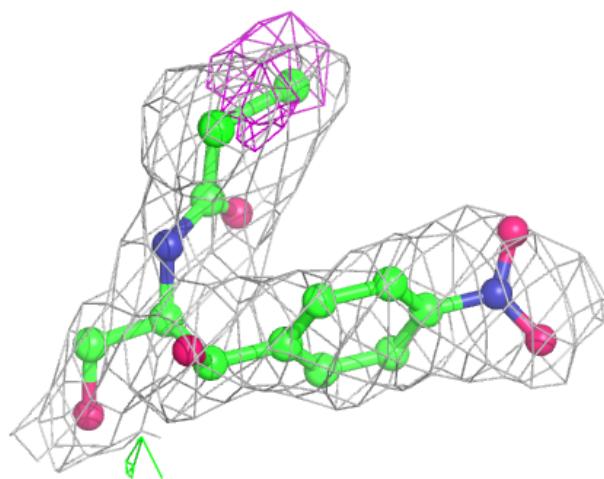
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



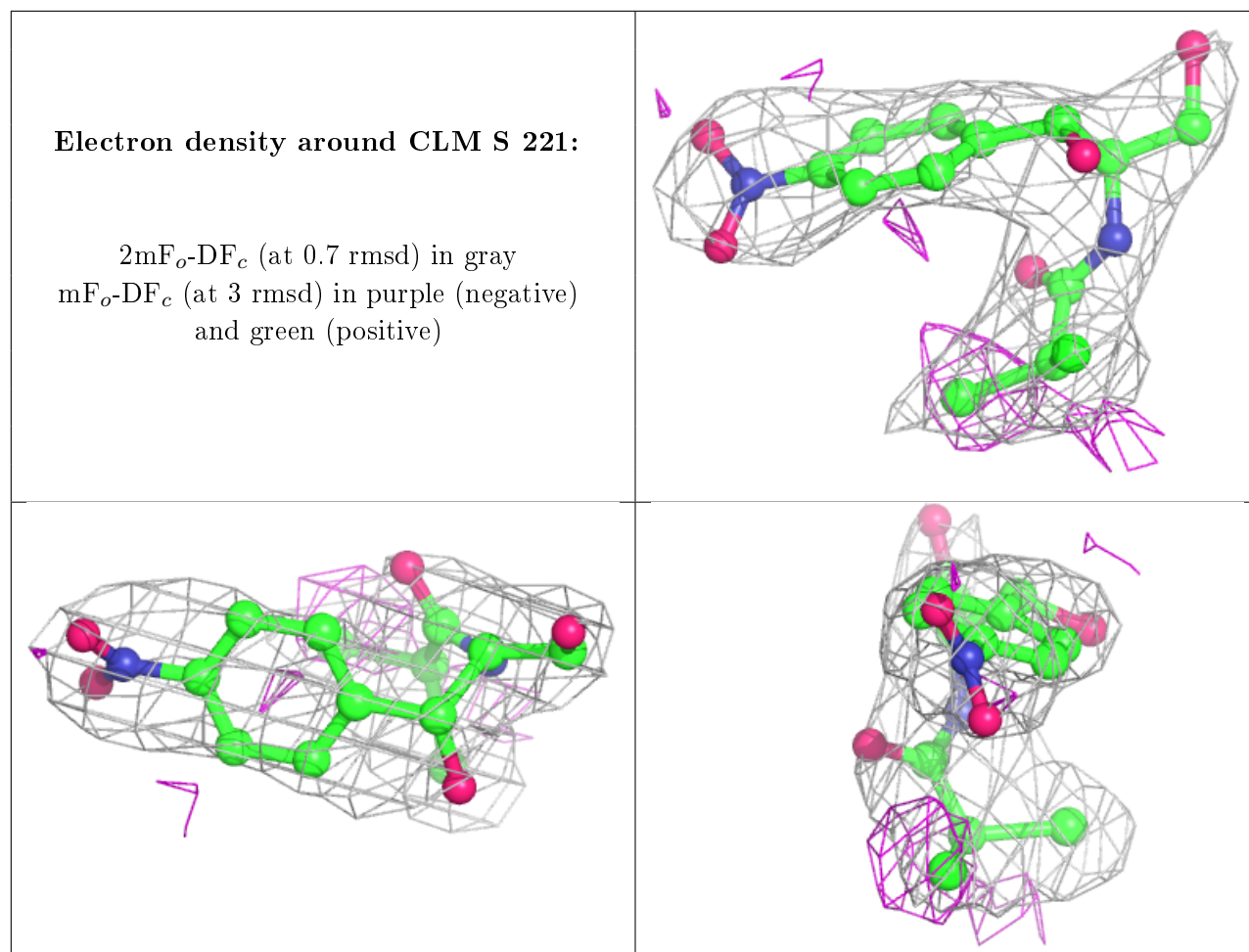


**Electron density around CLM R 221:**

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



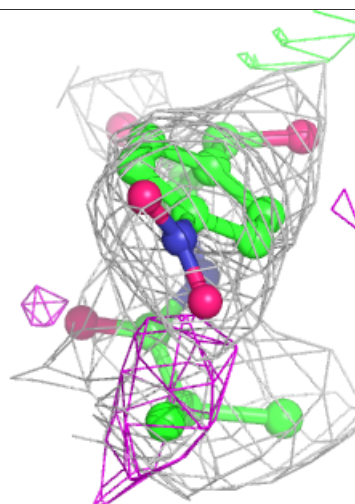
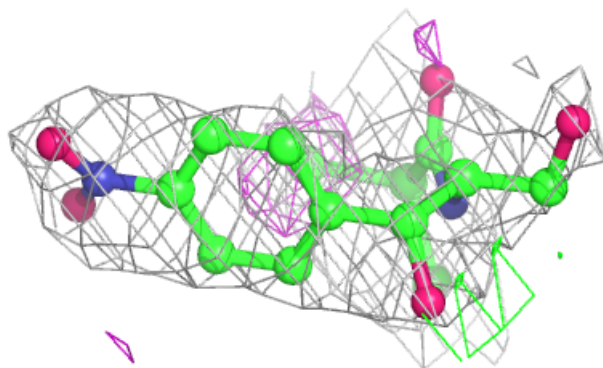
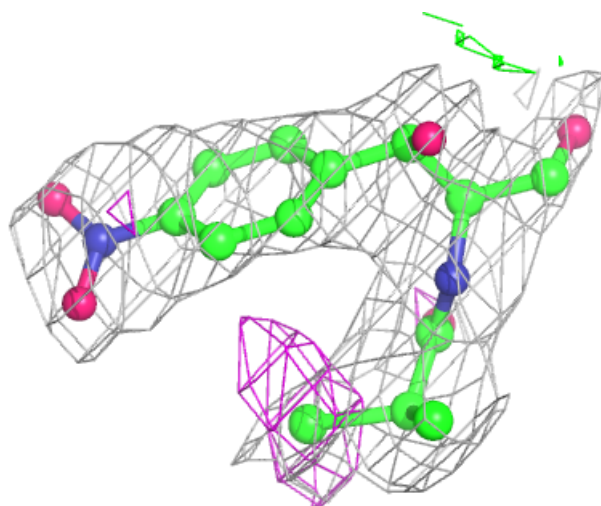






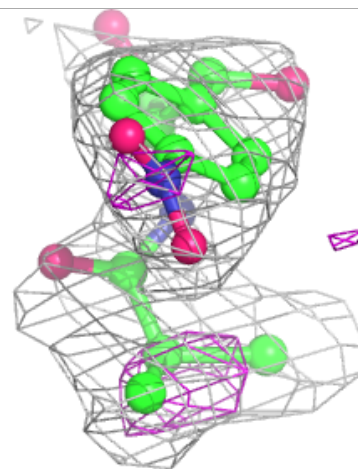
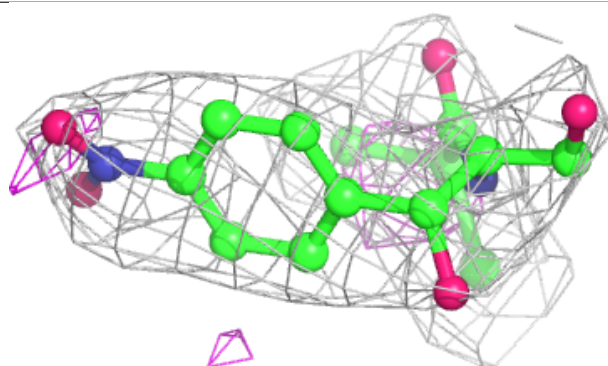
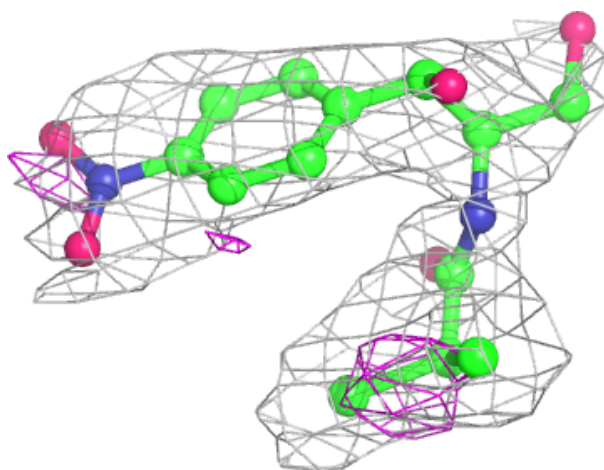
**Electron density around CLM M 221:**

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



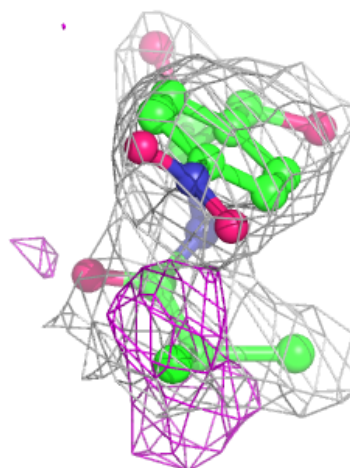
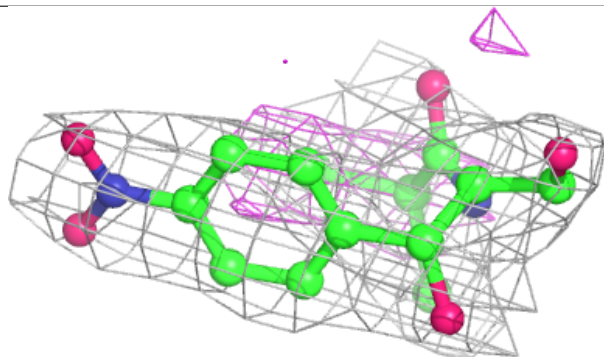
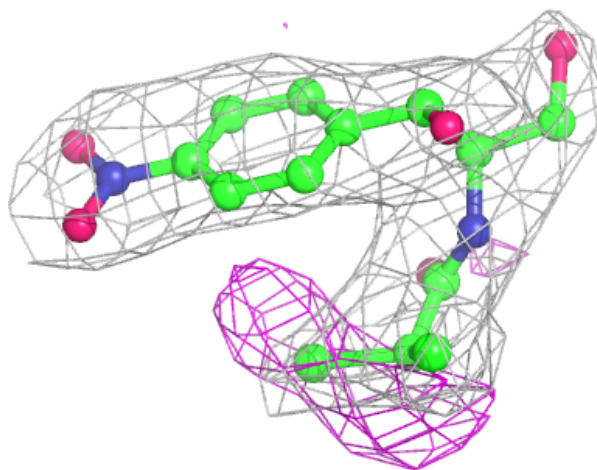
**Electron density around CLM K 221:**

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



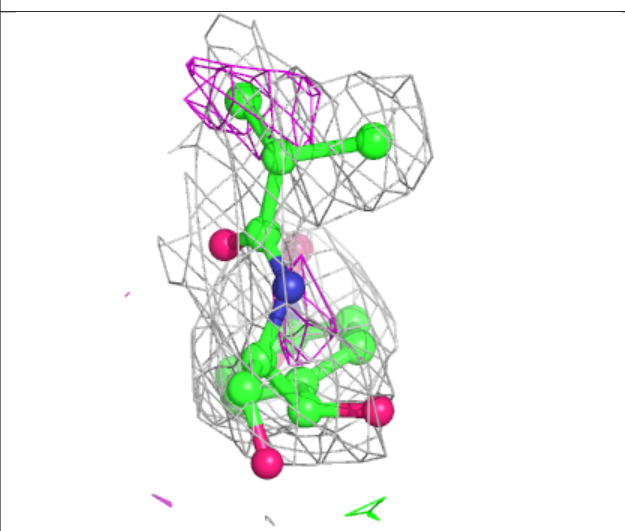
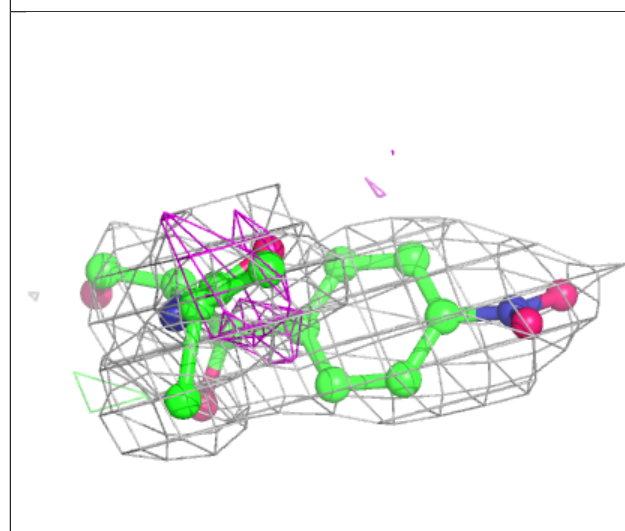
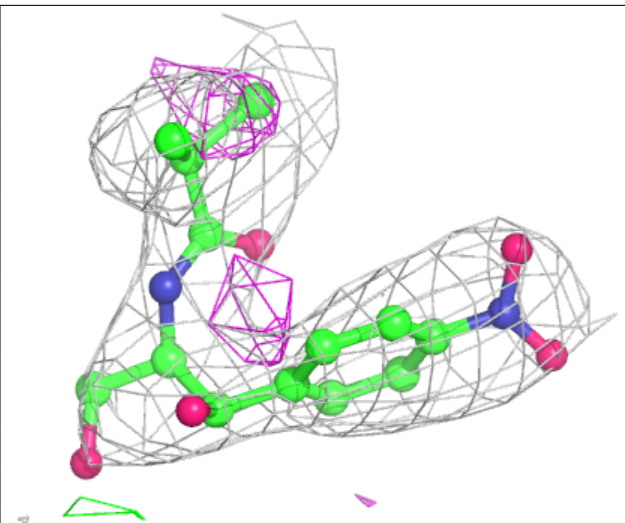
**Electron density around CLM I 221:**

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



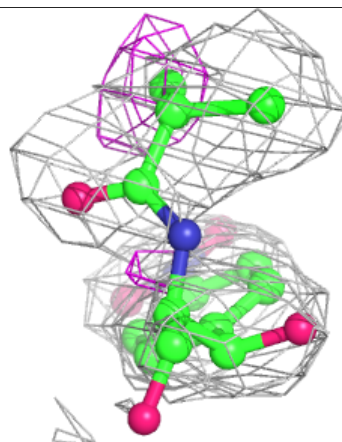
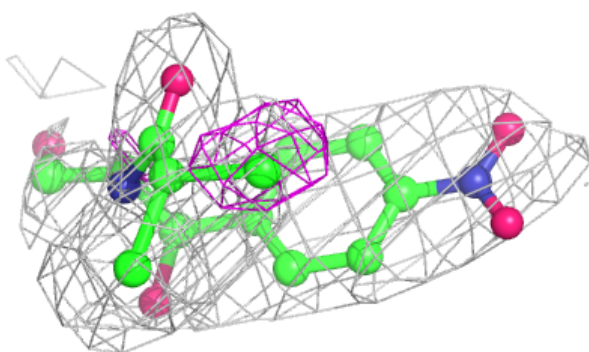
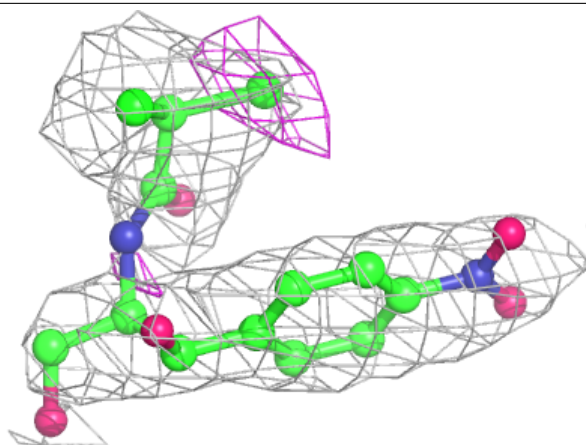
**Electron density around CLM J 221:**

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



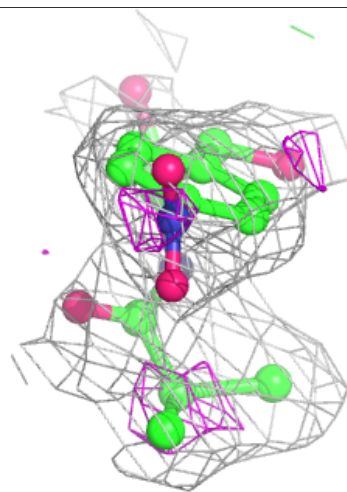
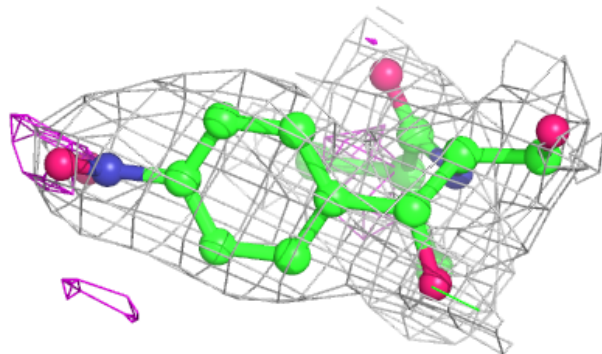
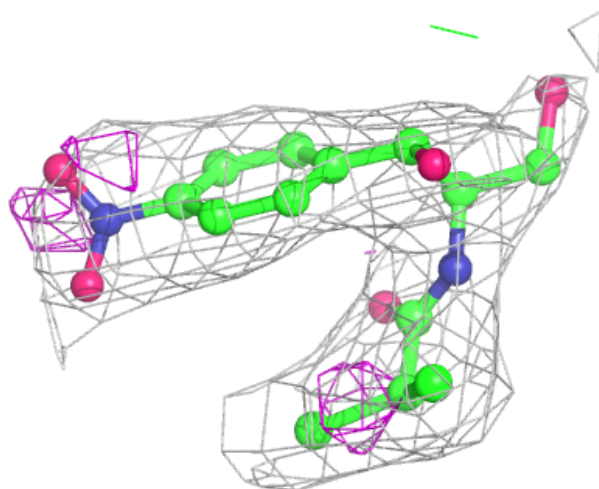
**Electron density around CLM G 221:**

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



**Electron density around CLM F 221:**

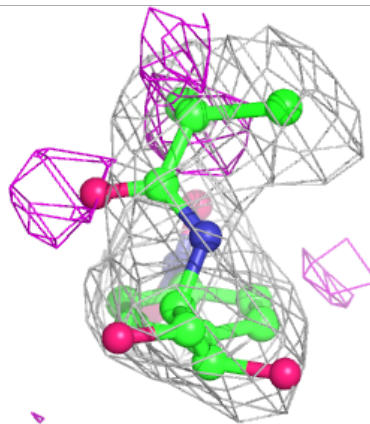
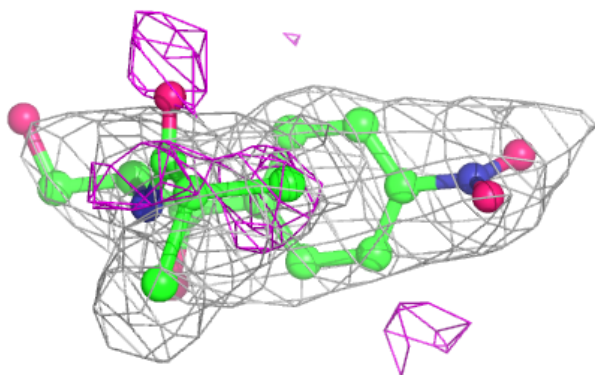
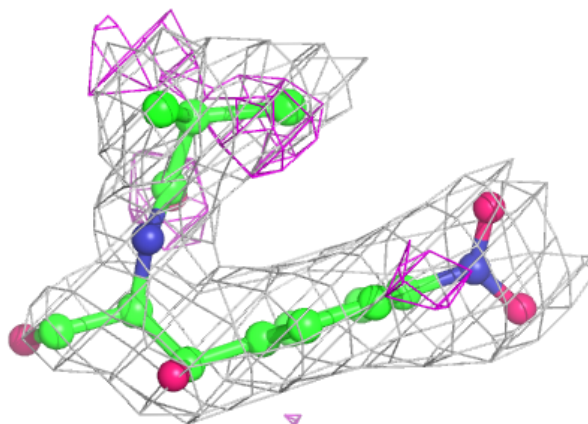
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

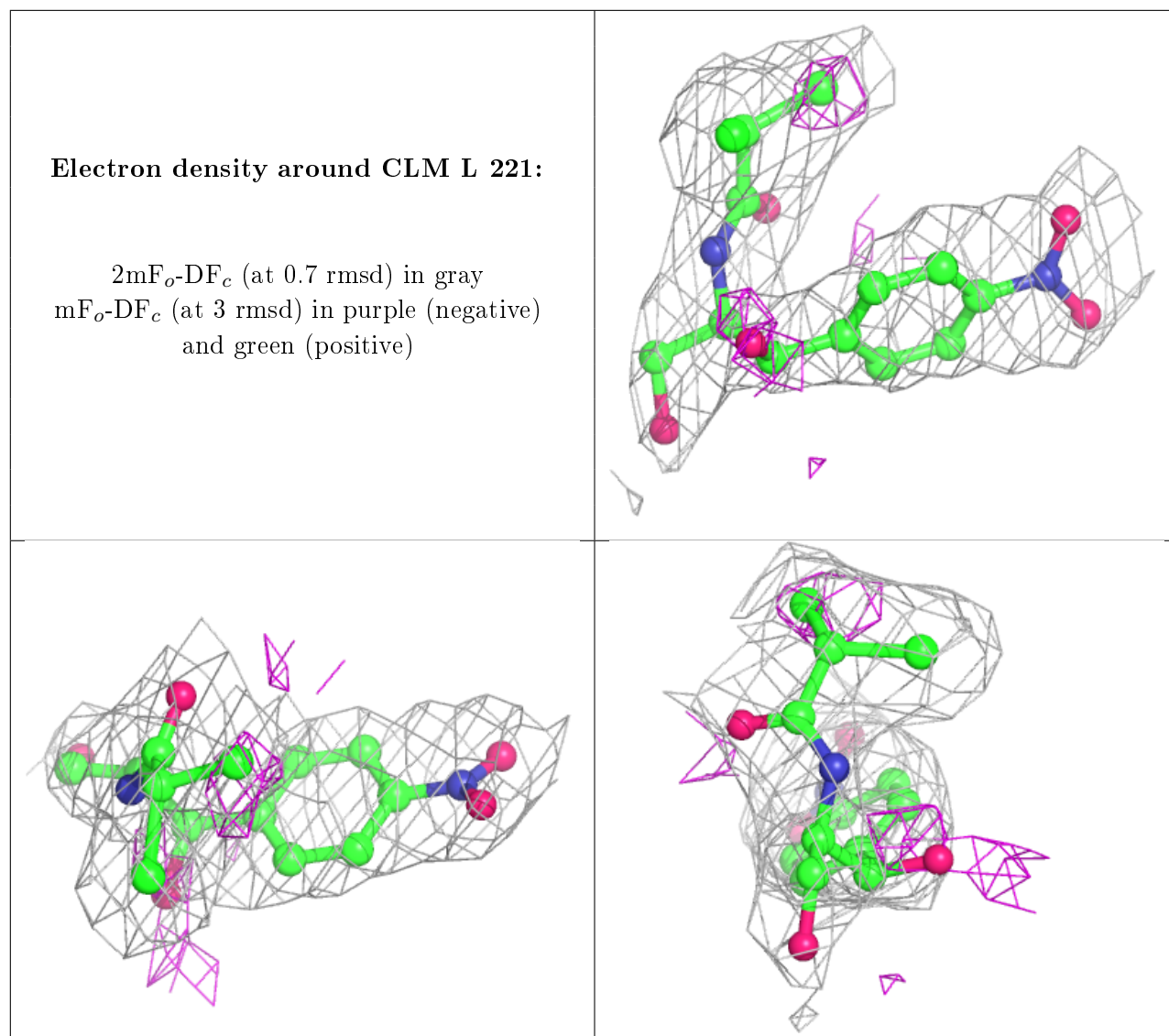




**Electron density around CLM E 221:**

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

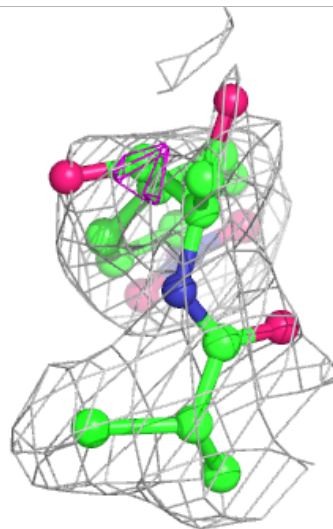
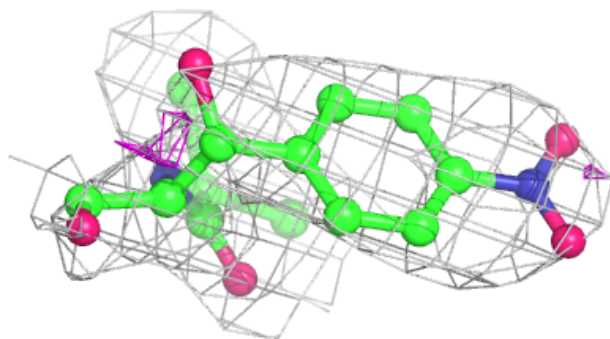
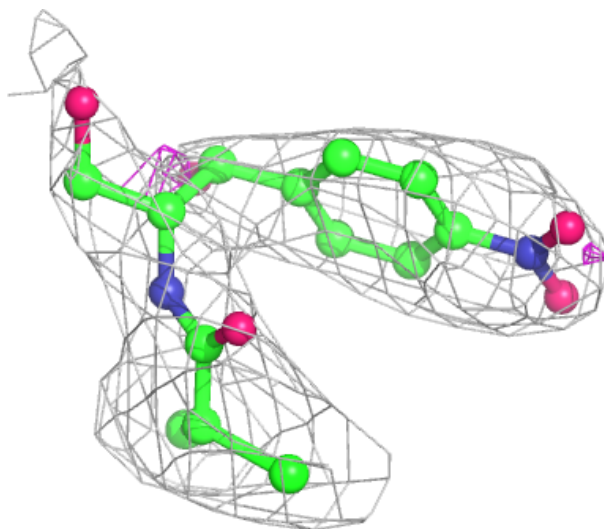






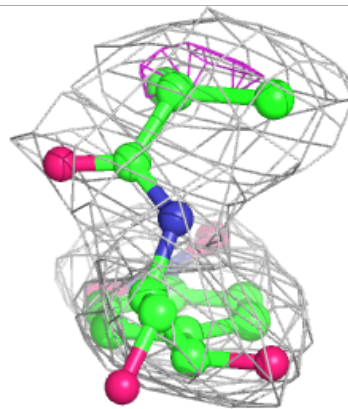
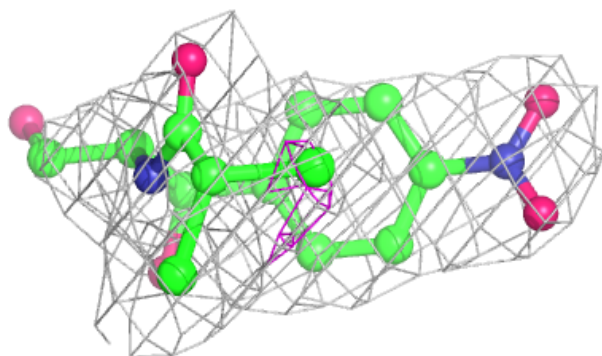
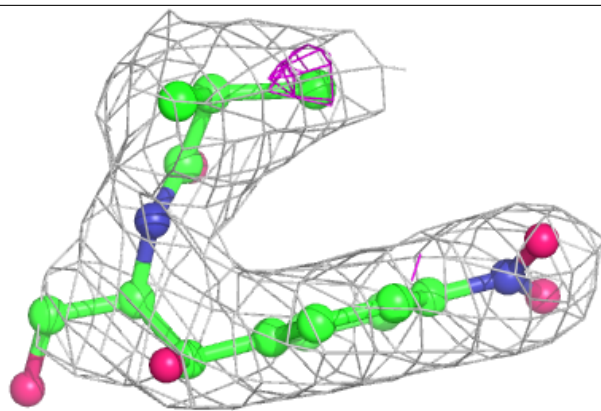
**Electron density around CLM A 221:**

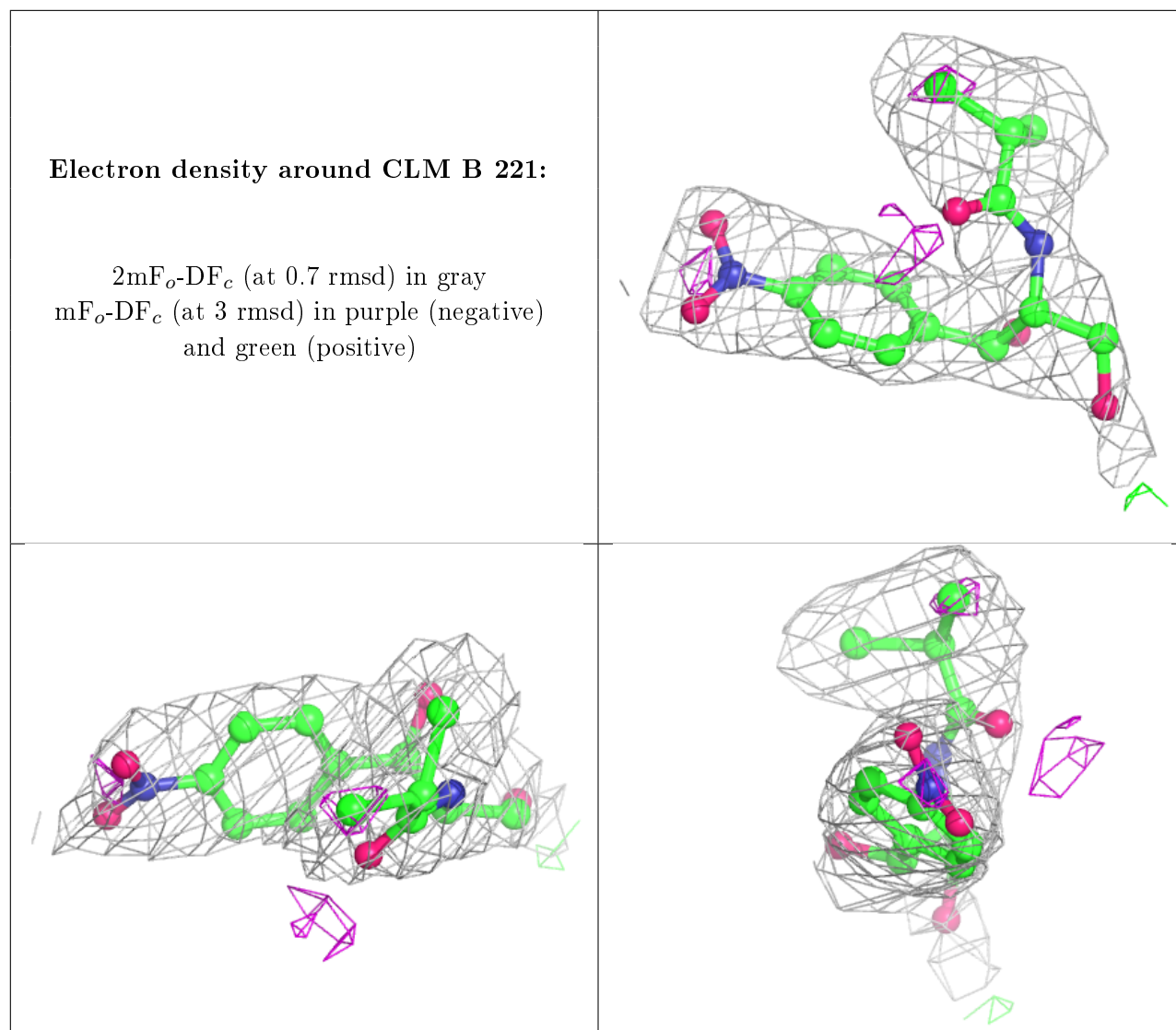
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around CLM D 221:**

$2mF_o-DF_c$  (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.