



wwPDB X-ray Structure Validation Summary Report ⓘ

Oct 11, 2023 – 03:08 PM EDT

PDB ID : 8ERB
Title : Crystal structure of Fub7 in complex with vinylglycine ketimine
Authors : Hai, Y.
Deposited on : 2022-10-11
Resolution : 1.98 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.35.1
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) : 2.35.1

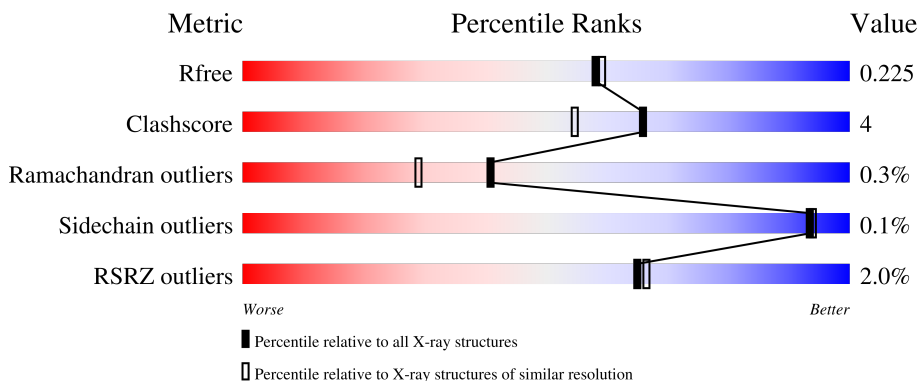
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.98 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	11647 (2.00-1.96)
Clashscore	141614	1014 (1.98-1.98)
Ramachandran outliers	138981	1006 (1.98-1.98)
Sidechain outliers	138945	1006 (1.98-1.98)
RSRZ outliers	127900	11410 (2.00-1.96)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	433	 2% 88% 11% .
1	B	433	 2% 90% 9% .
1	C	433	 2% 89% 9% .
1	D	433	 2% 90% 8% .
1	E	433	 2% 85% 13% ..

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Mol	Chain	Length	Quality of chain
1	F	433	<p>2% 86% 12% .</p>
1	G	433	<p>2% 91% 8% .</p>
1	H	433	<p>2% 89% 9% ..</p>
1	I	433	<p>3% 91% 7% .</p>
1	J	433	<p>2% 91% 8% .</p>
1	K	433	<p>2% 87% 11% ..</p>
1	L	433	<p>2% 91% 8% .</p>
1	M	433	<p>2% 89% 9% .</p>
1	N	433	<p>1% 88% 9% ..</p>
1	P	433	<p>2% 88% 10% ..</p>
1	Q	433	<p>2% 89% 9% ..</p>

2 Entry composition

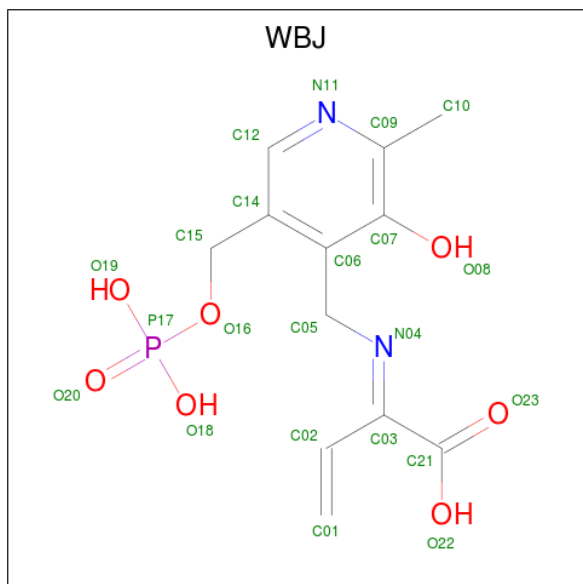
There are 3 unique types of molecules in this entry. The entry contains 55304 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Sulphydrylase FUB7.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	428	Total 3300	C 2096	N 570	O 627	S 7	0	1	0
1	B	427	Total 3300	C 2099	N 568	O 626	S 7	0	1	0
1	C	427	Total 3293	C 2091	N 569	O 626	S 7	0	1	0
1	D	428	Total 3297	C 2094	N 568	O 628	S 7	0	0	0
1	G	427	Total 3296	C 2093	N 568	O 628	S 7	0	1	0
1	H	426	Total 3281	C 2084	N 565	O 625	S 7	0	0	0
1	F	425	Total 3278	C 2083	N 564	O 624	S 7	0	1	0
1	I	428	Total 3297	C 2094	N 568	O 628	S 7	0	0	0
1	P	428	Total 3305	C 2099	N 571	O 628	S 7	0	1	0
1	J	427	Total 3288	C 2089	N 566	O 626	S 7	0	0	0
1	M	428	Total 3292	C 2091	N 567	O 627	S 7	0	0	0
1	Q	429	Total 3301	C 2096	N 569	O 629	S 7	0	0	0
1	N	422	Total 3263	C 2074	N 563	O 619	S 7	0	1	0
1	E	427	Total 3296	C 2094	N 569	O 626	S 7	0	1	0
1	L	428	Total 3297	C 2094	N 568	O 628	S 7	0	0	0
1	K	429	Total 3301	C 2096	N 569	O 629	S 7	0	0	0

- Molecule 2 is (2E)-2-[(3-hydroxy-2-methyl-5-[(phosphonoxy)methyl]pyridin-4-yl)methyl]imino]but-3-enoic acid (three-letter code: WBJ) (formula: C₁₂H₁₅N₂O₇P) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
2	A	1	Total	C	N	O	P	0	0
			22	12	2	7	1		
2	B	1	Total	C	N	O	P	0	0
			22	12	2	7	1		
2	C	1	Total	C	N	O	P	0	0
			22	12	2	7	1		
2	D	1	Total	C	N	O	P	0	0
			22	12	2	7	1		
2	G	1	Total	C	N	O	P	0	0
			22	12	2	7	1		
2	H	1	Total	C	N	O	P	0	0
			22	12	2	7	1		
2	F	1	Total	C	N	O	P	0	0
			22	12	2	7	1		
2	I	1	Total	C	N	O	P	0	0
			22	12	2	7	1		
2	P	1	Total	C	N	O	P	0	0
			22	12	2	7	1		
2	J	1	Total	C	N	O	P	0	0
			22	12	2	7	1		
2	M	1	Total	C	N	O	P	0	0
			22	12	2	7	1		
2	Q	1	Total	C	N	O	P	0	0
			22	12	2	7	1		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	N	1	Total	C	N	O	P	0	0
			22	12	2	7	1		
2	E	1	Total	C	N	O	P	0	0
			22	12	2	7	1		
2	L	1	Total	C	N	O	P	0	0
			22	12	2	7	1		
2	K	1	Total	C	N	O	P	0	0
			22	12	2	7	1		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	224	Total	O	0	0
			224	224		
3	B	142	Total	O	0	0
			142	142		
3	C	206	Total	O	0	0
			206	206		
3	D	179	Total	O	0	0
			179	179		
3	G	144	Total	O	0	0
			144	144		
3	H	104	Total	O	0	0
			104	104		
3	F	132	Total	O	0	0
			132	132		
3	I	121	Total	O	0	0
			121	121		
3	P	119	Total	O	0	0
			119	119		
3	J	108	Total	O	0	0
			108	108		
3	M	148	Total	O	0	0
			148	148		
3	Q	151	Total	O	0	0
			151	151		
3	N	125	Total	O	0	0
			125	125		
3	E	137	Total	O	0	0
			137	137		
3	L	120	Total	O	0	0
			120	120		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	K	107	Total 107	O 107	0	0

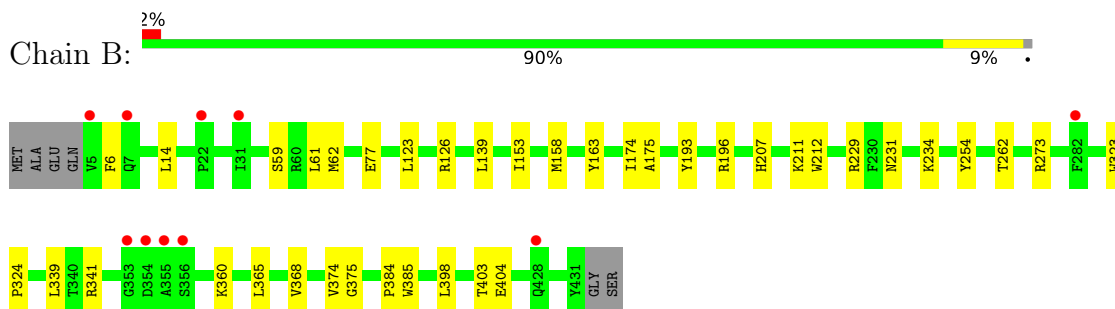
3 Residue-property plots [i](#)

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.

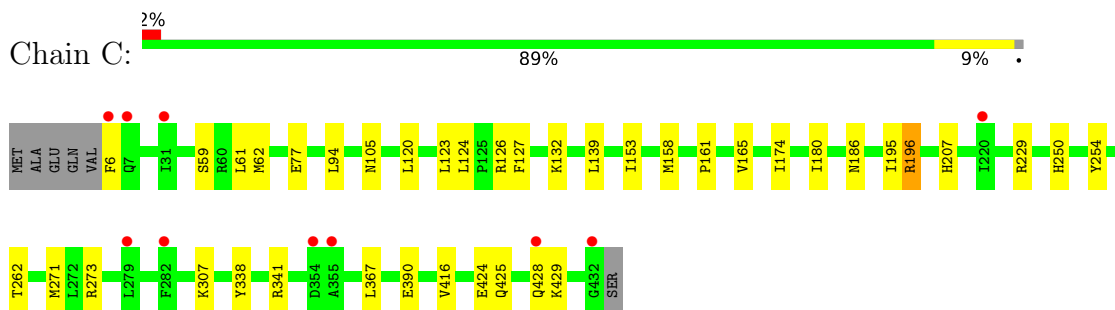
- Molecule 1: Sulfhydrylase FUB7



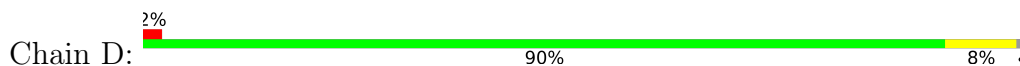
- Molecule 1: Sulfhydrylase FUB7

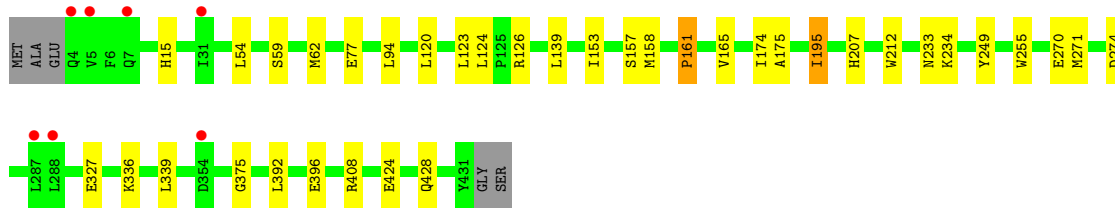


- Molecule 1: Sulfhydrylase FUB7

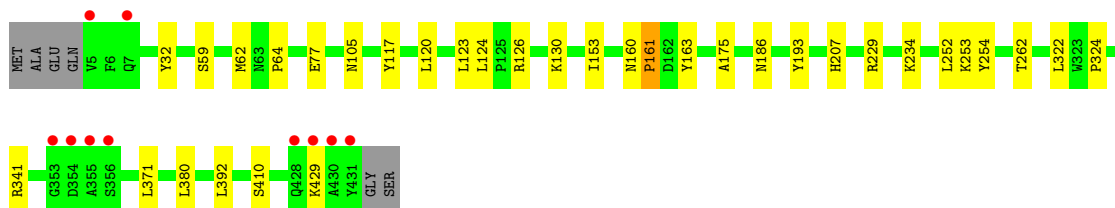
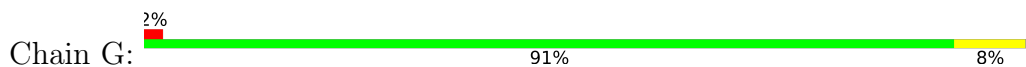


- Molecule 1: Sulfhydrylase FUB7

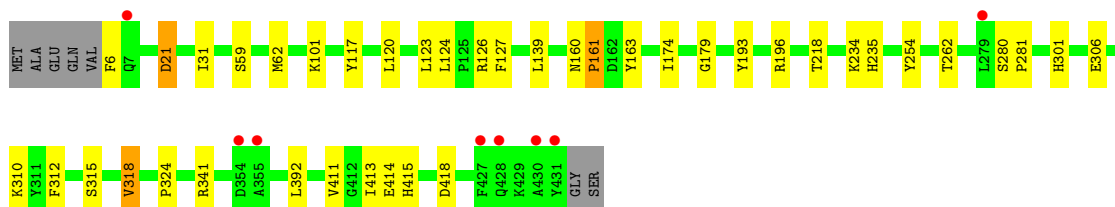
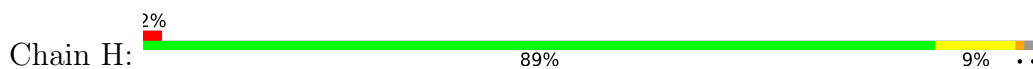




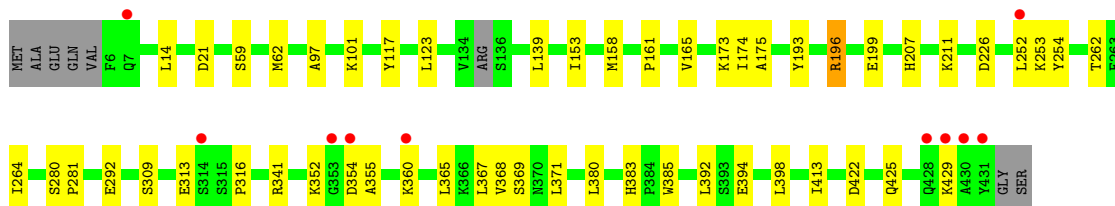
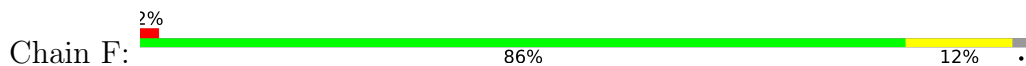
- Molecule 1: Sulfhydrylase FUB7



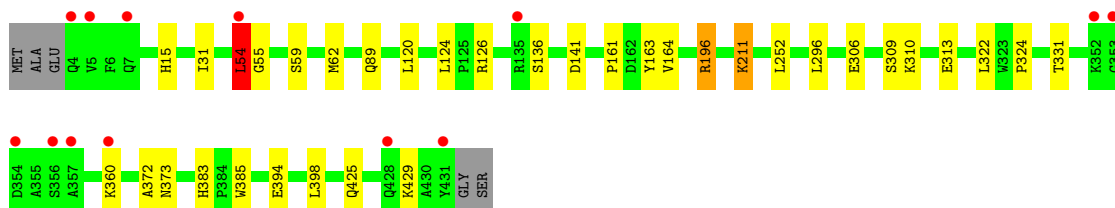
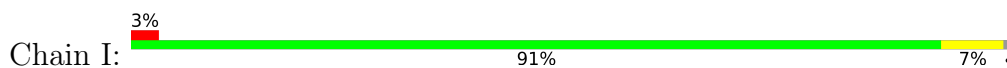
- Molecule 1: Sulfhydrylase FUB7



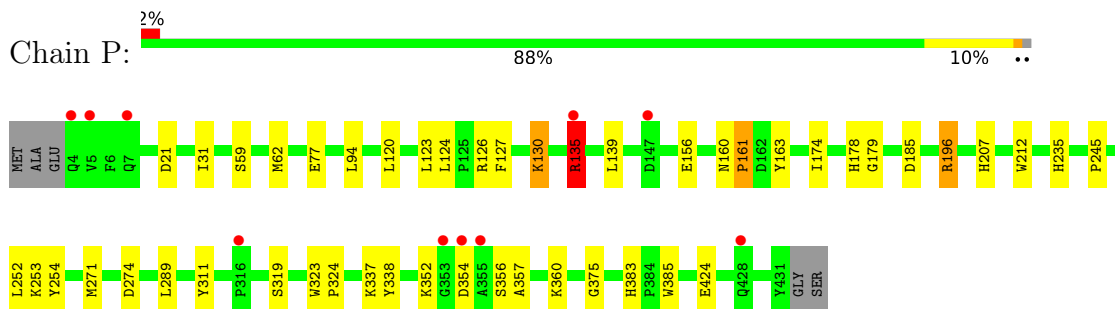
- Molecule 1: Sulfhydrylase FUB7



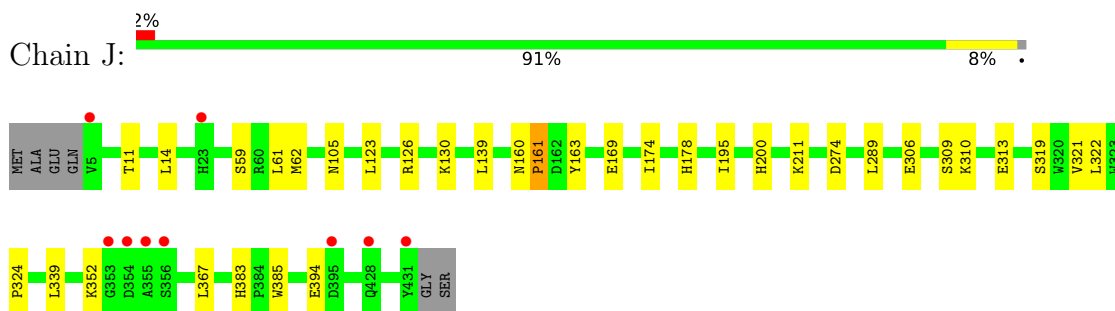
- Molecule 1: Sulfhydrylase FUB7



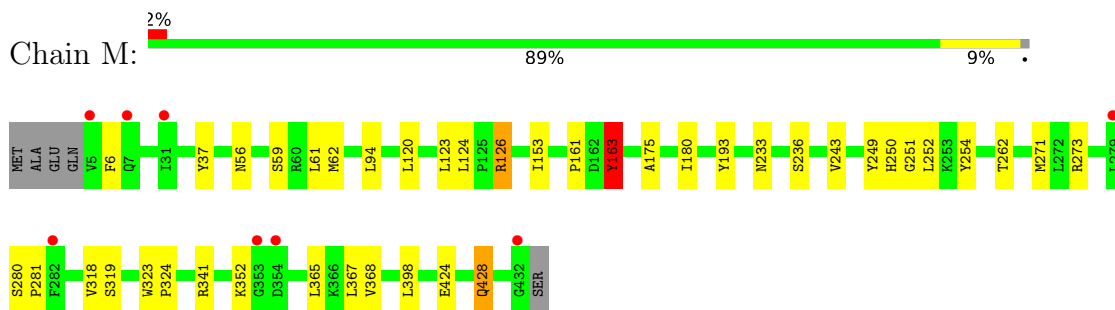
- Molecule 1: Sulfhydrylase FUB7



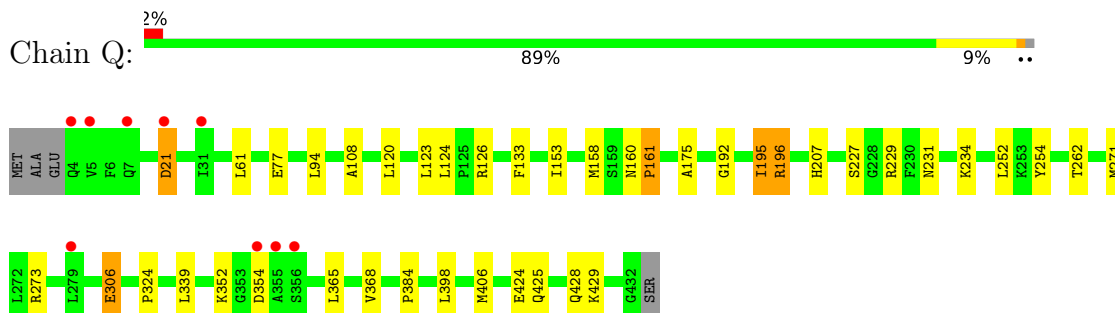
- Molecule 1: Sulfhydrylase FUB7



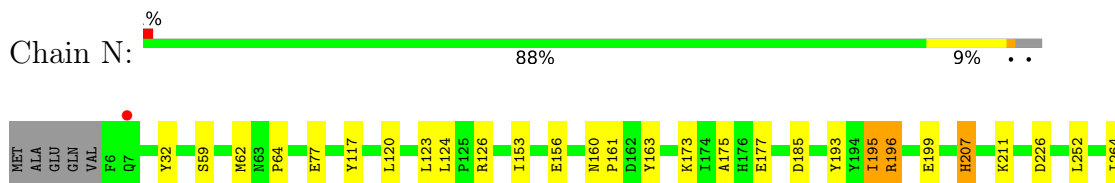
- Molecule 1: Sulfhydrylase FUB7

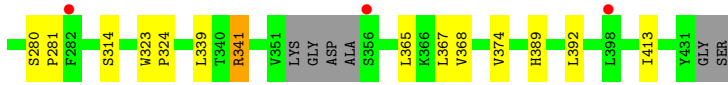


- Molecule 1: Sulfhydrylase FUB7

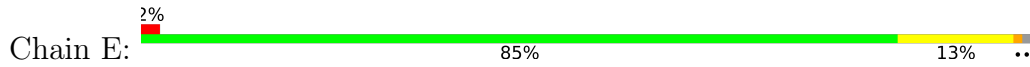


- Molecule 1: Sulfhydrylase FUB7

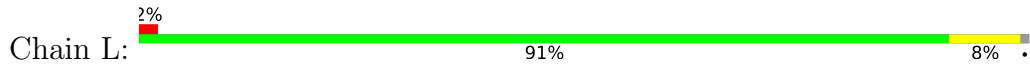




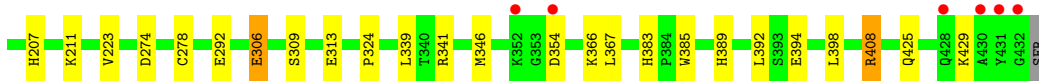
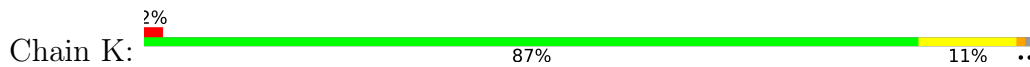
- Molecule 1: Sulfhydrylase FUB7



- Molecule 1: Sulfhydrylase FUB7



- Molecule 1: Sulfhydrylase FUB7



4 Data and refinement statistics i

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	146.70Å 193.36Å 149.91Å 90.00° 99.60° 90.00°	Depositor
Resolution (Å)	47.75 – 1.98 48.27 – 1.98	Depositor EDS
% Data completeness (in resolution range)	98.8 (47.75-1.98) 99.2 (48.27-1.98)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.65 (at 1.98Å)	Xtrriage
Refinement program	PHENIX 1.18.2_3874	Depositor
R, R_{free}	0.200 , 0.226 0.200 , 0.225	Depositor DCC
R_{free} test set	28351 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å ²)	18.7	Xtrriage
Anisotropy	0.294	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.39 , 47.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.006 for l,-k,h	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	55304	wwPDB-VP
Average B, all atoms (Å ²)	22.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 57.22 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 2.4422e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

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

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: WBJ

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	0.47	0/3383	0.71	6/4595 (0.1%)
1	B	0.46	0/3386	0.66	0/4597
1	C	0.49	0/3376	0.67	0/4585
1	D	0.53	2/3377 (0.1%)	0.98	8/4587 (0.2%)
1	E	0.50	1/3379 (0.0%)	1.21	6/4590 (0.1%)
1	F	0.49	0/3360	0.68	3/4563 (0.1%)
1	G	0.48	1/3376 (0.0%)	0.67	2/4586 (0.0%)
1	H	0.45	0/3361	0.83	4/4565 (0.1%)
1	I	0.44	0/3377	0.72	7/4587 (0.2%)
1	J	0.45	0/3368	0.67	1/4575 (0.0%)
1	K	0.47	1/3381 (0.0%)	0.77	6/4592 (0.1%)
1	L	0.48	1/3377 (0.0%)	0.67	4/4587 (0.1%)
1	M	0.50	0/3372	0.73	6/4580 (0.1%)
1	N	0.46	0/3345	0.67	3/4543 (0.1%)
1	P	0.47	0/3388	0.75	5/4602 (0.1%)
1	Q	0.57	3/3381 (0.1%)	1.00	14/4592 (0.3%)
All	All	0.48	9/53987 (0.0%)	0.79	75/73326 (0.1%)

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	F	0	1
1	H	0	1
1	K	0	2
1	M	0	1
1	N	0	1
1	P	0	1
1	Q	0	2

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Mol	Chain	#Chirality outliers	#Planarity outliers
All	All	0	9

The worst 5 of 9 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	Q	306	GLU	CD-OE2	12.22	1.39	1.25
1	E	237	ASP	CG-OD2	11.35	1.51	1.25
1	D	327	GLU	CB-CG	7.84	1.67	1.52
1	Q	196	ARG	CG-CD	-6.90	1.34	1.51
1	Q	306	GLU	CD-OE1	-6.34	1.18	1.25

The worst 5 of 75 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	237	ASP	CB-CG-OD1	45.50	159.25	118.30
1	E	237	ASP	CB-CG-OD2	-43.99	78.71	118.30
1	D	327	GLU	OE1-CD-OE2	-33.59	83.00	123.30
1	H	21	ASP	CB-CG-OD2	-25.77	95.11	118.30
1	Q	306	GLU	OE1-CD-OE2	-23.51	95.08	123.30

There are no chirality outliers.

5 of 9 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	F	207	HIS	Peptide
1	H	21	ASP	Sidechain
1	M	163	TYR	Sidechain
1	P	135	ARG	Sidechain
1	Q	21	ASP	Sidechain

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3300	0	3228	33	0
1	B	3300	0	3238	32	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	3293	0	3219	29	0
1	D	3297	0	3220	19	0
1	E	3296	0	3225	39	0
1	F	3278	0	3202	30	0
1	G	3296	0	3217	20	0
1	H	3281	0	3203	32	0
1	I	3297	0	3220	23	0
1	J	3288	0	3212	26	0
1	K	3301	0	3223	34	0
1	L	3297	0	3220	25	0
1	M	3292	0	3215	29	0
1	N	3263	0	3190	31	0
1	P	3305	0	3233	35	0
1	Q	3301	0	3223	23	0
2	A	22	0	0	0	0
2	B	22	0	0	1	0
2	C	22	0	0	0	0
2	D	22	0	0	0	0
2	E	22	0	0	0	0
2	F	22	0	0	0	0
2	G	22	0	0	0	0
2	H	22	0	0	0	0
2	I	22	0	0	0	0
2	J	22	0	0	0	0
2	K	22	0	0	0	0
2	L	22	0	0	1	0
2	M	22	0	0	0	0
2	N	22	0	0	0	0
2	P	22	0	0	0	0
2	Q	22	0	0	0	0
3	A	224	0	0	3	0
3	B	142	0	0	2	0
3	C	206	0	0	0	0
3	D	179	0	0	1	0
3	E	137	0	0	0	0
3	F	132	0	0	1	0
3	G	144	0	0	1	0
3	H	104	0	0	1	0
3	I	121	0	0	1	0
3	J	108	0	0	0	0
3	K	107	0	0	0	0
3	L	120	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	M	148	0	0	1	0
3	N	125	0	0	1	0
3	P	119	0	0	0	0
3	Q	151	0	0	2	0
All	All	55304	0	51488	421	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 4.

The worst 5 of 421 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:A:128:GLY:O	3:A:601:HOH:O	1.82	0.97
1:A:130:LYS:NZ	3:A:601:HOH:O	2.03	0.90
1:H:306:GLU:OE2	1:H:310:LYS:NZ	2.12	0.82
1:I:196:ARG:HG3	1:I:196:ARG:HH11	1.48	0.79
1:B:196:ARG:HG2	1:B:196:ARG:NH1	1.96	0.78

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	427/433 (99%)	418 (98%)	9 (2%)	0	100	100
1	B	427/433 (99%)	416 (97%)	11 (3%)	0	100	100
1	C	426/433 (98%)	416 (98%)	9 (2%)	1 (0%)	47	38
1	D	426/433 (98%)	416 (98%)	9 (2%)	1 (0%)	47	38
1	E	426/433 (98%)	415 (97%)	11 (3%)	0	100	100
1	F	422/433 (98%)	414 (98%)	6 (1%)	2 (0%)	29	16

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	G	426/433 (98%)	417 (98%)	8 (2%)	1 (0%)	47	38
1	H	424/433 (98%)	414 (98%)	9 (2%)	1 (0%)	47	38
1	I	426/433 (98%)	416 (98%)	8 (2%)	2 (0%)	29	16
1	J	425/433 (98%)	415 (98%)	8 (2%)	2 (0%)	29	16
1	K	427/433 (99%)	416 (97%)	8 (2%)	3 (1%)	22	11
1	L	426/433 (98%)	417 (98%)	8 (2%)	1 (0%)	47	38
1	M	426/433 (98%)	415 (97%)	10 (2%)	1 (0%)	47	38
1	N	419/433 (97%)	409 (98%)	10 (2%)	0	100	100
1	P	427/433 (99%)	416 (97%)	10 (2%)	1 (0%)	47	38
1	Q	427/433 (99%)	417 (98%)	9 (2%)	1 (0%)	47	38
All	All	6807/6928 (98%)	6647 (98%)	143 (2%)	17 (0%)	41	38

5 of 17 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	K	211	LYS
1	I	211	LYS
1	J	211	LYS
1	F	211	LYS
1	K	354	ASP

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	347/350 (99%)	347 (100%)	0	100	100
1	B	348/350 (99%)	348 (100%)	0	100	100
1	C	346/350 (99%)	344 (99%)	2 (1%)	86	85
1	D	347/350 (99%)	347 (100%)	0	100	100
1	E	347/350 (99%)	345 (99%)	2 (1%)	86	85
1	F	345/350 (99%)	343 (99%)	2 (1%)	86	85

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	G	347/350 (99%)	347 (100%)	0	100	100
1	H	345/350 (99%)	345 (100%)	0	100	100
1	I	347/350 (99%)	346 (100%)	1 (0%)	92	92
1	J	346/350 (99%)	346 (100%)	0	100	100
1	K	347/350 (99%)	347 (100%)	0	100	100
1	L	347/350 (99%)	347 (100%)	0	100	100
1	M	346/350 (99%)	346 (100%)	0	100	100
1	N	344/350 (98%)	342 (99%)	2 (1%)	86	85
1	P	348/350 (99%)	346 (99%)	2 (1%)	86	85
1	Q	347/350 (99%)	346 (100%)	1 (0%)	92	92
All	All	5544/5600 (99%)	5532 (100%)	12 (0%)	93	93

5 of 12 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	Q	352	LYS
1	N	196[A]	ARG
1	E	196[B]	ARG
1	N	196[B]	ARG
1	F	196[B]	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 54 such sidechains are listed below:

Mol	Chain	Res	Type
1	P	235	HIS
1	Q	216	HIS
1	L	303	GLN
1	J	178	HIS
1	Q	4	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

16 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	WBJ	M	501	-	21,22,22	2.12	3 (14%)	25,31,31	2.05	6 (24%)
2	WBJ	D	501	-	21,22,22	1.89	3 (14%)	25,31,31	2.06	6 (24%)
2	WBJ	I	501	-	21,22,22	2.50	4 (19%)	25,31,31	2.05	7 (28%)
2	WBJ	Q	501	-	21,22,22	2.11	3 (14%)	25,31,31	1.95	6 (24%)
2	WBJ	N	501	-	21,22,22	2.14	4 (19%)	25,31,31	2.05	6 (24%)
2	WBJ	L	501	-	21,22,22	2.74	3 (14%)	25,31,31	2.01	7 (28%)
2	WBJ	A	501	-	21,22,22	2.23	3 (14%)	25,31,31	1.89	7 (28%)
2	WBJ	B	501	-	21,22,22	2.44	3 (14%)	25,31,31	1.84	7 (28%)
2	WBJ	P	501	-	21,22,22	2.74	4 (19%)	25,31,31	2.08	6 (24%)
2	WBJ	C	501	-	21,22,22	2.08	3 (14%)	25,31,31	1.97	5 (20%)
2	WBJ	K	501	-	21,22,22	2.90	3 (14%)	25,31,31	1.96	7 (28%)
2	WBJ	F	501	-	21,22,22	2.69	5 (23%)	25,31,31	2.04	7 (28%)
2	WBJ	H	501	-	21,22,22	2.88	3 (14%)	25,31,31	1.84	4 (16%)
2	WBJ	G	501	-	21,22,22	2.74	4 (19%)	25,31,31	1.93	8 (32%)
2	WBJ	E	501	-	21,22,22	1.90	4 (19%)	25,31,31	2.05	7 (28%)
2	WBJ	J	501	-	21,22,22	2.82	4 (19%)	25,31,31	2.00	7 (28%)

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	WBJ	M	501	-	-	6/14/17/17	0/1/1/1
2	WBJ	D	501	-	-	6/14/17/17	0/1/1/1
2	WBJ	I	501	-	-	6/14/17/17	0/1/1/1
2	WBJ	Q	501	-	-	5/14/17/17	0/1/1/1
2	WBJ	N	501	-	-	8/14/17/17	0/1/1/1
2	WBJ	L	501	-	-	6/14/17/17	0/1/1/1
2	WBJ	A	501	-	-	6/14/17/17	0/1/1/1
2	WBJ	B	501	-	-	4/14/17/17	0/1/1/1
2	WBJ	P	501	-	-	6/14/17/17	0/1/1/1
2	WBJ	C	501	-	-	6/14/17/17	0/1/1/1
2	WBJ	K	501	-	-	3/14/17/17	0/1/1/1
2	WBJ	F	501	-	-	6/14/17/17	0/1/1/1
2	WBJ	H	501	-	-	5/14/17/17	0/1/1/1
2	WBJ	G	501	-	-	4/14/17/17	0/1/1/1
2	WBJ	E	501	-	-	8/14/17/17	0/1/1/1
2	WBJ	J	501	-	-	6/14/17/17	0/1/1/1

The worst 5 of 56 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	501	WBJ	C03-C21	11.00	1.59	1.48
2	K	501	WBJ	C03-C21	10.92	1.59	1.48
2	J	501	WBJ	C03-C21	10.01	1.58	1.48
2	F	501	WBJ	C03-C21	9.97	1.58	1.48
2	P	501	WBJ	C03-C21	9.95	1.58	1.48

The worst 5 of 103 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	501	WBJ	C21-C03-N04	-7.13	113.75	121.84
2	P	501	WBJ	C21-C03-N04	-6.94	113.96	121.84
2	C	501	WBJ	C21-C03-N04	-6.91	114.00	121.84
2	H	501	WBJ	C21-C03-N04	-6.84	114.08	121.84
2	J	501	WBJ	C21-C03-N04	-6.70	114.24	121.84

There are no chirality outliers.

5 of 91 torsion outliers are listed below:

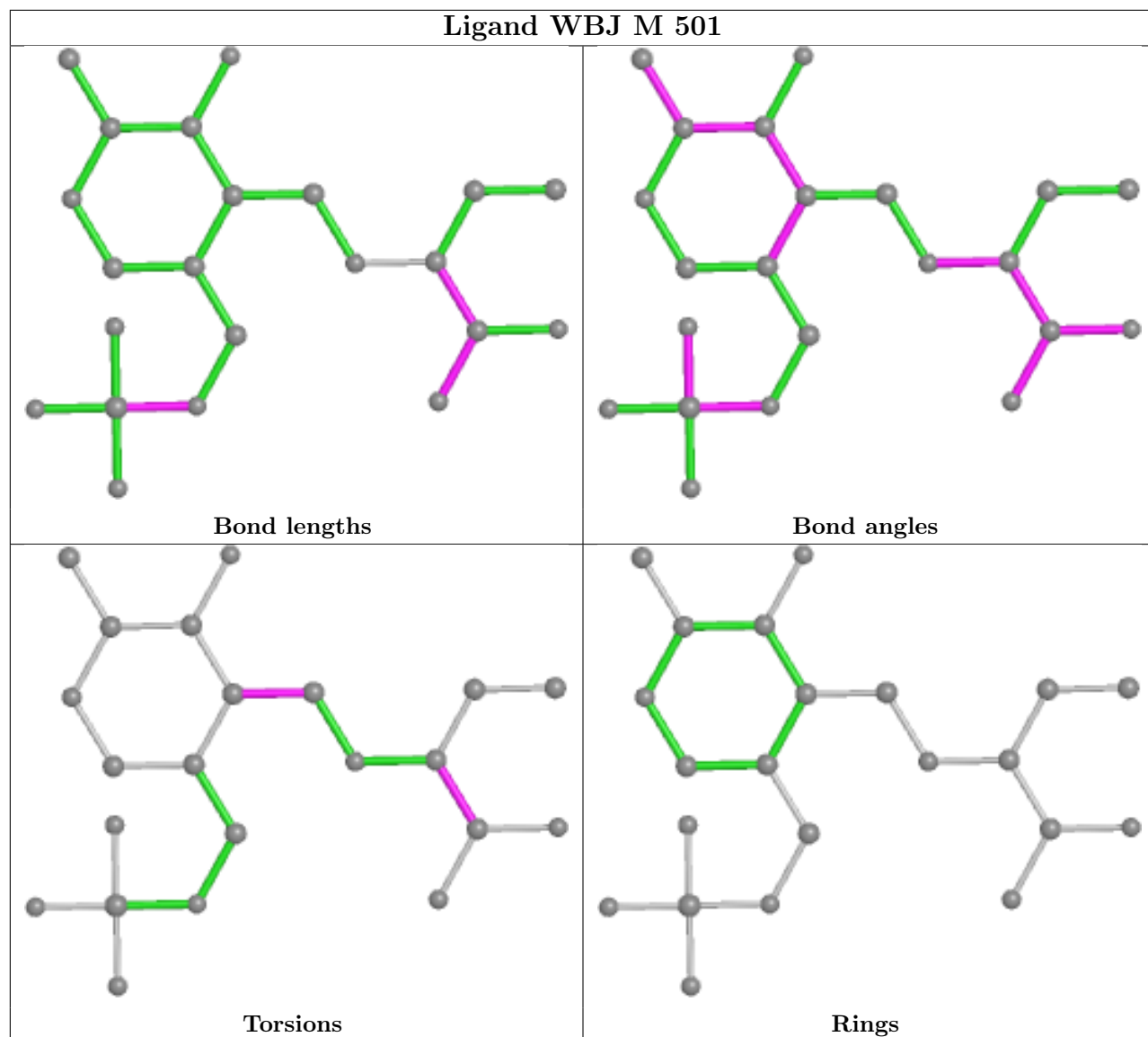
Mol	Chain	Res	Type	Atoms
2	A	501	WBJ	C02-C03-C21-O22
2	A	501	WBJ	N04-C03-C21-O22
2	A	501	WBJ	C02-C03-C21-O23
2	A	501	WBJ	N04-C05-C06-C07
2	A	501	WBJ	N04-C05-C06-C14

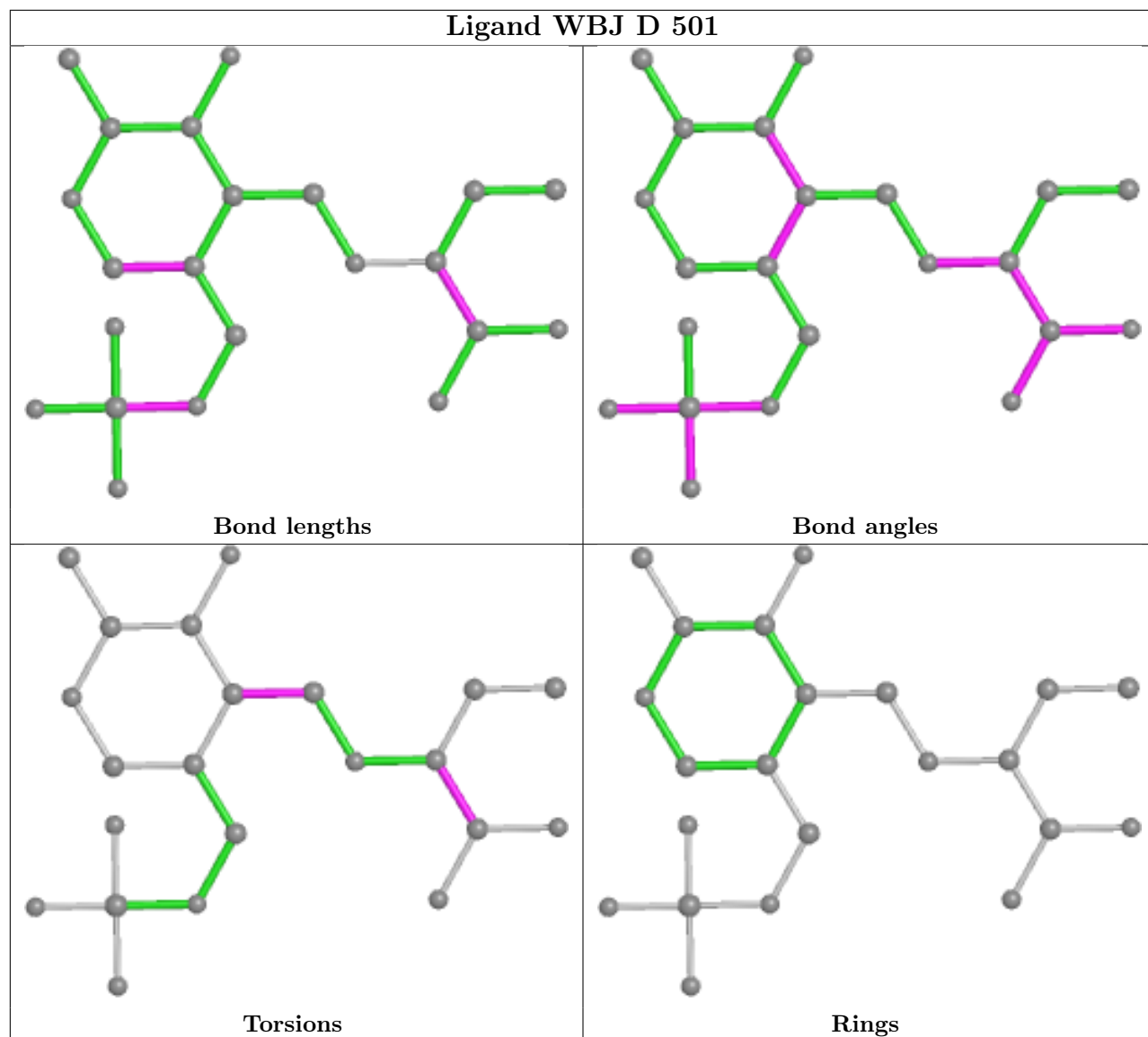
There are no ring outliers.

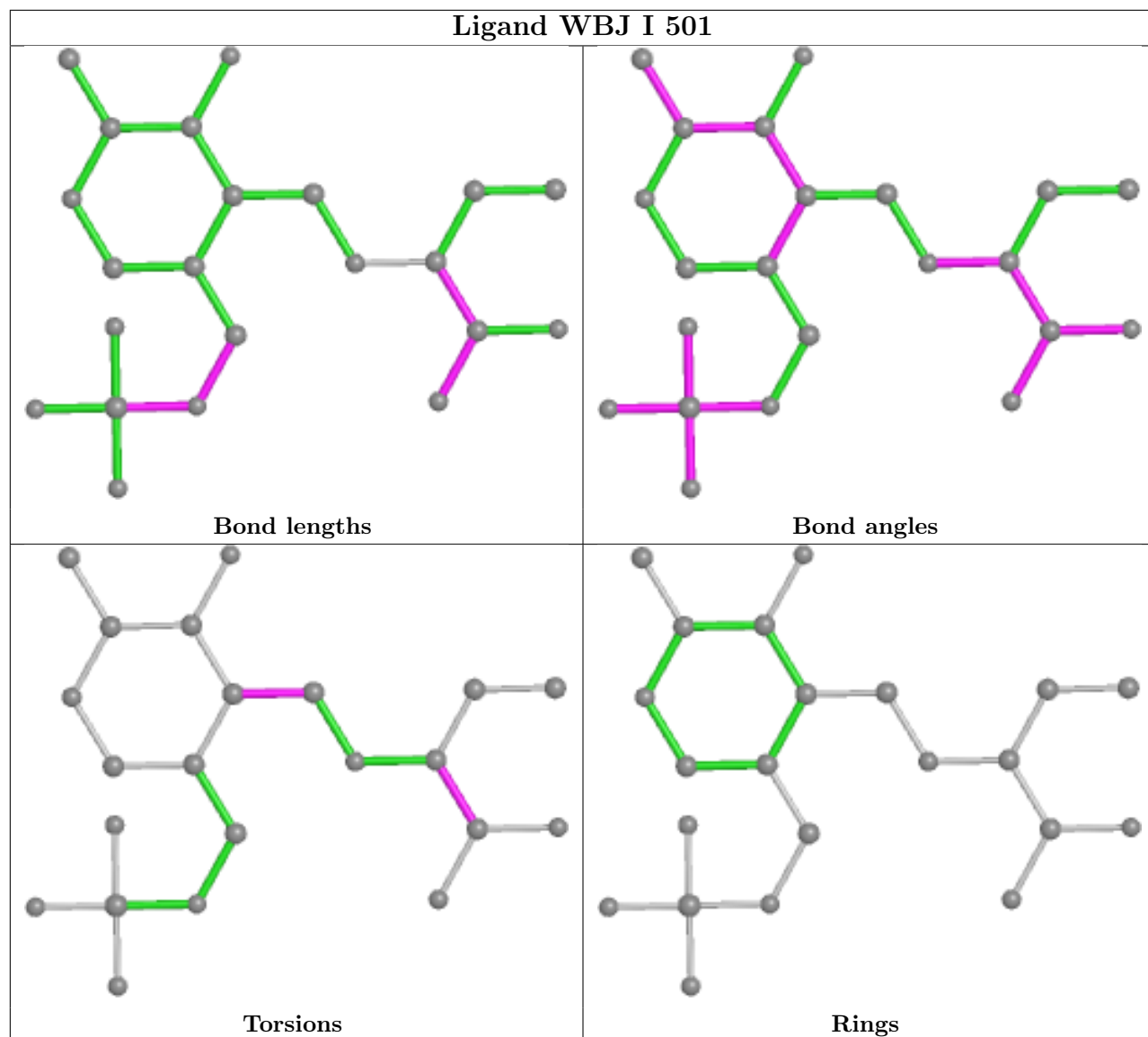
2 monomers are involved in 2 short contacts:

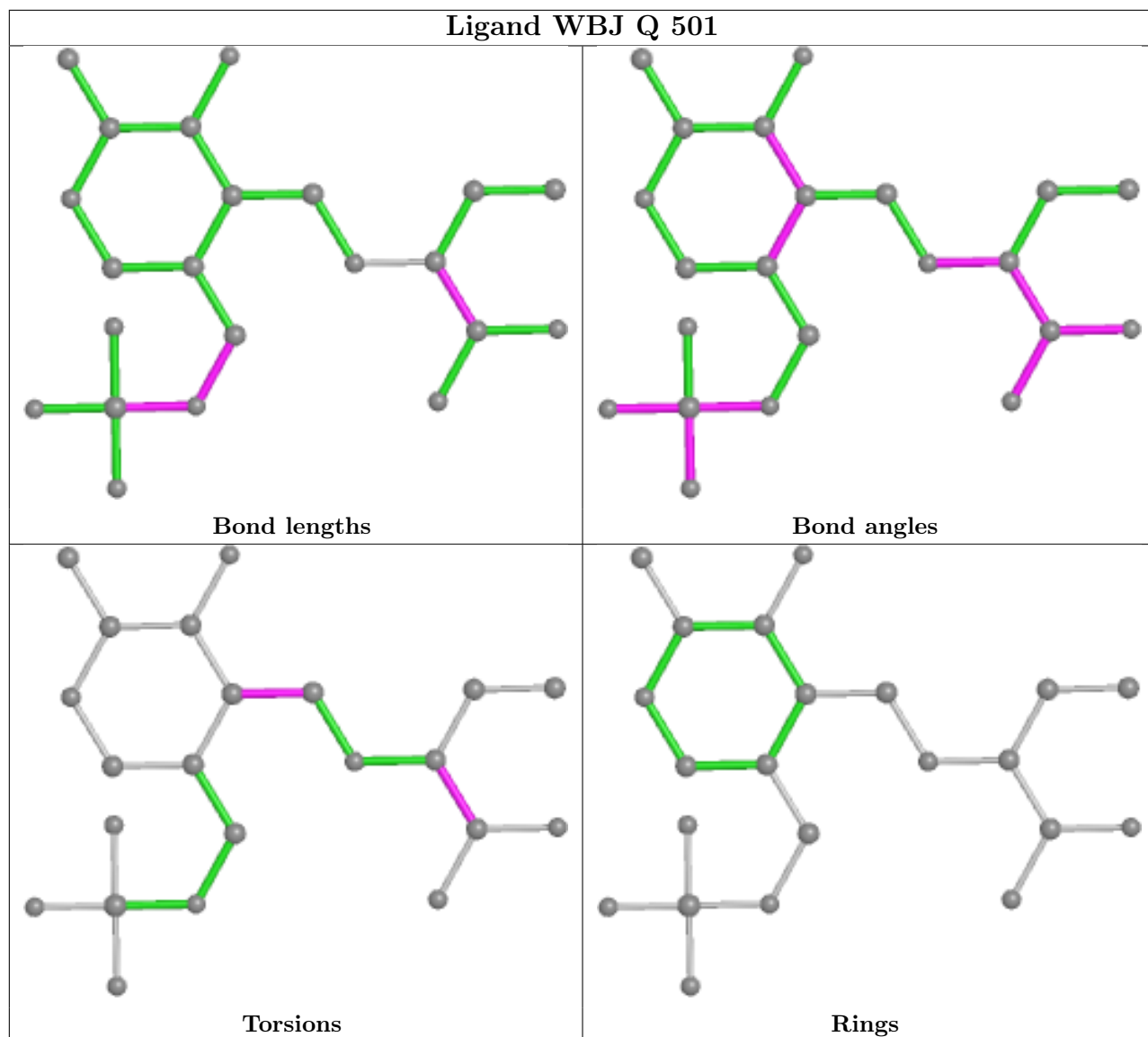
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	L	501	WBJ	1	0
2	B	501	WBJ	1	0

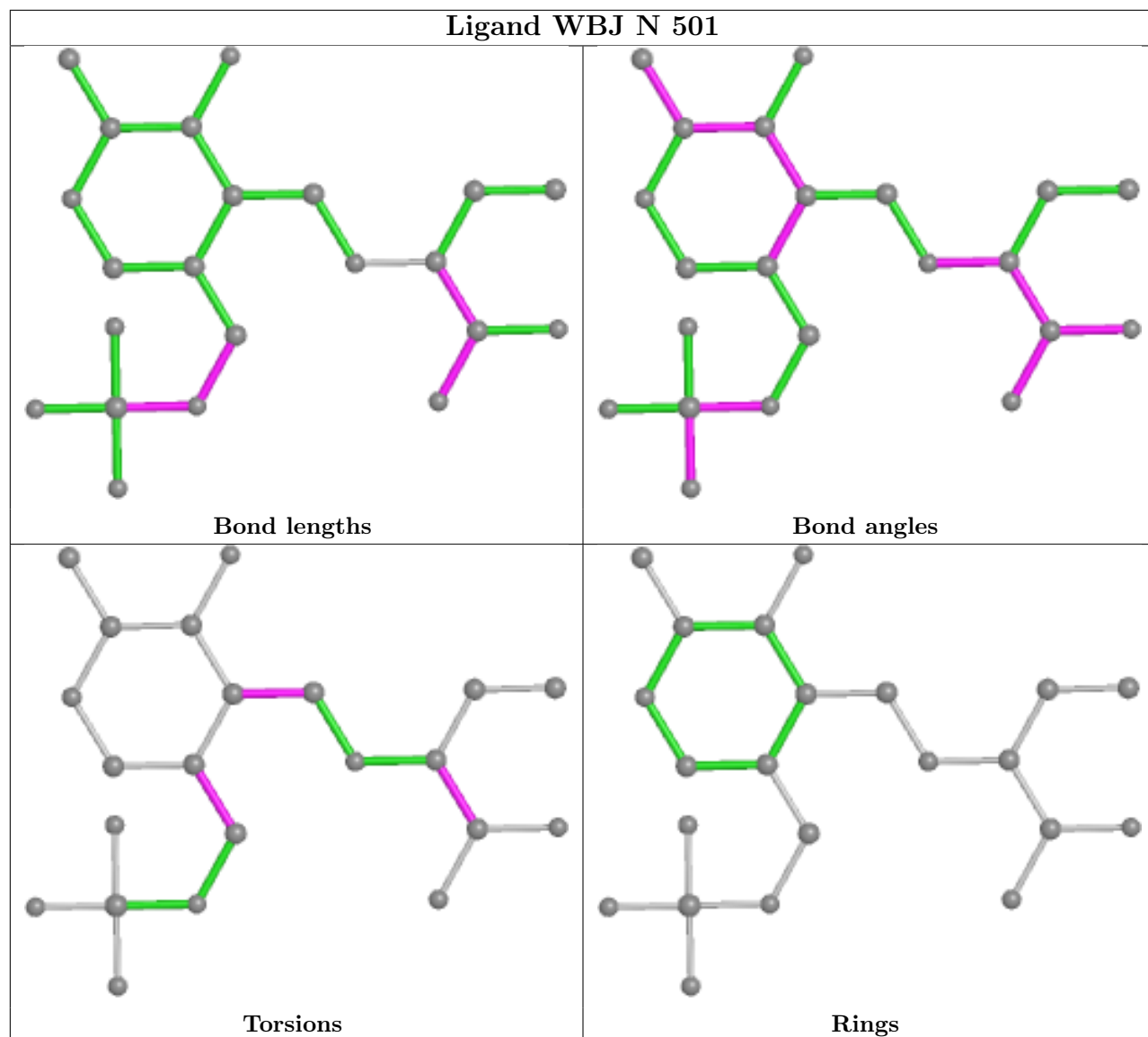
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

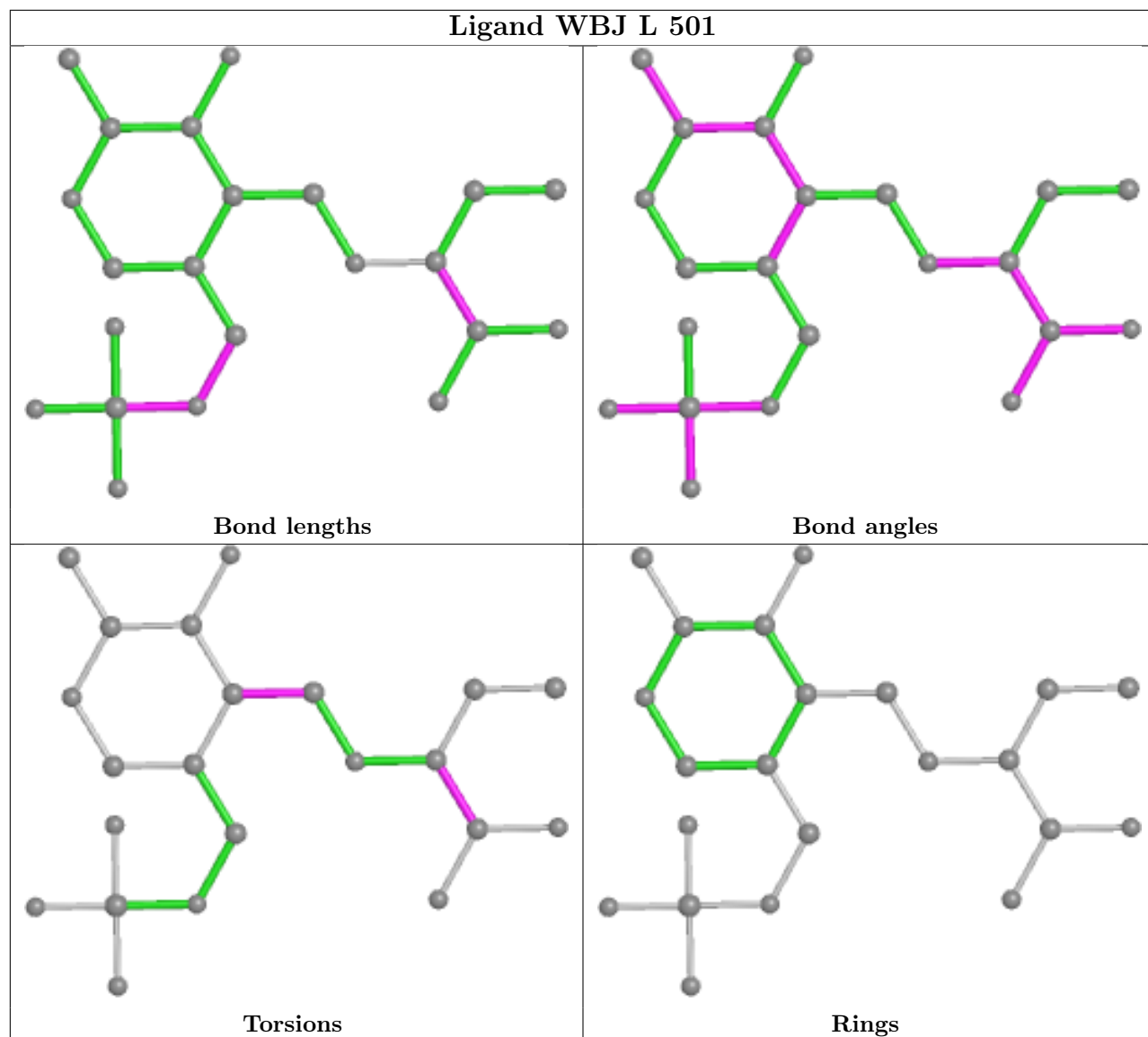


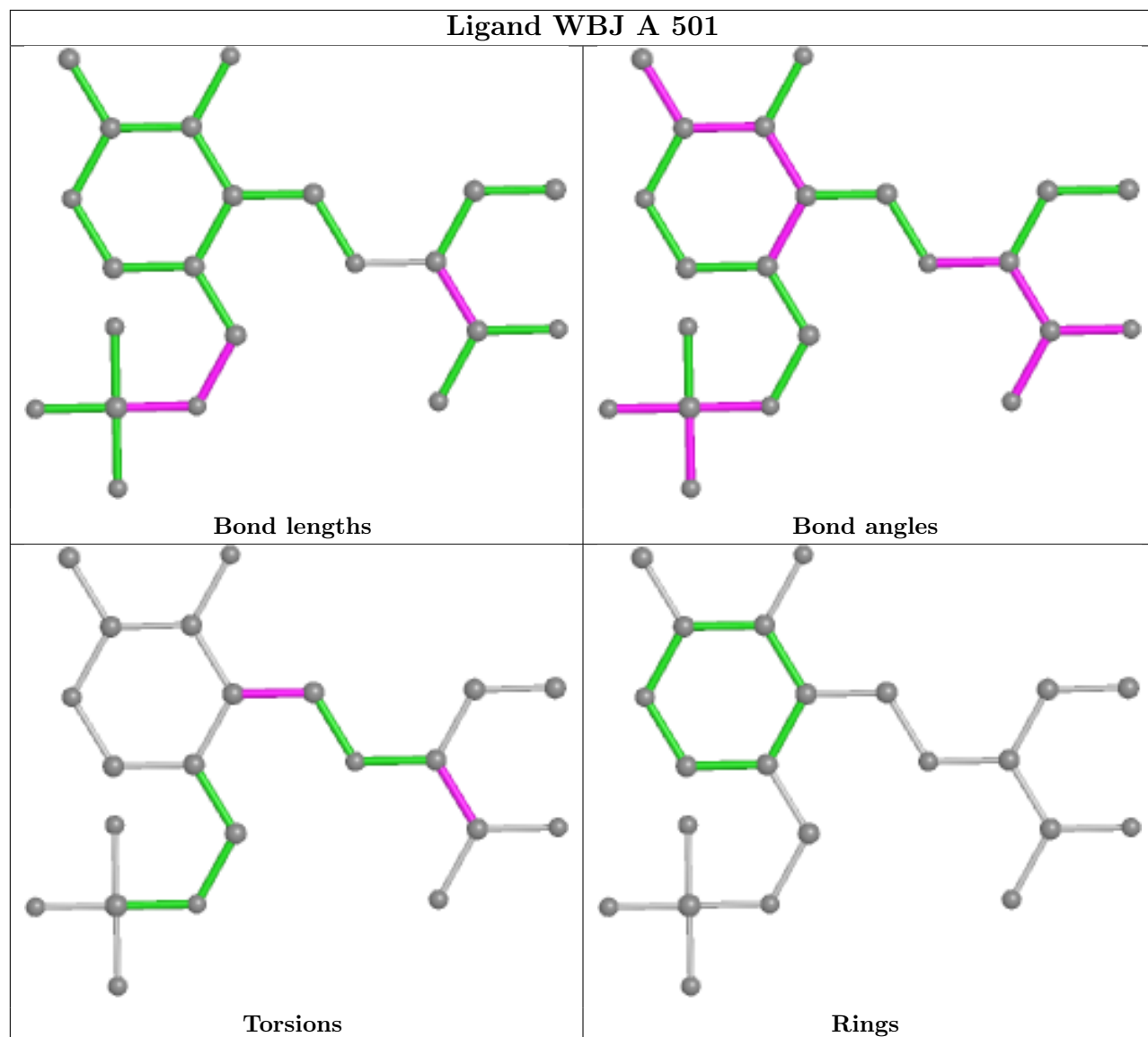


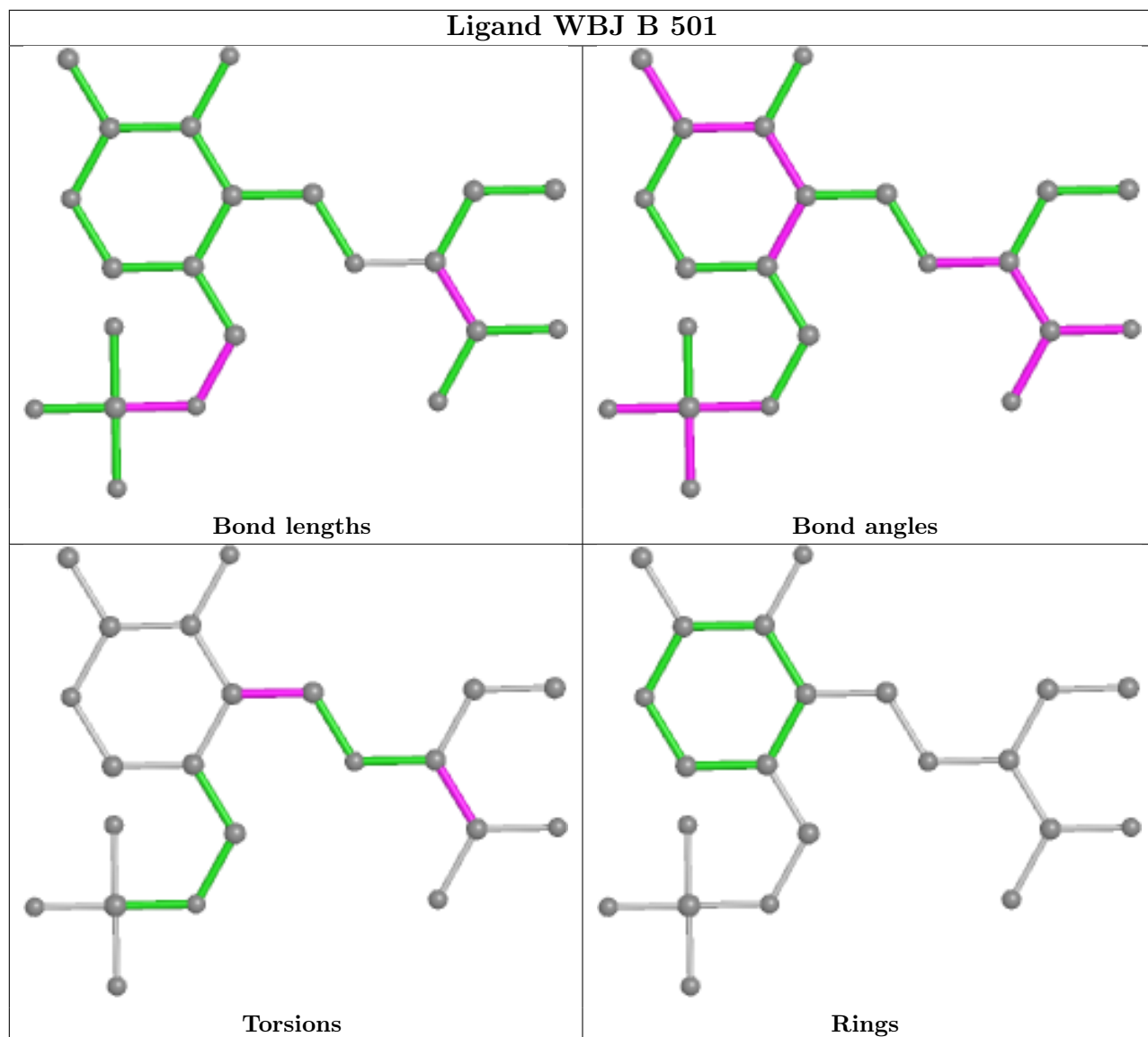


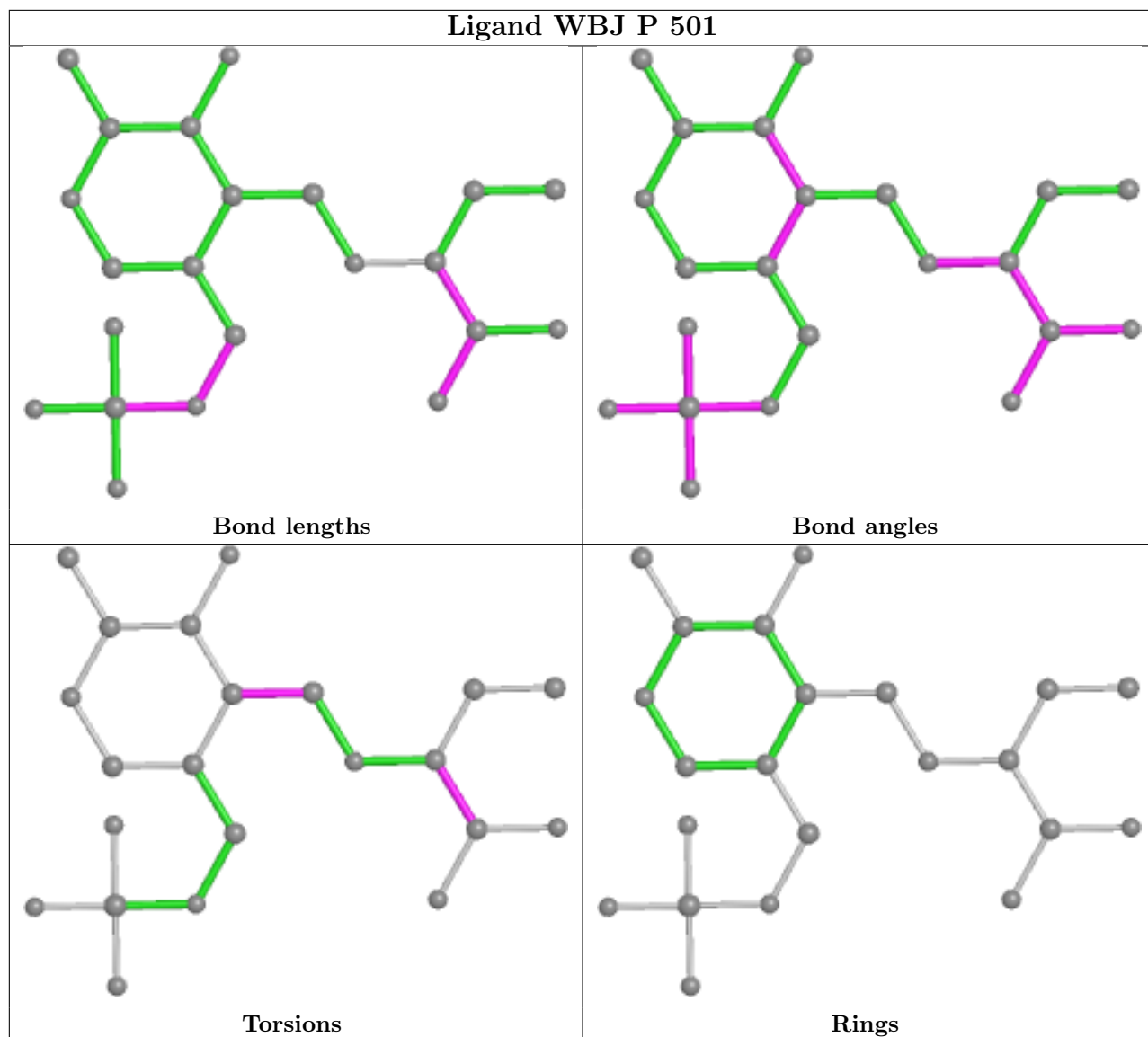


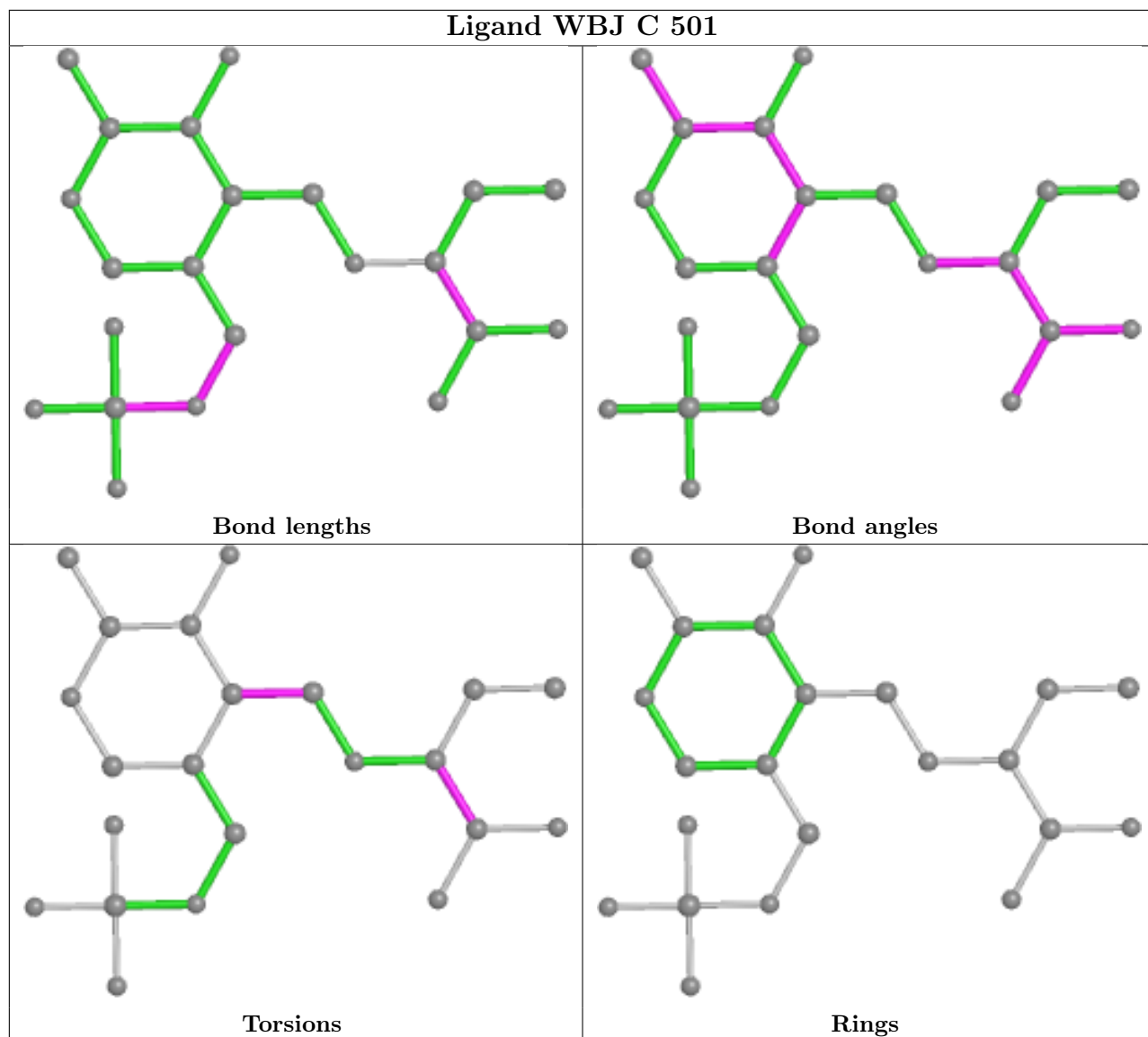


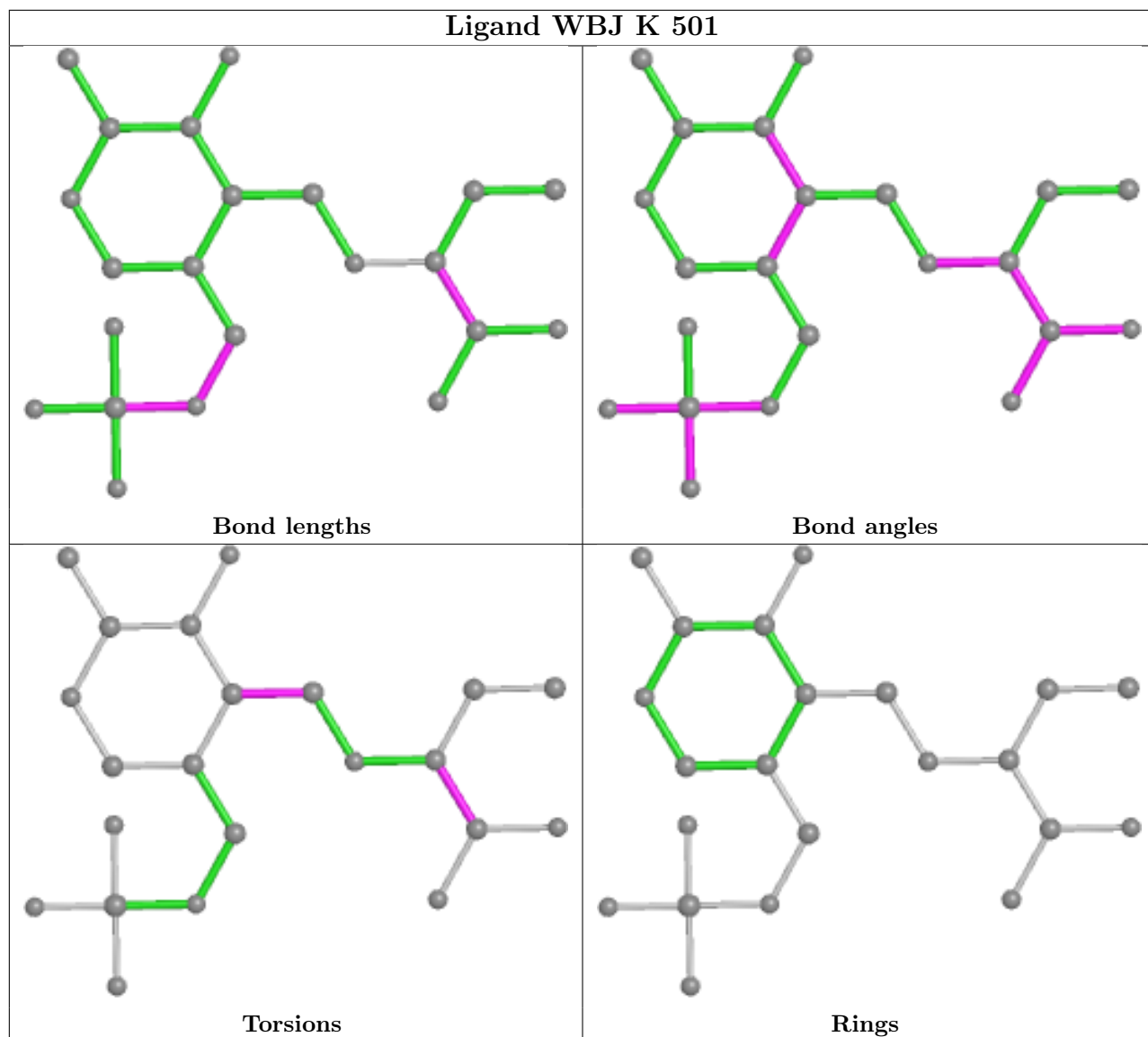


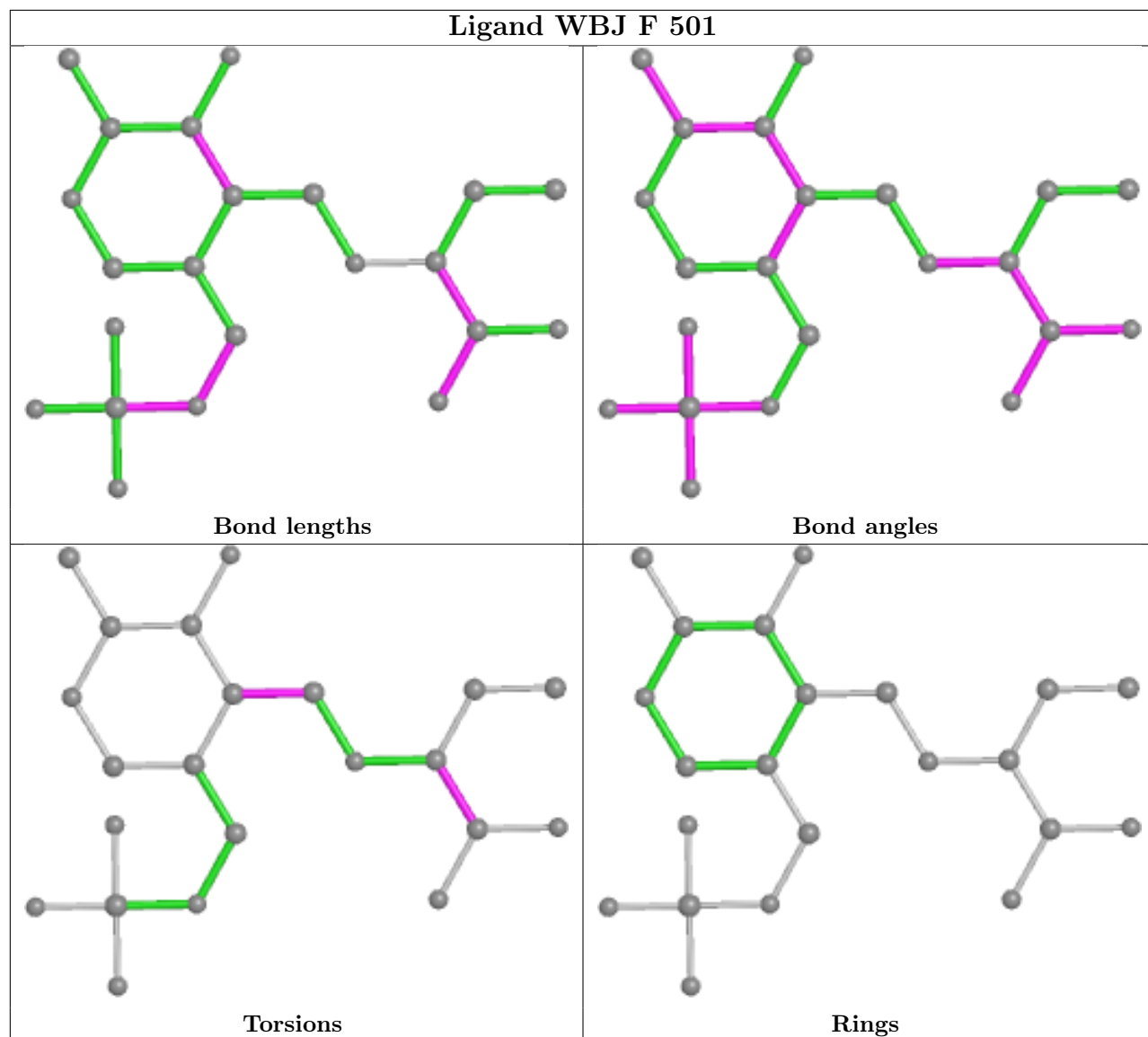


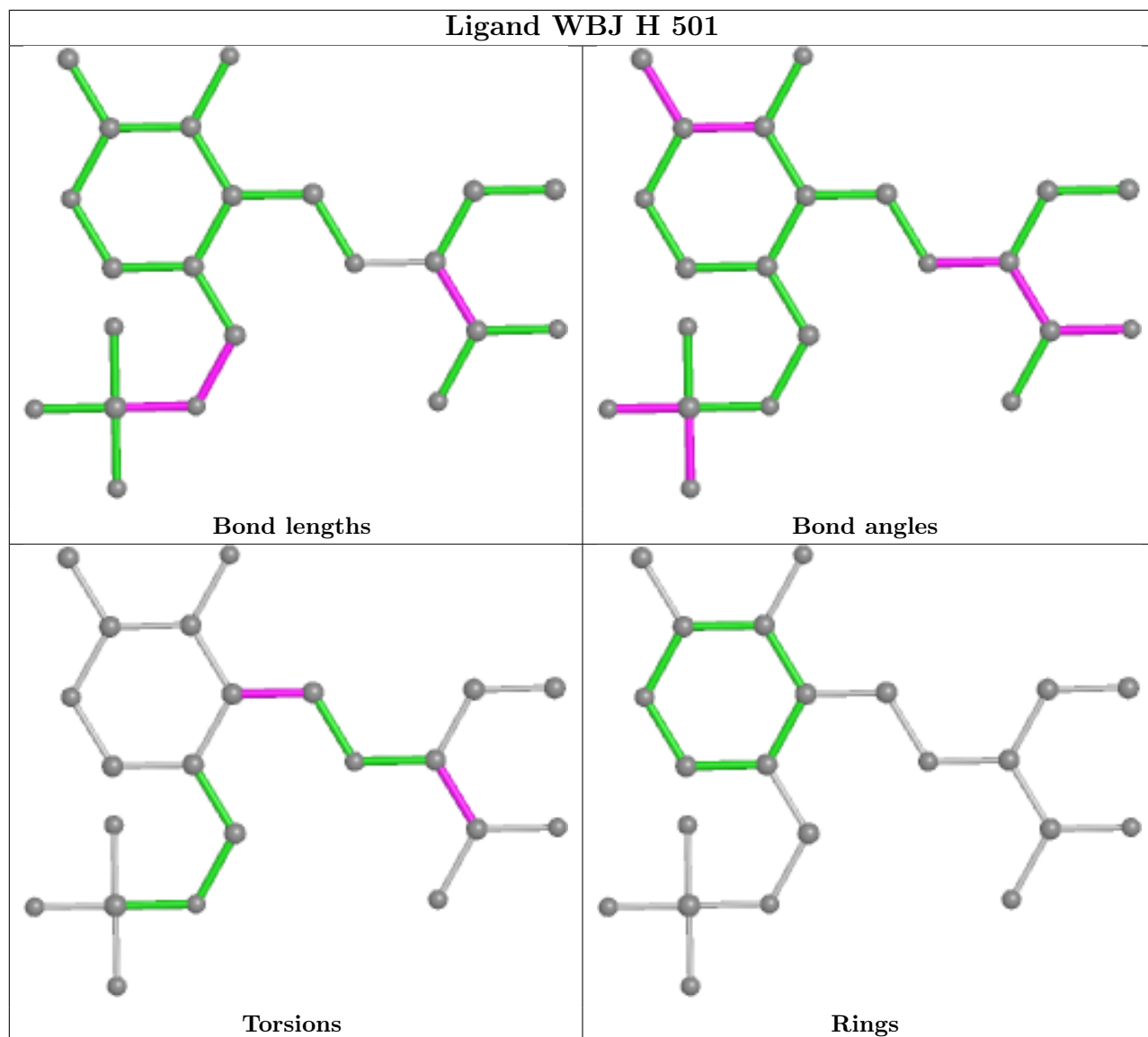


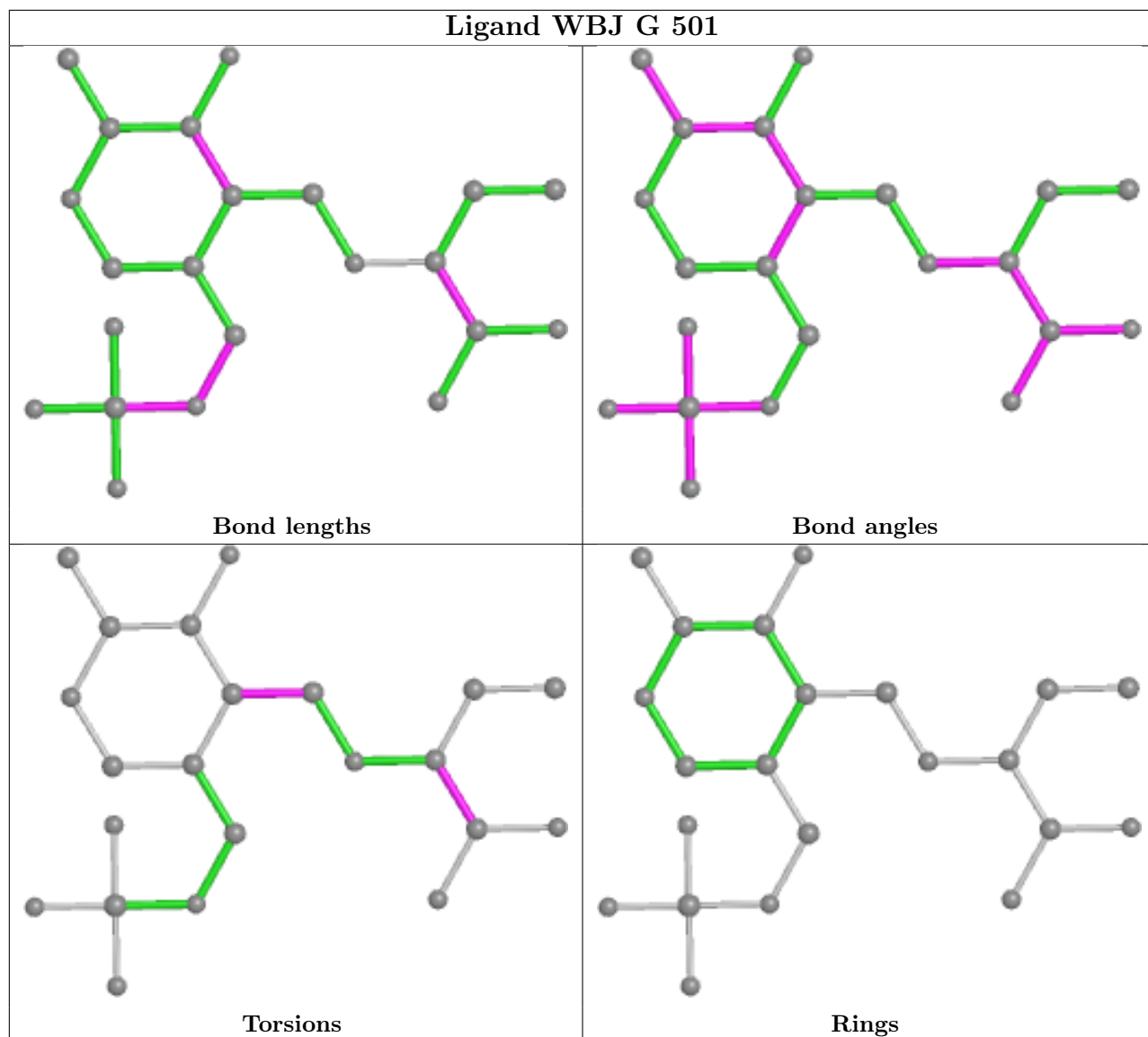


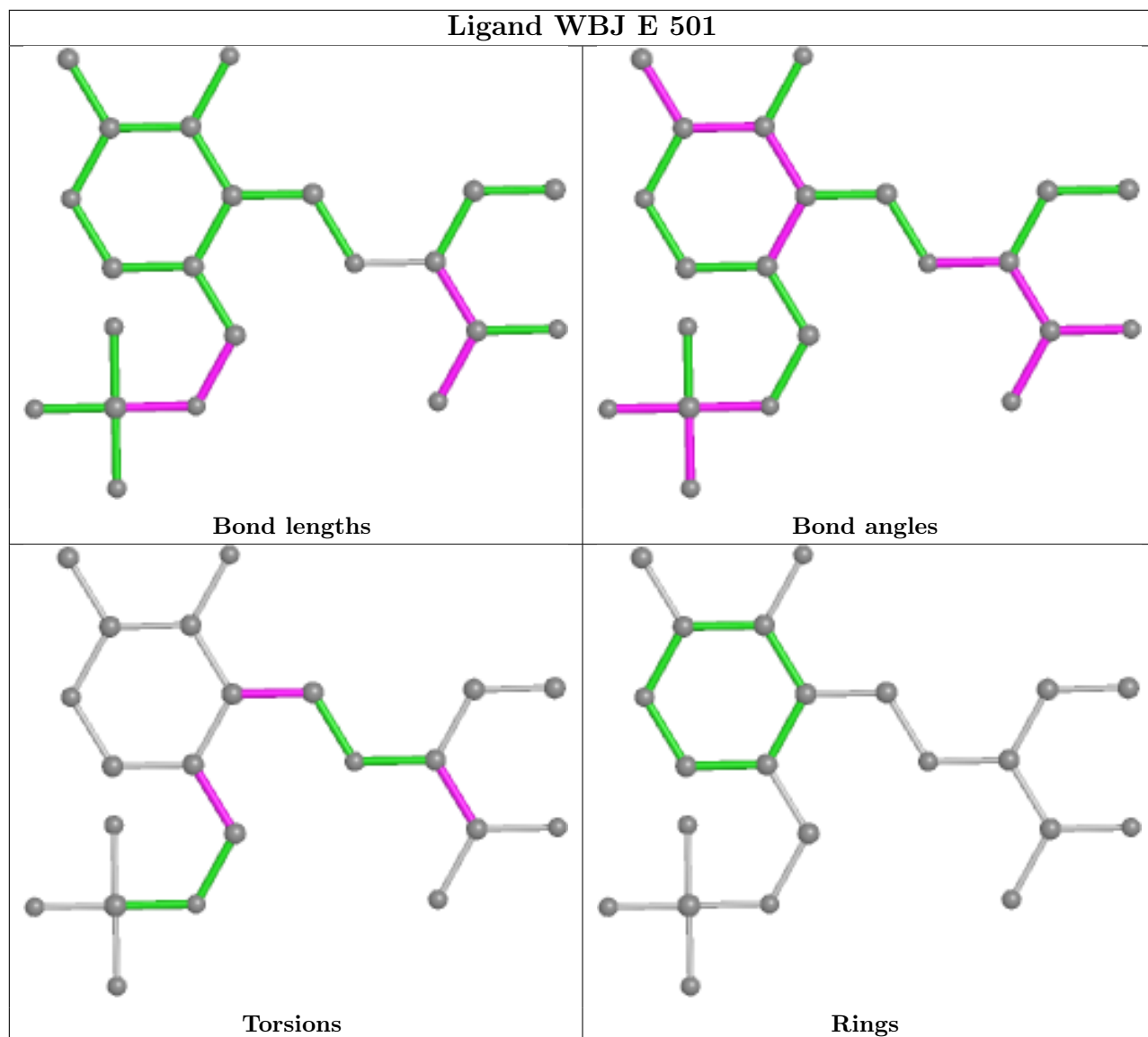


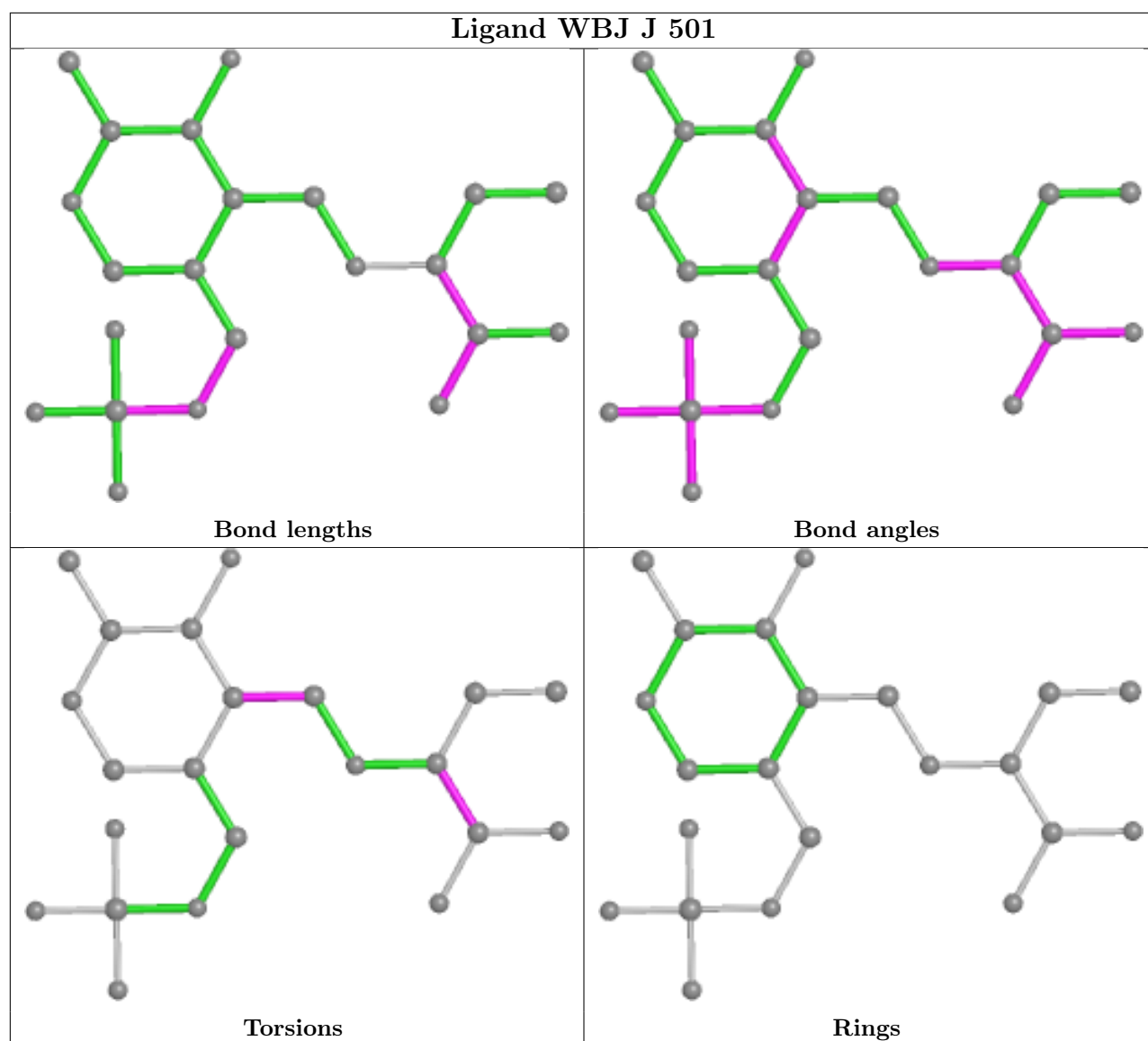












5.7 Other polymers [i](#)

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, 95th 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 ²)	Q<0.9
1	A	428/433 (98%)	-0.03	8 (1%) 66 68	9, 20, 35, 57	1 (0%)
1	B	427/433 (98%)	0.02	10 (2%) 60 62	11, 21, 36, 64	0
1	C	427/433 (98%)	-0.15	10 (2%) 60 62	9, 17, 31, 60	0
1	D	428/433 (98%)	-0.07	7 (1%) 72 73	9, 18, 32, 54	0
1	E	427/433 (98%)	0.07	8 (1%) 66 68	10, 22, 38, 64	0
1	F	425/433 (98%)	0.00	10 (2%) 59 61	11, 21, 36, 55	0
1	G	427/433 (98%)	-0.04	10 (2%) 60 62	11, 21, 35, 55	0
1	H	426/433 (98%)	-0.00	8 (1%) 66 68	12, 23, 37, 55	0
1	I	428/433 (98%)	-0.01	13 (3%) 50 52	13, 23, 38, 56	0
1	J	427/433 (98%)	0.04	9 (2%) 63 65	12, 23, 38, 60	0
1	K	429/433 (99%)	0.02	8 (1%) 66 68	13, 22, 39, 62	0
1	L	428/433 (98%)	-0.06	7 (1%) 72 73	11, 21, 37, 51	0
1	M	428/433 (98%)	-0.07	8 (1%) 66 68	10, 19, 33, 60	0
1	N	422/433 (97%)	0.02	4 (0%) 84 85	10, 22, 35, 51	0
1	P	428/433 (98%)	-0.05	10 (2%) 60 62	11, 21, 36, 58	0
1	Q	429/433 (99%)	-0.08	9 (2%) 63 65	10, 18, 33, 56	0
All	All	6834/6928 (98%)	-0.02	139 (2%) 65 66	9, 21, 36, 64	1 (0%)

The worst 5 of 139 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	5	VAL	5.6
1	N	7	GLN	5.4
1	E	354	ASP	5.1
1	K	354	ASP	5.0
1	C	354	ASP	4.8

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](#)

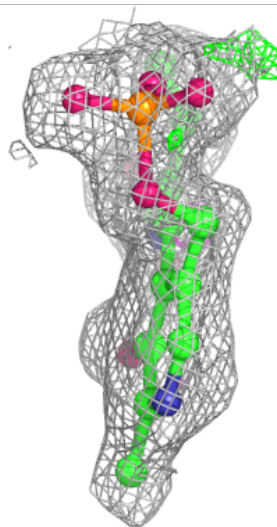
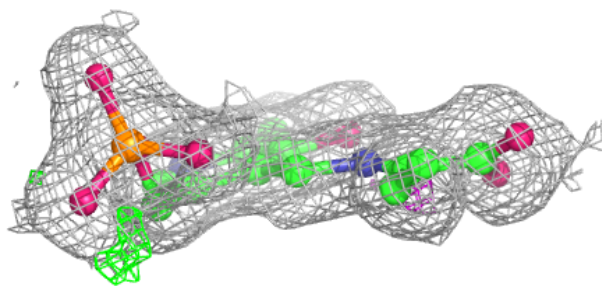
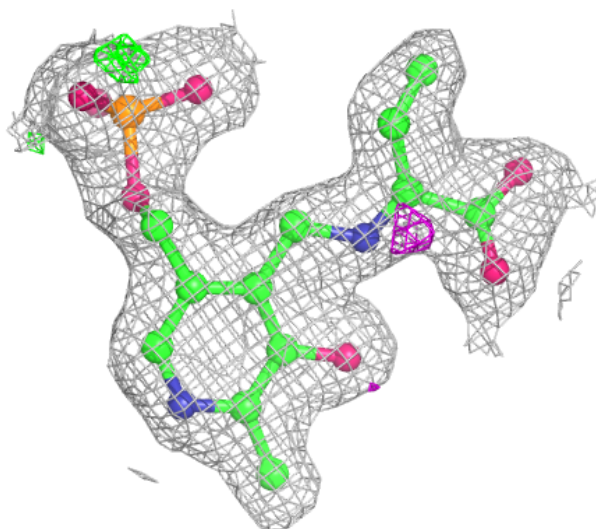
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	WBJ	B	501	22/22	0.96	0.12	13,19,26,29	0
2	WBJ	G	501	22/22	0.96	0.12	13,19,24,26	0
2	WBJ	H	501	22/22	0.97	0.11	14,19,31,33	0
2	WBJ	I	501	22/22	0.97	0.10	14,20,29,32	0
2	WBJ	J	501	22/22	0.97	0.10	13,23,29,35	0
2	WBJ	E	501	22/22	0.97	0.11	14,21,28,34	0
2	WBJ	L	501	22/22	0.97	0.11	13,21,27,30	0
2	WBJ	D	501	22/22	0.98	0.10	9,15,26,29	0
2	WBJ	P	501	22/22	0.98	0.10	13,17,27,31	0
2	WBJ	A	501	22/22	0.98	0.12	11,15,26,29	0
2	WBJ	M	501	22/22	0.98	0.10	11,15,26,29	0
2	WBJ	Q	501	22/22	0.98	0.10	13,18,26,29	0
2	WBJ	N	501	22/22	0.98	0.11	14,21,29,32	0
2	WBJ	C	501	22/22	0.98	0.10	9,15,25,29	0
2	WBJ	F	501	22/22	0.98	0.10	12,20,29,31	0
2	WBJ	K	501	22/22	0.98	0.10	14,20,30,34	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.

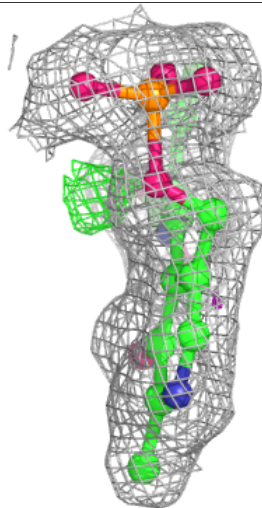
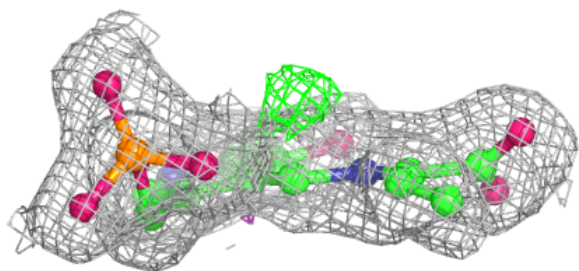
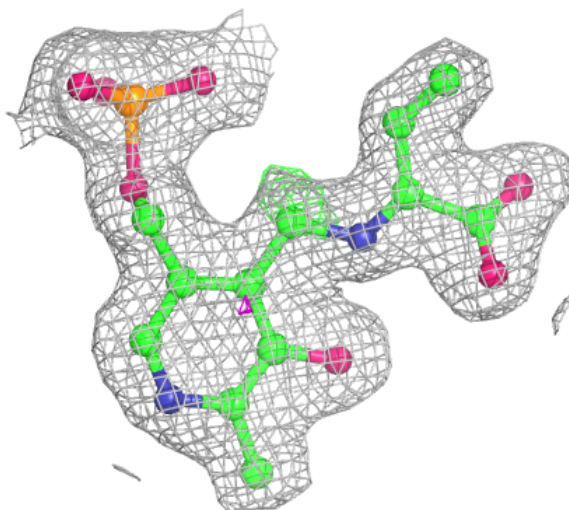
Electron density around WBJ B 501:

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



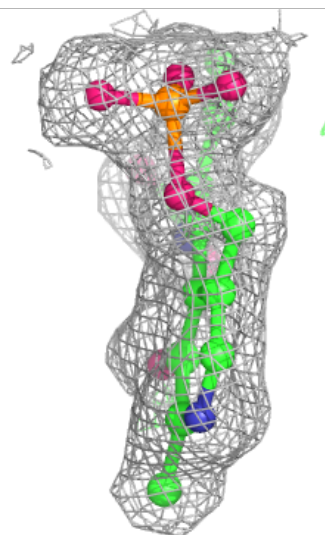
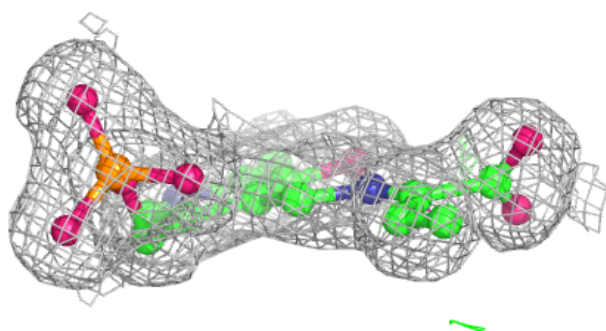
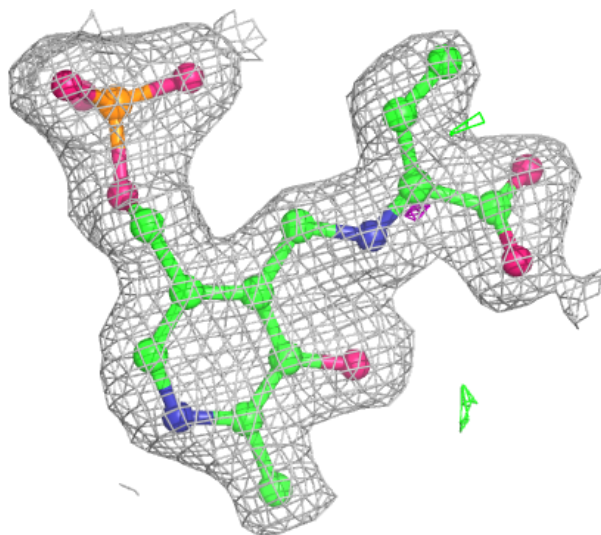
Electron density around WBJ G 501:

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



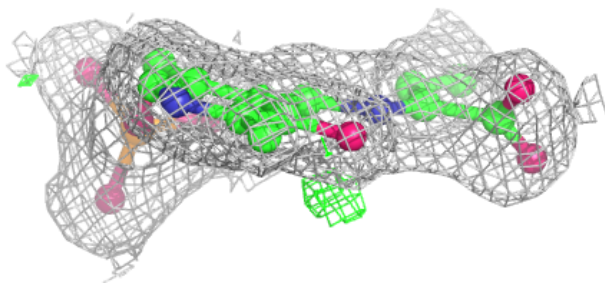
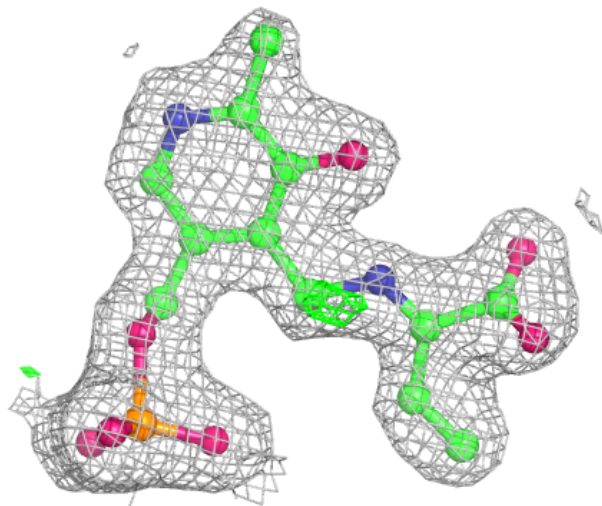
Electron density around WBJ H 501:

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



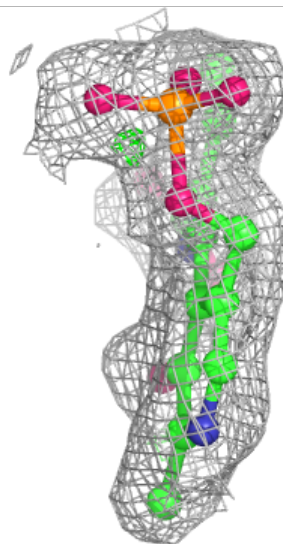
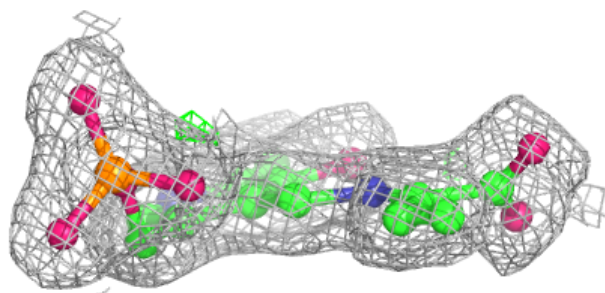
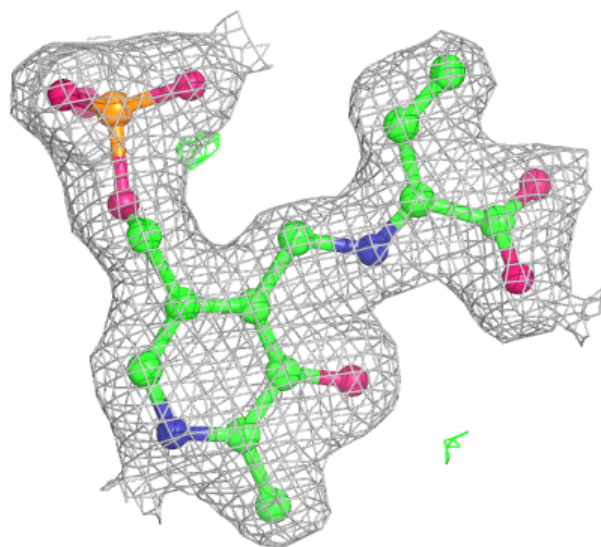
Electron density around WBJ I 501:

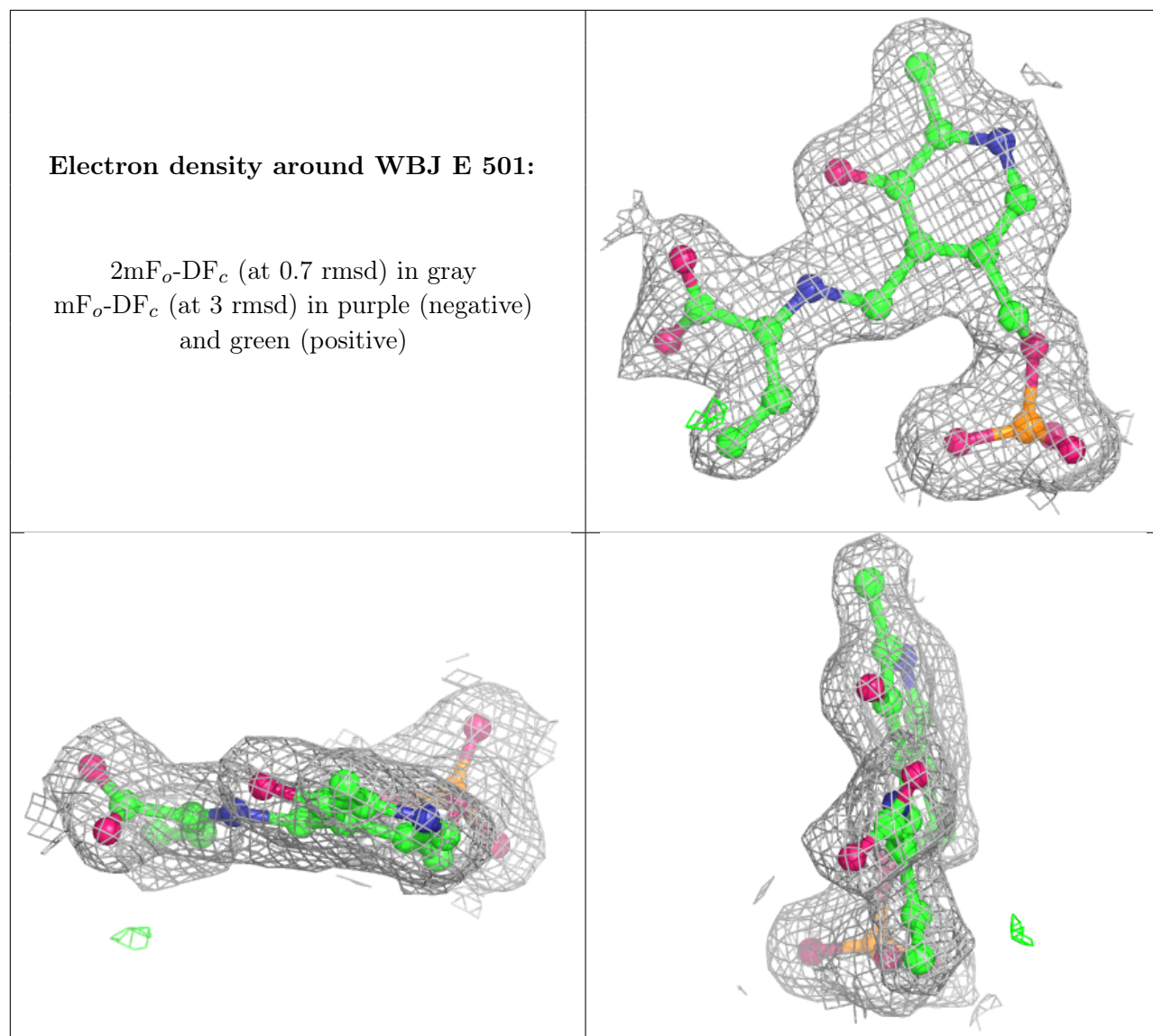
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

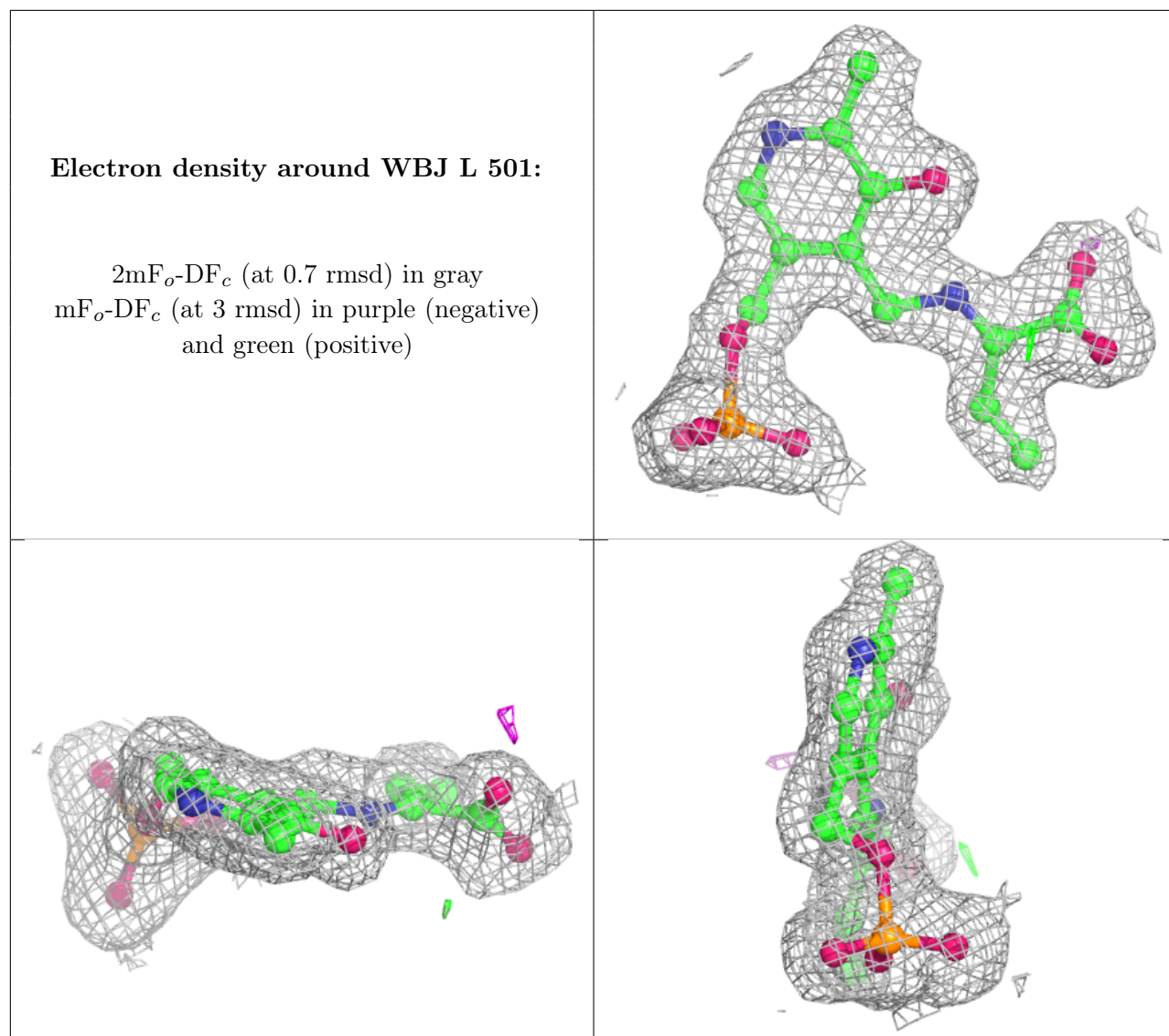


Electron density around WBJ J 501:

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

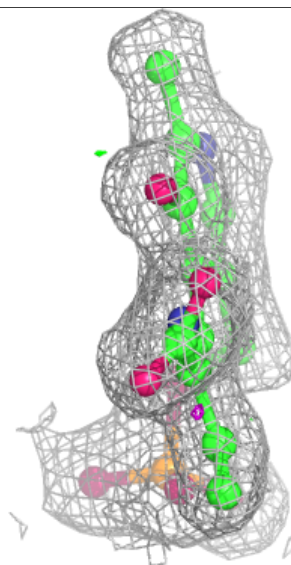
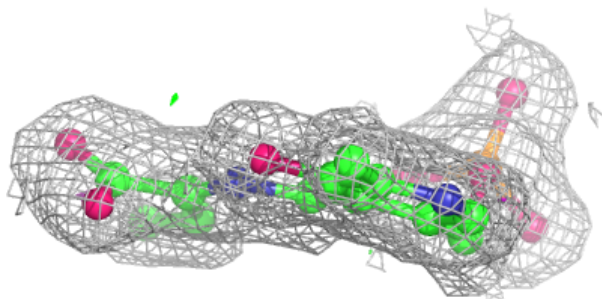
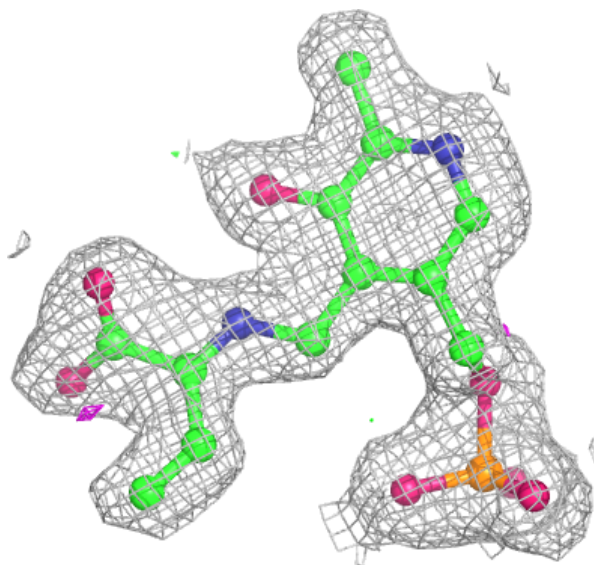






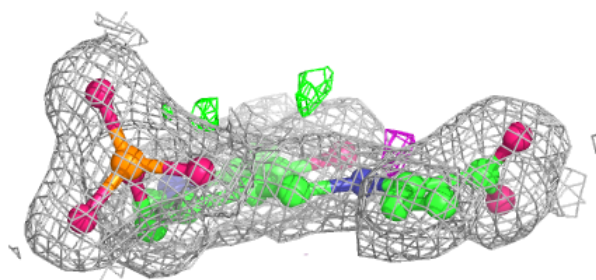
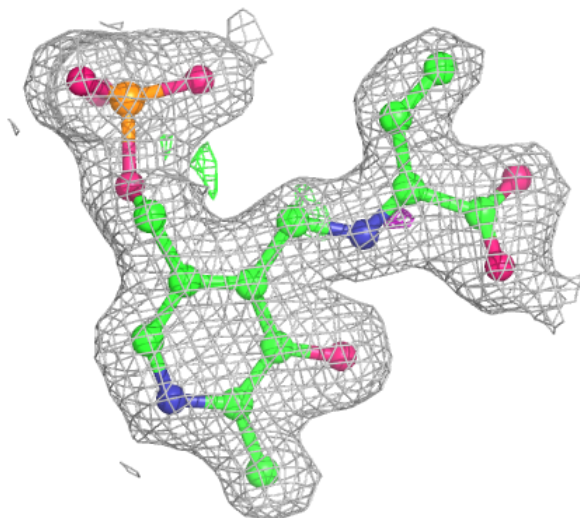
Electron density around WBJ D 501:

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



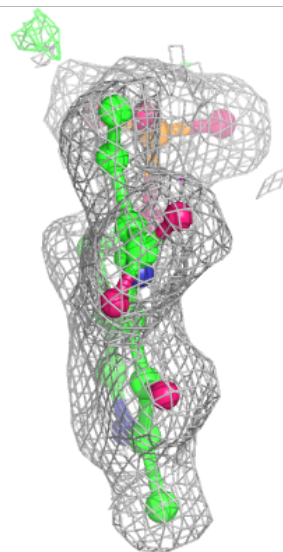
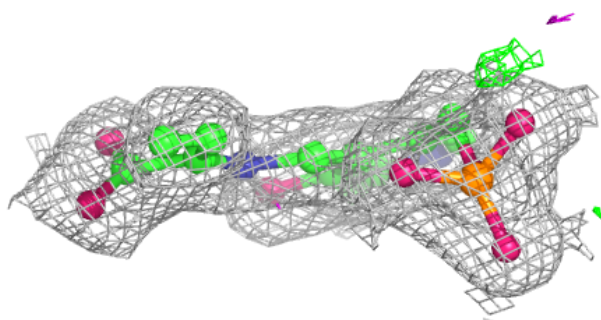
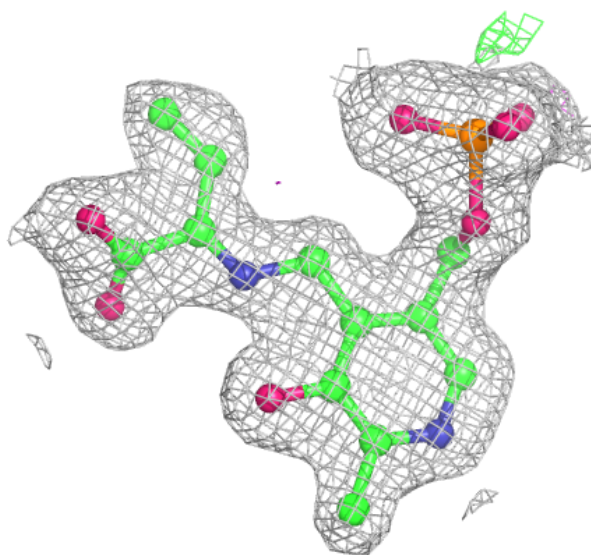
Electron density around WBJ P 501:

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



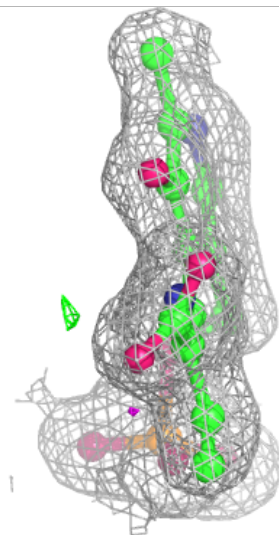
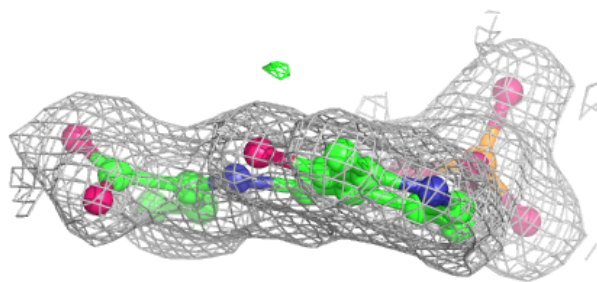
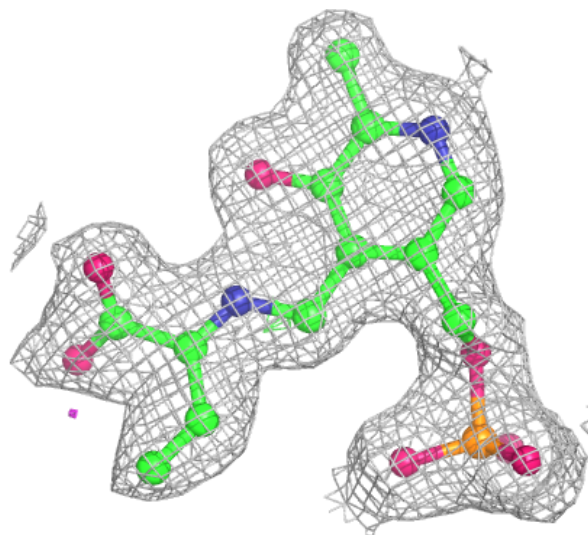
Electron density around WBJ A 501:

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



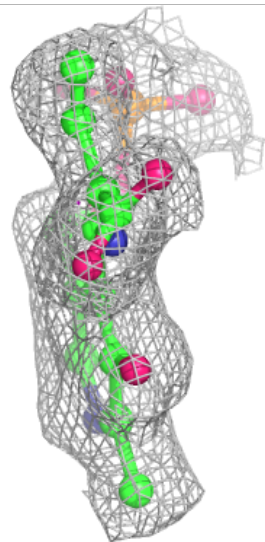
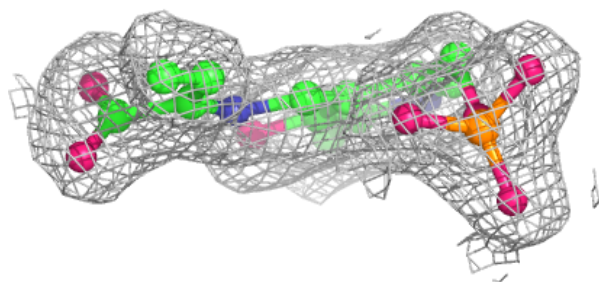
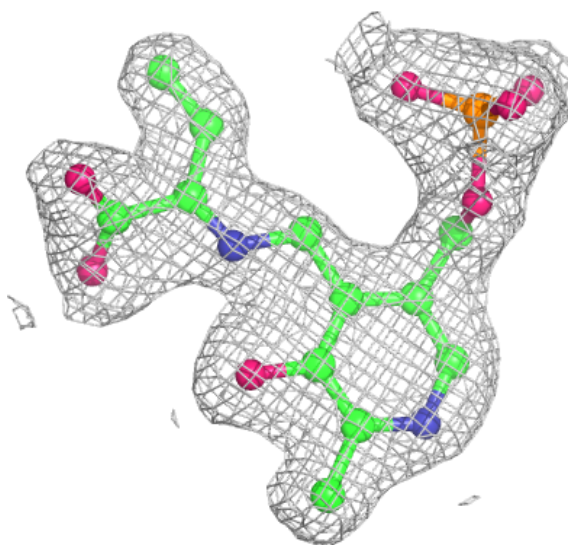
Electron density around WBJ M 501:

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



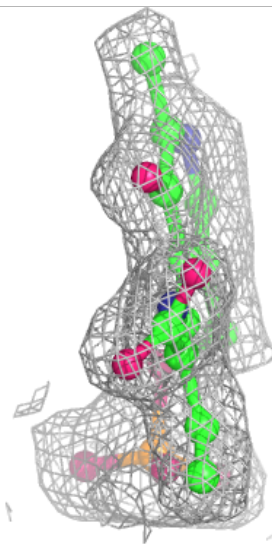
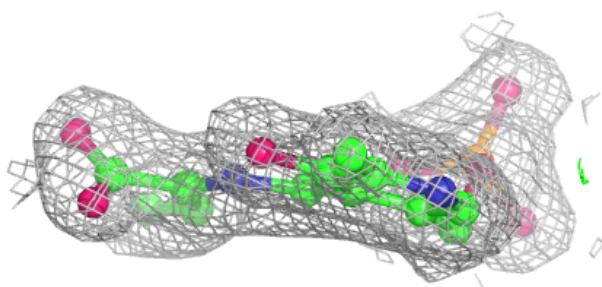
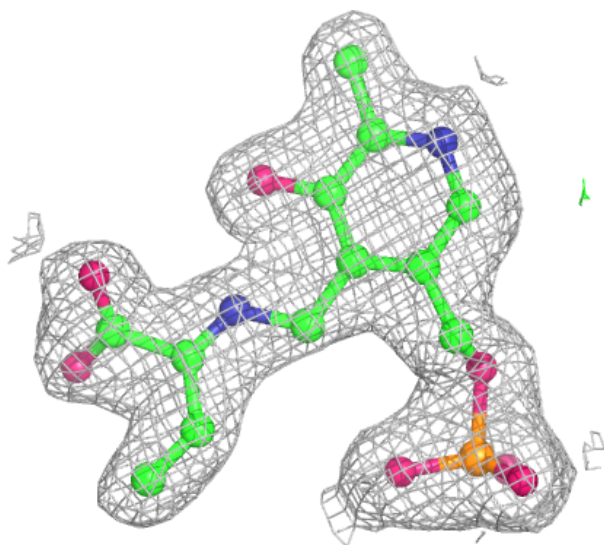
Electron density around WBJ Q 501:

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



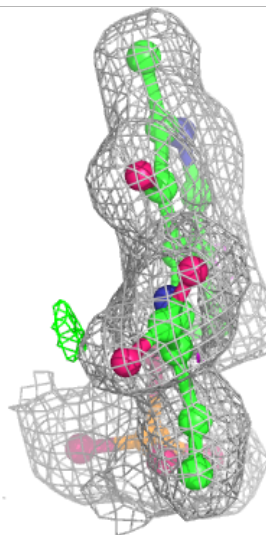
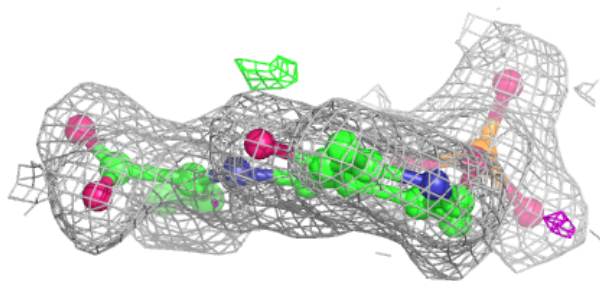
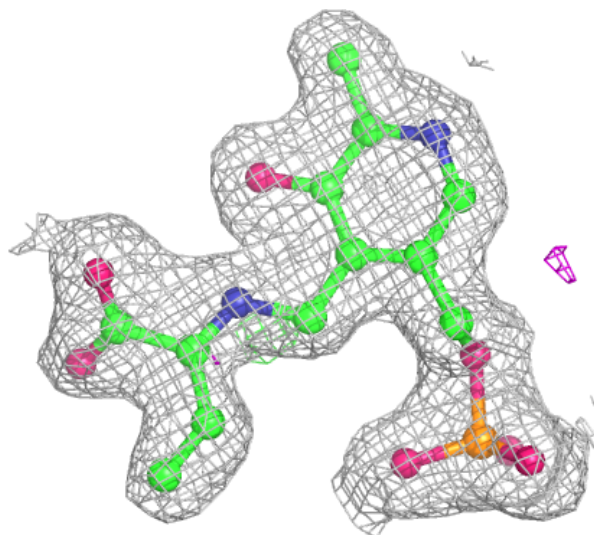
Electron density around WBJ N 501:

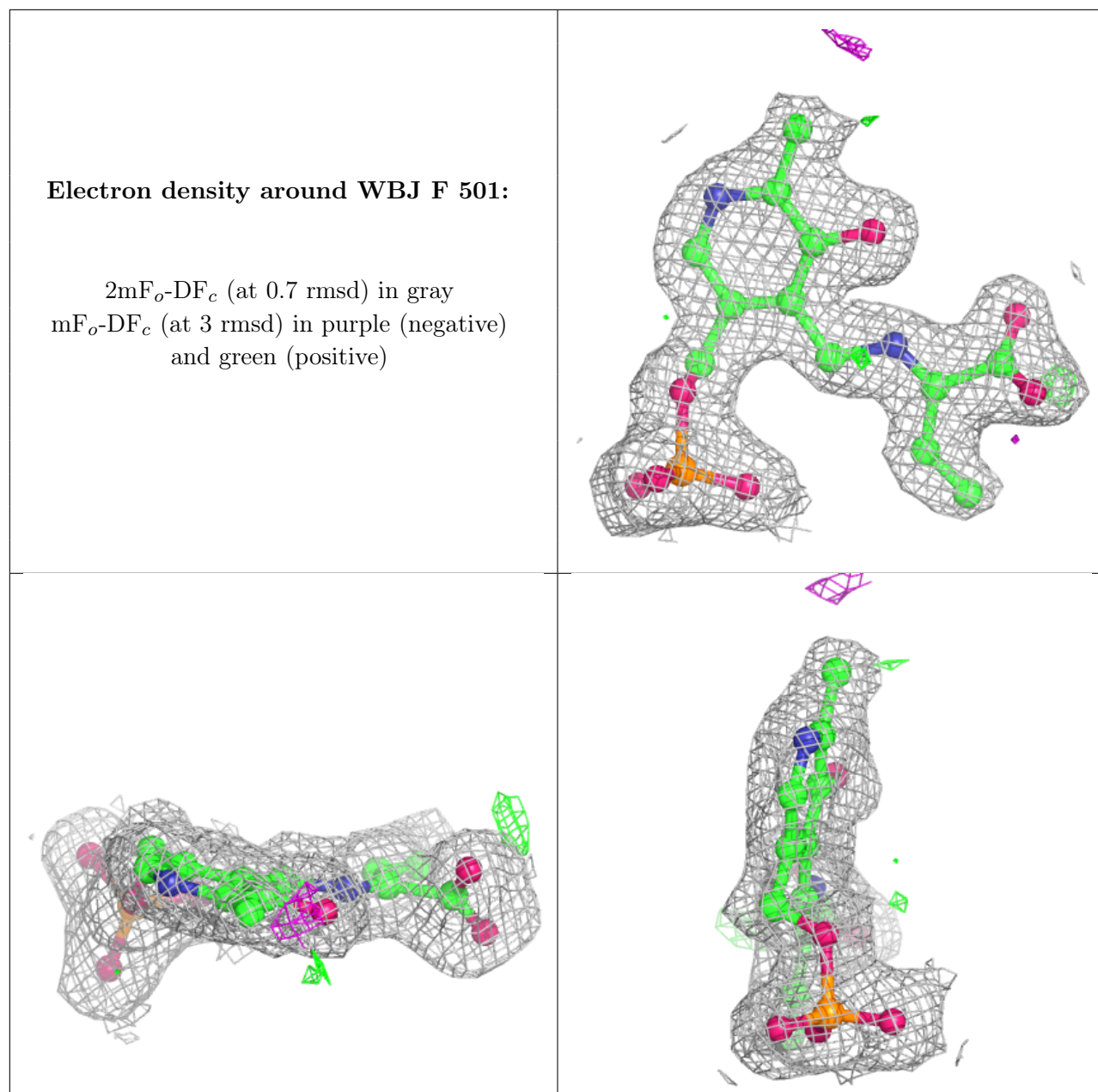
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

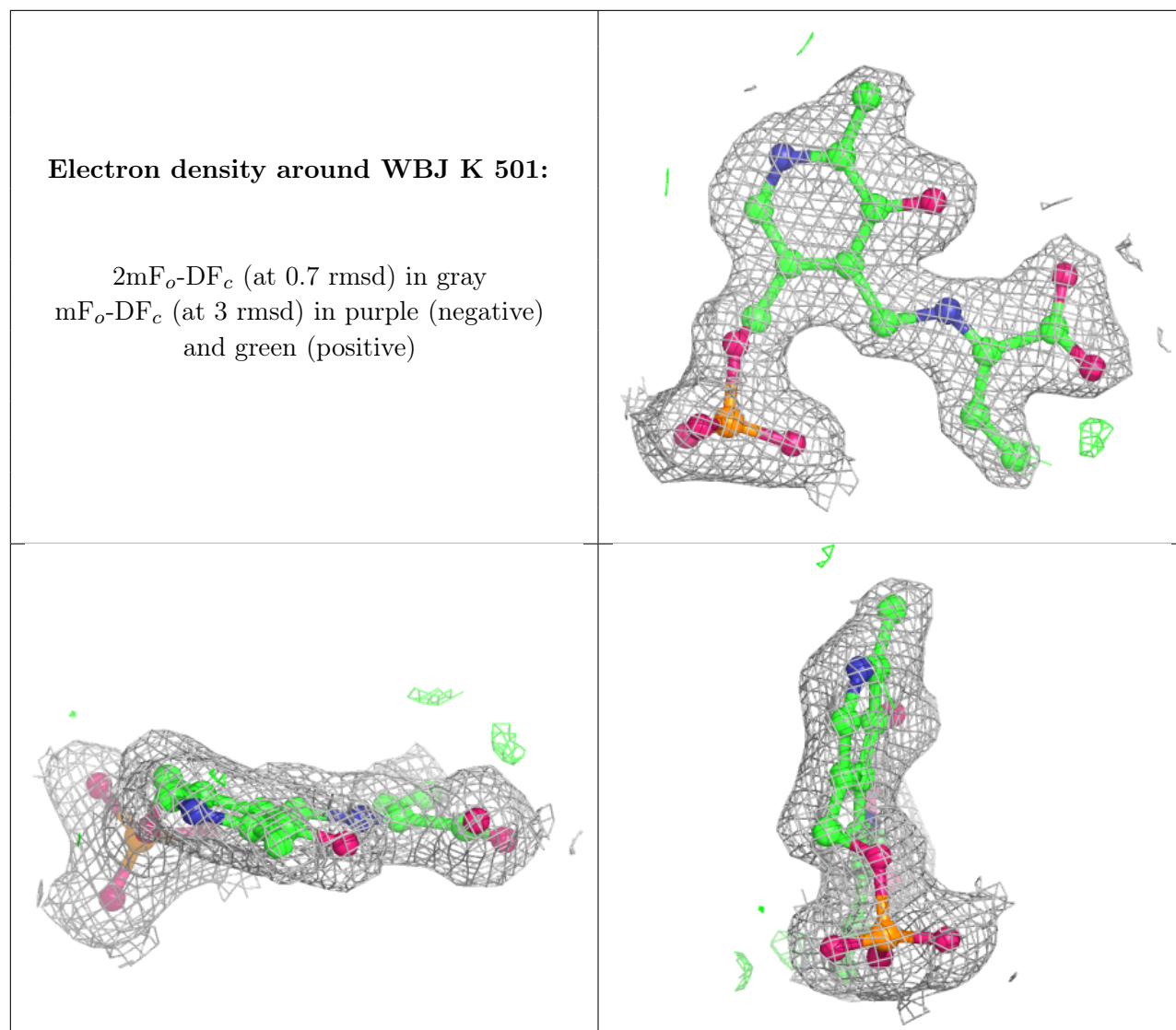


Electron density around WBJ C 501:

$2mF_o-DF_c$ (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.