



wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 15, 2024 – 10:13 PM EST

PDB ID : 1LOC
Title : INTERACTION OF A LEGUME LECTIN WITH TWO COMPONENTS OF
THE BACTERIAL CELL WALL
Authors : Bourne, Y.; Cambillau, C.
Deposited on : 1993-01-27
Resolution : 2.05 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 : 2.36
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

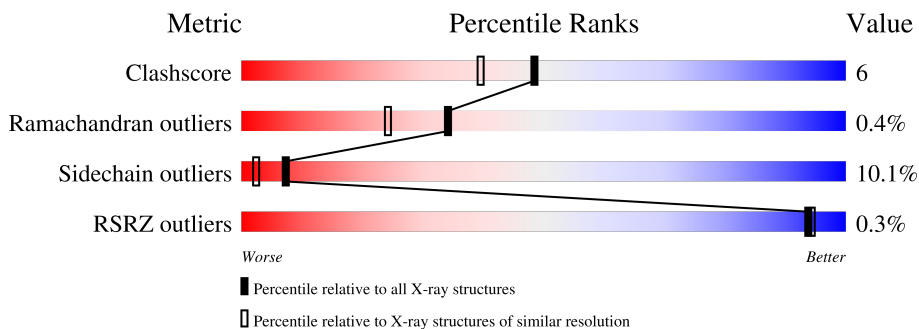
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.05 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.





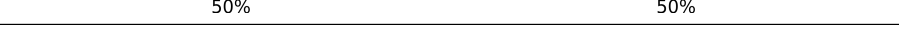
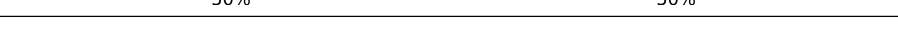
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	141614	1773 (2.04-2.04)
Ramachandran outliers	138981	1752 (2.04-2.04)
Sidechain outliers	138945	1752 (2.04-2.04)
RSRZ outliers	127900	1672 (2.04-2.04)

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	181	<div style="display: flex; align-items: center;"> <div style="width: 10%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 74%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 20%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 6%; height: 10px; background-color: orange; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: red;"></div> </div> <p style="text-align: center; margin-top: 5px;">74% 20% 6% .</p>
1	C	181	<div style="display: flex; align-items: center;"> <div style="width: 74%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 20%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 5%; height: 10px; background-color: orange; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: red;"></div> </div> <p style="text-align: center; margin-top: 5px;">74% 20% 5% ..</p>
1	E	181	<div style="display: flex; align-items: center;"> <div style="width: 10%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 70%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 22%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 8%; height: 10px; background-color: orange; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: red;"></div> </div> <p style="text-align: center; margin-top: 5px;">70% 22% 8% .</p>
1	G	181	<div style="display: flex; align-items: center;"> <div style="width: 77%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 19%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: orange; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: red;"></div> </div> <p style="text-align: center; margin-top: 5px;">77% 19% . ..</p>
2	B	52	<div style="display: flex; align-items: center;"> <div style="width: 69%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 19%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 10%; height: 10px; background-color: grey;"></div> </div> <p style="text-align: center; margin-top: 5px;">69% 19% . 10%</p>
2	D	52	<div style="display: flex; align-items: center;"> <div style="width: 81%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 6%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 10%; height: 10px; background-color: grey;"></div> </div> <p style="text-align: center; margin-top: 5px;">81% 6% . 10%</p>
2	F	52	<div style="display: flex; align-items: center;"> <div style="width: 62%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 25%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: orange; margin-right: 5px;"></div> <div style="width: 1%; height: 10px; background-color: red;"></div> <div style="width: 10%; height: 10px; background-color: grey;"></div> </div> <p style="text-align: center; margin-top: 5px;">62% 25% . . 10%</p>

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
2	H	52	 75% 13% 10%
3	1	2	 50% 50%
3	2	2	 50% 50%
3	3	2	 50% 50%
3	4	2	 50% 50%

2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 7558 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 LEGUME ISOLECTIN I (ALPHA CHAIN).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
1	A	180	1397	890	230	277	0	0	0
1	C	180	1397	890	230	277	0	0	0
1	E	180	1397	890	230	277	0	0	0
1	G	180	1397	890	230	277	0	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	153	ALA	LYS	conflict	UNP P04122
C	153	ALA	LYS	conflict	UNP P04122
E	153	ALA	LYS	conflict	UNP P04122
G	153	ALA	LYS	conflict	UNP P04122

- Molecule 2 is a protein called LEGUME ISOLECTIN I (BETA CHAIN).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	B	47	381	251	58	72	0	0	0
2	D	47	376	248	58	70	0	0	0
2	F	47	381	251	58	72	0	0	0
2	H	47	376	248	58	70	0	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	41	TYR	PHE	conflict	UNP P12306
D	41	TYR	PHE	conflict	UNP P12306
F	41	TYR	PHE	conflict	UNP P12306
H	41	TYR	PHE	conflict	UNP P12306

- Molecule 3 is a protein called MURAMYL-DIPEPTIDE D-ALA-D-IGLN.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	1	2	Total	C	N	O	0	0	0
			15	8	3	4			
3	2	1	Total	C	N	O	0	0	0
			5	3	1	1			
3	3	2	Total	C	N	O	0	0	0
			15	8	3	4			
3	4	2	Total	C	N	O	0	0	0
			15	8	3	4			

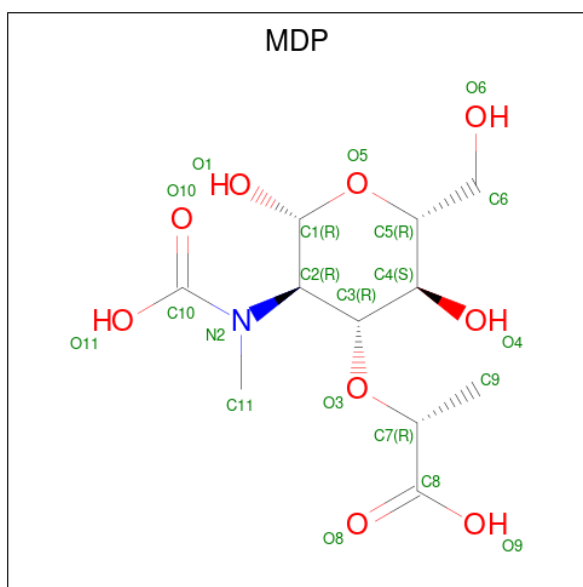
- Molecule 4 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	Ca	0	0
			1	1		
4	C	1	Total	Ca	0	0
			1	1		
4	E	1	Total	Ca	0	0
			1	1		
4	G	1	Total	Ca	0	0
			1	1		

- Molecule 5 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	Mn	0	0
			1	1		
5	C	1	Total	Mn	0	0
			1	1		
5	E	1	Total	Mn	0	0
			1	1		
5	G	1	Total	Mn	0	0
			1	1		

- Molecule 6 is N-carboxyl-N-methyl-beta-muramic acid (three-letter code: MDP) (formula: C₁₁H₁₉NO₉).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	1	1	Total	C	N	O	0	0
			20	11	1	8		
6	2	1	Total	C	N	O	0	0
			20	11	1	8		
6	3	1	Total	C	N	O	0	0
			20	11	1	8		
6	4	1	Total	C	N	O	0	0
			20	11	1	8		

- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	74	Total	O	0	0
			74	74		
7	B	14	Total	O	0	0
			14	14		
7	1	8	Total	O	0	0
			8	8		
7	C	48	Total	O	0	0
			48	48		
7	D	9	Total	O	0	0
			9	9		
7	2	1	Total	O	0	0
			1	1		
7	E	56	Total	O	0	0
			56	56		
7	F	10	Total	O	0	0
			10	10		

Continued on next page...

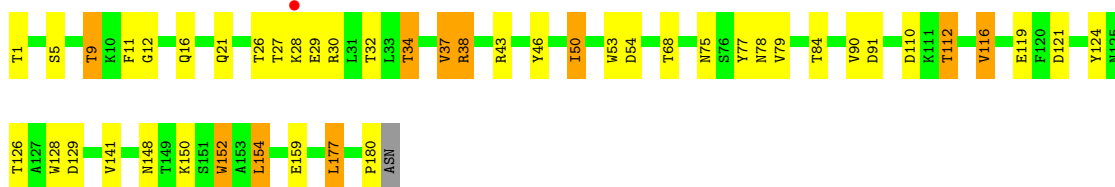
Continued from previous page...

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	3	5	Total O 5 5	0	0
7	G	77	Total O 77 77	0	0
7	H	8	Total O 8 8	0	0
7	4	8	Total O 8 8	0	0

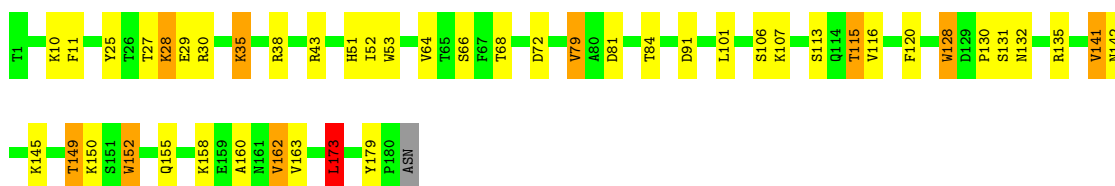
3 Residue-property plots

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.

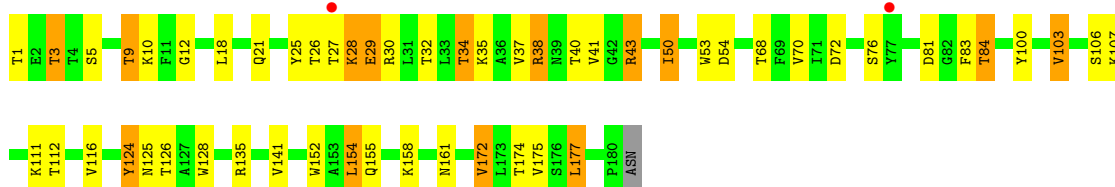
- Molecule 1: LEGUME ISOLECTIN I (ALPHA CHAIN)



- Molecule 1: LEGUME ISOLECTIN I (ALPHA CHAIN)

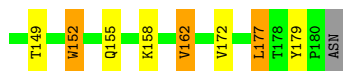


- Molecule 1: LEGUME ISOLECTIN I (ALPHA CHAIN)



- Molecule 1: LEGUME ISOLECTIN I (ALPHA CHAIN)

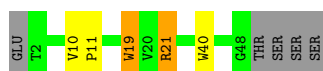
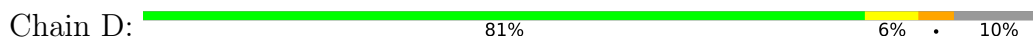




- Molecule 2: LEGUME ISOLECTIN I (BETA CHAIN)



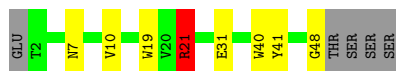
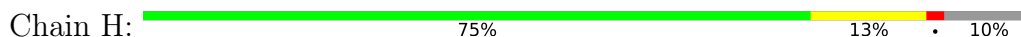
- Molecule 2: LEGUME ISOLECTIN I (BETA CHAIN)



- Molecule 2: LEGUME ISOLECTIN I (BETA CHAIN)



- Molecule 2: LEGUME ISOLECTIN I (BETA CHAIN)



- Molecule 3: MURAMYL-DIPEPTIDE D-ALA-D-IGLN



- Molecule 3: MURAMYL-DIPEPTIDE D-ALA-D-IGLN



- Molecule 3: MURAMYL-DIPEPTIDE D-ALA-D-IGLN



4B51
ZGL952

- Molecule 3: MURAMYL-DIPEPTIDE D-ALA-D-IGLN

Chain 4: 

4B51
ZGL952

4 Data and refinement statistics i

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	56.58Å 139.80Å 63.40Å 90.00° 91.50° 90.00°	Depositor
Resolution (Å)	6.00 – 2.05 6.00 – 2.05	Depositor EDS
% Data completeness (in resolution range)	(Not available) (6.00-2.05) 96.8 (6.00-2.05)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	6.37 (at 2.05Å)	Xtrriage
Refinement program	X-PLOR	Depositor
R, R_{free}	0.189 , (Not available) 0.178 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å ²)	25.8	Xtrriage
Anisotropy	0.046	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.52 , 124.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.037 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	7558	wwPDB-VP
Average B, all atoms (Å ²)	22.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.33% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

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: ZGL, DAL, MN, CA, MDP

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	0.95	3/1431 (0.2%)	1.68	27/1954 (1.4%)
1	C	0.83	2/1431 (0.1%)	1.54	19/1954 (1.0%)
1	E	0.90	0/1431	1.62	25/1954 (1.3%)
1	G	0.90	2/1431 (0.1%)	1.71	33/1954 (1.7%)
2	B	1.05	0/394	1.71	12/539 (2.2%)
2	D	1.00	0/389	1.67	7/532 (1.3%)
2	F	0.95	0/394	1.85	11/539 (2.0%)
2	H	1.02	0/389	1.94	10/532 (1.9%)
All	All	0.92	7/7290 (0.1%)	1.67	144/9958 (1.4%)

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	G	115	THR	CA-CB	5.96	1.68	1.53
1	A	116	VAL	CA-CB	5.57	1.66	1.54
1	C	141	VAL	CA-CB	5.56	1.66	1.54
1	A	141	VAL	CA-CB	5.55	1.66	1.54
1	C	115	THR	CA-CB	5.41	1.67	1.53

The worst 5 of 144 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	21	ARG	NE-CZ-NH1	21.85	131.22	120.30
2	F	21	ARG	NE-CZ-NH1	17.95	129.27	120.30
2	F	21	ARG	NE-CZ-NH2	-16.27	112.17	120.30
2	H	21	ARG	NE-CZ-NH2	-13.31	113.64	120.30
1	G	30	ARG	NE-CZ-NH2	-11.11	114.75	120.30

There are no chirality outliers.

There are no planarity outliers.

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	1397	0	1346	21	0
1	C	1397	0	1346	13	0
1	E	1397	0	1346	26	0
1	G	1397	0	1346	13	0
2	B	381	0	357	8	0
2	D	376	0	351	3	0
2	F	381	0	357	8	0
2	H	376	0	351	2	0
3	1	15	0	8	0	0
3	2	5	0	4	0	0
3	3	15	0	9	0	0
3	4	15	0	9	0	0
4	A	1	0	0	0	0
4	C	1	0	0	0	0
4	E	1	0	0	0	0
4	G	1	0	0	0	0
5	A	1	0	0	1	0
5	C	1	0	0	0	0
5	E	1	0	0	0	0
5	G	1	0	0	0	0
6	1	20	0	16	1	0
6	2	20	0	17	4	0
6	3	20	0	17	2	0
6	4	20	0	17	4	0
7	1	8	0	0	0	0
7	2	1	0	0	0	0
7	3	5	0	0	0	0
7	4	8	0	0	0	0
7	A	74	0	0	2	0
7	B	14	0	0	0	0
7	C	48	0	0	0	0
7	D	9	0	0	0	0
7	E	56	0	0	1	0
7	F	10	0	0	0	0
7	G	77	0	0	1	0
7	H	8	0	0	0	0
All	All	7558	0	6897	85	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 85 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)
6:4:1001:MDP:H113	6:4:1001:MDP:H7	1.38	1.05
6:3:1001:MDP:H7	6:3:1001:MDP:H113	1.54	0.89
6:2:1001:MDP:C8	6:2:1001:MDP:H113	2.03	0.89
6:4:1001:MDP:H113	6:4:1001:MDP:C7	2.07	0.84
6:1:1001:MDP:H113	6:1:1001:MDP:H7	1.62	0.82

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	178/181 (98%)	174 (98%)	4 (2%)	0	100	100
1	C	178/181 (98%)	175 (98%)	3 (2%)	0	100	100
1	E	178/181 (98%)	169 (95%)	8 (4%)	1 (1%)	25	15
1	G	178/181 (98%)	174 (98%)	4 (2%)	0	100	100
2	B	45/52 (86%)	43 (96%)	1 (2%)	1 (2%)	6	1
2	D	45/52 (86%)	43 (96%)	1 (2%)	1 (2%)	6	1
2	F	45/52 (86%)	42 (93%)	2 (4%)	1 (2%)	6	1
2	H	45/52 (86%)	44 (98%)	1 (2%)	0	100	100
All	All	892/932 (96%)	864 (97%)	24 (3%)	4 (0%)	34	24

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	E	28	LYS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
2	B	11	PRO
2	F	11	PRO
2	D	11	PRO

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	154/155 (99%)	140 (91%)	14 (9%)	9	3
1	C	154/155 (99%)	132 (86%)	22 (14%)	3	1
1	E	154/155 (99%)	134 (87%)	20 (13%)	4	1
1	G	154/155 (99%)	140 (91%)	14 (9%)	9	3
2	B	40/44 (91%)	39 (98%)	1 (2%)	47	40
2	D	39/44 (89%)	38 (97%)	1 (3%)	46	39
2	F	40/44 (91%)	36 (90%)	4 (10%)	7	2
2	H	39/44 (89%)	37 (95%)	2 (5%)	24	15
All	All	774/796 (97%)	696 (90%)	78 (10%)	7	2

5 of 78 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	177	LEU
1	G	149	THR
2	F	14	GLU
1	G	35	LYS
1	G	177	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 23 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	161	ASN
2	F	43	HIS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
2	F	35	HIS
1	G	51	HIS
2	B	43	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

7 non-standard protein/DNA/RNA residues are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	ZGL	4	952	3	9,9,9	1.23	1 (11%)	10,11,11	1.61	2 (20%)
3	ZGL	3	952	3	9,9,9	0.89	0	10,11,11	1.62	4 (40%)
3	ZGL	1	952	3	9,9,9	1.21	1 (11%)	10,11,11	1.24	1 (10%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	ZGL	4	952	3	-	5/9/9/9	-
3	ZGL	3	952	3	-	1/9/9/9	-
3	ZGL	1	952	3	-	5/9/9/9	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	4	952	ZGL	CB-CA	-2.47	1.47	1.53
3	1	952	ZGL	CG-C	2.09	1.55	1.50

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	1	952	ZGL	O2-CD-N1	-2.96	117.85	123.00
3	4	952	ZGL	CG-CB-CA	-2.96	106.94	113.84
3	3	952	ZGL	OXT-C-O	-2.56	116.93	123.30
3	3	952	ZGL	OXT-C-CG	2.37	121.65	114.03
3	3	952	ZGL	CA-CD-N1	-2.30	112.74	116.68

There are no chirality outliers.

5 of 11 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	1	952	ZGL	CD-CA-CB-CG
3	1	952	ZGL	N-CA-CB-CG
3	1	952	ZGL	CA-CB-CG-C
3	4	952	ZGL	N-CA-CB-CG
3	4	952	ZGL	CD-CA-CB-CG

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 12 ligands modelled in this entry, 8 are monoatomic - leaving 4 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
6	MDP	1	1001	3	18,20,21	1.03	1 (5%)	20,28,30	3.41	9 (45%)
6	MDP	2	1001	3	18,20,21	1.74	4 (22%)	20,28,30	3.67	11 (55%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
6	MDP	4	1001	3	18,20,21	0.99	1 (5%)	20,28,30	2.26	8 (40%)
6	MDP	3	1001	3	18,20,21	1.45	3 (16%)	20,28,30	2.27	3 (15%)

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
6	MDP	1	1001	3	-	2/12/36/38	0/1/1/1
6	MDP	2	1001	3	-	5/12/36/38	0/1/1/1
6	MDP	4	1001	3	-	5/12/36/38	0/1/1/1
6	MDP	3	1001	3	-	5/12/36/38	0/1/1/1

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	2	1001	MDP	C4-C5	4.07	1.61	1.53
6	3	1001	MDP	C1-C2	3.62	1.57	1.52
6	2	1001	MDP	C10-N2	-3.49	1.30	1.36
6	3	1001	MDP	O3-C7	-2.59	1.40	1.45
6	2	1001	MDP	C2-N2	2.52	1.52	1.47

The worst 5 of 31 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	1	1001	MDP	C1-C2-C3	-9.75	91.39	110.16
6	2	1001	MDP	C1-C2-C3	-8.85	93.14	110.16
6	3	1001	MDP	C1-C2-N2	-6.97	96.57	112.69
6	2	1001	MDP	C1-O5-C5	-6.32	101.73	113.66
6	4	1001	MDP	C1-C2-N2	-5.36	100.30	112.69

There are no chirality outliers.

5 of 17 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	1	1001	MDP	O10-C10-N2-C2
6	2	1001	MDP	C1-C2-N2-C11
6	2	1001	MDP	C3-C2-N2-C11
6	2	1001	MDP	O10-C10-N2-C2

Continued on next page...

Continued from previous page...

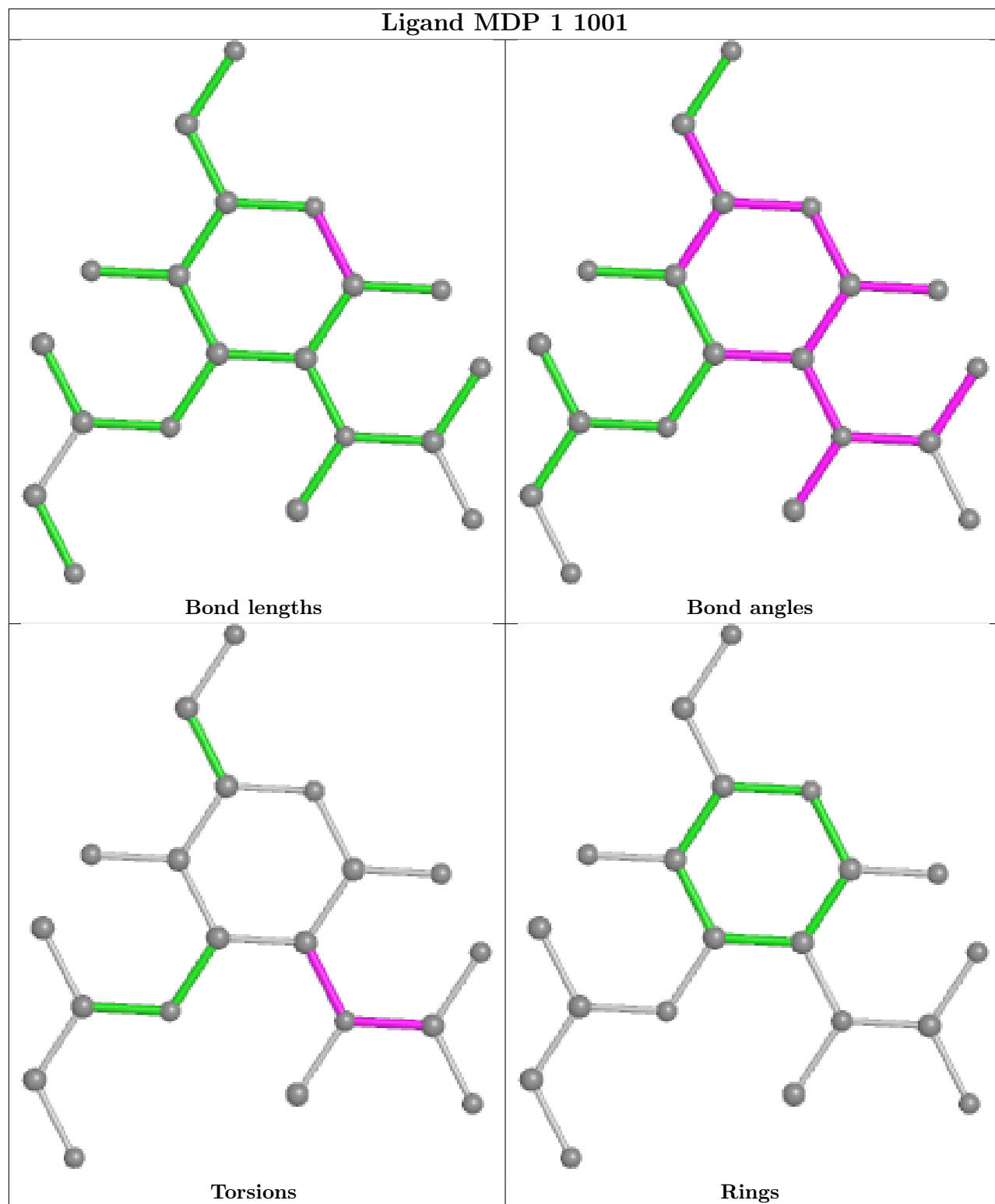
Mol	Chain	Res	Type	Atoms
6	3	1001	MDP	C3-C2-N2-C11

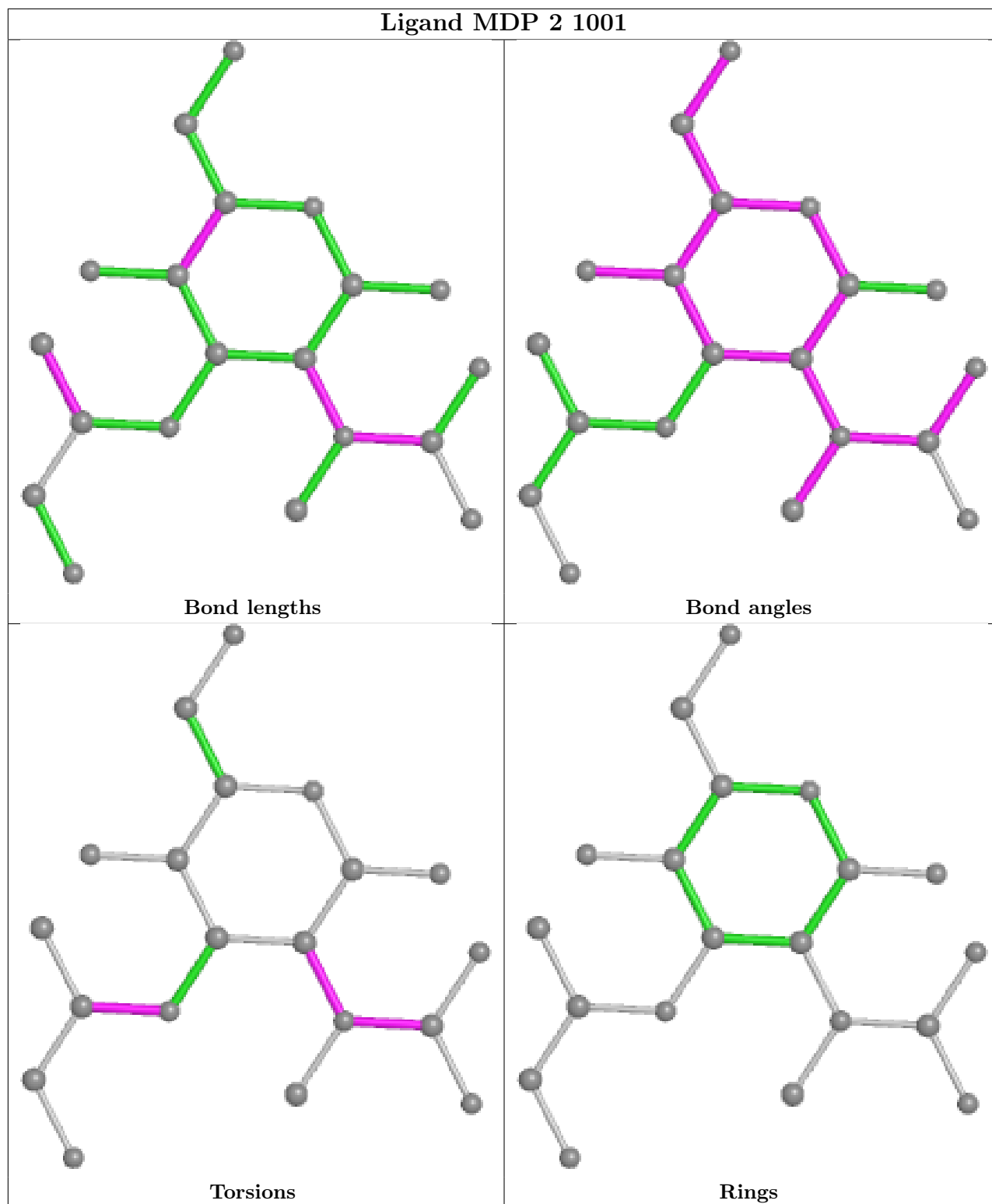
There are no ring outliers.

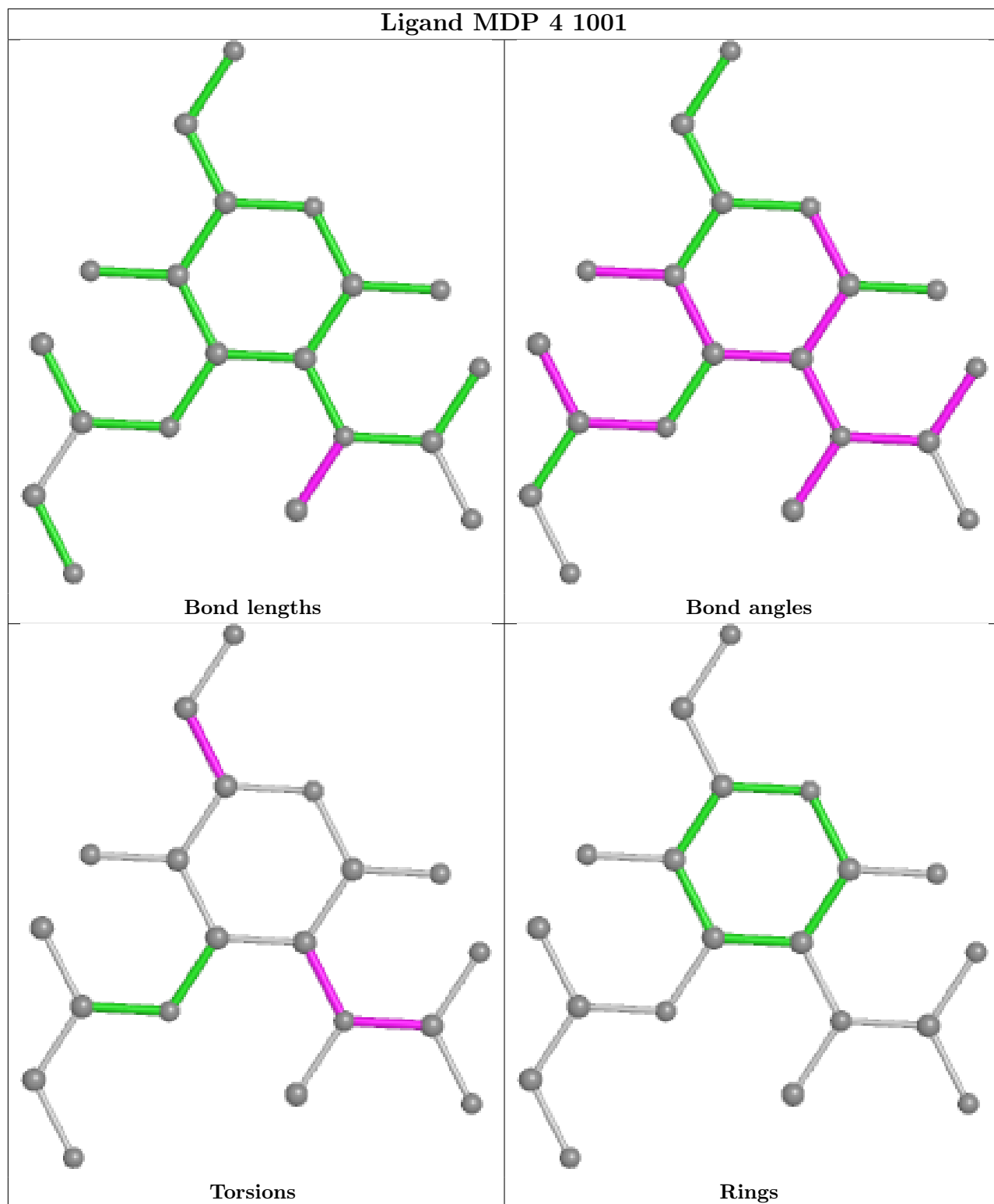
4 monomers are involved in 11 short contacts:

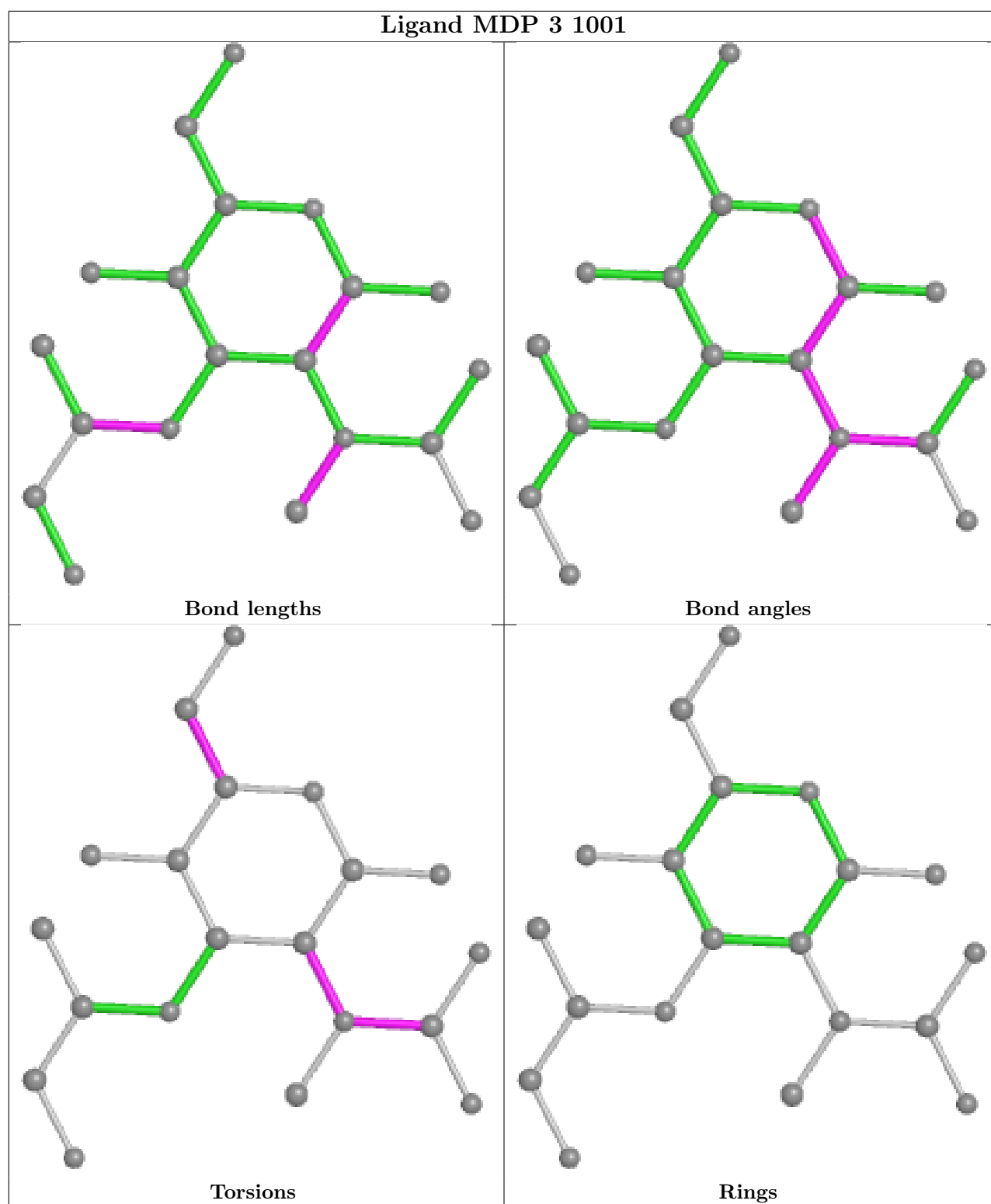
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	1	1001	MDP	1	0
6	2	1001	MDP	4	0
6	4	1001	MDP	4	0
6	3	1001	MDP	2	0

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









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

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

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

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

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	180/181 (99%)	-0.79	1 (0%) 89 91	11, 16, 29, 48	0
1	C	180/181 (99%)	-0.50	0 100 100	13, 24, 44, 61	0
1	E	180/181 (99%)	-0.51	2 (1%) 80 82	12, 21, 40, 61	0
1	G	180/181 (99%)	-0.69	0 100 100	12, 19, 36, 48	0
2	B	47/52 (90%)	-0.85	0 100 100	11, 17, 27, 34	0
2	D	47/52 (90%)	-0.60	0 100 100	13, 22, 39, 49	0
2	F	47/52 (90%)	-0.64	0 100 100	11, 22, 33, 42	0
2	H	47/52 (90%)	-0.77	0 100 100	11, 18, 30, 33	0
3	1	0/2	-	-	-	-
3	2	0/2	-	-	-	-
3	3	0/2	-	-	-	-
3	4	0/2	-	-	-	-
All	All	908/940 (96%)	-0.64	3 (0%) 94 94	11, 20, 37, 61	0

All (3) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	77	TYR	2.2
1	A	28	LYS	2.1
1	E	27	THR	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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
3	DAL	2	951	5/6	0.78	0.19	15,20,25,33	0
3	ZGL	1	952	10/10	0.86	0.17	22,28,44,46	0
3	ZGL	3	952	10/10	0.86	0.20	38,41,54,55	0
3	ZGL	4	952	10/10	0.87	0.17	31,37,45,48	0
3	DAL	3	951	5/6	0.92	0.11	29,31,35,37	0
3	DAL	4	951	5/6	0.96	0.10	24,25,26,29	0
3	DAL	1	951	5/6	0.96	0.08	15,16,18,20	0

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

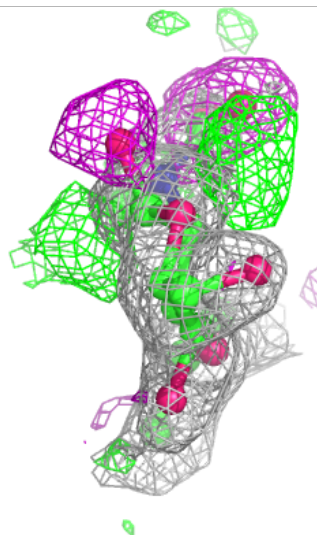
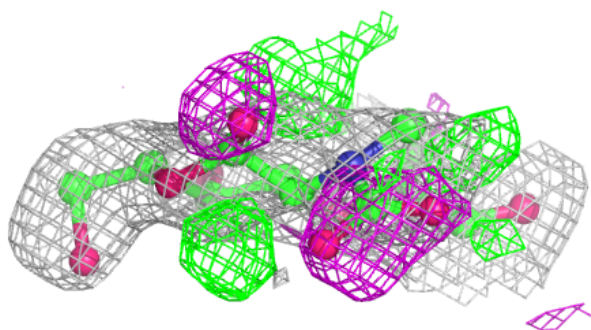
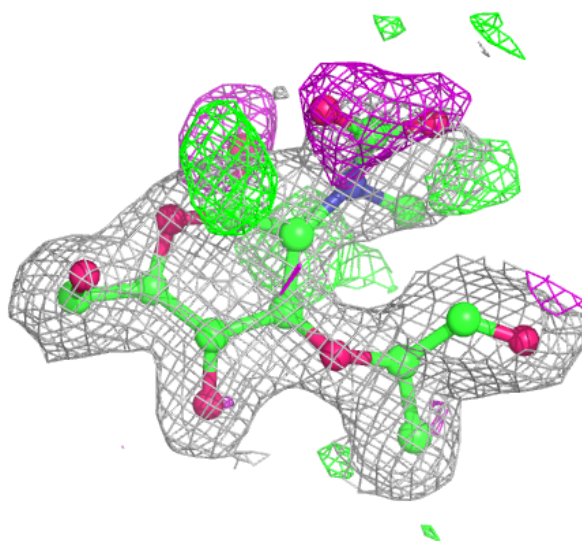
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q<0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	CA	E	201	1/1	0.50	0.19	42,42,42,42	0
4	CA	C	201	1/1	0.74	0.14	47,47,47,47	0
6	MDP	2	1001	20/21	0.79	0.24	15,23,33,35	0
4	CA	A	201	1/1	0.81	0.23	29,29,29,29	0
4	CA	G	201	1/1	0.86	0.16	41,41,41,41	0
6	MDP	3	1001	20/21	0.92	0.14	27,30,36,36	0
6	MDP	4	1001	20/21	0.94	0.12	22,25,32,32	0
6	MDP	1	1001	20/21	0.95	0.10	14,18,24,27	0
5	MN	E	202	1/1	0.96	0.06	33,33,33,33	0
5	MN	G	202	1/1	0.97	0.06	25,25,25,25	0
5	MN	A	202	1/1	0.98	0.21	18,18,18,18	0
5	MN	C	202	1/1	0.98	0.05	32,32,32,32	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.

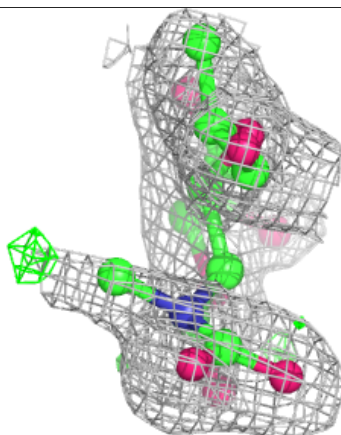
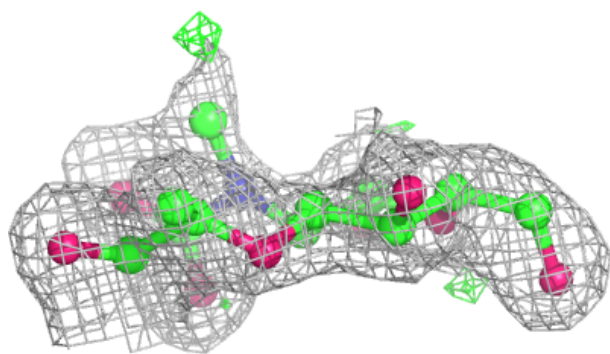
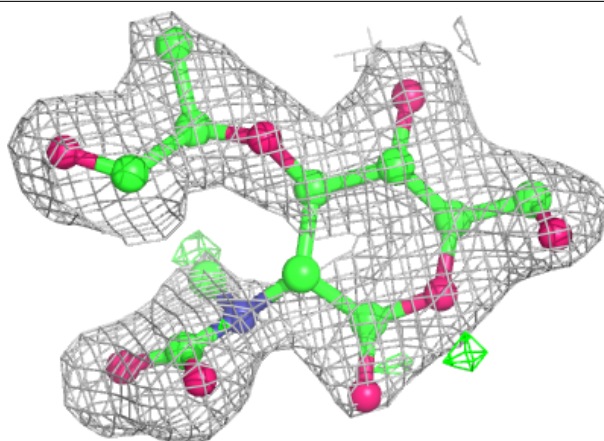
Electron density around MDP 2 1001:

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



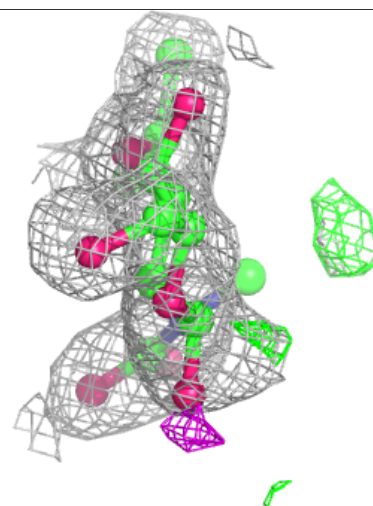
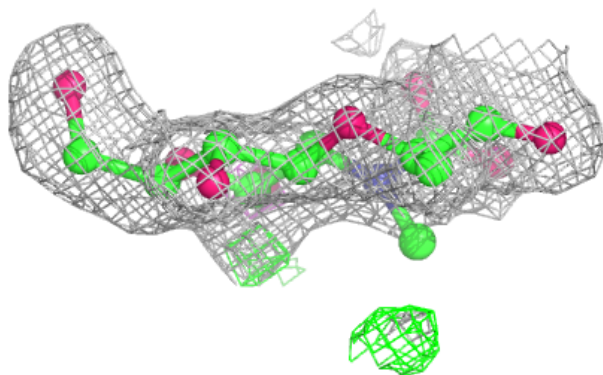
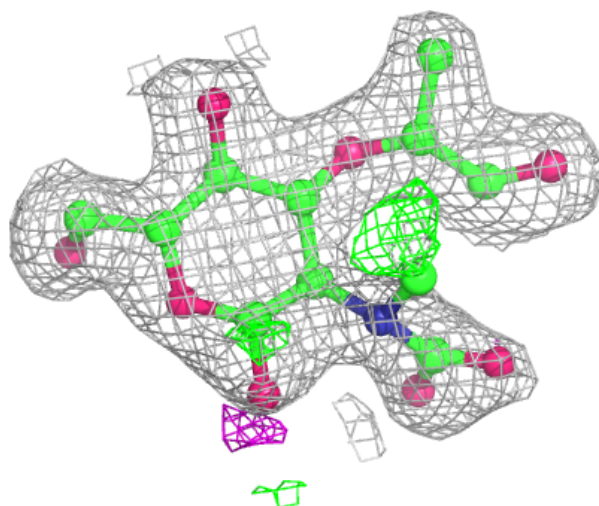
Electron density around MDP 3 1001:

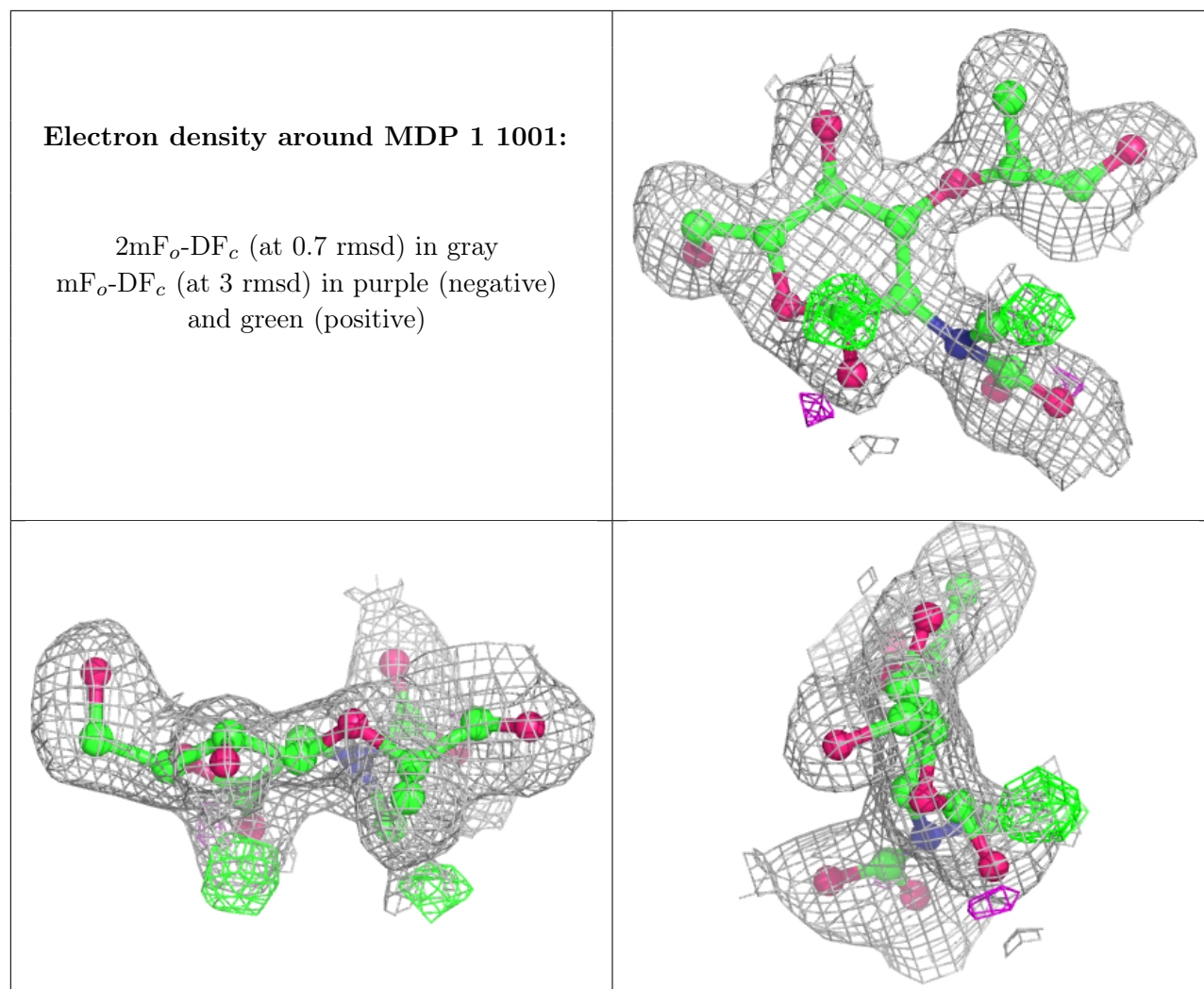
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around MDP 4 1001:

$2mF_o-DF_c$ (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.