Full wwPDB X-ray Structure Validation Report ⓘ

Sep 27, 2023 – 01:29 AM EDT

PDB ID	:	6C3I
Title	:	Crystal structure of the Deinococcus radiodurans Nramp/MntH divalent transition metal transporter G45R mutant in an inward occluded state
Authors	:	Zimanyi, C.M.; Bozzi, A.T.; Gaudet, R.
Deposited on	:	2018-01-09
Resolution	:	2.95 Å(reported)

This is a Full wwPDB X-ray Structure Validation 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:

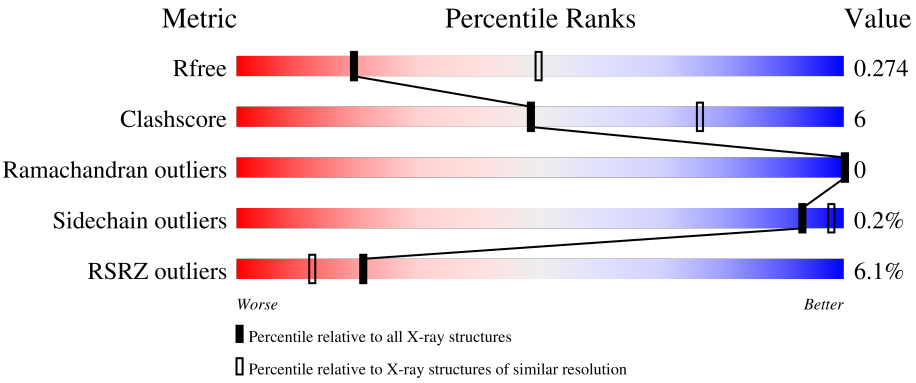
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.95 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	3104 (3.00-2.92)
Clashscore	141614	3462 (3.00-2.92)
Ramachandran outliers	138981	3340 (3.00-2.92)
Sidechain outliers	138945	3343 (3.00-2.92)
RSRZ outliers	127900	2986 (3.00-2.92)

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 <=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	445	5% 73% 14% 13%
1	B	445	5% 73% 14% 13%

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	OLC	B	501	-	-	-	X

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 5979 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.

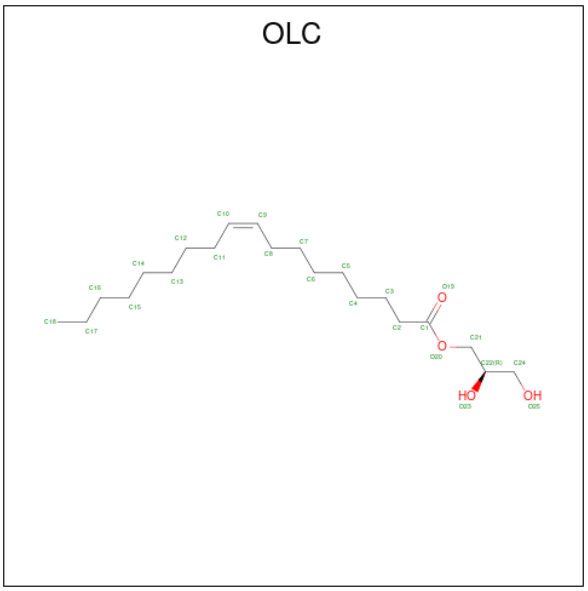
- Molecule 1 is a protein called Divalent metal cation transporter MntH.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	386	Total	C	N	O	S	0	0	0
			2899	1910	481	491	17			
1	B	388	Total	C	N	O	S	0	0	0
			2913	1918	484	494	17			

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-8	MET	-	expression tag	UNP Q9RTP8
A	-7	HIS	-	expression tag	UNP Q9RTP8
A	-6	HIS	-	expression tag	UNP Q9RTP8
A	-5	HIS	-	expression tag	UNP Q9RTP8
A	-4	HIS	-	expression tag	UNP Q9RTP8
A	-3	HIS	-	expression tag	UNP Q9RTP8
A	-2	HIS	-	expression tag	UNP Q9RTP8
A	-1	HIS	-	expression tag	UNP Q9RTP8
A	0	HIS	-	expression tag	UNP Q9RTP8
A	45	ARG	GLY	engineered mutation	UNP Q9RTP8
B	-8	MET	-	expression tag	UNP Q9RTP8
B	-7	HIS	-	expression tag	UNP Q9RTP8
B	-6	HIS	-	expression tag	UNP Q9RTP8
B	-5	HIS	-	expression tag	UNP Q9RTP8
B	-4	HIS	-	expression tag	UNP Q9RTP8
B	-3	HIS	-	expression tag	UNP Q9RTP8
B	-2	HIS	-	expression tag	UNP Q9RTP8
B	-1	HIS	-	expression tag	UNP Q9RTP8
B	0	HIS	-	expression tag	UNP Q9RTP8
B	45	ARG	GLY	engineered mutation	UNP Q9RTP8

- Molecule 2 is (2R)-2,3-dihydroxypropyl (9Z)-octadec-9-enoate (three-letter code: OLC) (formula: $C_{21}H_{40}O_4$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 25 21 4	0	0
2	A	1	Total C O 20 16 4	0	0
2	A	1	Total C O 18 14 4	0	0
2	A	1	Total C O 25 21 4	0	0
2	B	1	Total C O 25 21 4	0	0
2	B	1	Total C O 25 21 4	0	0

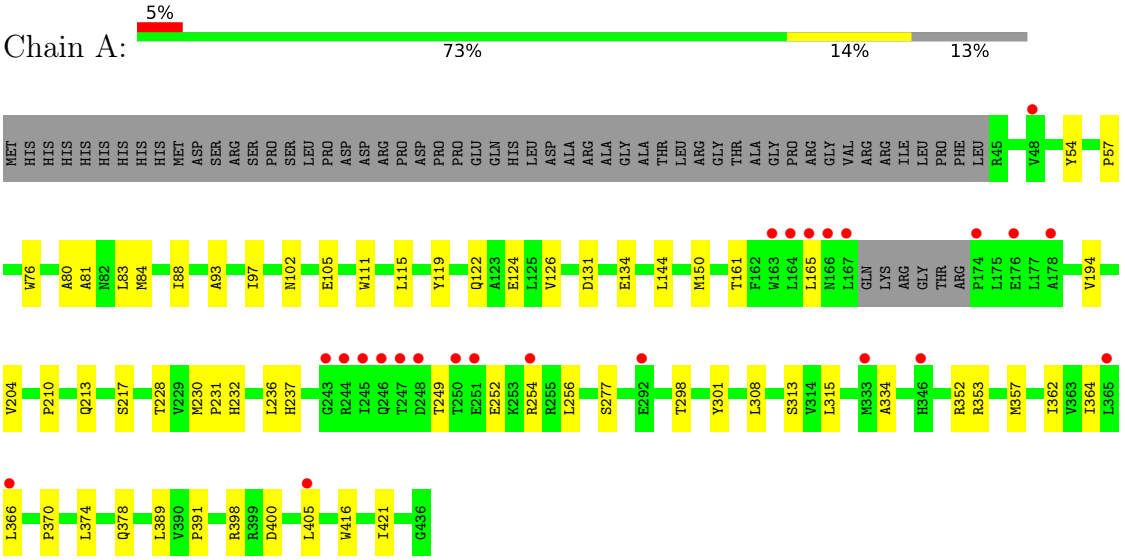
- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	14	Total O 14 14	0	0
3	B	15	Total O 15 15	0	0

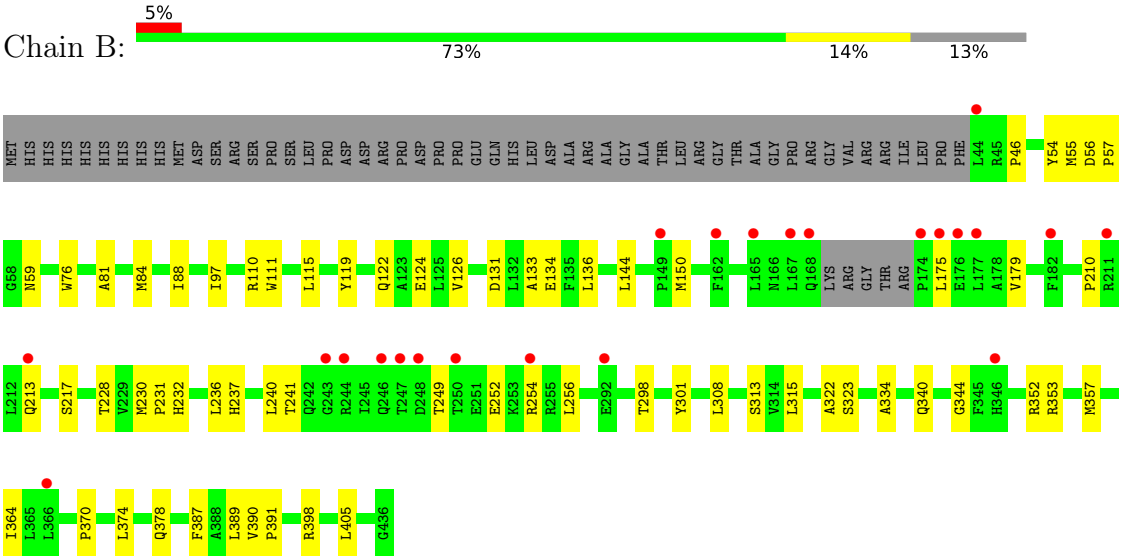
3 Residue-property plots (i)

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: Divalent metal cation transporter MntH



• Molecule 1: Divalent metal cation transporter MntH



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	70.73Å 97.85Å 118.26Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.62 – 2.95 45.36 – 2.95	Depositor EDS
% Data completeness (in resolution range)	95.8 (29.62-2.95) 95.7 (45.36-2.95)	Depositor EDS
R_{merge}	0.23	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.70 (at 2.96Å)	Xtriage
Refinement program	PHENIX 1.12_2829	Depositor
R, R_{free}	0.243 , 0.273 0.245 , 0.274	Depositor DCC
R_{free} test set	845 reflections (4.92%)	wwPDB-VP
Wilson B-factor (Å^2)	56.7	Xtriage
Anisotropy	0.283	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 63.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.47$, $< L^2 > = 0.29$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	5979	wwPDB-VP
Average B, all atoms (Å^2)	61.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 72.53 % 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 2.1665e-06. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

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

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	0.25	0/2962	0.40	0/4048
1	B	0.24	0/2976	0.39	0/4067
All	All	0.25	0/5938	0.40	0/8115

There are no bond length outliers.

There are no bond angle outliers.

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	2899	0	3040	36	0
1	B	2913	0	3050	39	0
2	A	88	0	130	5	0
2	B	50	0	80	3	0
3	A	14	0	0	0	0
3	B	15	0	0	1	0
All	All	5979	0	6300	74	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.

All (74) 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:B:179:VAL:HG13	1:B:322:ALA:HB1	1.74	0.70
1:A:83:LEU:HB3	2:A:501:OLC:H6	1.74	0.70
1:A:131:ASP:OD2	1:A:353:ARG:NH1	2.25	0.69
1:B:131:ASP:OD2	1:B:353:ARG:NH1	2.26	0.67
1:B:236:LEU:HD22	1:B:334:ALA:HB2	1.81	0.63
1:A:150:MET:HB3	1:A:364:ILE:HD12	1.83	0.60
1:A:366:LEU:HD22	1:B:175:LEU:HD22	1.85	0.58
1:B:353:ARG:HG3	1:B:357:MET:HE3	1.83	0.58
1:A:144:LEU:HD21	1:A:298:THR:HG22	1.86	0.58
1:B:124:GLU:OE2	1:B:352:ARG:NH1	2.35	0.58
1:B:254:ARG:HG2	1:B:405:LEU:HD21	1.87	0.57
1:A:81:ALA:HA	1:A:84:MET:HE2	1.85	0.57
1:A:353:ARG:HG3	1:A:357:MET:HE3	1.87	0.56
1:B:122:GLN:NE2	3:B:601:HOH:O	2.30	0.55
1:B:56:ASP:OD1	1:B:59:ASN:ND2	2.26	0.54
1:B:57:PRO:HG2	1:B:134:GLU:HA	1.89	0.54
1:B:308:LEU:HD13	1:B:315:LEU:HD12	1.90	0.53
1:A:230:MET:HB3	1:A:232:HIS:CD2	2.44	0.52
1:A:370:PRO:O	1:A:374:LEU:HG	2.10	0.52
1:B:97:ILE:HD13	1:B:256:LEU:HB3	1.91	0.52
1:A:124:GLU:OE2	1:A:352:ARG:NH1	2.33	0.52
1:A:362:ILE:O	1:A:366:LEU:HG	2.09	0.52
1:B:76:TRP:CD2	1:B:210:PRO:HA	2.45	0.51
1:B:370:PRO:O	1:B:374:LEU:HG	2.10	0.51
1:A:76:TRP:CD2	1:A:210:PRO:HA	2.45	0.51
1:B:55:MET:O	1:B:323:SER:OG	2.22	0.51
1:A:213:GLN:O	1:A:217:SER:OG	2.27	0.50
1:A:204:VAL:HG11	2:A:504:OLC:H3A	1.94	0.49
1:B:213:GLN:O	1:B:217:SER:OG	2.26	0.49
1:A:88:ILE:HG12	1:A:389:LEU:HD21	1.95	0.49
1:B:81:ALA:HA	1:B:84:MET:HE2	1.94	0.49
1:A:93:ALA:HB2	1:A:237:HIS:ND1	2.28	0.49
1:A:308:LEU:HD13	1:A:315:LEU:HD12	1.95	0.49
1:A:57:PRO:HG2	1:A:134:GLU:HA	1.94	0.48
1:A:236:LEU:HD22	1:A:334:ALA:HB2	1.95	0.48
1:B:150:MET:HB3	1:B:364:ILE:HD12	1.96	0.48
1:A:249:THR:HG23	1:A:252:GLU:H	1.79	0.47
1:B:230:MET:HB3	1:B:232:HIS:CD2	2.50	0.47
1:B:387:PHE:HA	2:B:502:OLC:H9	1.96	0.47
1:B:340:GLN:NE2	1:B:344:GLY:O	2.48	0.47
1:B:301:TYR:HB2	1:B:313:SER:HA	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:144:LEU:HD21	1:B:298:THR:HG22	1.96	0.46
1:B:88:ILE:HG12	1:B:389:LEU:HD21	1.98	0.46
1:A:115:LEU:HD21	2:A:503:OLC:H21	1.98	0.46
1:B:390:VAL:HG11	2:B:502:OLC:H8A	1.97	0.46
1:A:111:TRP:CH2	1:A:391:PRO:HB3	2.51	0.46
1:A:97:ILE:HD13	1:A:256:LEU:HB3	1.98	0.45
1:B:133:ALA:HA	1:B:374:LEU:HD22	1.98	0.45
1:A:416:TRP:HB3	2:A:502:OLC:H6	1.99	0.44
1:A:194:VAL:HG21	1:A:277:SER:HA	1.99	0.44
1:B:236:LEU:HD13	1:B:334:ALA:HA	1.99	0.44
1:B:54:TYR:CE1	1:B:228:THR:HA	2.53	0.44
1:A:398:ARG:HB3	1:A:400:ASP:OD1	2.18	0.44
1:B:46:PRO:HB3	1:B:240:LEU:HB3	2.00	0.43
1:A:119:TYR:O	1:A:122:GLN:HG3	2.19	0.43
1:B:126:VAL:HG11	1:B:231:PRO:HB2	2.00	0.43
1:B:249:THR:HG23	1:B:252:GLU:H	1.83	0.43
1:A:54:TYR:CE1	1:A:228:THR:HA	2.53	0.42
1:A:126:VAL:HG11	1:A:231:PRO:HB2	2.00	0.42
1:B:97:ILE:HG13	1:B:241:THR:HB	2.00	0.42
1:A:421:ILE:HD11	2:A:501:OLC:H16A	2.02	0.42
1:B:115:LEU:HD21	2:B:502:OLC:H4	2.01	0.42
1:A:254:ARG:HG2	1:A:405:LEU:HD21	2.02	0.42
1:B:136:LEU:HD23	1:B:136:LEU:HA	1.81	0.42
1:A:161:THR:O	1:A:165:LEU:HD23	2.20	0.42
1:A:374:LEU:O	1:A:378:GLN:HG2	2.20	0.41
1:B:374:LEU:O	1:B:378:GLN:HG2	2.21	0.41
1:A:102:ASN:ND2	1:A:105:GLU:OE2	2.53	0.41
1:A:301:TYR:HB2	1:A:313:SER:HA	2.02	0.41
1:B:76:TRP:CE2	1:B:210:PRO:HA	2.56	0.41
1:A:80:ALA:O	1:A:84:MET:HG3	2.20	0.41
1:B:110:ARG:HH22	1:B:398:ARG:NH2	2.19	0.41
1:B:111:TRP:CH2	1:B:391:PRO:HB3	2.56	0.40
1:B:119:TYR:HE2	1:B:391:PRO:HG3	1.86	0.40

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	382/445 (86%)	376 (98%)	6 (2%)	0	100	100
1	B	384/445 (86%)	378 (98%)	6 (2%)	0	100	100
All	All	766/890 (86%)	754 (98%)	12 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	298/349 (85%)	298 (100%)	0	100	100
1	B	299/349 (86%)	298 (100%)	1 (0%)	92	97
All	All	597/698 (86%)	596 (100%)	1 (0%)	93	98

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	237	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	260	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

6 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	OLC	A	502	-	19,19,24	0.90	2 (10%)	20,20,25	0.94	1 (5%)
2	OLC	A	501	-	24,24,24	0.82	2 (8%)	25,25,25	0.93	1 (4%)
2	OLC	B	502	-	24,24,24	0.81	2 (8%)	25,25,25	0.95	1 (4%)
2	OLC	A	503	-	17,17,24	0.96	2 (11%)	18,18,25	1.05	1 (5%)
2	OLC	B	501	-	24,24,24	0.81	2 (8%)	25,25,25	0.94	1 (4%)
2	OLC	A	504	-	24,24,24	0.81	2 (8%)	25,25,25	0.91	1 (4%)

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	OLC	A	502	-	-	10/19/19/24	-
2	OLC	A	501	-	-	11/24/24/24	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	OLC	B	502	-	-	7/24/24/24	-
2	OLC	A	503	-	-	9/17/17/24	-
2	OLC	B	501	-	-	8/24/24/24	-
2	OLC	A	504	-	-	10/24/24/24	-

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	503	OLC	O20-C1	2.45	1.40	1.33
2	A	501	OLC	O20-C1	2.45	1.40	1.33
2	A	502	OLC	O20-C1	2.43	1.40	1.33
2	B	501	OLC	O20-C1	2.43	1.40	1.33
2	A	504	OLC	O20-C1	2.41	1.40	1.33
2	B	502	OLC	O20-C1	2.41	1.40	1.33
2	A	504	OLC	O20-C21	-2.12	1.40	1.45
2	B	502	OLC	O20-C21	-2.10	1.40	1.45
2	A	501	OLC	O20-C21	-2.09	1.40	1.45
2	B	501	OLC	O20-C21	-2.08	1.40	1.45
2	A	502	OLC	O20-C21	-2.07	1.40	1.45
2	A	503	OLC	O20-C21	-2.05	1.40	1.45

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	503	OLC	O20-C1-C2	2.64	120.18	111.91
2	B	501	OLC	O20-C1-C2	2.63	120.17	111.91
2	B	502	OLC	O20-C1-C2	2.58	120.01	111.91
2	A	502	OLC	O20-C1-C2	2.51	119.78	111.91
2	A	504	OLC	O20-C1-C2	2.50	119.74	111.91
2	A	501	OLC	O20-C1-C2	2.48	119.68	111.91

There are no chirality outliers.

All (55) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	503	OLC	O20-C21-C22-C24
2	A	504	OLC	O20-C21-C22-C24
2	A	504	OLC	O20-C21-C22-O23
2	B	501	OLC	O20-C21-C22-C24
2	B	501	OLC	O20-C21-C22-O23

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Mol	Chain	Res	Type	Atoms
2	B	502	OLC	C21-C22-C24-O25
2	B	502	OLC	O20-C21-C22-O23
2	B	502	OLC	O19-C1-O20-C21
2	B	502	OLC	C2-C1-O20-C21
2	A	501	OLC	O19-C1-O20-C21
2	A	501	OLC	C2-C1-O20-C21
2	B	502	OLC	O20-C21-C22-C24
2	A	503	OLC	O20-C21-C22-O23
2	A	504	OLC	C1-C2-C3-C4
2	A	502	OLC	O20-C21-C22-O23
2	A	501	OLC	C4-C5-C6-C7
2	A	502	OLC	O20-C21-C22-C24
2	B	501	OLC	C1-C2-C3-C4
2	B	501	OLC	C3-C4-C5-C6
2	A	501	OLC	O20-C21-C22-O23
2	A	504	OLC	C5-C6-C7-C8
2	B	502	OLC	O23-C22-C24-O25
2	A	501	OLC	C10-C11-C12-C13
2	A	501	OLC	C6-C7-C8-C9
2	A	503	OLC	C6-C7-C8-C9
2	A	503	OLC	C1-C2-C3-C4
2	A	502	OLC	C5-C6-C7-C8
2	A	504	OLC	C11-C12-C13-C14
2	A	504	OLC	C15-C16-C17-C18
2	A	501	OLC	C15-C16-C17-C18
2	A	503	OLC	C2-C1-O20-C21
2	A	502	OLC	C1-C2-C3-C4
2	A	502	OLC	C2-C3-C4-C5
2	A	504	OLC	C4-C5-C6-C7
2	A	503	OLC	O19-C1-O20-C21
2	A	503	OLC	C5-C6-C7-C8
2	A	504	OLC	C12-C13-C14-C15
2	A	501	OLC	O23-C22-C24-O25
2	A	501	OLC	C21-C22-C24-O25
2	B	501	OLC	C2-C1-O20-C21
2	A	501	OLC	C5-C6-C7-C8
2	B	501	OLC	O19-C1-O20-C21
2	A	502	OLC	C9-C10-C11-C12
2	A	502	OLC	C10-C11-C12-C13
2	A	503	OLC	C3-C4-C5-C6
2	A	502	OLC	C3-C4-C5-C6
2	A	501	OLC	C12-C13-C14-C15

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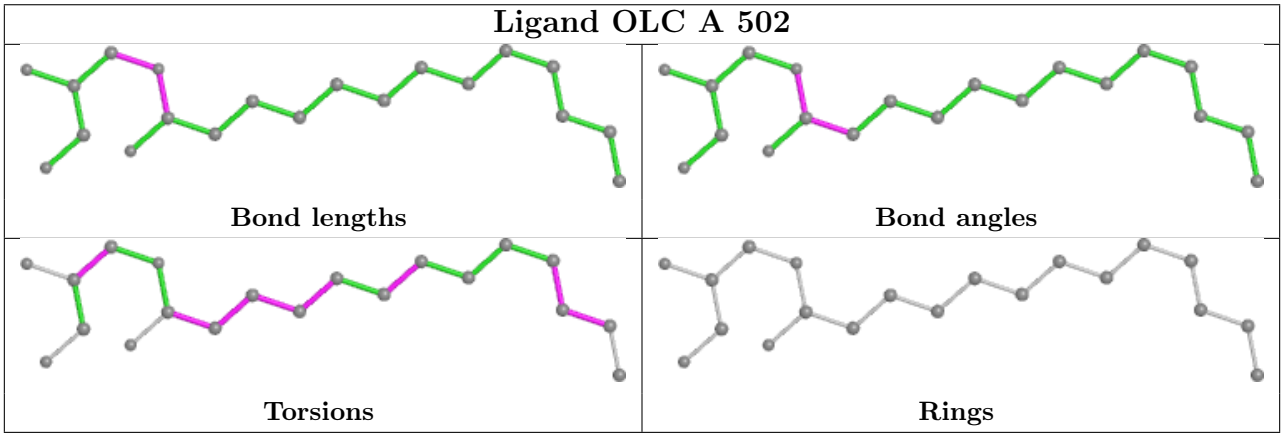
Mol	Chain	Res	Type	Atoms
2	B	501	OLC	C7-C8-C9-C10
2	A	502	OLC	O20-C1-C2-C3
2	A	503	OLC	C7-C8-C9-C10
2	B	502	OLC	C9-C10-C11-C12
2	A	504	OLC	C14-C15-C16-C17
2	B	501	OLC	C2-C3-C4-C5
2	A	502	OLC	O19-C1-C2-C3
2	A	504	OLC	O20-C1-C2-C3

There are no ring outliers.

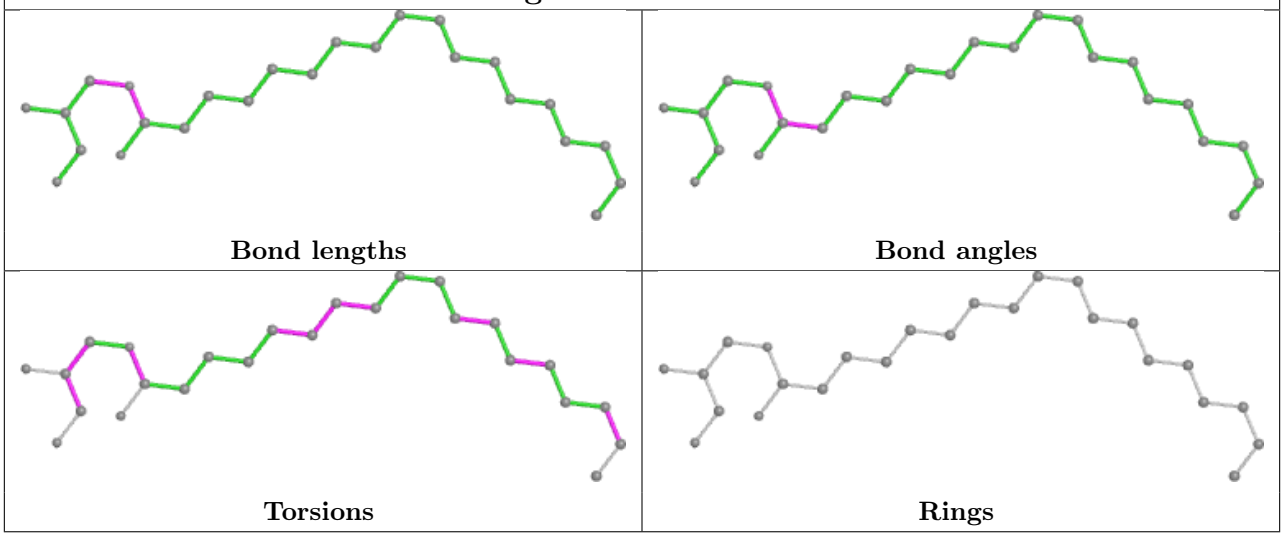
5 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	502	OLC	1	0
2	A	501	OLC	2	0
2	B	502	OLC	3	0
2	A	503	OLC	1	0
2	A	504	OLC	1	0

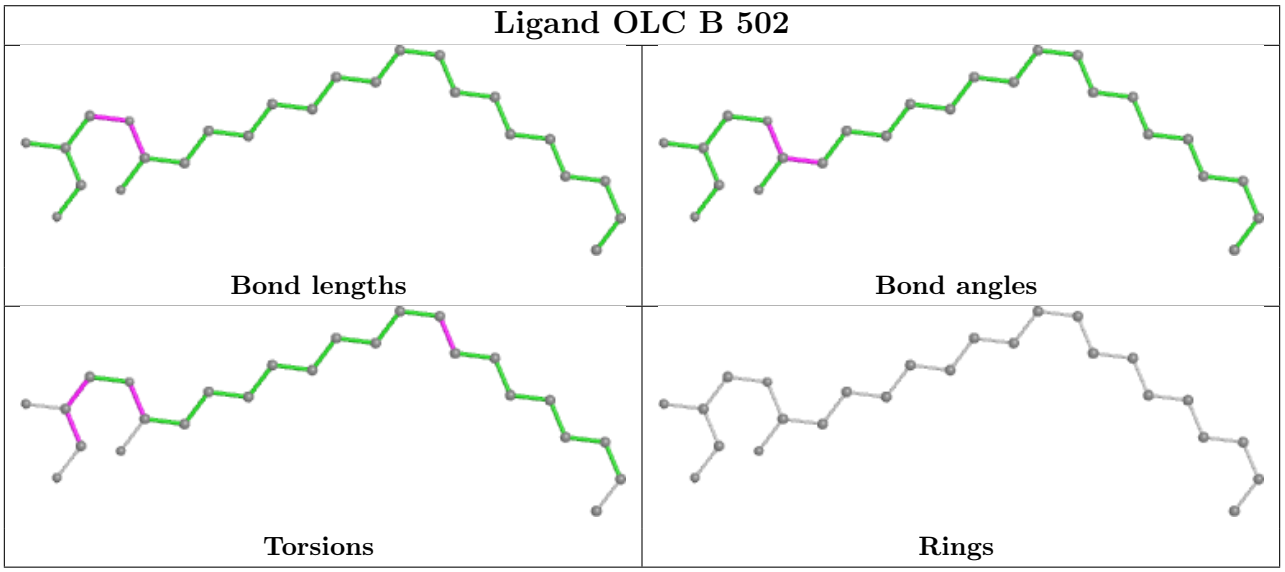
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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



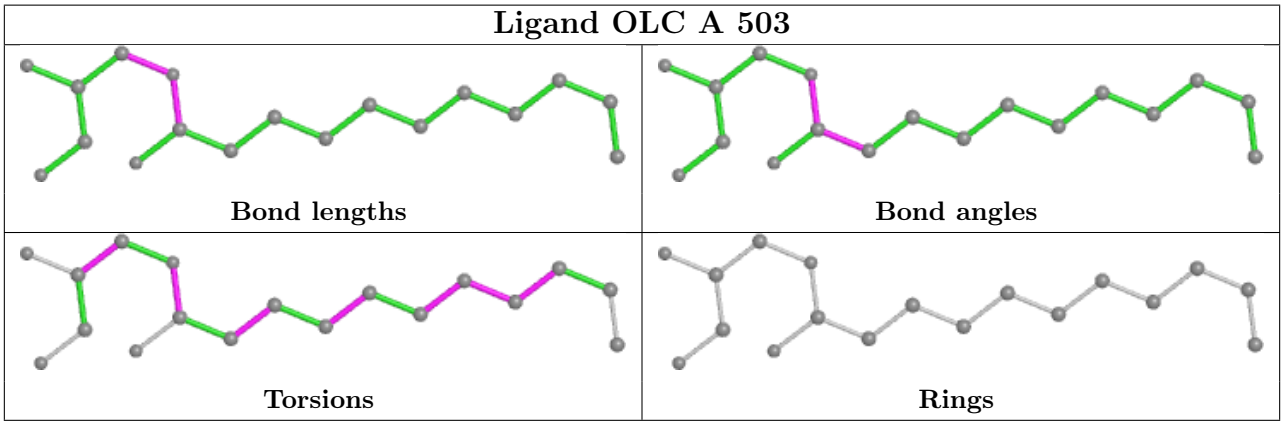
Ligand OLC A 501

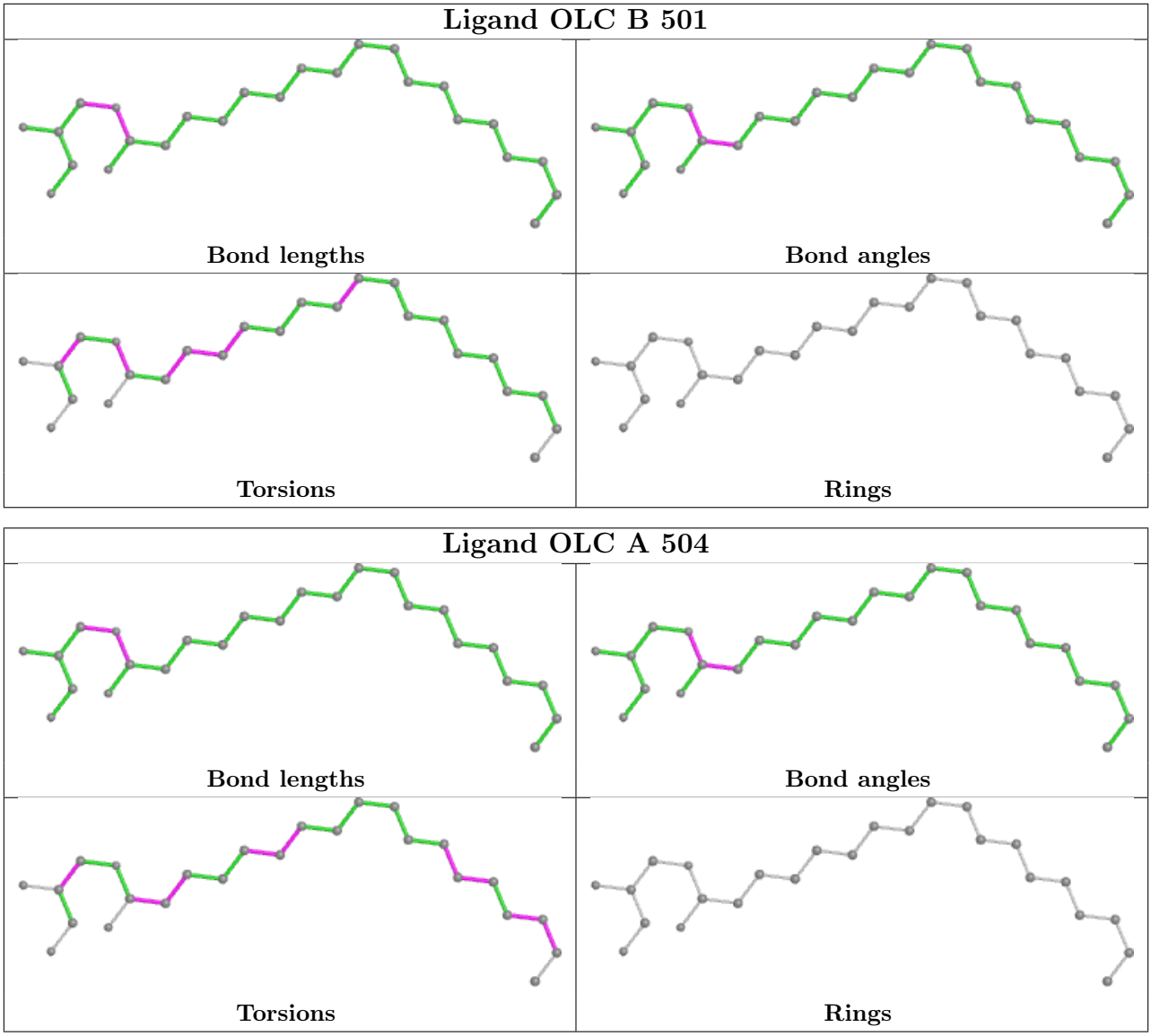


Ligand OLC B 502



Ligand OLC A 503





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^{th} 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	386/445 (86%)	0.22	24 (6%)	20	12	34, 53, 106, 152	0
1	B	388/445 (87%)	0.21	23 (5%)	22	13	32, 56, 99, 142	0
All	All	774/890 (86%)	0.22	47 (6%)	21	12	32, 55, 105, 152	0

All (47) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	244	ARG	12.4
1	B	44	LEU	7.0
1	B	168	GLN	6.8
1	A	174	PRO	6.3
1	B	247	THR	6.0
1	A	243	GLY	5.8
1	B	174	PRO	5.5
1	B	175	LEU	4.7
1	A	247	THR	4.7
1	A	250	THR	4.5
1	B	177	LEU	4.3
1	A	165	LEU	4.3
1	A	254	ARG	4.2
1	A	365	LEU	4.1
1	B	254	ARG	4.1
1	B	176	GLU	4.1
1	B	165	LEU	3.8
1	A	246	GLN	3.7
1	A	245	ILE	3.7
1	A	346	HIS	3.7
1	B	246	GLN	3.6
1	A	167	LEU	3.3
1	B	167	LEU	3.3
1	B	248	ASP	3.3

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Mol	Chain	Res	Type	RSRZ
1	A	163	TRP	3.2
1	B	243	GLY	3.1
1	A	176	GLU	3.1
1	A	164	LEU	3.0
1	B	346	HIS	2.9
1	B	292	GLU	2.9
1	A	251	GLU	2.8
1	B	366	LEU	2.8
1	A	178	ALA	2.7
1	A	292	GLU	2.7
1	A	248	ASP	2.7
1	B	162	PHE	2.6
1	B	244	ARG	2.5
1	A	166	ASN	2.4
1	B	149	PRO	2.3
1	A	48	VAL	2.3
1	B	250	THR	2.2
1	B	213	GLN	2.2
1	B	211	ARG	2.2
1	A	366	LEU	2.2
1	B	182	PHE	2.1
1	A	405	LEU	2.1
1	A	333	MET	2.0

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

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} 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.

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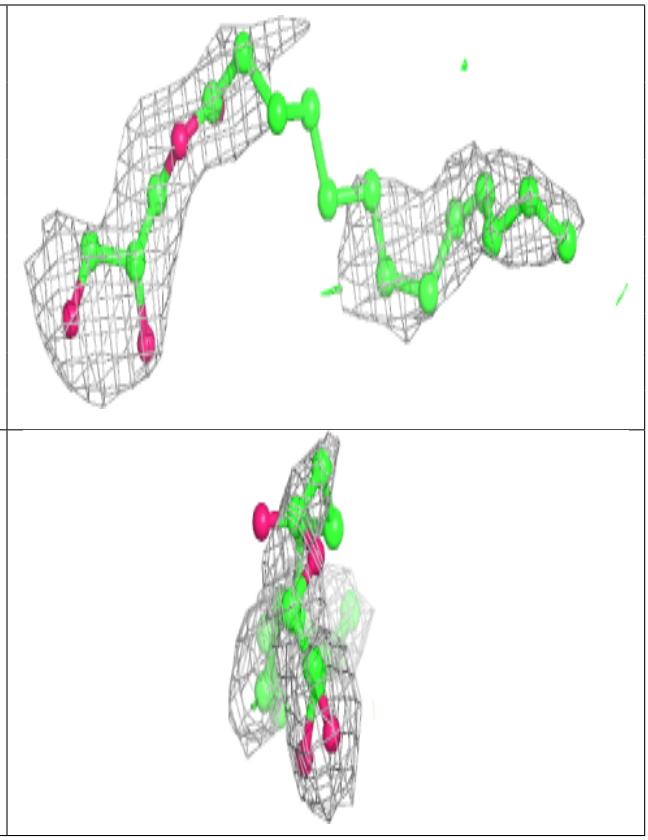
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9

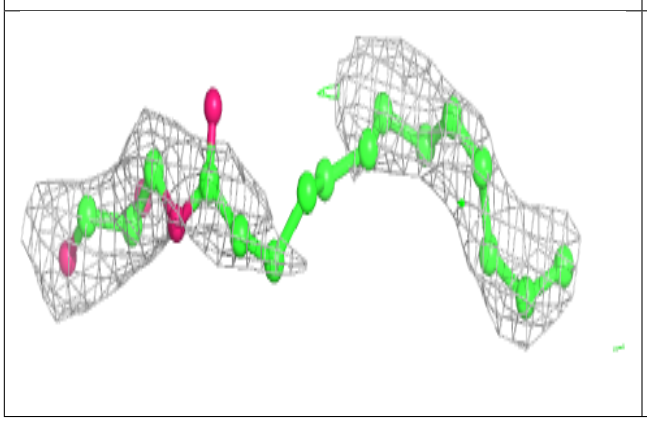
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	OLC	A	502	20/25	0.77	0.35	52,66,78,83	0
2	OLC	B	501	25/25	0.79	0.54	40,56,71,81	0
2	OLC	A	504	25/25	0.80	0.53	37,62,81,87	0
2	OLC	B	502	25/25	0.80	0.34	43,60,94,97	0
2	OLC	A	503	18/25	0.81	0.32	61,68,76,77	0
2	OLC	A	501	25/25	0.81	0.29	55,72,85,89	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 OLC A 502:

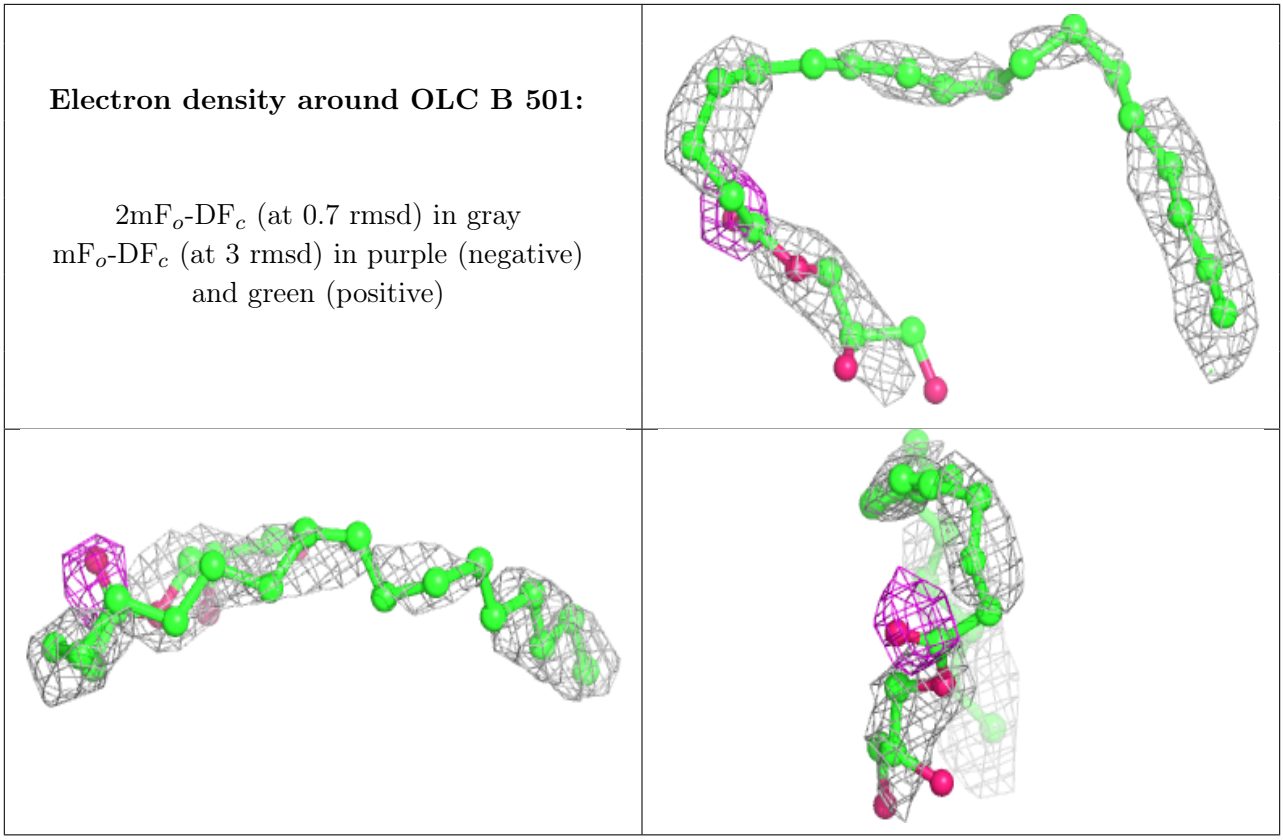
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)





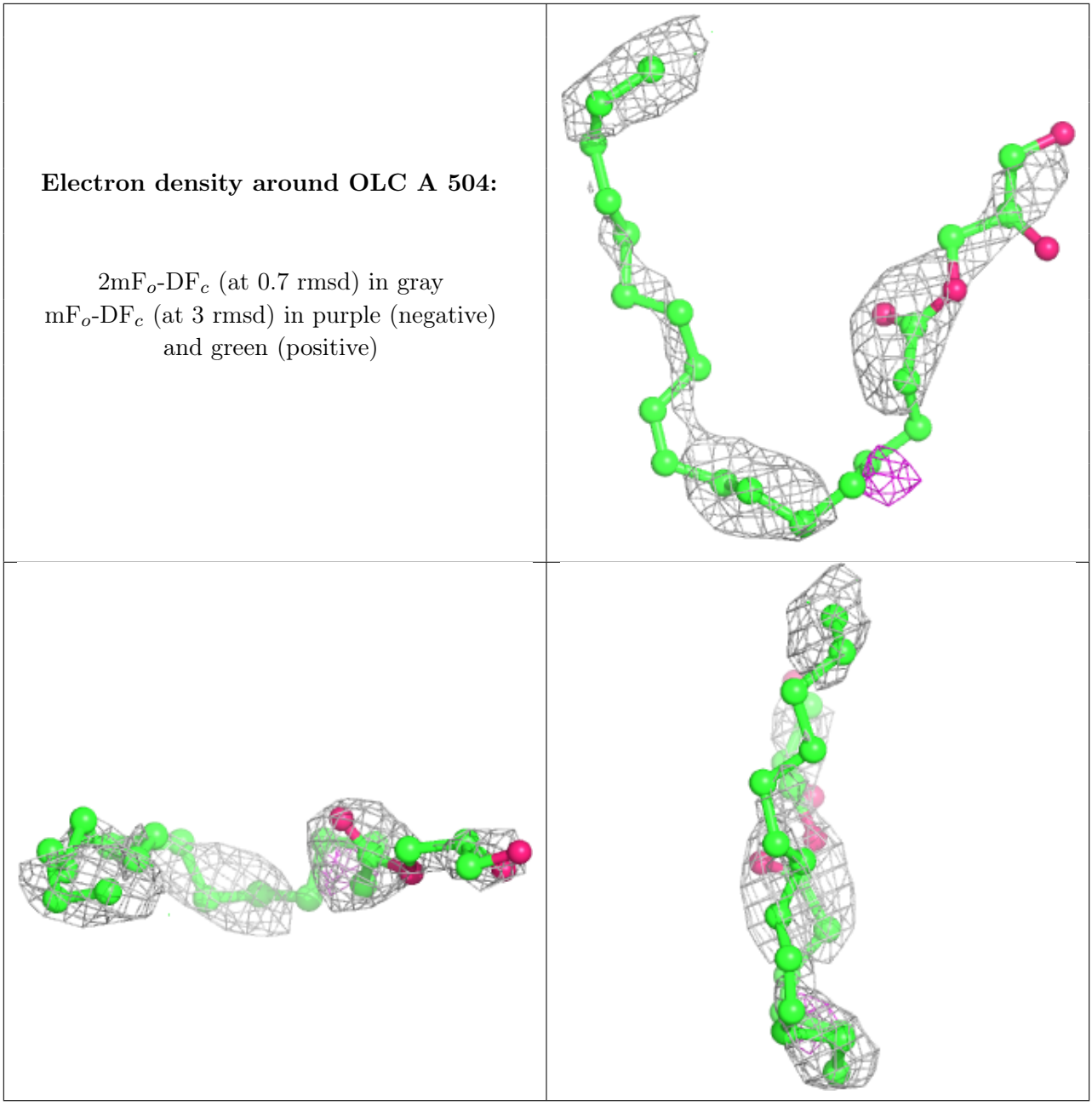
Electron density around OLC B 501:

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



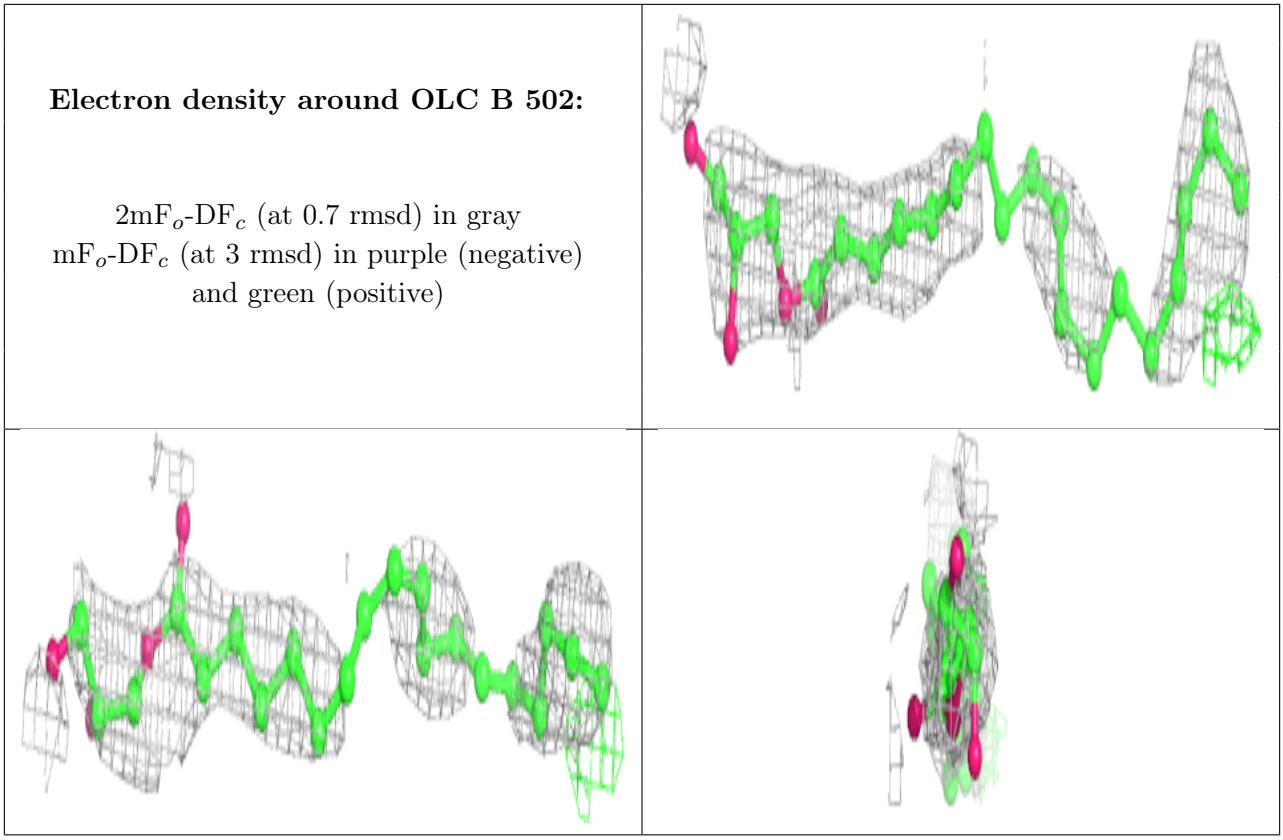
Electron density around OLC A 504:

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



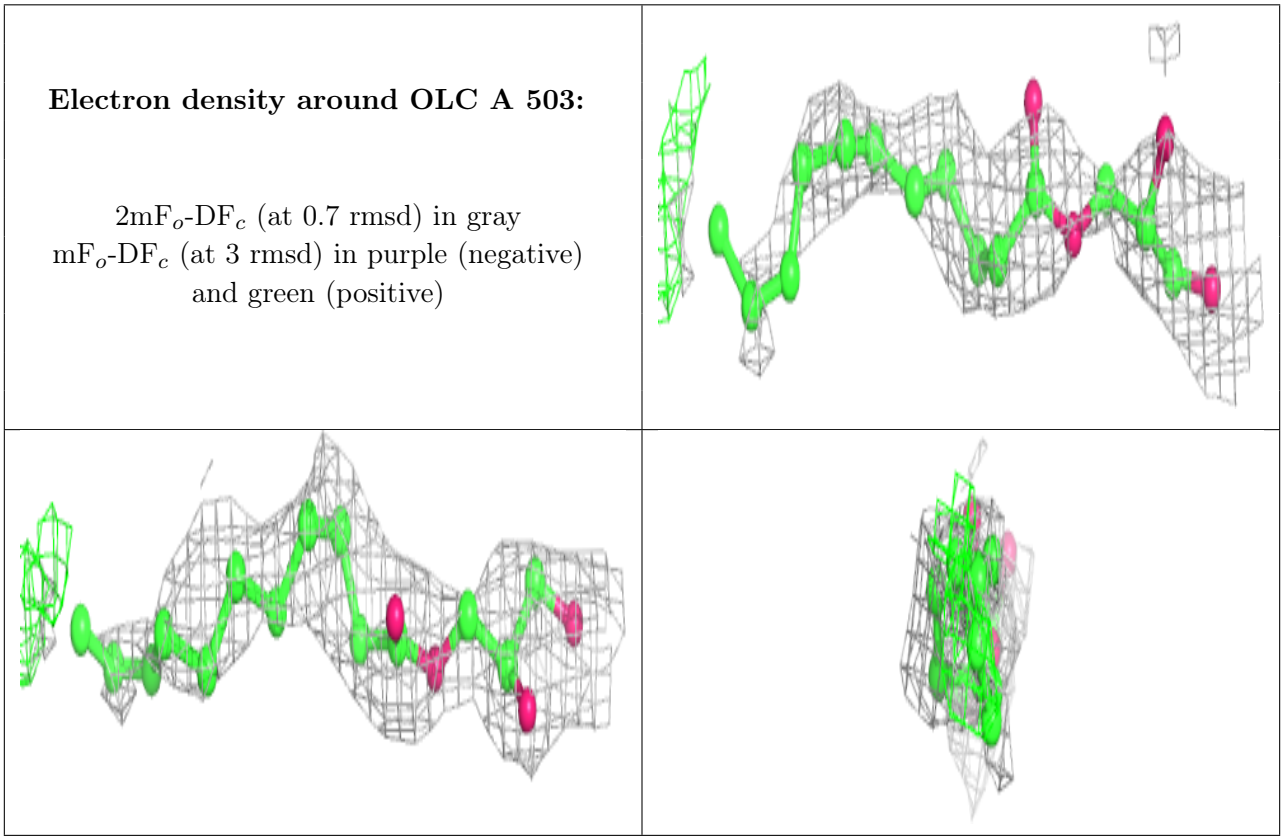
Electron density around OLC B 502:

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



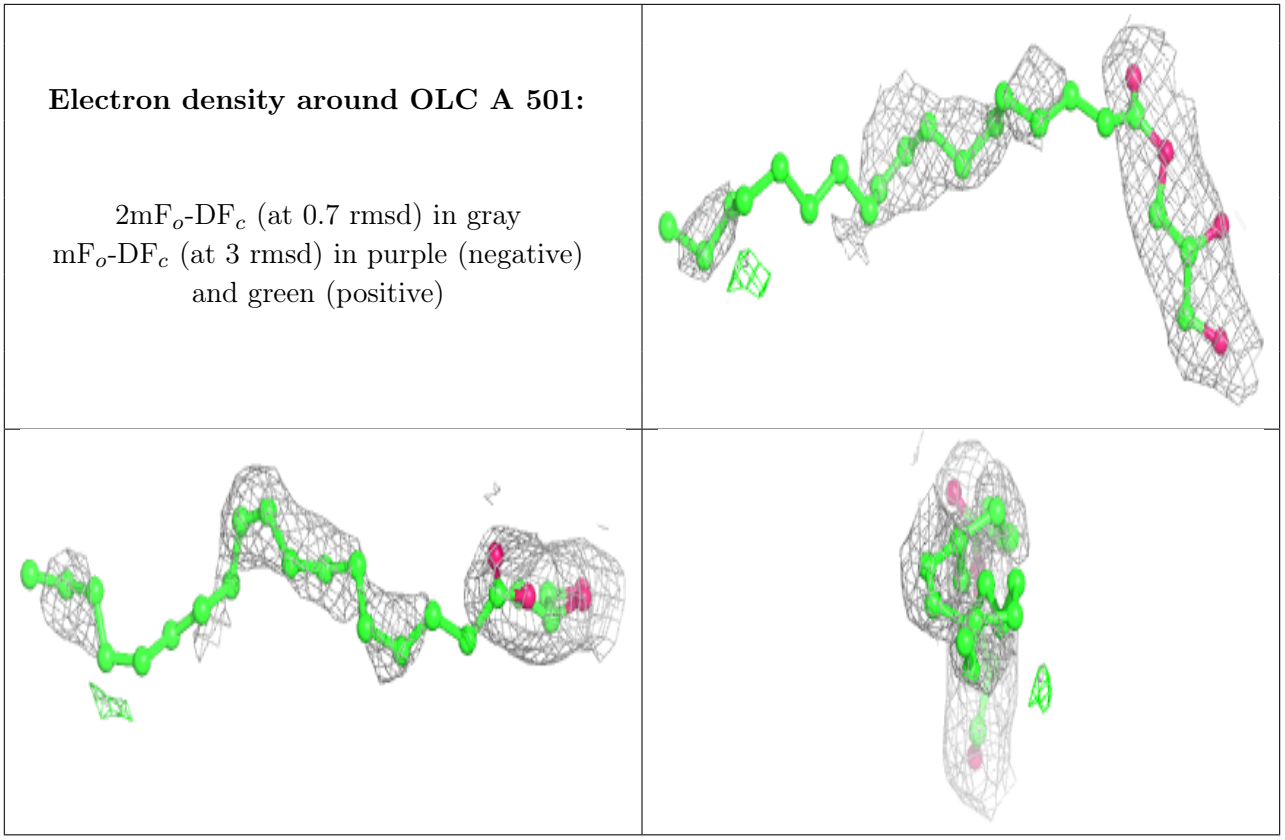
Electron density around OLC A 503:

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



Electron density around OLC 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)



6.5 Other polymers (i)

There are no such residues in this entry.