wwPDB X-ray Structure Validation Summary Report (i)

Feb 17, 2024 – 12:58 PM EST

PDB ID	:	3SUD
Title	:	Crystal structure of NS3/4A protease in complex with MK-5172
Authors	:	Schiffer, C.A.; Romano, K.P.
Deposited on	:	2011-07-11
Resolution	:	1.96 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 (i) 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 (i)) were used in the production of this report:

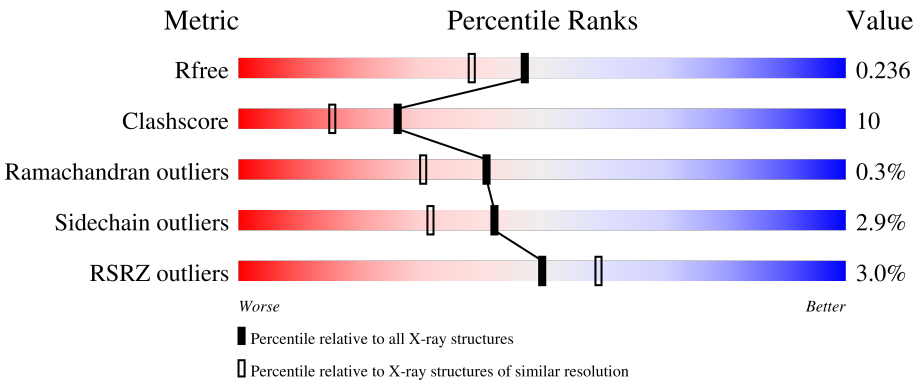
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (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 1.96 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	2580 (1.96-1.96)
Clashscore	141614	2705 (1.96-1.96)
Ramachandran outliers	138981	2678 (1.96-1.96)
Sidechain outliers	138945	2678 (1.96-1.96)
RSRZ outliers	127900	2539 (1.96-1.96)

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 <=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	203	2% 82% 12% 6%
1	B	203	% 81% 12% • 6%
1	C	203	4% 71% 19% • 8%
1	D	203	4% 76% 17% 6%

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	SUE	A	1201	X	-	-	-
2	SUE	B	1201	X	-	-	-
2	SUE	C	1201	X	-	-	-
2	SUE	D	1201	X	-	-	-
4	ZN	A	1203	-	-	X	-

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 5763 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 NS3 protease, NS4A protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	191	1347	841	234	266	6	0	2	0
1	B	191	1346	839	238	263	6	0	0	0
1	C	187	1320	820	241	254	5	0	1	0
1	D	191	1330	829	235	260	6	0	0	0

There are 112 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	980	GLY	-	expression tag	UNP A8DG50
A	981	SER	-	expression tag	UNP A8DG50
A	982	HIS	-	expression tag	UNP A8DG50
A	983	MET	-	expression tag	UNP A8DG50
A	984	ALA	-	expression tag	UNP A8DG50
A	985	SER	-	expression tag	UNP A8DG50
A	986	MET	CYS	engineered mutation	UNP A8DG50
A	987	LYS	LEU	engineered mutation	UNP A8DG50
A	988	LYS	SER	engineered mutation	UNP A8DG50
A	989	LYS	THR	engineered mutation	UNP A8DG50
A	991	SER	CYS	SEE REMARK 999	UNP A8DG50
A	998	ILE	VAL	SEE REMARK 999	UNP A8DG50
A	999	ASN	ILE	SEE REMARK 999	UNP A8DG50
A	1001	SER	ALA	engineered mutation	UNP A8DG50
A	1002	GLY	PRO	engineered mutation	UNP A8DG50
A	1003	ASP	ILE	engineered mutation	UNP A8DG50
A	1013	GLU	LEU	engineered mutation	UNP A8DG50
A	1014	GLU	LEU	engineered mutation	UNP A8DG50
A	1017	GLN	ILE	engineered mutation	UNP A8DG50
A	1018	GLU	ILE	engineered mutation	UNP A8DG50
A	1021	GLN	LEU	engineered mutation	UNP A8DG50

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Chain	Residue	Modelled	Actual	Comment	Reference
A	1040	THR	ALA	engineered mutation	UNP A8DG50
A	1047	SER	CYS	engineered mutation	UNP A8DG50
A	1052	LEU	CYS	engineered mutation	UNP A8DG50
A	1072	THR	ILE	engineered mutation	UNP A8DG50
A	1086	GLN	PRO	engineered mutation	UNP A8DG50
A	1139	ALA	SER	engineered mutation	UNP A8DG50
A	1159	SER	CYS	engineered mutation	UNP A8DG50
B	980	GLY	-	expression tag	UNP A8DG50
B	981	SER	-	expression tag	UNP A8DG50
B	982	HIS	-	expression tag	UNP A8DG50
B	983	MET	-	expression tag	UNP A8DG50
B	984	ALA	-	expression tag	UNP A8DG50
B	985	SER	-	expression tag	UNP A8DG50
B	986	MET	CYS	engineered mutation	UNP A8DG50
B	987	LYS	LEU	engineered mutation	UNP A8DG50
B	988	LYS	SER	engineered mutation	UNP A8DG50
B	989	LYS	THR	engineered mutation	UNP A8DG50
B	991	SER	CYS	SEE REMARK 999	UNP A8DG50
B	998	ILE	VAL	SEE REMARK 999	UNP A8DG50
B	999	ASN	ILE	SEE REMARK 999	UNP A8DG50
B	1001	SER	ALA	engineered mutation	UNP A8DG50
B	1002	GLY	PRO	engineered mutation	UNP A8DG50
B	1003	ASP	ILE	engineered mutation	UNP A8DG50
B	1013	GLU	LEU	engineered mutation	UNP A8DG50
B	1014	GLU	LEU	engineered mutation	UNP A8DG50
B	1017	GLN	ILE	engineered mutation	UNP A8DG50
B	1018	GLU	ILE	engineered mutation	UNP A8DG50
B	1021	GLN	LEU	engineered mutation	UNP A8DG50
B	1040	THR	ALA	engineered mutation	UNP A8DG50
B	1047	SER	CYS	engineered mutation	UNP A8DG50
B	1052	LEU	CYS	engineered mutation	UNP A8DG50
B	1072	THR	ILE	engineered mutation	UNP A8DG50
B	1086	GLN	PRO	engineered mutation	UNP A8DG50
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B	1159	SER	CYS	engineered mutation	UNP A8DG50
C	980	GLY	-	expression tag	UNP A8DG50
C	981	SER	-	expression tag	UNP A8DG50
C	982	HIS	-	expression tag	UNP A8DG50
C	983	MET	-	expression tag	UNP A8DG50
C	984	ALA	-	expression tag	UNP A8DG50
C	985	SER	-	expression tag	UNP A8DG50
C	986	MET	CYS	engineered mutation	UNP A8DG50

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Chain	Residue	Modelled	Actual	Comment	Reference
C	987	LYS	LEU	engineered mutation	UNP A8DG50
C	988	LYS	SER	engineered mutation	UNP A8DG50
C	989	LYS	THR	engineered mutation	UNP A8DG50
C	991	SER	CYS	SEE REMARK 999	UNP A8DG50
C	998	ILE	VAL	SEE REMARK 999	UNP A8DG50
C	999	ASN	ILE	SEE REMARK 999	UNP A8DG50
C	1001	SER	ALA	engineered mutation	UNP A8DG50
C	1002	GLY	PRO	engineered mutation	UNP A8DG50
C	1003	ASP	ILE	engineered mutation	UNP A8DG50
C	1013	GLU	LEU	engineered mutation	UNP A8DG50
C	1014	GLU	LEU	engineered mutation	UNP A8DG50
C	1017	GLN	ILE	engineered mutation	UNP A8DG50
C	1018	GLU	ILE	engineered mutation	UNP A8DG50
C	1021	GLN	LEU	engineered mutation	UNP A8DG50
C	1040	THR	ALA	engineered mutation	UNP A8DG50
C	1047	SER	CYS	engineered mutation	UNP A8DG50
C	1052	LEU	CYS	engineered mutation	UNP A8DG50
C	1072	THR	ILE	engineered mutation	UNP A8DG50
C	1086	GLN	PRO	engineered mutation	UNP A8DG50
C	1139	ALA	SER	engineered mutation	UNP A8DG50
C	1159	SER	CYS	engineered mutation	UNP A8DG50
D	980	GLY	-	expression tag	UNP A8DG50
D	981	SER	-	expression tag	UNP A8DG50
D	982	HIS	-	expression tag	UNP A8DG50
D	983	MET	-	expression tag	UNP A8DG50
D	984	ALA	-	expression tag	UNP A8DG50
D	985	SER	-	expression tag	UNP A8DG50
D	986	MET	CYS	engineered mutation	UNP A8DG50
D	987	LYS	LEU	engineered mutation	UNP A8DG50
D	988	LYS	SER	engineered mutation	UNP A8DG50
D	989	LYS	THR	engineered mutation	UNP A8DG50
D	991	SER	CYS	SEE REMARK 999	UNP A8DG50
D	998	ILE	VAL	SEE REMARK 999	UNP A8DG50
D	999	ASN	ILE	SEE REMARK 999	UNP A8DG50
D	1001	SER	ALA	engineered mutation	UNP A8DG50
D	1002	GLY	PRO	engineered mutation	UNP A8DG50
D	1003	ASP	ILE	engineered mutation	UNP A8DG50
D	1013	GLU	LEU	engineered mutation	UNP A8DG50
D	1014	GLU	LEU	engineered mutation	UNP A8DG50
D	1017	GLN	ILE	engineered mutation	UNP A8DG50
D	1018	GLU	ILE	engineered mutation	UNP A8DG50
D	1021	GLN	LEU	engineered mutation	UNP A8DG50

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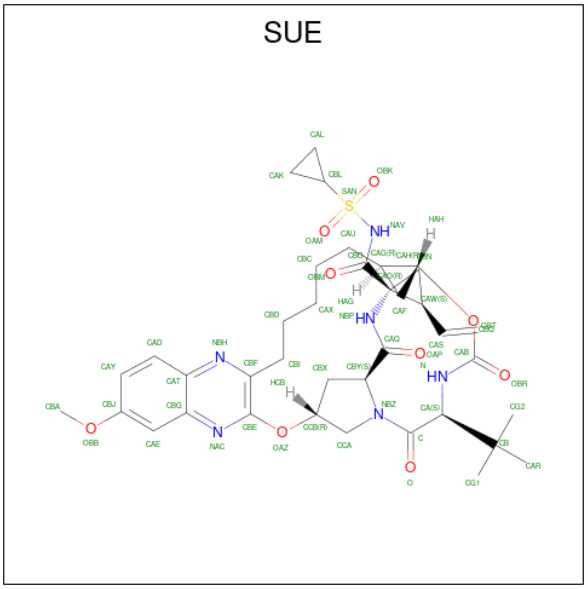
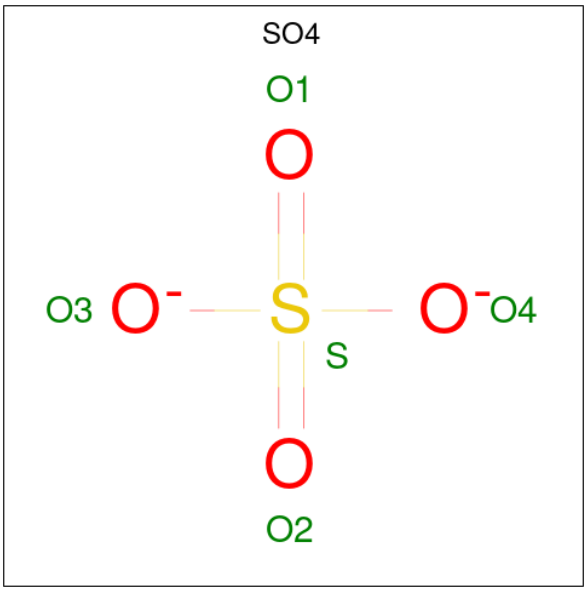
Chain	Residue	Modelled	Actual	Comment	Reference
D	1040	THR	ALA	engineered mutation	UNP A8DG50
D	1047	SER	CYS	engineered mutation	UNP A8DG50
D	1052	LEU	CYS	engineered mutation	UNP A8DG50
D	1072	THR	ILE	engineered mutation	UNP A8DG50
D	1086	GLN	PRO	engineered mutation	UNP A8DG50
D	1139	ALA	SER	engineered mutation	UNP A8DG50
D	1159	SER	CYS	engineered mutation	UNP A8DG50

- Molecule 2 is (1aR,5S,8S,10R,22aR)-5-tert-butyl-N-{(1R,2S)-1-[(cyclopropylsulfonyl)carbamoyl]-2-ethenylcyclopropyl}-14-methoxy-3,6-di oxo-1,1a,3,4,5,6,9,10,18,19,20,21,22,22a-tetradecahydro-8H-7,10-methanocyclopropa[18,19][1,10,3,6]dioxadiazacyclononadec ino[11,12-b]quinoxaline-8-carboxamide (three-letter code: SUE) (formula: $C_{38}H_{50}N_6O_9S$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
2	A	1	54	38	6	9	1	0	0
2	B	1	54	38	6	9	1	0	0
2	C	1	54	38	6	9	1	0	0
2	D	1	54	38	6	9	1	0	0

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total O S 5 4 1	0	0

- Molecule 4 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total Zn 1 1	0	0
4	B	1	Total Zn 1 1	0	0
4	C	1	Total Zn 1 1	0	0
4	D	1	Total Zn 1 1	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	50	Total O 50 50	0	0
5	B	56	Total O 56 56	0	0
5	C	46	Total O 47 47	0	1
5	D	42	Total O 42 42	0	0

3 Residue-property plots (i)

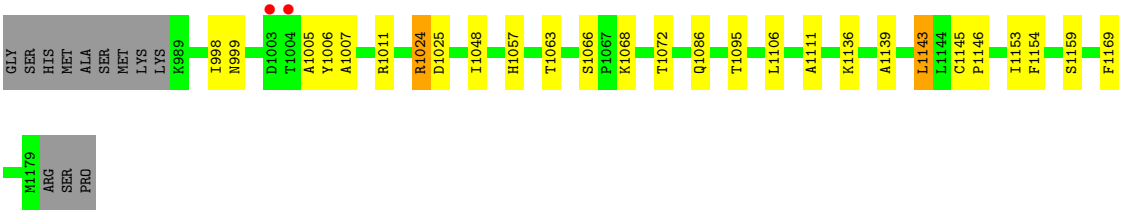
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: NS3 protease, NS4A protein

Chain A:

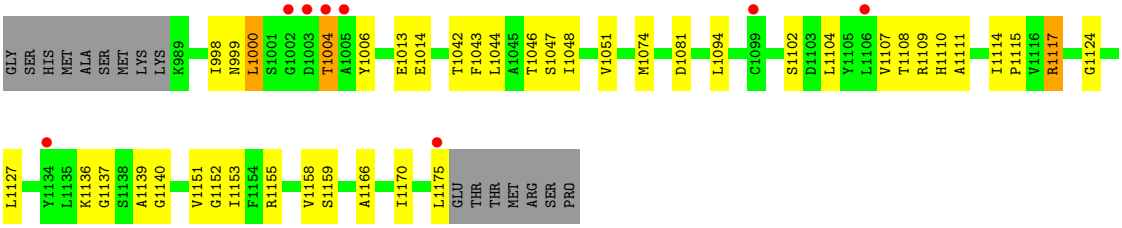
• Molecule 1: NS3 protease, NS4A protein

Chain B:



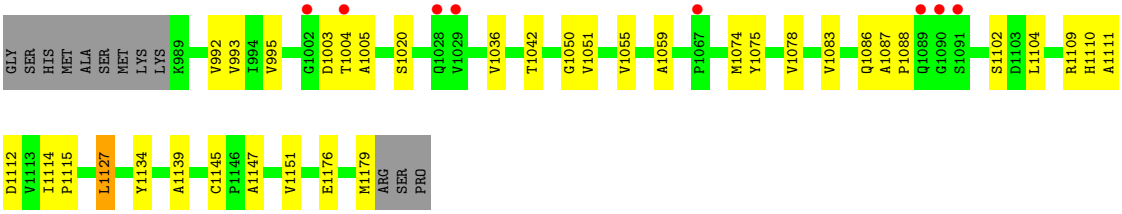
• Molecule 1: NS3 protease, NS4A protein

Chain C:



• Molecule 1: NS3 protease, NS4A protein

Chain D:


GLY
SER
HIS
MET
ALA
SER
MET
LYS
LYS
K989
V992
V993
I994
V995
G1002
D1003
T1004
A1005
S1020
Q1028
V1029
V1036
T1042
G1050
V1051
V1055
A1059
P1067
M1074
Y1075
V1078
V1083
Q1086
A1087
P1088
Q1089
G1090
S1091
S1102
D1103
L1104
R1109
H1110
A1111
D1112
V1113
I1114
P1115
L1127
Y1134
A1139
C1145
P1146
A1147
V1151
E1176
M1179
ARG
SER
PRO

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	56.13Å 102.70Å 73.29Å 90.00° 112.54° 90.00°	Depositor
Resolution (Å)	36.48 – 1.96 36.48 – 1.96	Depositor EDS
% Data completeness (in resolution range)	91.3 (36.48-1.96) 91.4 (36.48-1.96)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.77 (at 1.97Å)	Xtriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.184 , 0.237 0.189 , 0.236	Depositor DCC
R_{free} test set	2543 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å^2)	24.4	Xtriage
Anisotropy	0.515	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 22.9	EDS
L-test for twinning[2]	$< \|L\| > = 0.40$, $< L^2 > = 0.22$	Xtriage
Estimated twinning fraction	0.417 for h,-k,-h-l	Xtriage
Reported twinning fraction	0.548 for H, K, L 0.452 for -H, -K, H+L	Depositor
Outliers	0 of 50189 reflections	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	5763	wwPDB-VP
Average B, all atoms (Å^2)	29.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.36% of the height of the origin peak. No significant pseudotranslation is detected.*

[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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: SUE, SO4, ZN

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	0.61	1/1377 (0.1%)	0.67	0/1884
1	B	0.61	0/1370	0.64	0/1874
1	C	0.64	0/1346	0.73	1/1841 (0.1%)
1	D	0.47	0/1354	0.63	0/1854
All	All	0.59	1/5447 (0.0%)	0.67	1/7453 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	1053	TRP	CD2-CE2	5.13	1.47	1.41

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	1000	LEU	CB-CG-CD1	5.29	120.00	111.00

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1347	0	1304	27	0
1	B	1346	0	1303	19	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	1320	0	1281	47	0
1	D	1330	0	1274	25	0
2	A	54	0	49	3	0
2	B	54	0	50	7	0
2	C	54	0	49	2	0
2	D	54	0	49	2	0
3	A	5	0	0	0	0
4	A	1	0	0	2	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
5	A	50	0	0	2	0
5	B	56	0	0	0	0
5	C	47	0	0	0	0
5	D	42	0	0	0	0
All	All	5763	0	5359	114	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 10.

The worst 5 of 114 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:C:1051:VAL:CG2	1:C:1074:MET:CE	2.44	0.95
1:C:1051:VAL:HG22	1:C:1074:MET:CE	1.98	0.93
1:C:1051:VAL:CG2	1:C:1074:MET:HE2	1.99	0.91
1:A:1097:CYS:HG	4:A:1203:ZN:ZN	0.71	0.91
1:B:1057:HIS:CD2	2:B:1201:SUE:HAL	2.13	0.84

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	191/203 (94%)	186 (97%)	5 (3%)	0	100	100
1	B	189/203 (93%)	185 (98%)	3 (2%)	1 (0%)	29	17
1	C	186/203 (92%)	182 (98%)	4 (2%)	0	100	100
1	D	189/203 (93%)	177 (94%)	11 (6%)	1 (0%)	29	17
All	All	755/812 (93%)	730 (97%)	23 (3%)	2 (0%)	41	30

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	1004	THR
1	B	1136	LYS

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	140/164 (85%)	136 (97%)	4 (3%)	42	31
1	B	139/164 (85%)	134 (96%)	5 (4%)	35	23
1	C	135/164 (82%)	130 (96%)	5 (4%)	34	22
1	D	135/164 (82%)	132 (98%)	3 (2%)	52	44
All	All	549/656 (84%)	532 (97%)	17 (3%)	42	28

5 of 17 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	1020	SER
1	D	1127	LEU
1	B	1143	LEU
1	B	1159	SER
1	C	1000	LEU

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

Mol	Chain	Res	Type
1	A	1027	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 9 ligands modelled in this entry, 4 are monoatomic - leaving 5 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	$\#\|Z\| > 2$
2	SUE	C	1201	-	54,60,60	2.55	18 (33%)	73,92,92	2.94	22 (30%)
2	SUE	D	1201	-	54,60,60	2.24	12 (22%)	73,92,92	2.37	21 (28%)
2	SUE	A	1201	-	54,60,60	2.07	10 (18%)	73,92,92	2.32	19 (26%)
2	SUE	B	1201	-	54,60,60	2.59	14 (25%)	73,92,92	2.52	14 (19%)
3	SO4	A	1202	-	4,4,4	0.16	0	6,6,6	2.48	2 (33%)

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	SUE	C	1201	-	1/1/15/19	8/61/91/91	0/6/7/7
2	SUE	D	1201	-	1/1/15/19	8/61/91/91	0/6/7/7
2	SUE	A	1201	-	1/1/15/19	9/61/91/91	0/6/7/7
2	SUE	B	1201	-	1/1/15/19	6/61/91/91	0/6/7/7

The worst 5 of 54 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1201	SUE	CA-C	-9.30	1.40	1.53
2	B	1201	SUE	OBK-SAN	9.27	1.53	1.43
2	D	1201	SUE	CA-C	-9.26	1.40	1.53
2	C	1201	SUE	CA-C	-7.65	1.42	1.53
2	B	1201	SUE	OAM-SAN	7.20	1.51	1.43

The worst 5 of 78 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	1201	SUE	OBK-SAN-OAM	-18.34	105.48	119.24
2	B	1201	SUE	OBK-SAN-OAM	-16.53	106.84	119.24
2	D	1201	SUE	OBK-SAN-OAM	-11.57	110.56	119.24
2	A	1201	SUE	OBK-SAN-OAM	-10.39	111.45	119.24
2	C	1201	SUE	OBT-CAB-N	6.69	119.00	110.32

All (4) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
2	A	1201	SUE	NBZ
2	B	1201	SUE	NBZ
2	C	1201	SUE	NBZ
2	D	1201	SUE	NBZ

5 of 31 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1201	SUE	CBO-NAV-SAN-CBL
2	A	1201	SUE	NAC-CBE-OAZ-CCB
2	A	1201	SUE	CBF-CBE-OAZ-CCB
2	B	1201	SUE	CBO-NAV-SAN-CBL
2	B	1201	SUE	CBQ-CAS-CAW-CBN

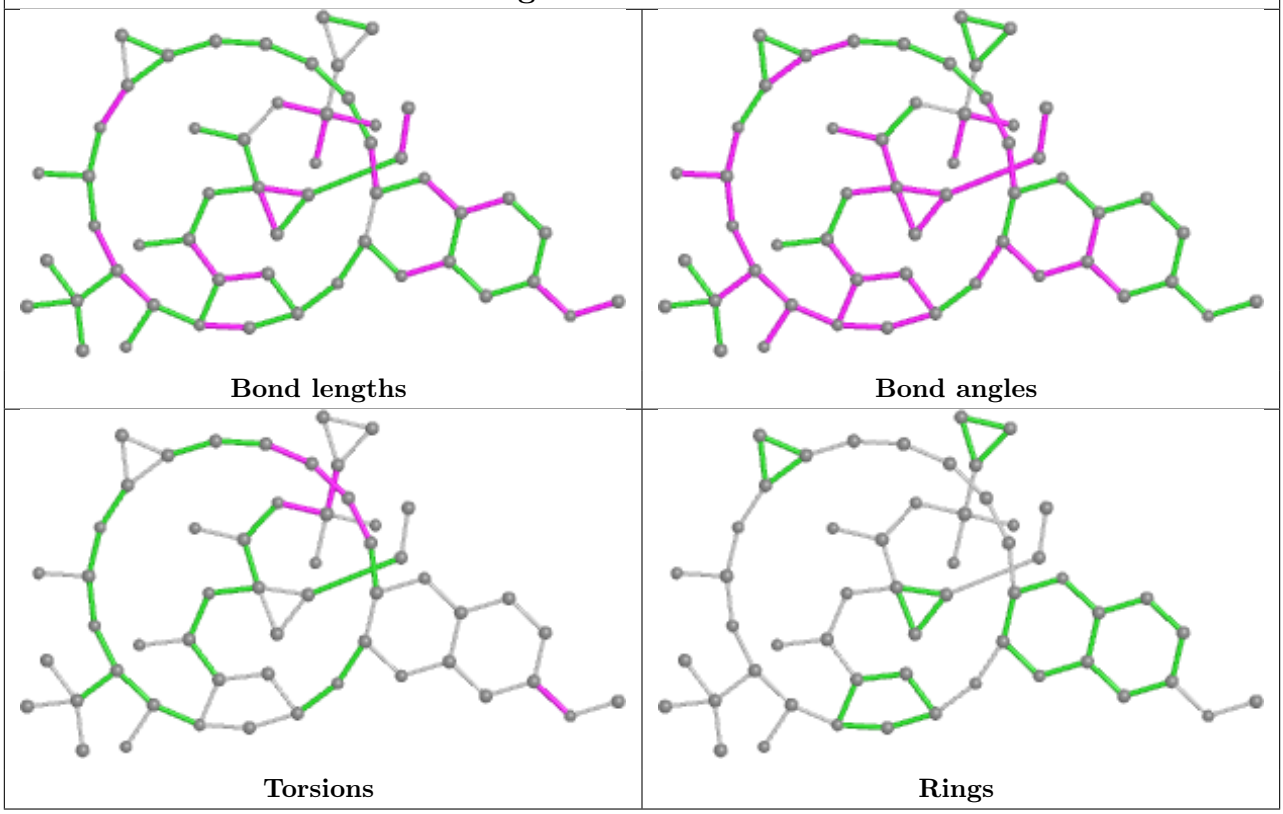
There are no ring outliers.

4 monomers are involved in 14 short contacts:

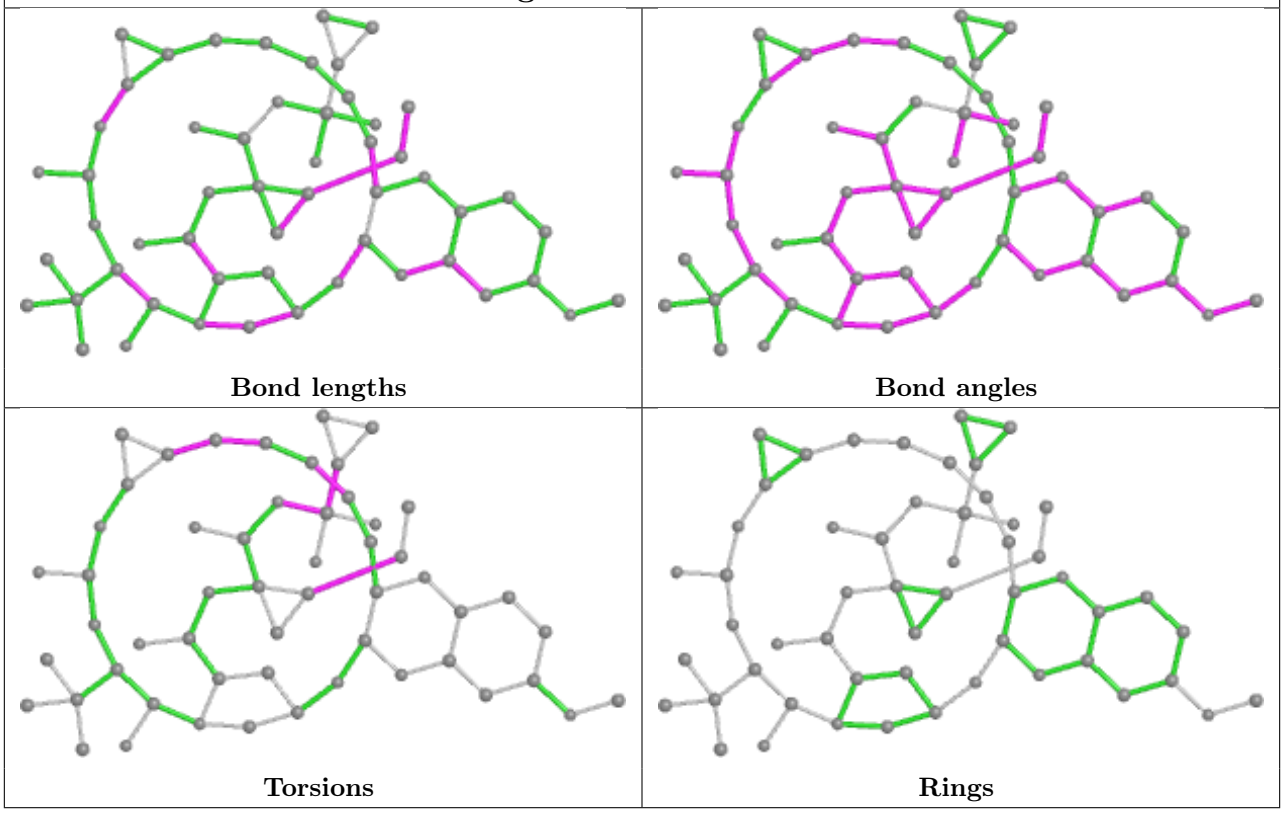
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	1201	SUE	2	0
2	D	1201	SUE	2	0
2	A	1201	SUE	3	0
2	B	1201	SUE	7	0

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.

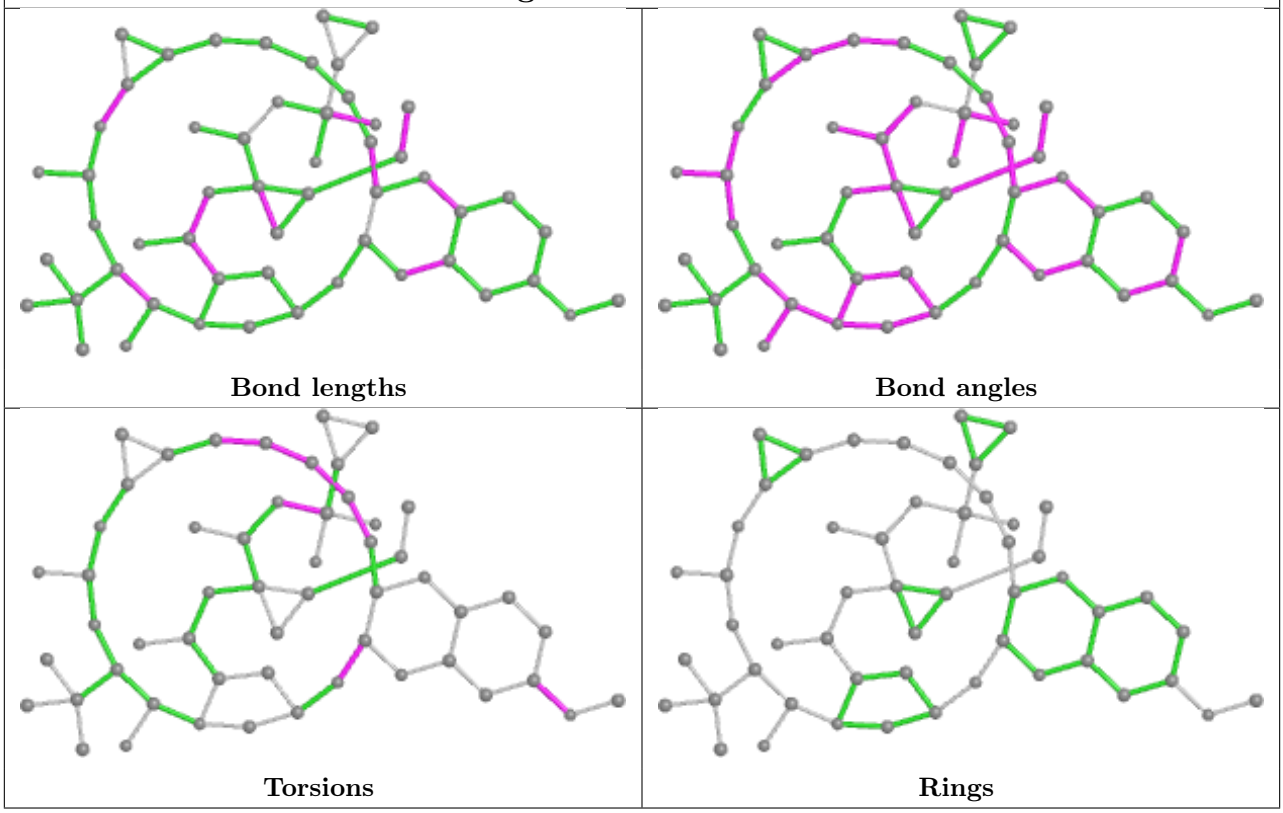
Ligand SUE C 1201

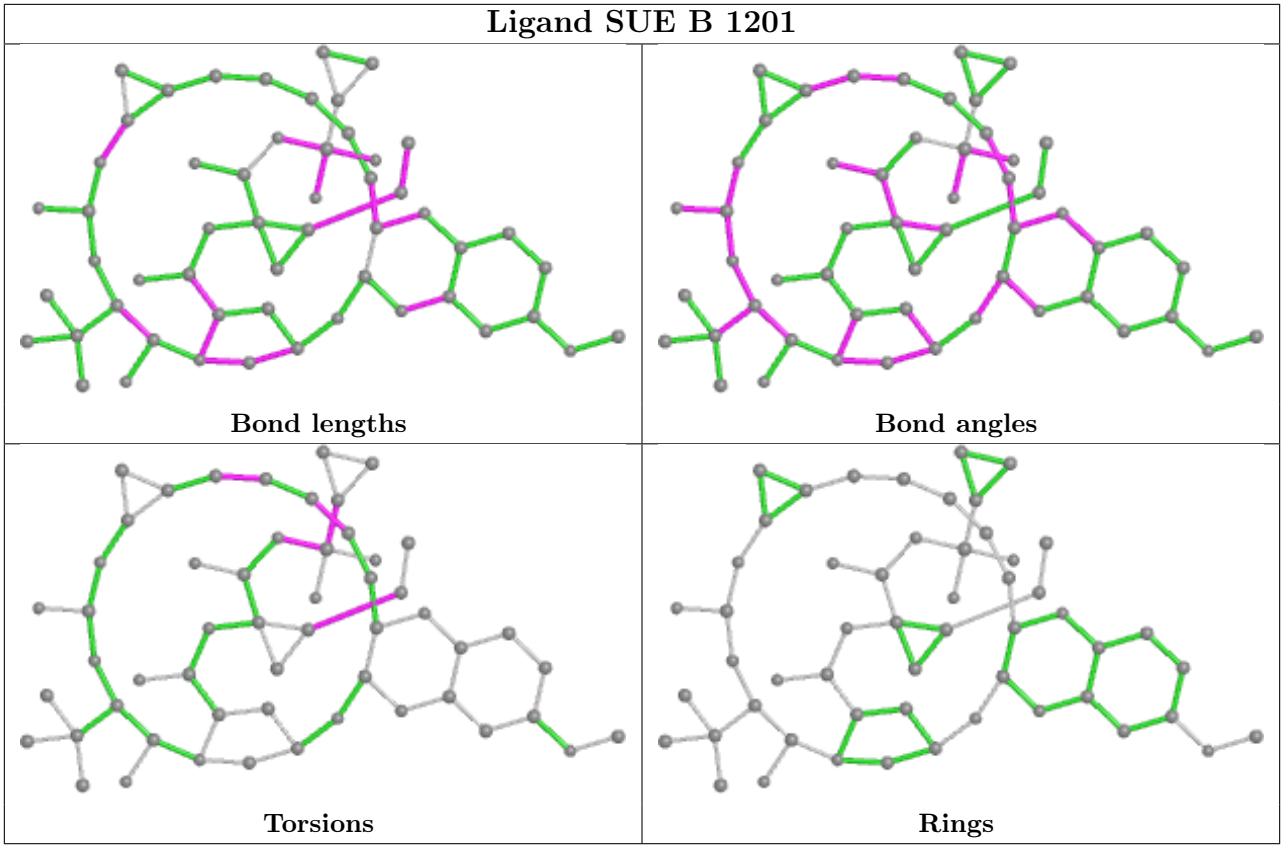


Ligand SUE D 1201



Ligand SUE A 1201





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 (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	191/203 (94%)	0.13	5 (2%)	56	65	19, 28, 46, 58	0
1	B	191/203 (94%)	0.12	2 (1%)	82	87	18, 27, 41, 68	0
1	C	187/203 (92%)	0.24	8 (4%)	35	45	18, 27, 44, 63	0
1	D	191/203 (94%)	0.36	8 (4%)	36	45	20, 31, 54, 59	0
All	All	760/812 (93%)	0.21	23 (3%)	50	59	18, 28, 50, 68	0

The worst 5 of 23 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	1003	ASP	7.3
1	C	1004	THR	6.1
1	A	1001	SER	4.9
1	B	1003	ASP	4.4
1	D	1090	GLY	4.0

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)

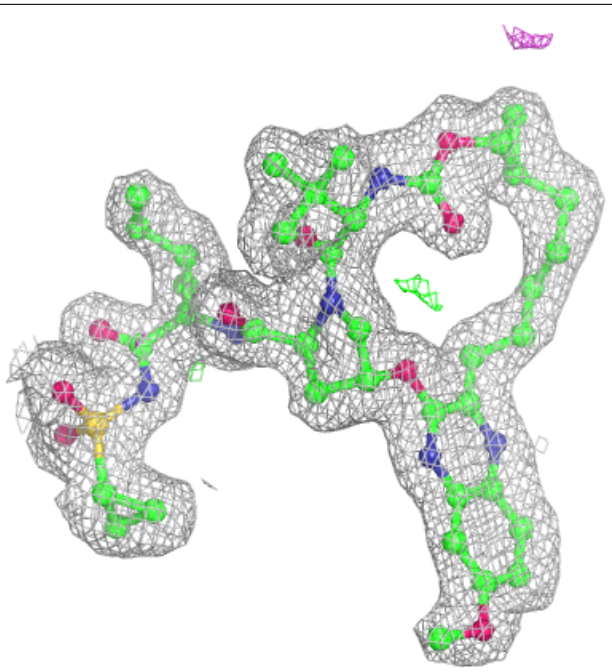
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

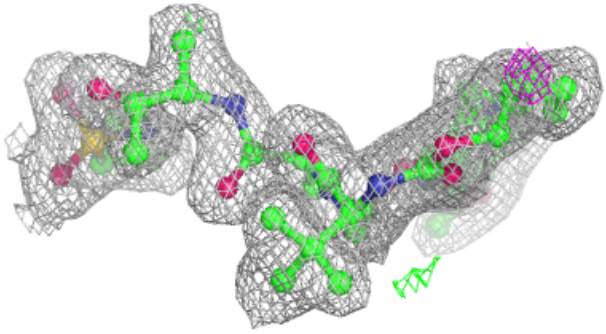
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	SUE	B	1201	54/54	0.94	0.11	17,19,27,28	0
3	SO4	A	1202	5/5	0.94	0.09	35,38,40,41	0
2	SUE	A	1201	54/54	0.95	0.09	16,18,21,22	0
2	SUE	D	1201	54/54	0.96	0.09	13,17,20,22	0
2	SUE	C	1201	54/54	0.98	0.08	14,17,22,23	0
4	ZN	A	1203	1/1	0.99	0.09	18,18,18,18	0
4	ZN	B	1202	1/1	0.99	0.09	20,20,20,20	0
4	ZN	C	1202	1/1	1.00	0.08	26,26,26,26	0
4	ZN	D	1202	1/1	1.00	0.07	21,21,21,21	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 SUE B 1201:

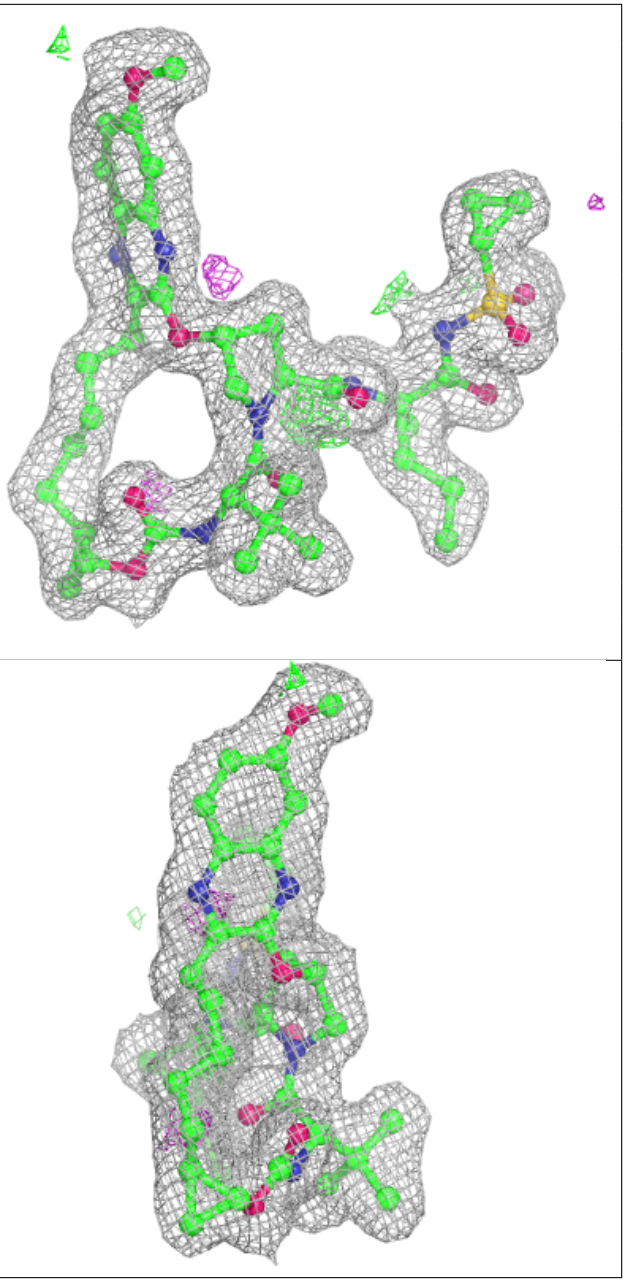
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





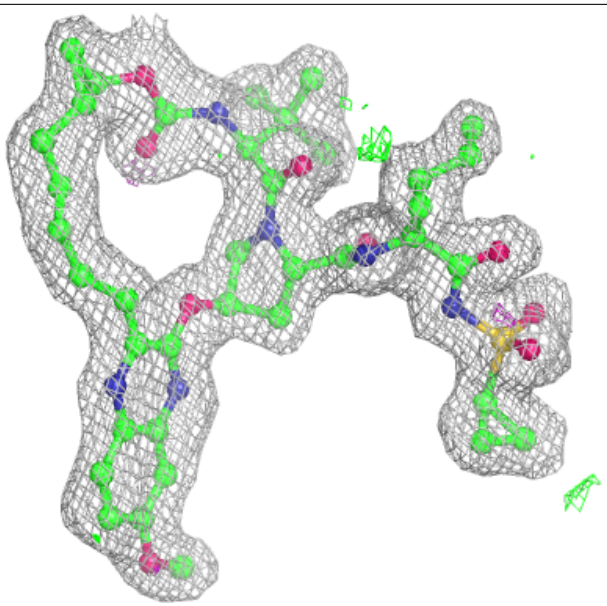
Electron density around SUE A 1201:

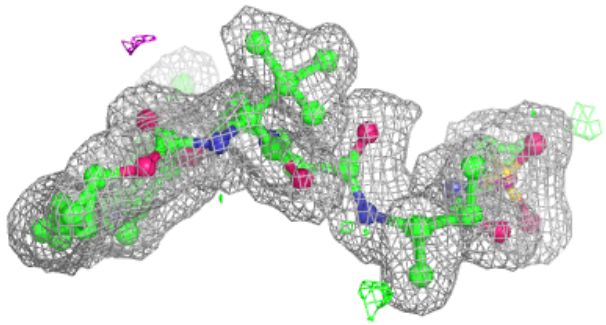
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around SUE D 1201:

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





Electron density around SUE C 1201:

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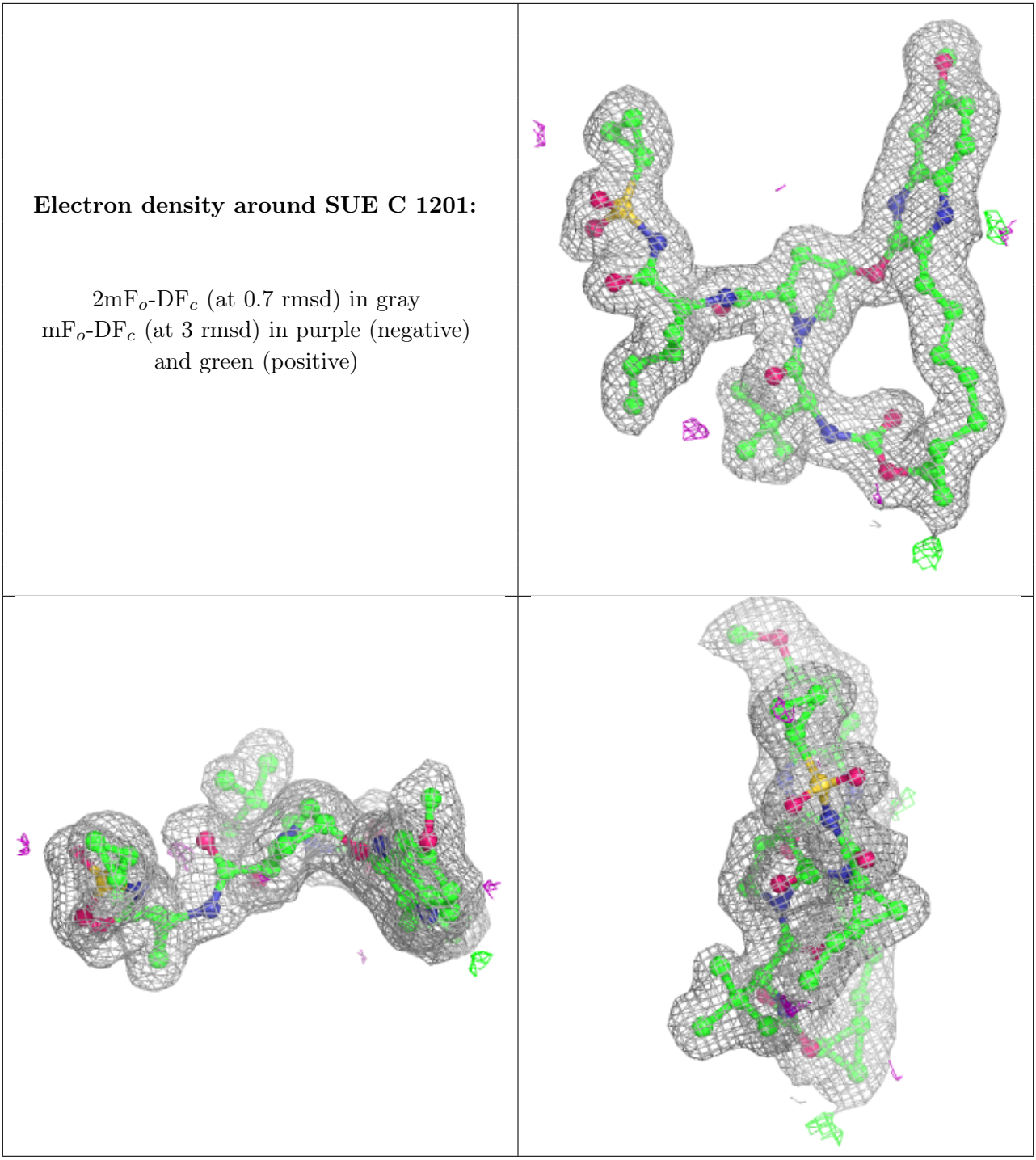
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



6.5 Other polymers (i)

There are no such residues in this entry.