wwPDB X-ray Structure Validation Summary Report (i)

Dec 7, 2023 – 05:21 am GMT

PDB ID	:	1UWA
Title	:	L290F mutant rubisco from chlamydomonas
Authors	:	Karkehabadi, S.; Taylor, T.C.; Spreitzer, R.J.; Andersson, I.
Deposited on	:	2004-02-03
Resolution	:	2.30 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:

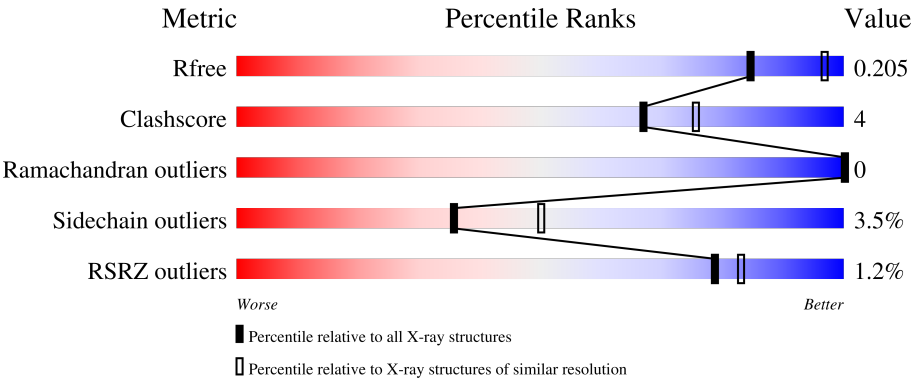
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
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 2.30 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	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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	475	88% 9%
1	B	475	85% 12%
1	E	475	87% 10%
1	H	475	86% 12%
1	K	475	87% 11%

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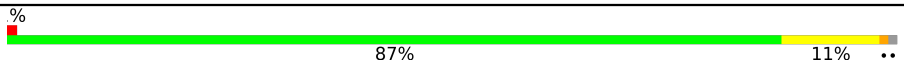
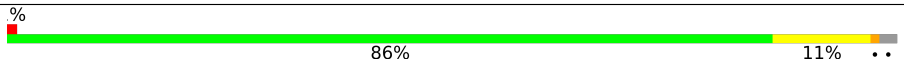
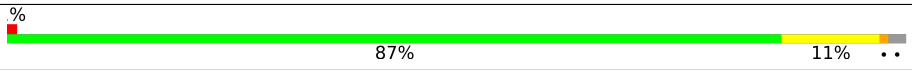
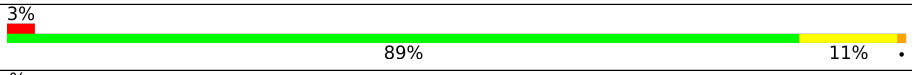
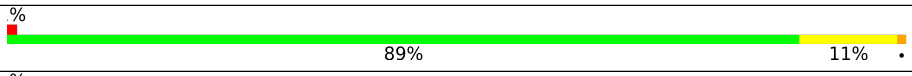
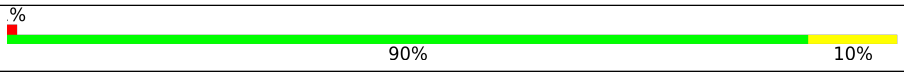
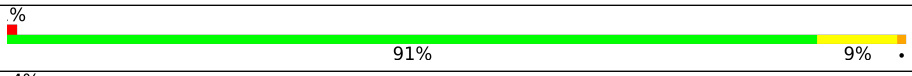
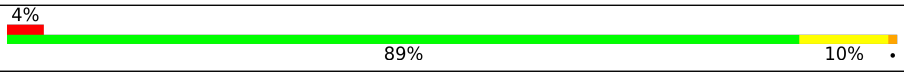
Mol	Chain	Length	Quality of chain
1	O	475	
1	R	475	
1	V	475	
2	C	140	
2	F	140	
2	I	140	
2	J	140	
2	M	140	
2	P	140	
2	T	140	
2	W	140	

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
5	EDO	V	507	-	-	-	X

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 41073 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 RIBULOSE BISPHOSPHATE CARBOXYLASE LARGE CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	465	Total	C	N	O	S	0	2	0
			3640	2302	641	673	24			
1	B	465	Total	C	N	O	S	0	3	0
			3643	2303	641	675	24			
1	E	469	Total	C	N	O	S	0	4	0
			3671	2319	646	682	24			
1	H	469	Total	C	N	O	S	0	4	0
			3674	2321	649	680	24			
1	K	469	Total	C	N	O	S	0	3	0
			3669	2319	646	680	24			
1	O	469	Total	C	N	O	S	0	4	0
			3672	2320	646	682	24			
1	R	465	Total	C	N	O	S	0	2	0
			3639	2302	641	672	24			
1	V	465	Total	C	N	O	S	0	1	0
			3635	2300	640	671	24			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	46	PRO	LEU	conflict	UNP P00877
B	46	PRO	LEU	conflict	UNP P00877
E	46	PRO	LEU	conflict	UNP P00877
H	46	PRO	LEU	conflict	UNP P00877
K	46	PRO	LEU	conflict	UNP P00877
O	46	PRO	LEU	conflict	UNP P00877
R	46	PRO	LEU	conflict	UNP P00877
V	46	PRO	LEU	conflict	UNP P00877
A	290	PHE	LEU	engineered mutation	UNP P00877
B	290	PHE	LEU	engineered mutation	UNP P00877
E	290	PHE	LEU	engineered mutation	UNP P00877
H	290	PHE	LEU	engineered mutation	UNP P00877

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Chain	Residue	Modelled	Actual	Comment	Reference
K	290	PHE	LEU	engineered mutation	UNP P00877
O	290	PHE	LEU	engineered mutation	UNP P00877
R	290	PHE	LEU	engineered mutation	UNP P00877
V	290	PHE	LEU	engineered mutation	UNP P00877

- Molecule 2 is a protein called RIBULOSE BISPHOSPHATE CARBOXYLASE SMALL CHAIN 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	140	Total	C	N	O	S	0	1	0
			1142	737	192	202	11			
2	F	140	Total	C	N	O	S	0	1	0
			1138	736	187	203	12			
2	I	140	Total	C	N	O	S	0	1	0
			1133	732	188	202	11			
2	J	140	Total	C	N	O	S	0	1	0
			1142	737	190	203	12			
2	M	140	Total	C	N	O	S	0	1	0
			1140	736	189	203	12			
2	P	140	Total	C	N	O	S	0	1	0
			1138	734	189	203	12			
2	T	140	Total	C	N	O	S	0	1	0
			1134	733	186	203	12			
2	W	140	Total	C	N	O	S	0	1	0
			1141	737	189	203	12			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
I	128	SER	THR	conflict	UNP P00873
I	132	TRP	PHE	conflict	UNP P00873
C	128	SER	THR	conflict	UNP P00873
C	132	TRP	PHE	conflict	UNP P00873
F	128	SER	THR	conflict	UNP P00873
F	132	TRP	PHE	conflict	UNP P00873
J	128	SER	THR	conflict	UNP P00873
J	132	TRP	PHE	conflict	UNP P00873
P	128	SER	THR	conflict	UNP P00873
P	132	TRP	PHE	conflict	UNP P00873
T	128	SER	THR	conflict	UNP P00873
T	132	TRP	PHE	conflict	UNP P00873
M	128	SER	THR	conflict	UNP P00873
M	132	TRP	PHE	conflict	UNP P00873

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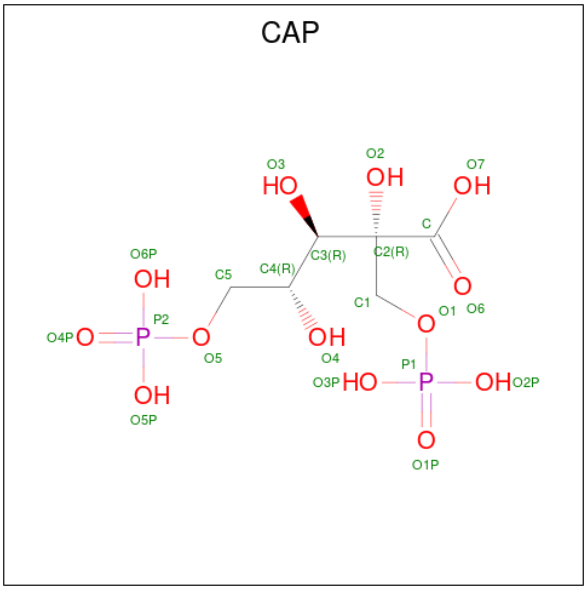
Chain	Residue	Modelled	Actual	Comment	Reference
W	128	SER	THR	conflict	UNP P00873
W	132	TRP	PHE	conflict	UNP P00873

- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

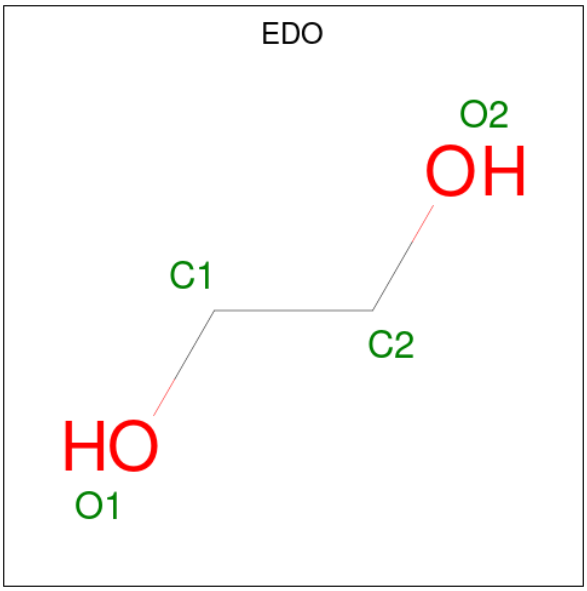
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total Mg 1 1	0	0
3	B	1	Total Mg 1 1	0	0
3	E	1	Total Mg 1 1	0	0
3	H	1	Total Mg 1 1	0	0
3	K	1	Total Mg 1 1	0	0
3	O	1	Total Mg 1 1	0	0
3	R	1	Total Mg 1 1	0	0
3	V	1	Total Mg 1 1	0	0

- Molecule 4 is 2-CARBOXYARABINITOL-1,5-DIPHOSPHATE (three-letter code: CAP) (formula: $C_6H_{14}O_{13}P_2$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O P 21 6 13 2	0	0
4	B	1	Total C O P 21 6 13 2	0	0
4	E	1	Total C O P 21 6 13 2	0	0
4	H	1	Total C O P 21 6 13 2	0	0
4	K	1	Total C O P 21 6 13 2	0	0
4	O	1	Total C O P 21 6 13 2	0	0
4	R	1	Total C O P 21 6 13 2	0	0
4	V	1	Total C O P 21 6 13 2	0	0

- Molecule 5 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: $C_2H_6O_2$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 4 2 2	0	0
5	A	1	Total C O 4 2 2	0	0
5	A	1	Total C O 4 2 2	0	0
5	A	1	Total C O 4 2 2	0	0

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 4 2 2	0	0
5	A	1	Total C O 4 2 2	0	0
5	A	1	Total C O 4 2 2	0	0
5	B	1	Total C O 4 2 2	0	0
5	B	1	Total C O 4 2 2	0	0
5	B	1	Total C O 4 2 2	0	0
5	B	1	Total C O 4 2 2	0	0
5	B	1	Total C O 4 2 2	0	0
5	B	1	Total C O 4 2 2	0	0
5	B	1	Total C O 4 2 2	0	0
5	C	1	Total C O 4 2 2	0	0
5	C	1	Total C O 4 2 2	0	0
5	E	1	Total C O 4 2 2	0	0
5	E	1	Total C O 4 2 2	0	0
5	E	1	Total C O 4 2 2	0	0
5	E	1	Total C O 4 2 2	0	0
5	E	1	Total C O 4 2 2	0	0
5	F	1	Total C O 4 2 2	0	0
5	F	1	Total C O 4 2 2	0	0
5	H	1	Total C O 4 2 2	0	0
5	H	1	Total C O 4 2 2	0	0

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	H	1	Total	C	O	0	0
			4	2	2		
5	H	1	Total	C	O	0	0
			4	2	2		
5	H	1	Total	C	O	0	0
			4	2	2		
5	H	1	Total	C	O	0	0
			4	2	2		
5	I	1	Total	C	O	0	0
			4	2	2		
5	I	1	Total	C	O	0	0
			4	2	2		
5	J	1	Total	C	O	0	0
			4	2	2		
5	J	1	Total	C	O	0	0
			4	2	2		
5	K	1	Total	C	O	0	0
			4	2	2		
5	K	1	Total	C	O	0	0
			4	2	2		
5	K	1	Total	C	O	0	0
			4	2	2		
5	K	1	Total	C	O	0	0
			4	2	2		
5	K	1	Total	C	O	0	0
			4	2	2		
5	M	1	Total	C	O	0	0
			4	2	2		
5	O	1	Total	C	O	0	0
			4	2	2		
5	O	1	Total	C	O	0	0
			4	2	2		
5	O	1	Total	C	O	0	0
			4	2	2		
5	O	1	Total	C	O	0	0
			4	2	2		
5	O	1	Total	C	O	0	0
			4	2	2		
5	P	1	Total	C	O	0	0
			4	2	2		
5	P	1	Total	C	O	0	0
			4	2	2		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	R	1	Total C O 4 2 2	0	0
5	R	1	Total C O 4 2 2	0	0
5	R	1	Total C O 4 2 2	0	0
5	R	1	Total C O 4 2 2	0	0
5	R	1	Total C O 4 2 2	0	0
5	R	1	Total C O 4 2 2	0	0
5	T	1	Total C O 4 2 2	0	0
5	T	1	Total C O 4 2 2	0	0
5	V	1	Total C O 4 2 2	0	0
5	V	1	Total C O 4 2 2	0	0
5	V	1	Total C O 4 2 2	0	0
5	V	1	Total C O 4 2 2	0	0
5	V	1	Total C O 4 2 2	0	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	253	Total O 253 253	0	0
6	B	252	Total O 252 252	0	0
6	C	47	Total O 47 47	0	0
6	E	253	Total O 253 253	0	0
6	F	49	Total O 49 49	0	0
6	H	195	Total O 195 195	0	0

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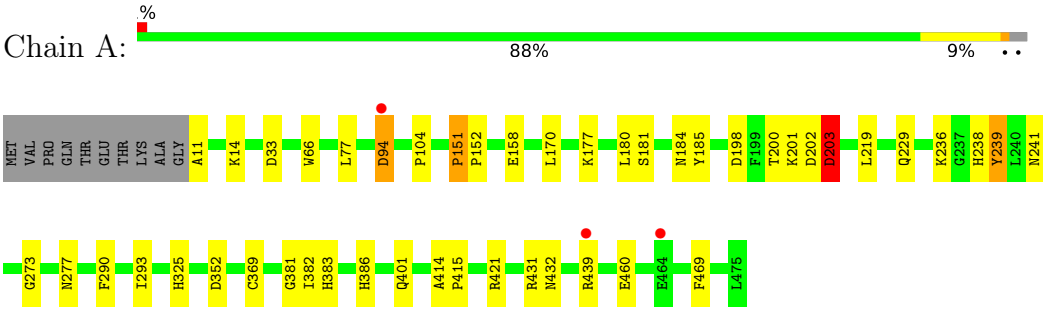
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	I	57	Total O 57 57	0	0
6	J	45	Total O 45 45	0	0
6	K	245	Total O 245 245	0	0
6	M	63	Total O 63 63	0	0
6	O	229	Total O 229 229	0	0
6	P	60	Total O 60 60	0	0
6	R	221	Total O 221 221	0	0
6	T	52	Total O 52 52	0	0
6	V	219	Total O 219 219	0	0
6	W	70	Total O 70 70	0	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.

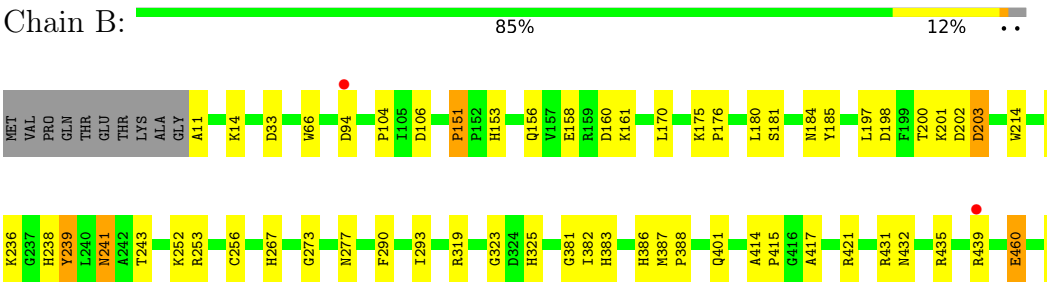
• Molecule 1: RIBULOSE BISPHOSPHATE CARBOXYLASE LARGE CHAIN

Chain A:



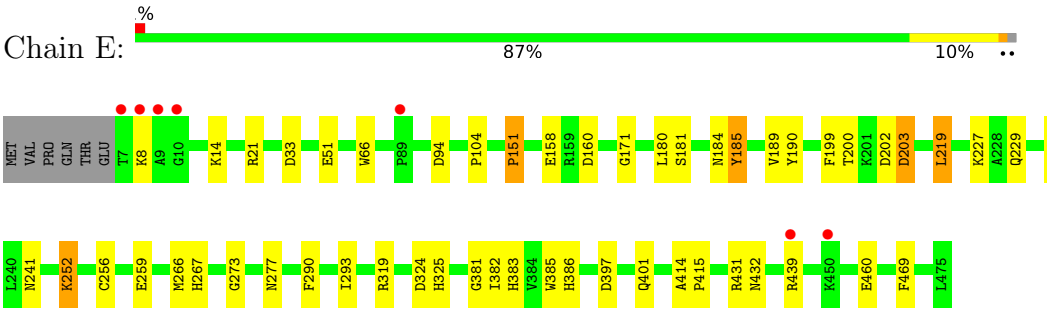
• Molecule 1: RIBULOSE BISPHOSPHATE CARBOXYLASE LARGE CHAIN

Chain B:



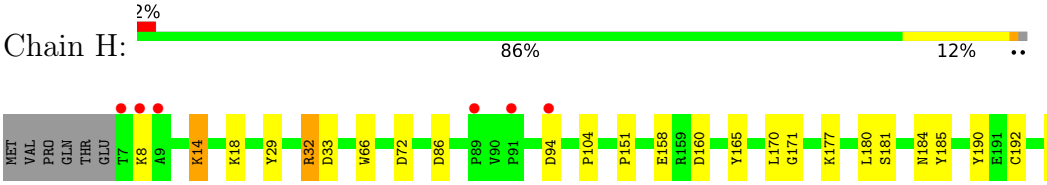
• Molecule 1: RIBULOSE BISPHOSPHATE CARBOXYLASE LARGE CHAIN

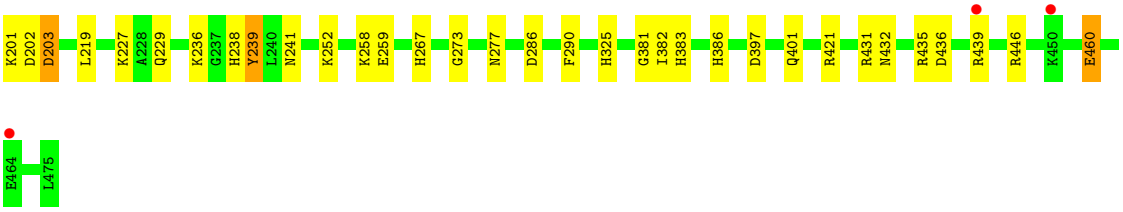
Chain E:



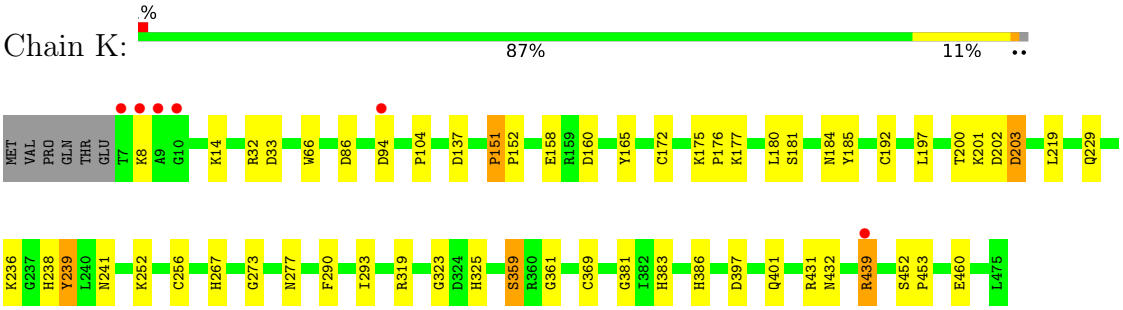
• Molecule 1: RIBULOSE BISPHOSPHATE CARBOXYLASE LARGE CHAIN

Chain H:

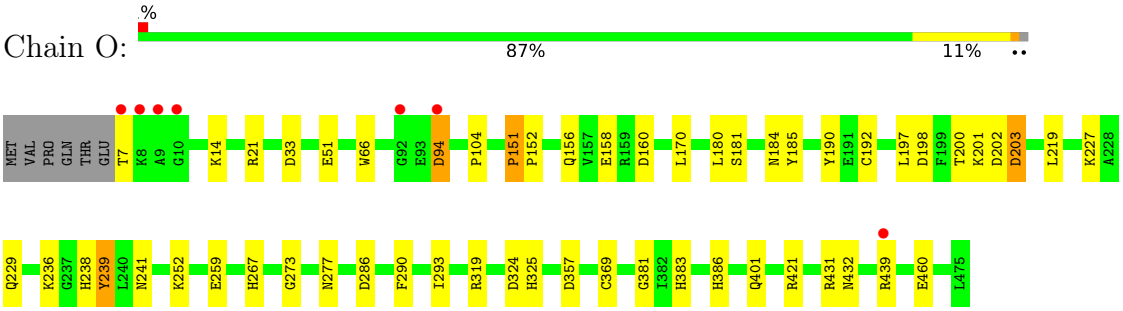




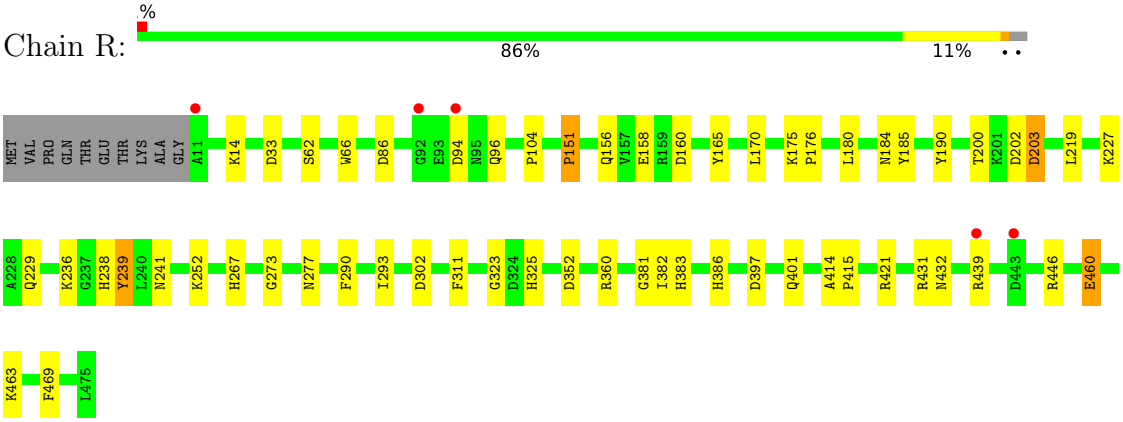
• Molecule 1: RIBULOSE BISPHOSPHATE CARBOXYLASE LARGE CHAIN



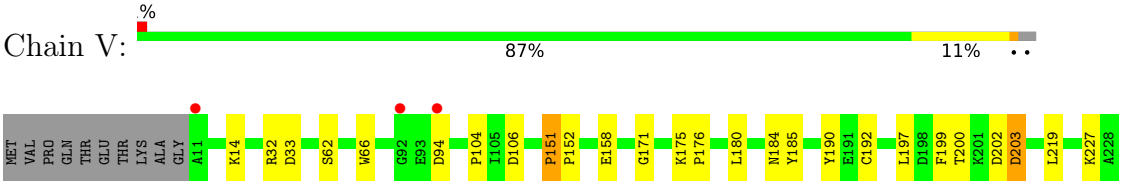
• Molecule 1: RIBULOSE BISPHOSPHATE CARBOXYLASE LARGE CHAIN



• Molecule 1: RIBULOSE BISPHOSPHATE CARBOXYLASE LARGE CHAIN

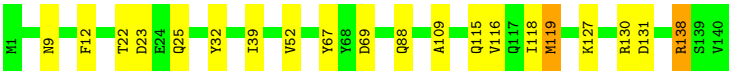


• Molecule 1: RIBULOSE BISPHOSPHATE CARBOXYLASE LARGE CHAIN



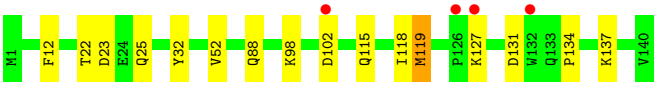
• Molecule 2: RIBULOSE BISPHOSPHATE CARBOXYLASE SMALL CHAIN 1

Chain C:



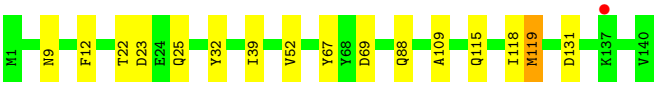
• Molecule 2: RIBULOSE BISPHOSPHATE CARBOXYLASE SMALL CHAIN 1

Chain F:



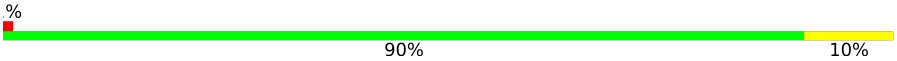
• Molecule 2: RIBULOSE BISPHOSPHATE CARBOXYLASE SMALL CHAIN 1

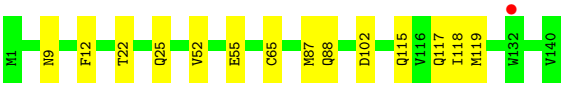
Chain I:



• Molecule 2: RIBULOSE BISPHOSPHATE CARBOXYLASE SMALL CHAIN 1

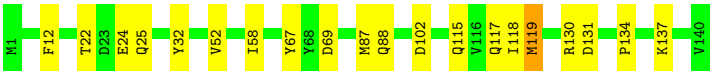
Chain J:





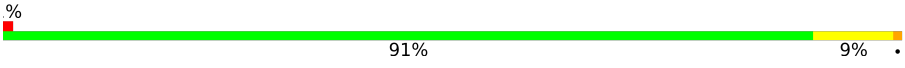
• Molecule 2: RIBULOSE BISPHOSPHATE CARBOXYLASE SMALL CHAIN 1

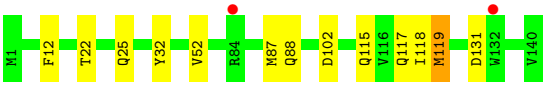
Chain M:



• Molecule 2: RIBULOSE BISPHOSPHATE CARBOXYLASE SMALL CHAIN 1

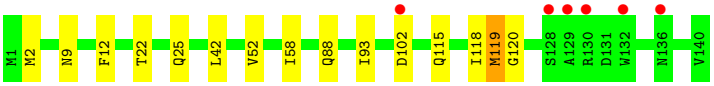
Chain P:





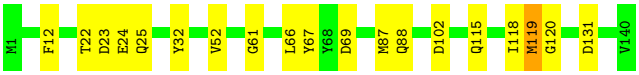
• Molecule 2: RIBULOSE BISPHOSPHATE CARBOXYLASE SMALL CHAIN 1

Chain T:



• Molecule 2: RIBULOSE BISPHOSPHATE CARBOXYLASE SMALL CHAIN 1

Chain W:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	120.98Å 177.71Å 122.66Å 90.00° 117.70° 90.00°	Depositor
Resolution (Å)	30.00 – 2.30 29.97 – 2.10	Depositor EDS
% Data completeness (in resolution range)	98.2 (30.00-2.30) 95.7 (29.97-2.10)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.53 (at 2.10Å)	Xtriage
Refinement program	REFMAC 5.1.24	Depositor
R, R_{free}	0.171 , 0.205 0.170 , 0.205	Depositor DCC
R_{free} test set	12964 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å^2)	32.4	Xtriage
Anisotropy	0.252	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 38.3	EDS
L-test for twinning[2]	$< \|L\| > = 0.52$, $< L^2 > = 0.36$	Xtriage
Estimated twinning fraction	0.000 for -h-l,k,h 0.000 for l,k,-h-l 0.000 for h,-k,-h-l 0.000 for -h-l,-k,l 0.158 for l,-k,h	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	41073	wwPDB-VP
Average B, all atoms (Å^2)	34.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.65% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: HYP, CAP, KCX, SMC, MG, EDO

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	0.56	0/3690	0.75	5/4986 (0.1%)
1	B	0.55	0/3699	0.74	5/4998 (0.1%)
1	E	0.54	0/3733	0.73	5/5043 (0.1%)
1	H	0.57	0/3735	0.74	7/5045 (0.1%)
1	K	0.65	1/3722 (0.0%)	0.74	7/5025 (0.1%)
1	O	0.54	0/3733	0.73	8/5043 (0.2%)
1	R	0.55	0/3690	0.74	6/4986 (0.1%)
1	V	0.55	0/3680	0.74	4/4974 (0.1%)
2	C	0.56	0/1181	1.06	6/1605 (0.4%)
2	F	0.57	0/1177	0.69	3/1600 (0.2%)
2	I	0.58	0/1172	0.71	3/1595 (0.2%)
2	J	0.54	0/1181	0.68	1/1605 (0.1%)
2	M	0.55	0/1179	0.72	3/1603 (0.2%)
2	P	0.55	0/1177	0.71	2/1601 (0.1%)
2	T	0.57	0/1173	0.69	1/1596 (0.1%)
2	W	0.55	0/1180	0.72	4/1604 (0.2%)
All	All	0.56	1/39102 (0.0%)	0.74	70/52909 (0.1%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	K	359	SER	C-N	21.06	1.82	1.34

The worst 5 of 70 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	138	ARG	NE-CZ-NH1	-21.02	109.79	120.30
2	C	138	ARG	NE-CZ-NH2	20.39	130.50	120.30
2	C	138	ARG	CD-NE-CZ	9.92	137.49	123.60
1	O	203	ASP	CB-CG-OD2	7.07	124.66	118.30
1	E	203	ASP	CB-CG-OD2	6.68	124.32	118.30

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	3640	0	3542	28	0
1	B	3643	0	3540	37	0
1	E	3671	0	3566	33	1
1	H	3674	0	3577	34	1
1	K	3669	0	3571	36	1
1	O	3672	0	3570	30	0
1	R	3639	0	3540	33	1
1	V	3635	0	3538	33	0
2	C	1142	0	1110	10	0
2	F	1138	0	1103	8	0
2	I	1133	0	1090	8	0
2	J	1142	0	1110	8	0
2	M	1140	0	1103	12	0
2	P	1138	0	1099	7	0
2	T	1134	0	1092	9	0
2	W	1141	0	1105	12	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	E	1	0	0	0	0
3	H	1	0	0	0	0
3	K	1	0	0	0	0
3	O	1	0	0	0	0
3	R	1	0	0	0	0
3	V	1	0	0	0	0
4	A	21	0	7	0	0
4	B	21	0	7	0	0
4	E	21	0	7	0	0
4	H	21	0	7	0	0
4	K	21	0	7	0	0
4	O	21	0	7	0	0
4	R	21	0	7	0	0
4	V	21	0	7	0	0
5	A	28	0	42	4	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	B	28	0	42	4	0
5	C	8	0	12	0	0
5	E	20	0	30	2	0
5	F	8	0	12	0	0
5	H	24	0	36	2	0
5	I	8	0	12	0	0
5	J	8	0	12	1	0
5	K	20	0	30	0	0
5	M	4	0	6	0	0
5	O	20	0	30	0	0
5	P	8	0	12	0	0
5	R	24	0	36	1	0
5	T	8	0	12	0	0
5	V	20	0	30	6	0
6	A	253	0	0	2	0
6	B	252	0	0	4	0
6	C	47	0	0	1	0
6	E	253	0	0	2	0
6	F	49	0	0	1	0
6	H	195	0	0	5	0
6	I	57	0	0	0	0
6	J	45	0	0	1	0
6	K	245	0	0	4	0
6	M	63	0	0	2	0
6	O	229	0	0	3	0
6	P	60	0	0	1	0
6	R	221	0	0	7	0
6	T	52	0	0	1	0
6	V	219	0	0	6	0
6	W	70	0	0	3	0
All	All	41073	0	37666	299	2

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 299 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:267:HIS:HD2	1:B:277:ASN:HD22	1.09	0.97
1:R:267:HIS:HD2	1:R:277:ASN:HD22	1.06	0.97
1:V:267:HIS:HD2	1:V:277:ASN:HD22	1.07	0.96

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:J:87:MET:HE3	6:J:315:HOH:O	1.64	0.96
1:K:267:HIS:HD2	1:K:277:ASN:HD22	1.12	0.95

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:51[A]:GLU:OE2	1:K:439:ARG:NH2[1_554]	1.95	0.25
1:H:14:LYS:CE	1:R:460:GLU:OE1[2_547]	2.00	0.20

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	460/475 (97%)	446 (97%)	14 (3%)	0	100	100
1	B	461/475 (97%)	448 (97%)	13 (3%)	0	100	100
1	E	466/475 (98%)	452 (97%)	14 (3%)	0	100	100
1	H	466/475 (98%)	452 (97%)	14 (3%)	0	100	100
1	K	462/475 (97%)	449 (97%)	13 (3%)	0	100	100
1	O	466/475 (98%)	452 (97%)	14 (3%)	0	100	100
1	R	460/475 (97%)	446 (97%)	14 (3%)	0	100	100
1	V	459/475 (97%)	445 (97%)	14 (3%)	0	100	100
2	C	139/140 (99%)	132 (95%)	7 (5%)	0	100	100
2	F	139/140 (99%)	133 (96%)	6 (4%)	0	100	100
2	I	139/140 (99%)	133 (96%)	6 (4%)	0	100	100
2	J	139/140 (99%)	132 (95%)	7 (5%)	0	100	100
2	M	139/140 (99%)	134 (96%)	5 (4%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	P	139/140 (99%)	134 (96%)	5 (4%)	0	100	100
2	T	139/140 (99%)	132 (95%)	7 (5%)	0	100	100
2	W	139/140 (99%)	132 (95%)	7 (5%)	0	100	100
All	All	4812/4920 (98%)	4652 (97%)	160 (3%)	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	370/376 (98%)	360 (97%)	10 (3%)	44	61
1	B	371/376 (99%)	360 (97%)	11 (3%)	41	57
1	E	374/376 (100%)	363 (97%)	11 (3%)	42	58
1	H	374/376 (100%)	358 (96%)	16 (4%)	29	40
1	K	373/376 (99%)	361 (97%)	12 (3%)	39	54
1	O	374/376 (100%)	361 (96%)	13 (4%)	36	50
1	R	370/376 (98%)	359 (97%)	11 (3%)	41	57
1	V	369/376 (98%)	359 (97%)	10 (3%)	44	61
2	C	122/123 (99%)	114 (93%)	8 (7%)	16	22
2	F	122/123 (99%)	116 (95%)	6 (5%)	25	35
2	I	120/123 (98%)	114 (95%)	6 (5%)	24	34
2	J	123/123 (100%)	117 (95%)	6 (5%)	25	35
2	M	122/123 (99%)	116 (95%)	6 (5%)	25	35
2	P	122/123 (99%)	117 (96%)	5 (4%)	30	43
2	T	121/123 (98%)	115 (95%)	6 (5%)	24	34
2	W	122/123 (99%)	117 (96%)	5 (4%)	30	43
All	All	3949/3992 (99%)	3807 (96%)	142 (4%)	36	49

5 of 142 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	R	219	LEU
1	R	439	ARG
1	V	203	ASP
1	H	32[A]	ARG
1	H	14	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 111 such sidechains are listed below:

Mol	Chain	Res	Type
1	K	238	HIS
2	W	115	GLN
1	O	238	HIS
2	W	29	GLN
1	V	238	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)

40 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	$\#\|Z\| > 2$
1	SMC	H	369	1	5,6,7	0.68	0	2,6,8	0.66	0
1	HYP	H	151	1	6,8,9	0.74	0	5,10,12	4.13	4 (80%)
1	SMC	K	369	1	5,6,7	1.16	1 (20%)	2,6,8	0.36	0
1	SMC	A	369	1	5,6,7	1.06	1 (20%)	2,6,8	0.74	0
1	SMC	B	256	1	5,6,7	1.37	1 (20%)	2,6,8	1.03	0
1	SMC	R	256	1	5,6,7	0.54	0	2,6,8	1.08	0
1	KCX	R	201	1,3	9,11,12	0.78	0	5,12,14	0.98	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
1	HYP	O	151	1	6,8,9	0.94	0	5,10,12	3.97	3 (60%)
1	KCX	A	201	1,3	9,11,12	1.31	2 (22%)	5,12,14	0.85	0
1	HYP	B	151	1	6,8,9	0.80	0	5,10,12	3.91	3 (60%)
1	KCX	H	201	1,3	9,11,12	0.85	0	5,12,14	1.50	1 (20%)
1	KCX	V	201	1,3	9,11,12	0.65	0	5,12,14	0.89	0
1	SMC	O	369	1	5,6,7	0.78	0	2,6,8	1.55	1 (50%)
1	SMC	V	256	1	5,6,7	0.63	0	2,6,8	0.57	0
1	HYP	E	151	1	6,8,9	0.70	0	5,10,12	3.70	4 (80%)
1	SMC	H	256	1	5,6,7	0.66	0	2,6,8	0.87	0
1	SMC	K	256	1	5,6,7	1.38	1 (20%)	2,6,8	0.59	0
1	HYP	E	104	1	6,8,9	0.72	0	5,10,12	3.29	3 (60%)
1	HYP	K	104	1	6,8,9	0.66	0	5,10,12	3.34	3 (60%)
1	HYP	V	151	1	6,8,9	0.79	0	5,10,12	3.20	3 (60%)
1	HYP	K	151	1	6,8,9	0.90	0	5,10,12	3.55	3 (60%)
1	KCX	B	201	1,3	9,11,12	1.19	1 (11%)	5,12,14	0.67	0
1	SMC	V	369	1	5,6,7	0.96	0	2,6,8	0.86	0
1	SMC	O	256	1	5,6,7	0.76	0	2,6,8	0.33	0
1	HYP	B	104	1	6,8,9	0.85	0	5,10,12	3.28	3 (60%)
1	SMC	E	369	1	5,6,7	0.87	0	2,6,8	0.72	0
1	SMC	A	256	1	5,6,7	0.98	0	2,6,8	0.26	0
1	KCX	O	201	1,3	9,11,12	1.09	0	5,12,14	1.08	1 (20%)
1	HYP	A	151	1	6,8,9	0.68	0	5,10,12	4.12	4 (80%)
1	HYP	R	151	1	6,8,9	0.51	0	5,10,12	3.37	3 (60%)
1	SMC	B	369	1	5,6,7	0.70	0	2,6,8	1.17	0
1	SMC	R	369	1	5,6,7	0.70	0	2,6,8	1.55	0
1	HYP	O	104	1	6,8,9	0.69	0	5,10,12	3.22	3 (60%)
1	HYP	A	104	1	6,8,9	0.61	0	5,10,12	3.23	3 (60%)
1	SMC	E	256	1	5,6,7	1.06	1 (20%)	2,6,8	0.72	0
1	KCX	K	201	1,3	9,11,12	0.90	0	5,12,14	1.27	1 (20%)
1	HYP	R	104	1	5,7,9	0.49	0	7,8,12	1.37	2 (28%)
1	KCX	E	201	1,3	9,11,12	1.00	0	5,12,14	0.79	0
1	HYP	V	104	1	6,8,9	0.60	0	5,10,12	3.19	3 (60%)
1	HYP	H	104	1	6,8,9	0.62	0	5,10,12	3.66	3 (60%)

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
1	SMC	H	369	1	-	1/3/5/7	-
1	HYP	H	151	1	-	0/0/11/13	0/1/1/1
1	SMC	K	369	1	-	1/3/5/7	-
1	SMC	A	369	1	-	1/3/5/7	-
1	SMC	B	256	1	-	0/3/5/7	-
1	SMC	R	256	1	-	0/3/5/7	-
1	KCX	R	201	1,3	-	0/9/10/12	-
1	HYP	O	151	1	-	0/0/11/13	0/1/1/1
1	KCX	A	201	1,3	-	0/9/10/12	-
1	HYP	B	151	1	-	0/0/11/13	0/1/1/1
1	KCX	H	201	1,3	-	0/9/10/12	-
1	KCX	V	201	1,3	-	0/9/10/12	-
1	SMC	O	369	1	-	1/3/5/7	-
1	SMC	V	256	1	-	0/3/5/7	-
1	HYP	E	151	1	-	0/0/11/13	0/1/1/1
1	SMC	H	256	1	-	0/3/5/7	-
1	SMC	K	256	1	-	0/3/5/7	-
1	HYP	E	104	1	-	0/0/11/13	0/1/1/1
1	HYP	K	104	1	-	0/0/11/13	0/1/1/1
1	HYP	V	151	1	-	0/0/11/13	0/1/1/1
1	HYP	K	151	1	-	0/0/11/13	0/1/1/1
1	KCX	B	201	1,3	-	0/9/10/12	-
1	SMC	V	369	1	-	1/3/5/7	-
1	SMC	O	256	1	-	0/3/5/7	-
1	HYP	B	104	1	-	0/0/11/13	0/1/1/1
1	SMC	E	369	1	-	1/3/5/7	-
1	SMC	A	256	1	-	0/3/5/7	-
1	KCX	O	201	1,3	-	0/9/10/12	-
1	HYP	A	151	1	-	0/0/11/13	0/1/1/1
1	HYP	R	151	1	-	0/0/11/13	0/1/1/1
1	SMC	B	369	1	-	1/3/5/7	-
1	SMC	R	369	1	-	1/3/5/7	-
1	HYP	O	104	1	-	0/0/11/13	0/1/1/1
1	HYP	A	104	1	-	0/0/11/13	0/1/1/1
1	SMC	E	256	1	-	0/3/5/7	-
1	KCX	K	201	1,3	-	0/9/10/12	-
1	HYP	R	104	1	-	0/0/9/13	0/1/1/1
1	KCX	E	201	1,3	-	0/9/10/12	-
1	HYP	V	104	1	-	0/0/11/13	0/1/1/1
1	HYP	H	104	1	-	0/0/11/13	0/1/1/1

The worst 5 of 8 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	K	256	SMC	CB-SG	-2.99	1.76	1.80
1	B	256	SMC	CB-SG	-2.94	1.76	1.80
1	B	201	KCX	OQ1-CX	2.54	1.26	1.21
1	A	201	KCX	OQ1-CX	2.40	1.26	1.21
1	K	369	SMC	CB-SG	-2.17	1.77	1.80

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

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	151	HYP	CB-CG-CD	6.00	110.63	103.27
1	H	104	HYP	CB-CG-CD	5.76	110.32	103.27
1	H	151	HYP	OD1-CG-CD	-5.74	97.79	110.35
1	O	151	HYP	CB-CG-CD	5.70	110.25	103.27
1	B	151	HYP	CB-CG-CD	5.32	109.78	103.27

There are no chirality outliers.

5 of 8 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	369	SMC	N-CA-CB-SG
1	B	369	SMC	N-CA-CB-SG
1	E	369	SMC	N-CA-CB-SG
1	H	369	SMC	N-CA-CB-SG
1	K	369	SMC	N-CA-CB-SG

There are no ring outliers.

7 monomers are involved in 12 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	O	151	HYP	2	0
1	B	151	HYP	2	0
1	E	151	HYP	1	0
1	V	151	HYP	2	0
1	K	151	HYP	3	0
1	A	151	HYP	1	0
1	R	151	HYP	1	0

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 75 ligands modelled in this entry, 8 are monoatomic - leaving 67 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	$\#\|Z\| > 2$
5	EDO	R	504	-	3,3,3	0.33	0	2,2,2	0.03	0
5	EDO	A	508	-	3,3,3	0.33	0	2,2,2	0.13	0
5	EDO	A	509	-	3,3,3	0.37	0	2,2,2	0.23	0
4	CAP	E	502	3	17,20,20	1.23	2 (11%)	22,31,31	1.13	1 (4%)
5	EDO	E	503	-	3,3,3	0.28	0	2,2,2	0.21	0
5	EDO	H	504	-	3,3,3	0.30	0	2,2,2	0.42	0
5	EDO	O	503	-	3,3,3	0.35	0	2,2,2	0.22	0
5	EDO	H	508	-	3,3,3	0.42	0	2,2,2	0.10	0
5	EDO	M	201	-	3,3,3	0.28	0	2,2,2	0.27	0
5	EDO	A	506	-	3,3,3	0.37	0	2,2,2	0.18	0
5	EDO	O	506	-	3,3,3	0.40	0	2,2,2	0.23	0
5	EDO	B	508	-	3,3,3	0.48	0	2,2,2	0.27	0
5	EDO	R	506	-	3,3,3	0.36	0	2,2,2	0.08	0
5	EDO	V	506	-	3,3,3	0.30	0	2,2,2	0.24	0
5	EDO	T	201	-	3,3,3	0.33	0	2,2,2	0.11	0
5	EDO	J	202	-	3,3,3	0.35	0	2,2,2	0.04	0
5	EDO	I	202	-	3,3,3	0.26	0	2,2,2	0.40	0
5	EDO	R	507	-	3,3,3	0.50	0	2,2,2	0.10	0
4	CAP	O	502	3	17,20,20	1.21	2 (11%)	22,31,31	1.00	0
5	EDO	B	503	-	3,3,3	0.48	0	2,2,2	0.07	0
5	EDO	E	506	-	3,3,3	0.35	0	2,2,2	0.26	0
5	EDO	P	202	-	3,3,3	0.31	0	2,2,2	0.10	0
5	EDO	C	202	-	3,3,3	0.29	0	2,2,2	0.39	0
4	CAP	R	502	3	17,20,20	1.15	2 (11%)	22,31,31	1.03	1 (4%)
5	EDO	P	201	-	3,3,3	0.24	0	2,2,2	0.59	0
5	EDO	J	201	-	3,3,3	0.35	0	2,2,2	0.19	0
5	EDO	C	201	-	3,3,3	0.28	0	2,2,2	0.16	0
5	EDO	E	507	-	3,3,3	0.29	0	2,2,2	0.28	0
4	CAP	A	502	3	17,20,20	1.15	2 (11%)	22,31,31	0.88	0
5	EDO	O	505	-	3,3,3	0.29	0	2,2,2	0.52	0
5	EDO	B	509	-	3,3,3	0.25	0	2,2,2	0.48	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
5	EDO	B	507	-	3,3,3	0.45	0	2,2,2	0.17	0
5	EDO	F	202	-	3,3,3	0.25	0	2,2,2	0.43	0
4	CAP	H	502	3	17,20,20	1.09	2 (11%)	22,31,31	0.94	1 (4%)
5	EDO	V	505	-	3,3,3	0.34	0	2,2,2	0.22	0
4	CAP	V	502	3	17,20,20	1.18	2 (11%)	22,31,31	0.95	1 (4%)
5	EDO	V	503	-	3,3,3	0.45	0	2,2,2	0.19	0
4	CAP	K	502	3	17,20,20	1.29	3 (17%)	22,31,31	0.91	1 (4%)
5	EDO	A	505	-	3,3,3	0.35	0	2,2,2	0.13	0
5	EDO	I	201	-	3,3,3	0.33	0	2,2,2	0.05	0
5	EDO	K	504	-	3,3,3	0.32	0	2,2,2	0.53	0
5	EDO	A	503	-	3,3,3	0.35	0	2,2,2	0.12	0
5	EDO	V	504	-	3,3,3	0.28	0	2,2,2	0.42	0
5	EDO	T	202	-	3,3,3	0.26	0	2,2,2	0.70	0
5	EDO	K	503	-	3,3,3	0.41	0	2,2,2	0.13	0
5	EDO	O	507	-	3,3,3	0.37	0	2,2,2	0.09	0
5	EDO	H	503	-	3,3,3	0.23	0	2,2,2	0.43	0
5	EDO	E	505	-	3,3,3	0.34	0	2,2,2	0.35	0
4	CAP	B	502	3	17,20,20	1.20	2 (11%)	22,31,31	0.83	0
5	EDO	K	505	-	3,3,3	0.29	0	2,2,2	0.29	0
5	EDO	B	504	-	3,3,3	0.32	0	2,2,2	0.23	0
5	EDO	F	201	-	3,3,3	0.30	0	2,2,2	0.12	0
5	EDO	V	507	-	3,3,3	0.36	0	2,2,2	0.11	0
5	EDO	K	507	-	3,3,3	0.36	0	2,2,2	0.21	0
5	EDO	R	508	-	3,3,3	0.35	0	2,2,2	0.03	0
5	EDO	A	507	-	3,3,3	0.37	0	2,2,2	0.16	0
5	EDO	H	506	-	3,3,3	0.37	0	2,2,2	0.17	0
5	EDO	B	505	-	3,3,3	0.31	0	2,2,2	0.20	0
5	EDO	H	505	-	3,3,3	0.35	0	2,2,2	0.12	0
5	EDO	K	506	-	3,3,3	0.43	0	2,2,2	0.21	0
5	EDO	O	504	-	3,3,3	0.20	0	2,2,2	0.10	0
5	EDO	E	504	-	3,3,3	0.36	0	2,2,2	0.24	0
5	EDO	H	507	-	3,3,3	0.32	0	2,2,2	0.08	0
5	EDO	B	506	-	3,3,3	0.40	0	2,2,2	0.21	0
5	EDO	R	505	-	3,3,3	0.32	0	2,2,2	0.31	0
5	EDO	A	504	-	3,3,3	0.32	0	2,2,2	0.06	0
5	EDO	R	503	-	3,3,3	0.40	0	2,2,2	0.13	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	EDO	R	504	-	-	1/1/1/1	-
5	EDO	A	508	-	-	1/1/1/1	-
5	EDO	A	509	-	-	1/1/1/1	-
4	CAP	E	502	3	-	7/29/29/29	-
5	EDO	E	503	-	-	0/1/1/1	-
5	EDO	H	504	-	-	0/1/1/1	-
5	EDO	O	503	-	-	0/1/1/1	-
5	EDO	H	508	-	-	0/1/1/1	-
5	EDO	M	201	-	-	1/1/1/1	-
5	EDO	A	506	-	-	1/1/1/1	-
5	EDO	O	506	-	-	0/1/1/1	-
5	EDO	B	508	-	-	1/1/1/1	-
5	EDO	R	506	-	-	1/1/1/1	-
5	EDO	V	506	-	-	1/1/1/1	-
5	EDO	T	201	-	-	1/1/1/1	-
5	EDO	J	202	-	-	1/1/1/1	-
5	EDO	I	202	-	-	0/1/1/1	-
5	EDO	R	507	-	-	0/1/1/1	-
4	CAP	O	502	3	-	7/29/29/29	-
5	EDO	B	503	-	-	0/1/1/1	-
5	EDO	E	506	-	-	1/1/1/1	-
5	EDO	P	202	-	-	0/1/1/1	-
5	EDO	C	202	-	-	1/1/1/1	-
4	CAP	R	502	3	-	7/29/29/29	-
5	EDO	P	201	-	-	0/1/1/1	-
5	EDO	J	201	-	-	0/1/1/1	-
5	EDO	C	201	-	-	0/1/1/1	-
5	EDO	E	507	-	-	0/1/1/1	-
4	CAP	A	502	3	-	7/29/29/29	-
5	EDO	O	505	-	-	0/1/1/1	-
5	EDO	B	509	-	-	1/1/1/1	-
5	EDO	B	507	-	-	1/1/1/1	-
5	EDO	F	202	-	-	0/1/1/1	-
4	CAP	H	502	3	-	7/29/29/29	-
5	EDO	V	505	-	-	0/1/1/1	-
4	CAP	V	502	3	-	7/29/29/29	-
5	EDO	V	503	-	-	0/1/1/1	-
4	CAP	K	502	3	-	6/29/29/29	-
5	EDO	A	505	-	-	0/1/1/1	-
5	EDO	I	201	-	-	1/1/1/1	-
5	EDO	K	504	-	-	1/1/1/1	-
5	EDO	A	503	-	-	0/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	EDO	V	504	-	-	1/1/1/1	-
5	EDO	T	202	-	-	0/1/1/1	-
5	EDO	K	503	-	-	0/1/1/1	-
5	EDO	O	507	-	-	1/1/1/1	-
5	EDO	H	503	-	-	0/1/1/1	-
5	EDO	E	505	-	-	1/1/1/1	-
4	CAP	B	502	3	-	6/29/29/29	-
5	EDO	K	505	-	-	0/1/1/1	-
5	EDO	B	504	-	-	1/1/1/1	-
5	EDO	F	201	-	-	0/1/1/1	-
5	EDO	V	507	-	-	0/1/1/1	-
5	EDO	K	507	-	-	1/1/1/1	-
5	EDO	R	508	-	-	1/1/1/1	-
5	EDO	A	507	-	-	1/1/1/1	-
5	EDO	H	506	-	-	0/1/1/1	-
5	EDO	B	505	-	-	1/1/1/1	-
5	EDO	H	505	-	-	0/1/1/1	-
5	EDO	K	506	-	-	0/1/1/1	-
5	EDO	O	504	-	-	1/1/1/1	-
5	EDO	E	504	-	-	1/1/1/1	-
5	EDO	H	507	-	-	1/1/1/1	-
5	EDO	B	506	-	-	0/1/1/1	-
5	EDO	R	505	-	-	0/1/1/1	-
5	EDO	A	504	-	-	0/1/1/1	-
5	EDO	R	503	-	-	1/1/1/1	-

The worst 5 of 17 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	O	502	CAP	O6-C	3.29	1.32	1.22
4	V	502	CAP	O6-C	3.07	1.32	1.22
4	E	502	CAP	O6-C	3.05	1.32	1.22
4	K	502	CAP	O6-C	2.99	1.31	1.22
4	V	502	CAP	O7-C	2.99	1.41	1.30

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	E	502	CAP	O2-C2-C	-3.52	102.55	108.97
4	R	502	CAP	O2-C2-C	-3.34	102.87	108.97
4	V	502	CAP	O2-C2-C	-2.42	104.54	108.97
4	H	502	CAP	O2-C2-C	-2.25	104.86	108.97

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	K	502	CAP	O2-C2-C	-2.07	105.19	108.97

There are no chirality outliers.

5 of 82 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	502	CAP	O6-C-C2-C1
4	A	502	CAP	O7-C-C2-C1
4	A	502	CAP	O6-C-C2-O2
4	A	502	CAP	O7-C-C2-O2
4	A	502	CAP	O3-C3-C4-O4

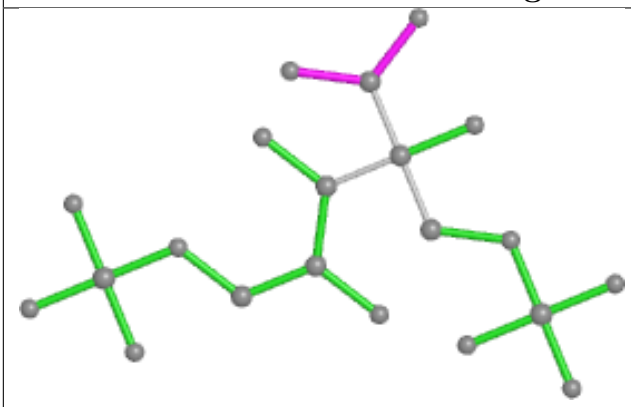
There are no ring outliers.

13 monomers are involved in 20 short contacts:

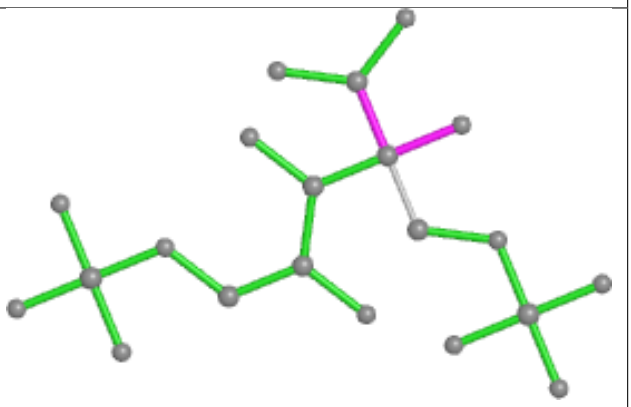
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	508	EDO	1	0
5	A	509	EDO	2	0
5	H	504	EDO	1	0
5	H	508	EDO	1	0
5	R	506	EDO	1	0
5	V	506	EDO	3	0
5	J	202	EDO	1	0
5	E	506	EDO	1	0
5	B	509	EDO	3	0
5	A	503	EDO	1	0
5	E	505	EDO	1	0
5	V	507	EDO	3	0
5	B	506	EDO	1	0

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.

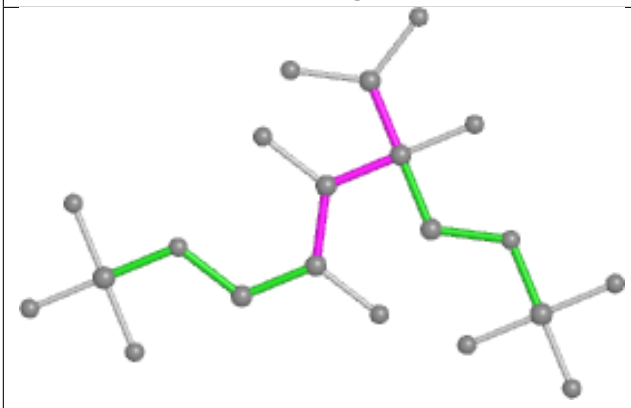
Ligand CAP E 502



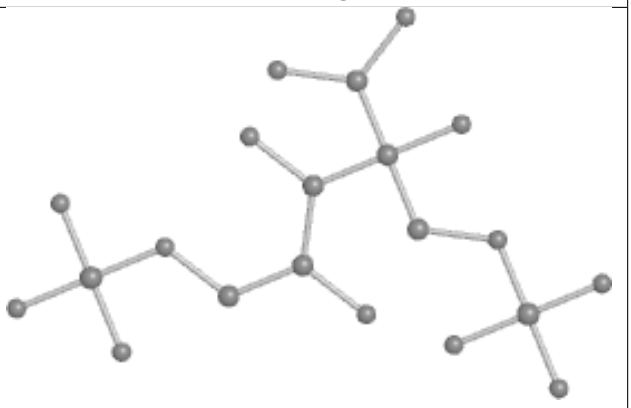
Bond lengths



Bond angles

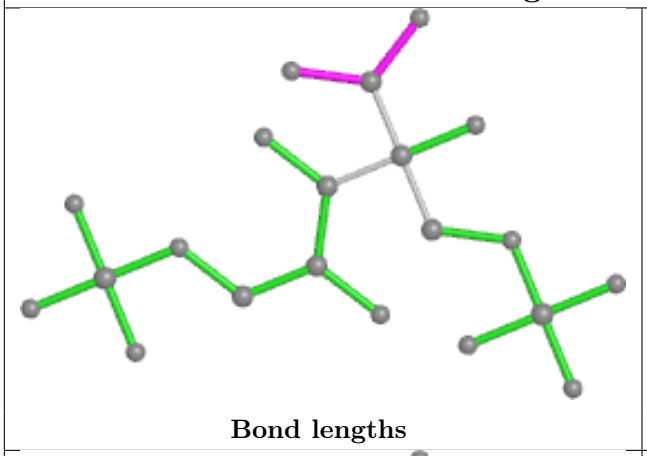


Torsions

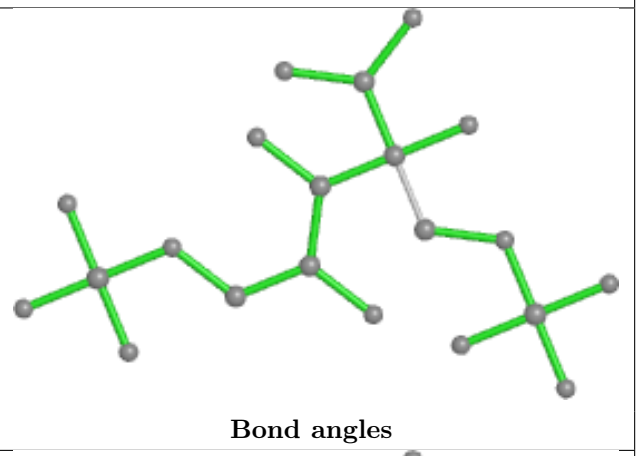


Rings

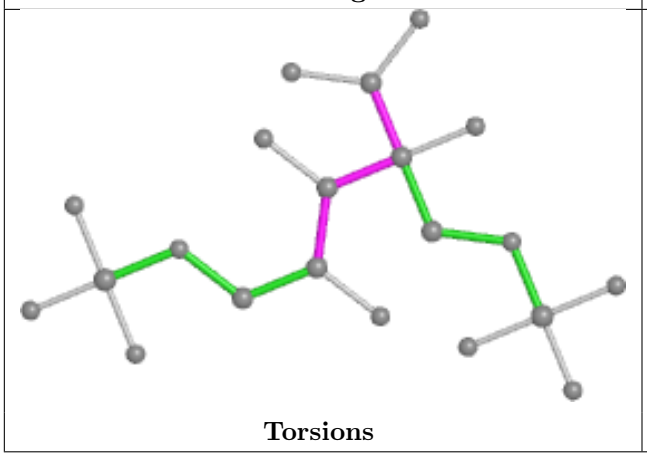
Ligand CAP O 502



Bond lengths



Bond angles



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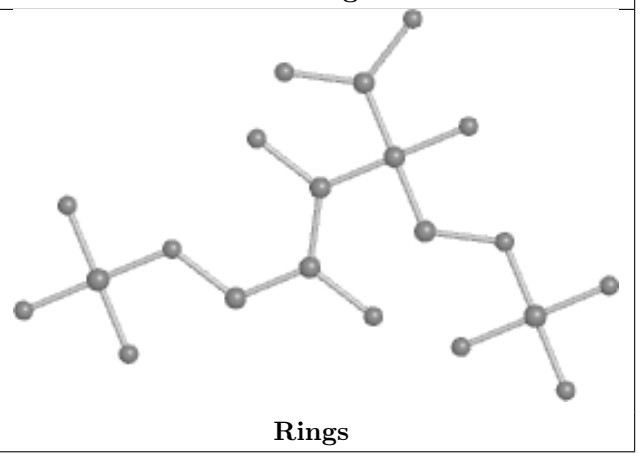
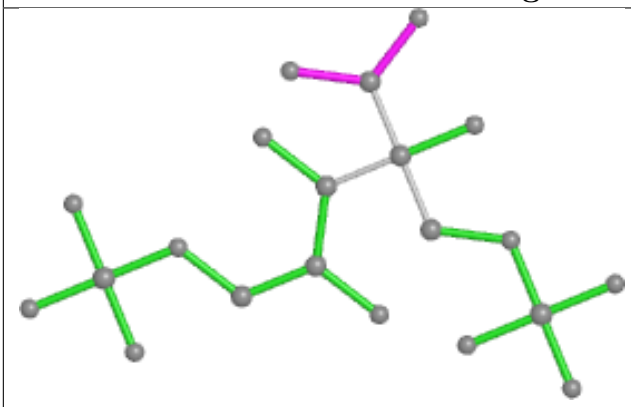
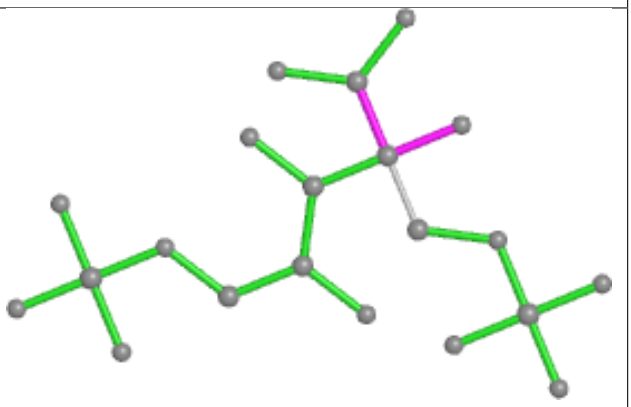


Rings

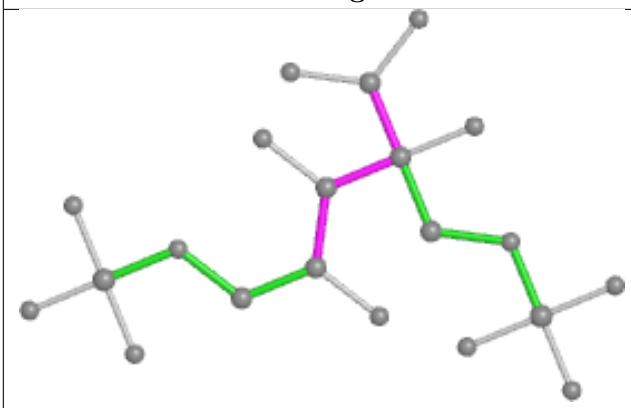
Ligand CAP R 502



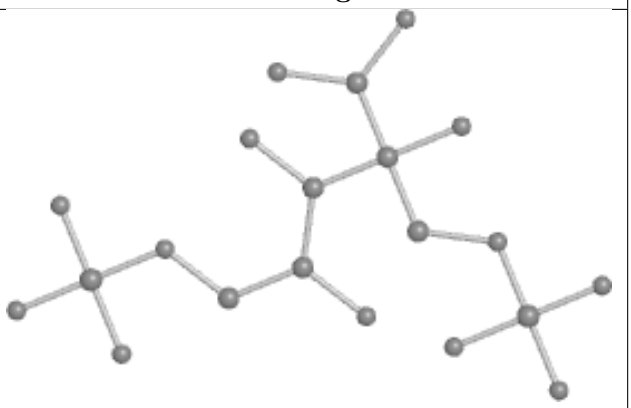
Bond lengths



Bond angles

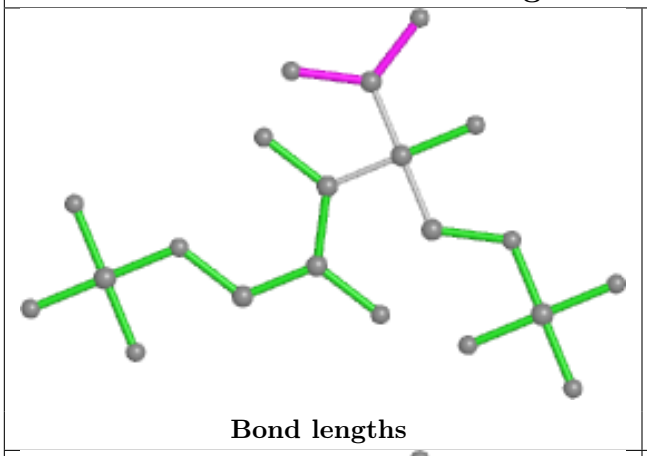


Torsions

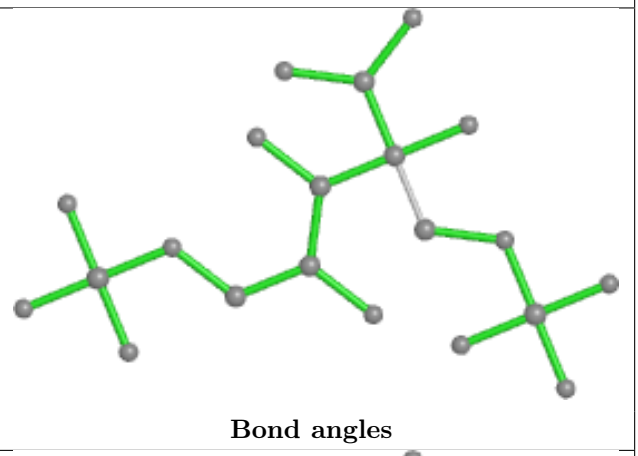


Rings

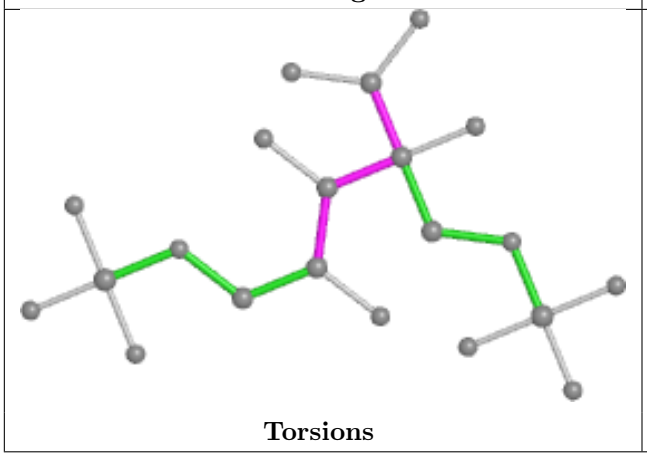
Ligand CAP A 502



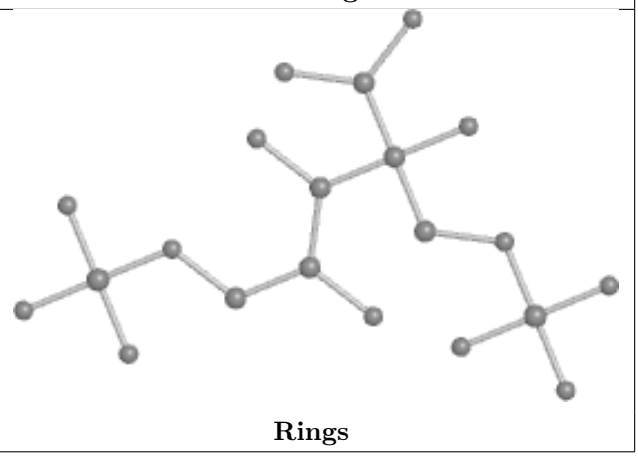
Bond lengths



Bond angles

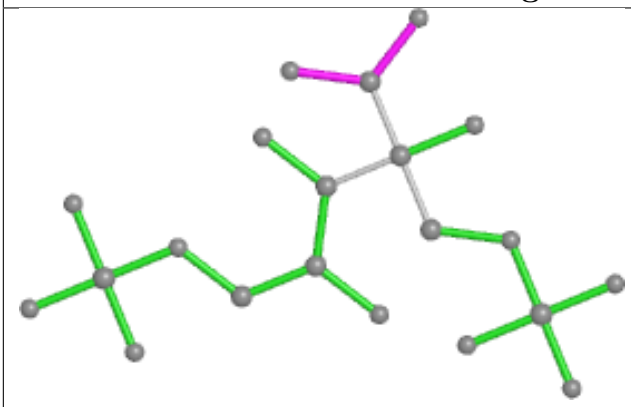


Torsions

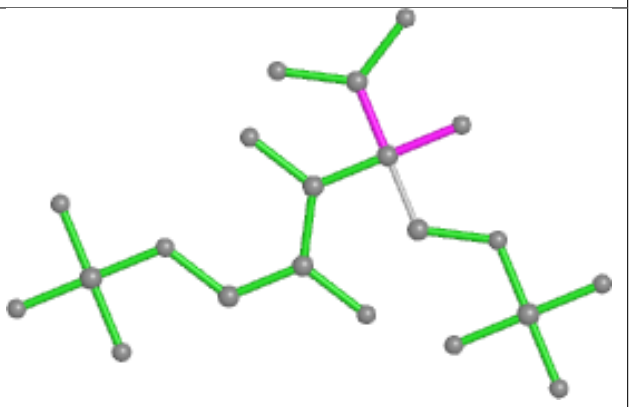


Rings

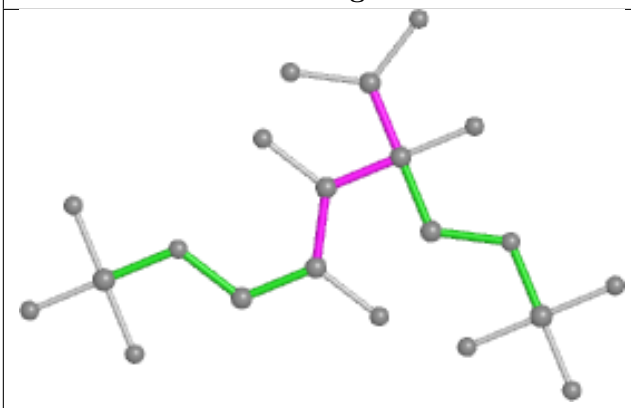
Ligand CAP H 502



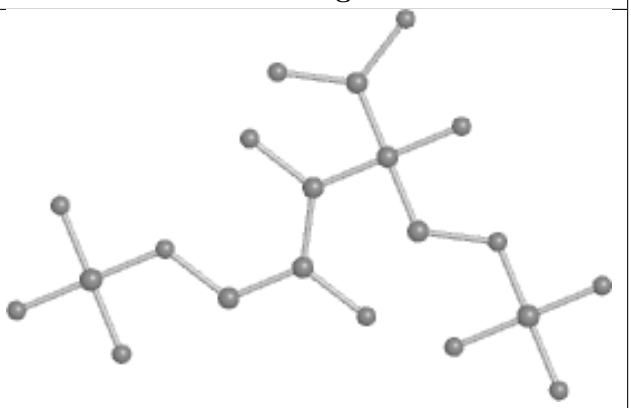
Bond lengths



Bond angles

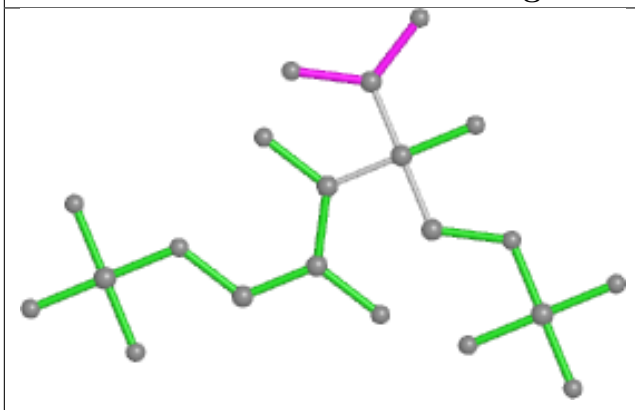


Torsions

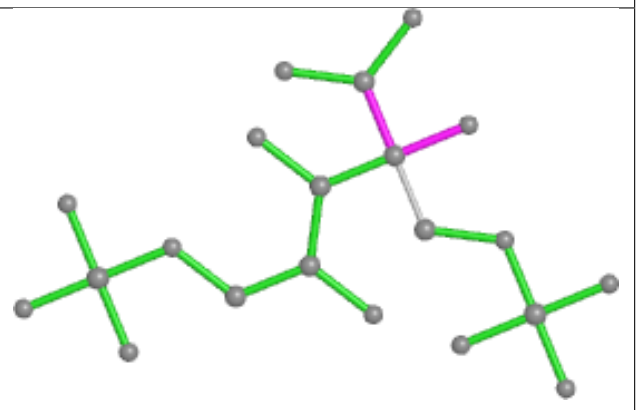


Rings

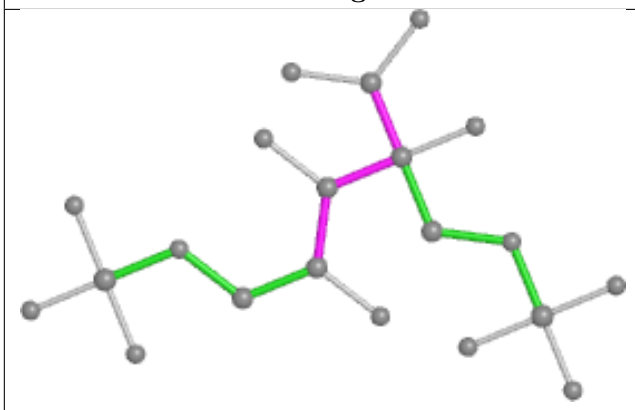
Ligand CAP V 502



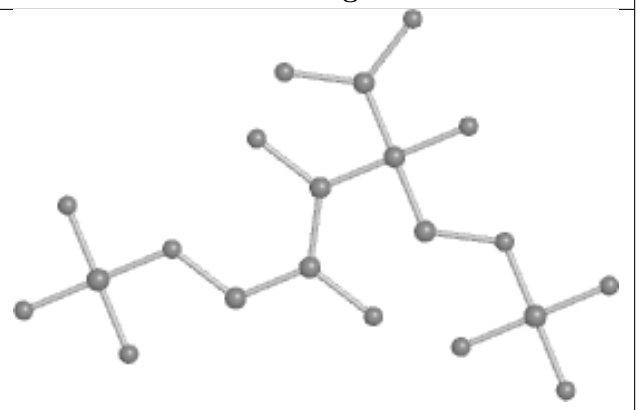
Bond lengths



Bond angles

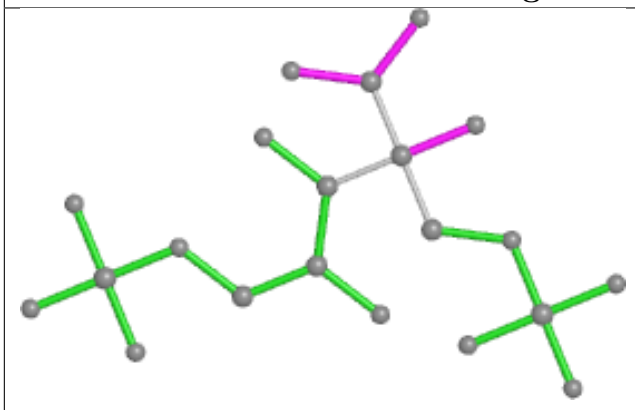


Torsions

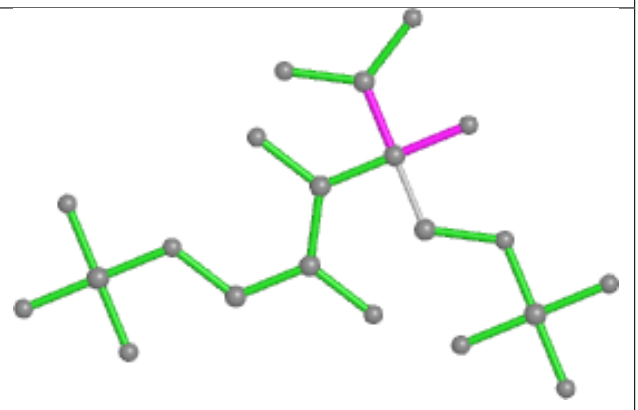


Rings

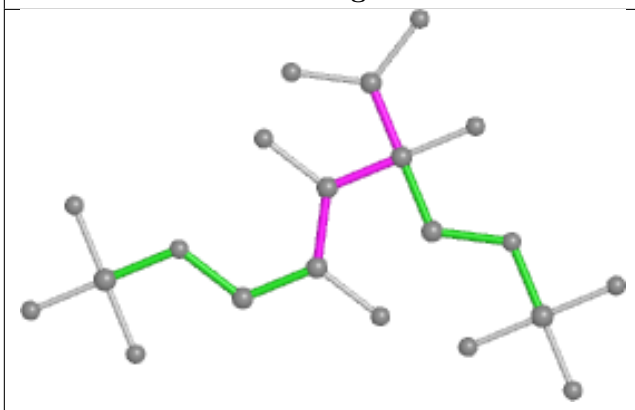
Ligand CAP K 502



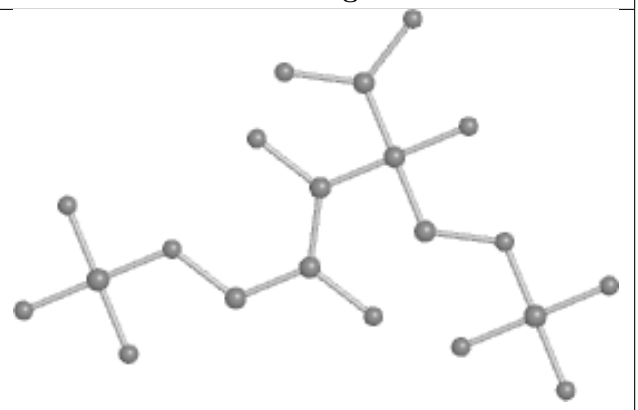
Bond lengths



Bond angles

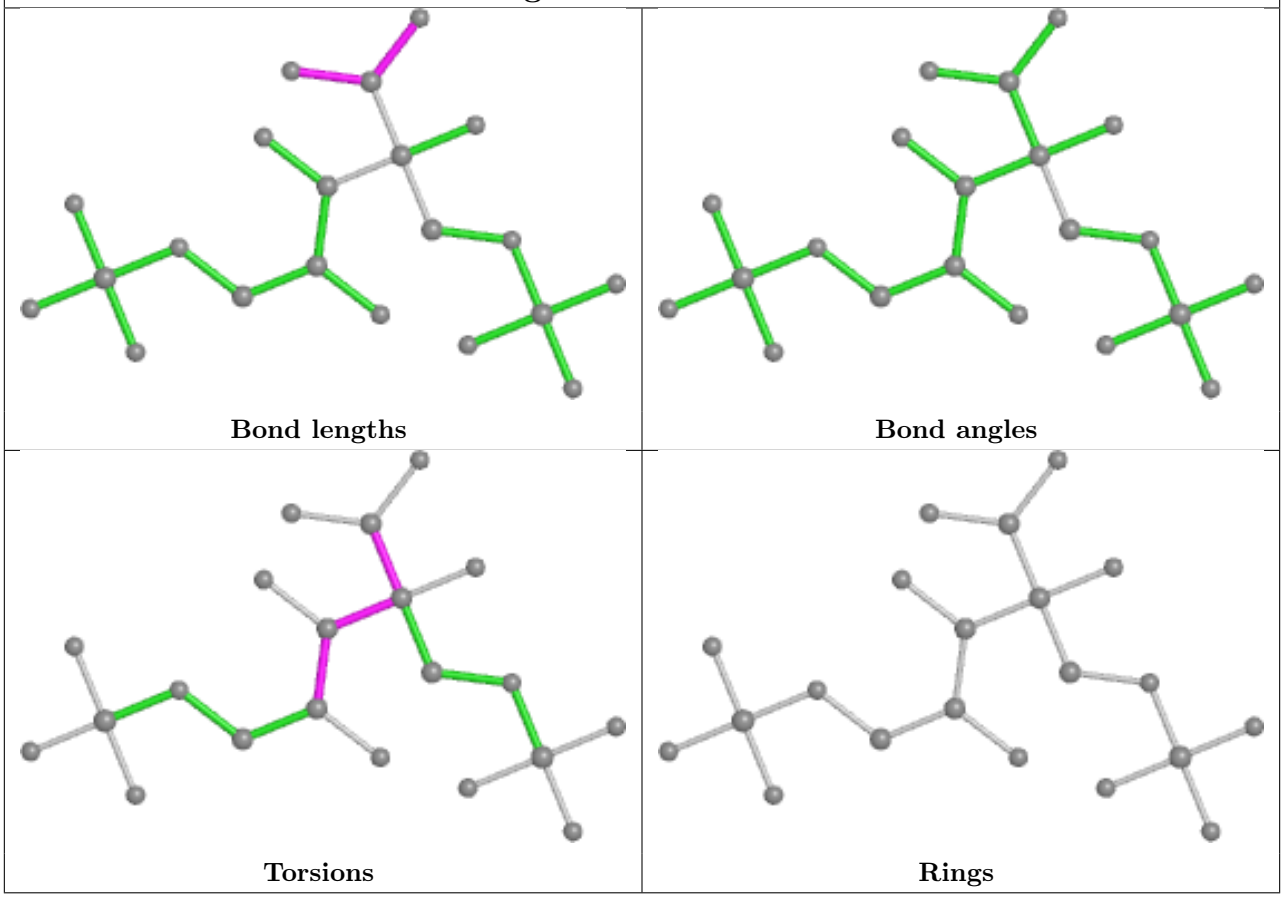


Torsions



Rings

Ligand CAP B 502



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	K	2

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	K	360:ARG	C	361:GLY	N	2.35
1	K	359:SER	C	360:ARG	N	1.82

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	460/475 (96%)	-0.64	3 (0%) 87 91	24, 31, 46, 63	0
1	B	460/475 (96%)	-0.67	2 (0%) 92 95	24, 31, 46, 63	0
1	E	464/475 (97%)	-0.58	7 (1%) 73 79	24, 31, 47, 92	0
1	H	464/475 (97%)	-0.58	9 (1%) 66 73	24, 31, 47, 95	0
1	K	464/475 (97%)	-0.55	6 (1%) 77 81	24, 31, 47, 90	0
1	O	464/475 (97%)	-0.58	7 (1%) 73 79	24, 31, 47, 87	0
1	R	460/475 (96%)	-0.62	5 (1%) 80 85	24, 31, 46, 63	0
1	V	460/475 (96%)	-0.64	4 (0%) 84 88	24, 31, 46, 63	0
2	C	140/140 (100%)	-0.28	0 100 100	30, 40, 52, 64	0
2	F	140/140 (100%)	-0.27	4 (2%) 51 58	30, 40, 52, 60	0
2	I	140/140 (100%)	-0.35	1 (0%) 87 91	30, 40, 52, 56	0
2	J	140/140 (100%)	-0.22	1 (0%) 87 91	30, 40, 52, 63	1 (0%)
2	M	140/140 (100%)	-0.46	0 100 100	30, 40, 52, 57	1 (0%)
2	P	140/140 (100%)	-0.36	2 (1%) 75 80	30, 40, 52, 60	0
2	T	140/140 (100%)	-0.16	6 (4%) 35 42	30, 40, 52, 57	0
2	W	140/140 (100%)	-0.51	0 100 100	30, 40, 52, 56	1 (0%)
All	All	4816/4920 (97%)	-0.54	57 (1%) 79 83	24, 32, 50, 95	3 (0%)

The worst 5 of 57 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	V	92	GLY	7.0
1	H	7	THR	5.2
1	E	8	LYS	4.9
1	K	8	LYS	4.5
1	K	7	THR	4.5

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, 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.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
1	HYP	B	151	8/9	0.92	0.10	24,27,29,30	0
1	HYP	E	104	8/9	0.92	0.10	26,28,30,30	0
1	HYP	V	151	8/9	0.93	0.10	24,28,29,30	0
1	HYP	B	104	8/9	0.94	0.09	26,28,30,30	0
1	HYP	H	104	8/9	0.94	0.09	26,29,30,30	0
1	HYP	O	151	8/9	0.94	0.09	24,28,29,30	0
1	HYP	R	104	7/9	0.94	0.08	26,28,30,30	0
1	HYP	A	151	8/9	0.94	0.08	24,28,29,30	0
1	HYP	R	151	8/9	0.95	0.09	24,28,29,30	0
1	HYP	V	104	8/9	0.95	0.07	26,28,30,30	0
1	HYP	O	104	8/9	0.95	0.07	26,28,30,30	0
1	HYP	K	104	8/9	0.96	0.08	26,29,30,30	0
1	HYP	K	151	8/9	0.96	0.07	24,28,29,30	0
1	KCX	A	201	12/13	0.96	0.12	23,26,28,29	0
1	KCX	B	201	12/13	0.96	0.11	23,26,28,29	0
1	SMC	O	256	7/8	0.96	0.08	27,29,30,30	0
1	SMC	A	256	7/8	0.96	0.09	27,29,29,31	0
1	HYP	A	104	8/9	0.96	0.08	26,28,30,30	0
1	HYP	H	151	8/9	0.96	0.06	24,28,29,30	0
1	SMC	H	369	7/8	0.96	0.07	28,31,32,37	0
1	SMC	E	369	7/8	0.97	0.06	28,30,32,37	0
1	KCX	O	201	12/13	0.97	0.13	23,26,28,29	0
1	SMC	B	256	7/8	0.97	0.07	27,28,29,30	0
1	SMC	O	369	7/8	0.97	0.07	28,30,32,36	0
1	HYP	E	151	8/9	0.97	0.06	24,28,29,30	0
1	KCX	K	201	12/13	0.97	0.12	23,26,28,29	0
1	KCX	R	201	12/13	0.97	0.12	23,26,28,29	0
1	SMC	R	256	7/8	0.97	0.07	27,29,29,31	0
1	SMC	K	369	7/8	0.97	0.08	28,30,32,37	0
1	KCX	H	201	12/13	0.97	0.10	23,26,28,29	0
1	KCX	V	201	12/13	0.97	0.12	23,26,28,29	0
1	SMC	V	369	7/8	0.97	0.07	28,30,32,37	0
1	SMC	K	256	7/8	0.98	0.07	27,29,29,31	0
1	SMC	R	369	7/8	0.98	0.07	28,30,32,37	0
1	SMC	A	369	7/8	0.98	0.06	28,30,32,37	0
1	SMC	B	369	7/8	0.98	0.06	28,30,32,36	0
1	KCX	E	201	12/13	0.98	0.12	23,26,28,29	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
1	SMC	V	256	7/8	0.98	0.06	27,29,30,31	0
1	SMC	E	256	7/8	0.98	0.07	27,29,29,31	0
1	SMC	H	256	7/8	0.99	0.05	27,29,29,30	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, 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.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
5	EDO	V	507	4/4	0.29	0.41	62,63,63,67	0
5	EDO	C	202	4/4	0.47	0.29	88,89,91,92	0
5	EDO	K	507	4/4	0.59	0.36	61,64,65,67	0
5	EDO	A	508	4/4	0.61	0.20	66,69,70,71	0
5	EDO	B	507	4/4	0.65	0.27	52,55,55,57	0
5	EDO	A	506	4/4	0.66	0.38	56,59,61,63	0
5	EDO	O	507	4/4	0.67	0.26	55,57,58,59	0
5	EDO	B	509	4/4	0.71	0.15	57,57,58,61	0
5	EDO	T	201	4/4	0.74	0.20	62,64,69,70	0
5	EDO	A	505	4/4	0.74	0.16	55,55,56,58	0
5	EDO	H	507	4/4	0.75	0.22	59,62,62,63	0
5	EDO	V	506	4/4	0.76	0.35	53,62,67,69	0
5	EDO	H	505	4/4	0.76	0.30	59,62,62,63	0
5	EDO	R	508	4/4	0.78	0.28	59,60,60,61	0
5	EDO	B	505	4/4	0.78	0.18	48,53,53,55	0
5	EDO	E	507	4/4	0.79	0.20	55,65,66,72	0
5	EDO	P	202	4/4	0.79	0.31	59,61,62,62	0
5	EDO	V	505	4/4	0.80	0.14	51,54,58,58	0
5	EDO	K	505	4/4	0.81	0.23	56,63,64,66	0
5	EDO	I	201	4/4	0.84	0.22	56,60,61,63	0
5	EDO	J	202	4/4	0.85	0.16	44,46,48,49	0
5	EDO	M	201	4/4	0.87	0.22	74,74,74,76	0
5	EDO	J	201	4/4	0.87	0.15	50,56,60,63	0
5	EDO	E	506	4/4	0.88	0.15	48,53,56,56	0
5	EDO	E	505	4/4	0.88	0.14	46,49,49,51	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
5	EDO	K	506	4/4	0.88	0.16	39,41,45,49	0
5	EDO	O	505	4/4	0.89	0.16	58,64,67,67	0
5	EDO	H	508	4/4	0.89	0.17	38,41,46,48	0
5	EDO	B	503	4/4	0.90	0.11	30,31,37,37	0
5	EDO	H	506	4/4	0.90	0.24	49,51,52,55	0
5	EDO	C	201	4/4	0.90	0.30	53,54,57,60	0
5	EDO	O	503	4/4	0.90	0.15	35,40,40,43	0
5	EDO	K	503	4/4	0.90	0.13	40,45,45,49	0
5	EDO	F	201	4/4	0.90	0.26	51,53,53,56	0
5	EDO	R	505	4/4	0.91	0.13	40,43,43,46	0
5	EDO	A	509	4/4	0.91	0.22	49,59,61,63	0
5	EDO	O	506	4/4	0.91	0.19	42,51,52,57	0
5	EDO	I	202	4/4	0.92	0.20	64,64,64,65	0
5	EDO	R	507	4/4	0.93	0.11	31,32,32,36	0
5	EDO	F	202	4/4	0.93	0.12	49,53,53,55	0
5	EDO	A	503	4/4	0.93	0.11	33,35,36,37	0
5	EDO	O	504	4/4	0.94	0.11	33,34,35,39	0
5	EDO	P	201	4/4	0.94	0.16	41,47,51,58	0
5	EDO	K	504	4/4	0.94	0.10	32,33,35,36	0
5	EDO	V	503	4/4	0.94	0.09	30,35,38,40	0
5	EDO	R	503	4/4	0.94	0.12	31,31,34,35	0
5	EDO	B	508	4/4	0.94	0.11	22,22,25,29	0
5	EDO	R	506	4/4	0.94	0.18	46,47,49,54	0
5	EDO	T	202	4/4	0.95	0.09	38,44,45,46	0
5	EDO	A	507	4/4	0.95	0.10	34,34,36,37	0
5	EDO	E	503	4/4	0.95	0.09	29,35,36,39	0
5	EDO	R	504	4/4	0.95	0.08	36,37,40,42	0
5	EDO	B	506	4/4	0.95	0.15	29,39,39,41	0
3	MG	K	501	1/1	0.96	0.08	27,27,27,27	0
5	EDO	H	504	4/4	0.96	0.10	39,40,42,43	0
5	EDO	V	504	4/4	0.96	0.09	39,41,41,46	0
5	EDO	E	504	4/4	0.97	0.09	28,33,34,35	0
3	MG	R	501	1/1	0.97	0.06	28,28,28,28	0
5	EDO	B	504	4/4	0.97	0.08	33,33,35,37	0
4	CAP	V	502	21/21	0.97	0.09	28,31,33,37	0
3	MG	B	501	1/1	0.97	0.09	27,27,27,27	0
3	MG	A	501	1/1	0.97	0.10	27,27,27,27	0
5	EDO	H	503	4/4	0.97	0.05	33,33,34,37	0
3	MG	O	501	1/1	0.98	0.09	27,27,27,27	0
4	CAP	A	502	21/21	0.98	0.12	27,31,32,37	0
5	EDO	A	504	4/4	0.98	0.09	33,34,41,42	0
4	CAP	B	502	21/21	0.98	0.11	28,31,32,37	0

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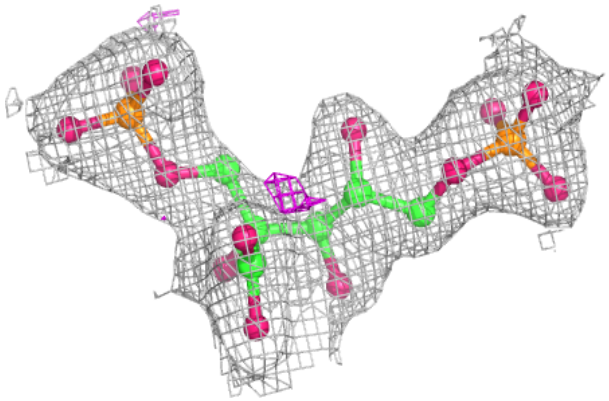
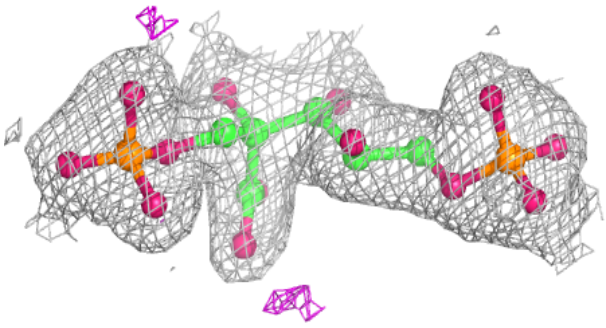
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	CAP	E	502	21/21	0.98	0.11	28,31,33,37	0
4	CAP	R	502	21/21	0.98	0.10	27,31,33,37	0
3	MG	E	501	1/1	0.99	0.14	27,27,27,27	0
3	MG	V	501	1/1	0.99	0.07	27,27,27,27	0
4	CAP	H	502	21/21	0.99	0.09	28,32,33,37	0
4	CAP	K	502	21/21	0.99	0.13	27,31,33,37	0
4	CAP	O	502	21/21	0.99	0.10	27,31,33,37	0
3	MG	H	501	1/1	0.99	0.05	28,28,28,28	0

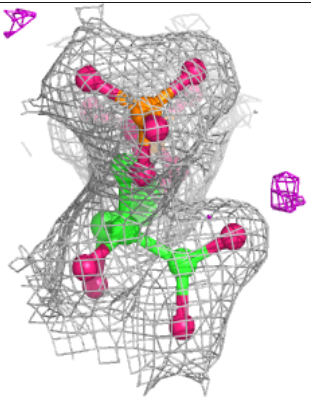
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around CAP V 502:

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

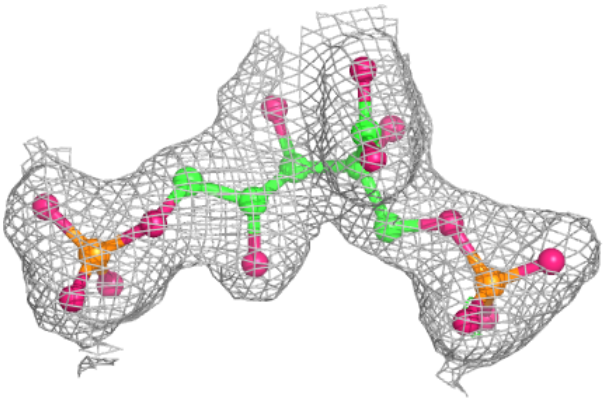


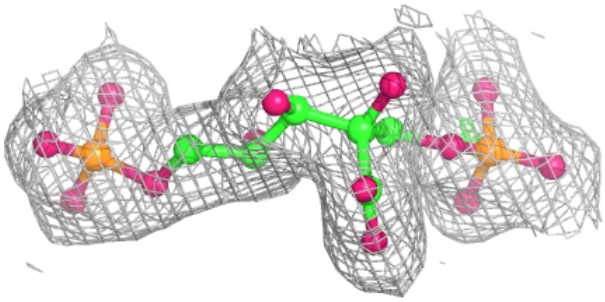


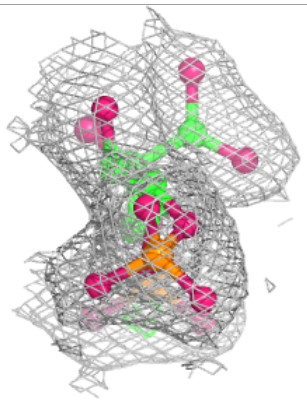


Electron density around CAP A 502:

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

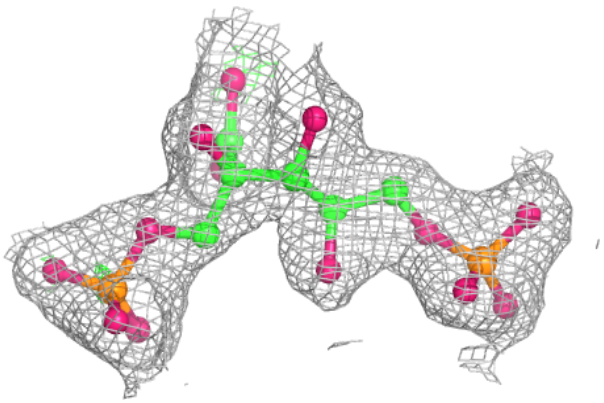


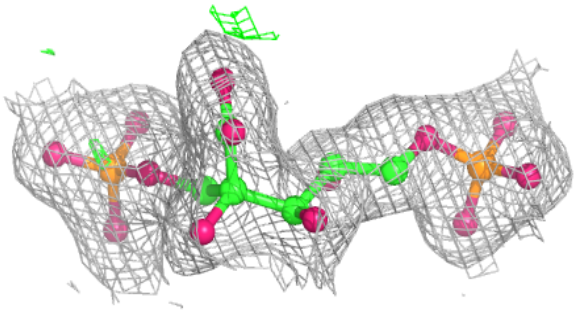


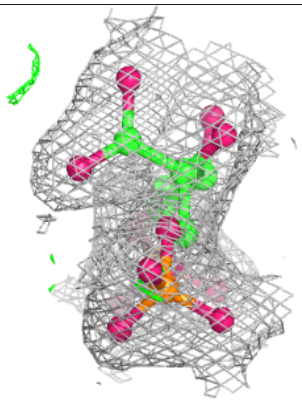


Electron density around CAP B 502:

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

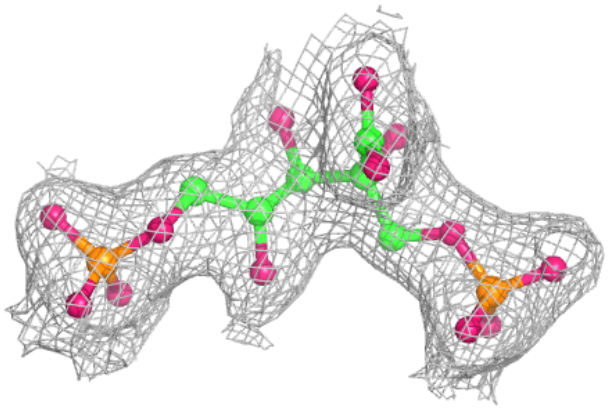


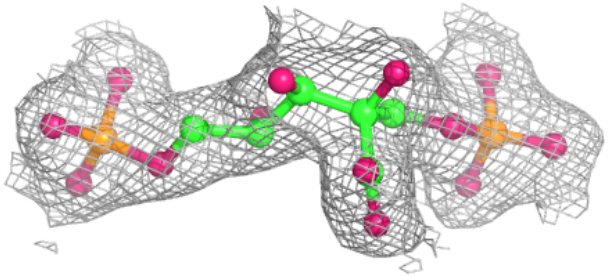


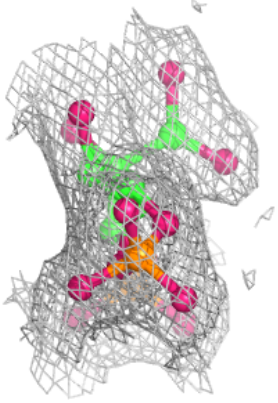


Electron density around CAP E 502:

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

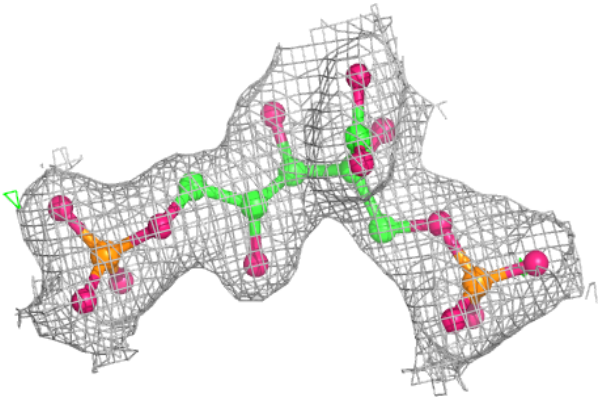


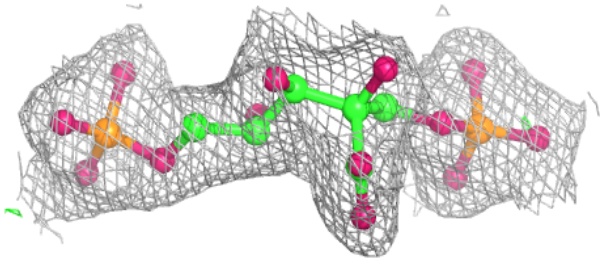


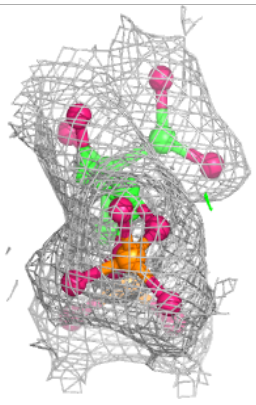


Electron density around CAP R 502:

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

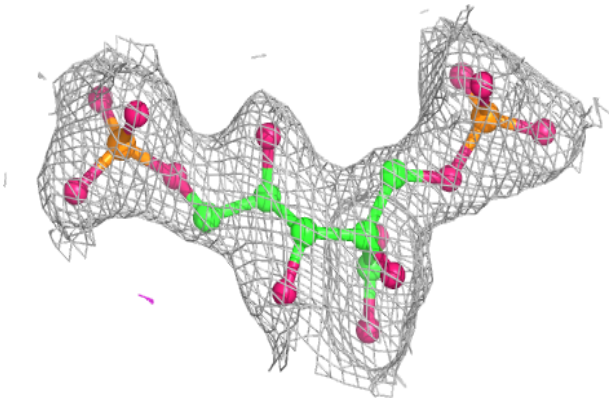


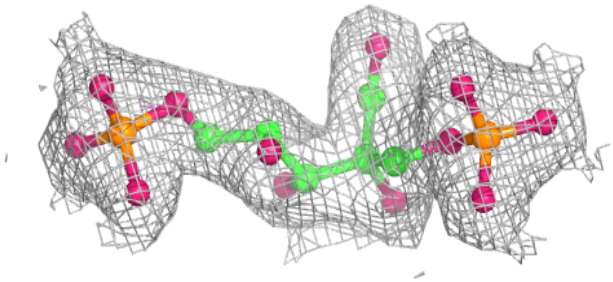


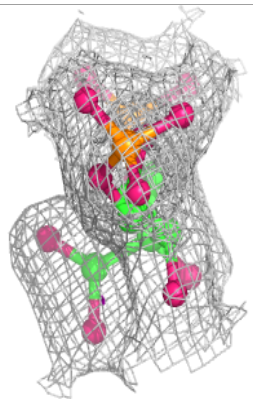


Electron density around CAP H 502:

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

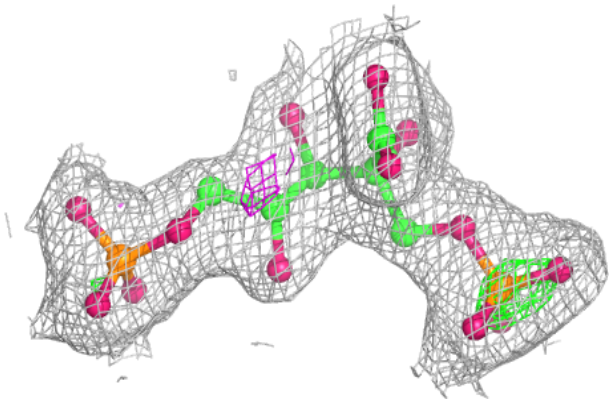


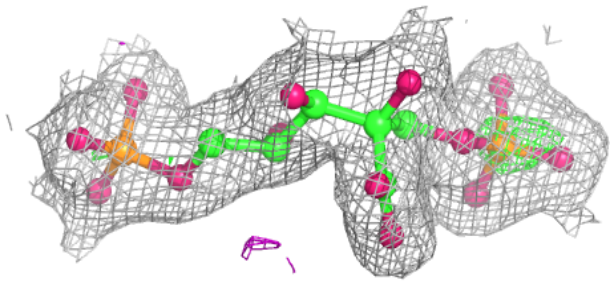


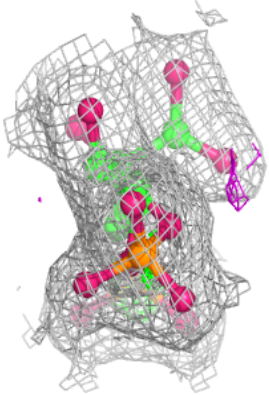


Electron density around CAP K 502:

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

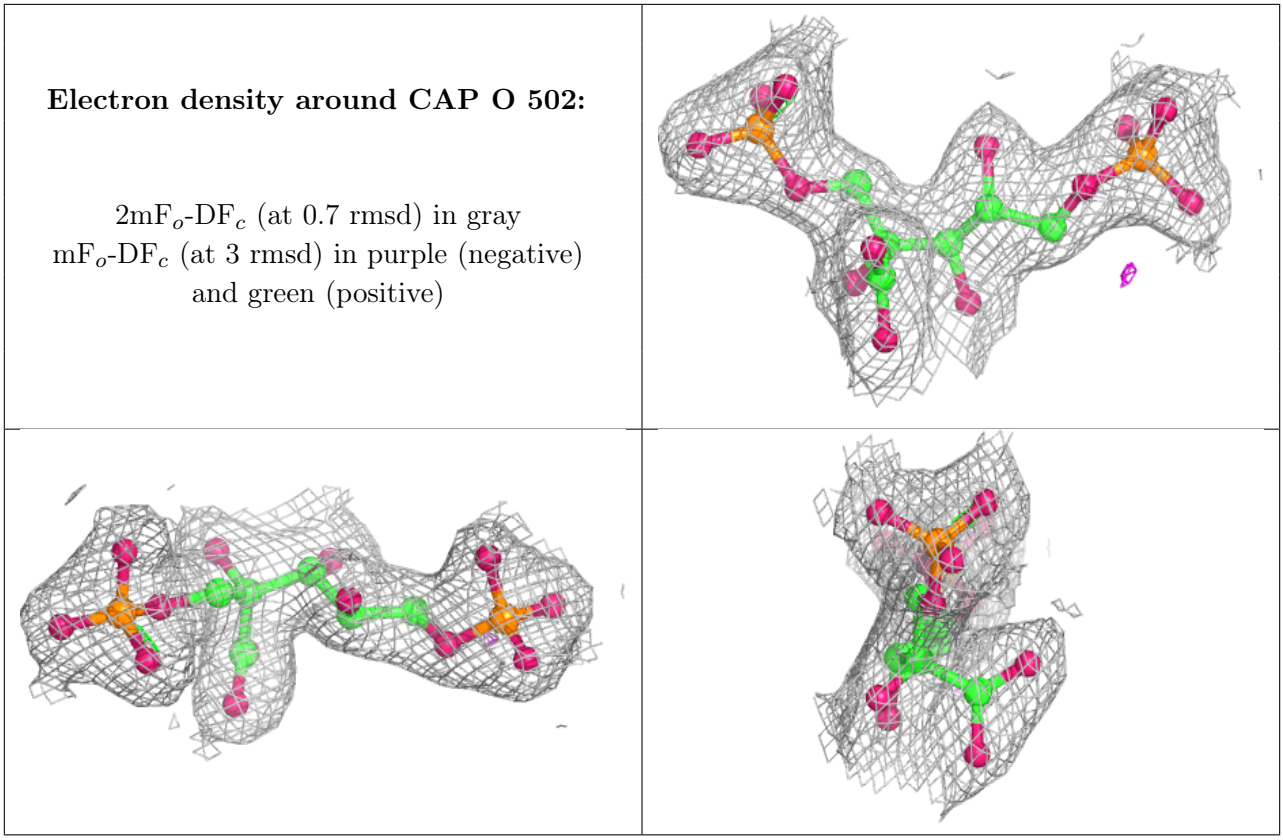






Electron density around CAP O 502:

$2mF_o$-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.