Full wwPDB X-ray Structure Validation Report ⓘ

Jul 21, 2025 – 11:29 am BST

PDB ID	:	9G6I / pdb_00009g6i
Title	:	Crystal structure of S. epidermidis ClpP in complex with bortezomib - cocrystallization
Authors	:	Alves Franca, B.; Rohde, H.; Betzel, C.
Deposited on	:	2024-07-18
Resolution	:	1.74 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

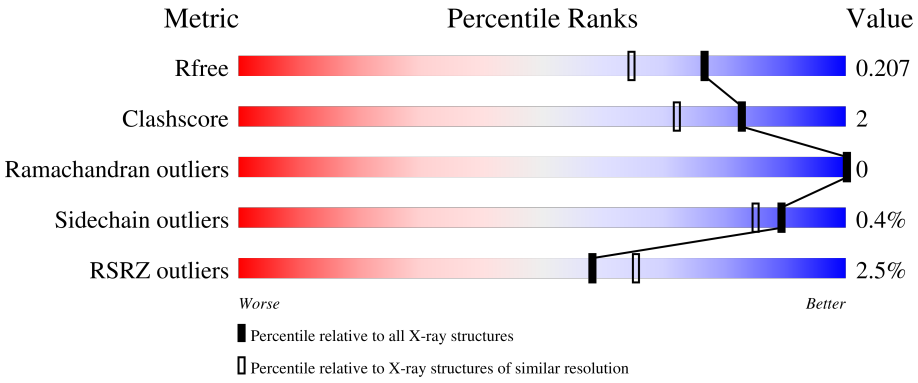
MolProbity	:	4-5-2 with Phenix2.0rc1
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.44

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 1.74 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}	164625	1043 (1.74-1.74)
Clashscore	180529	1119 (1.74-1.74)
Ramachandran outliers	177936	1112 (1.74-1.74)
Sidechain outliers	177891	1112 (1.74-1.74)
RSRZ outliers	164620	1043 (1.74-1.74)

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	199	2% 88% · 10%
1	B	199	3% 85% 5% 11%
1	C	199	3% 85% 6% 9%
1	D	199	% 84% 6% 10%
1	E	199	3% 84% 7% 10%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	F	199	3% 86% 10%
1	G	199	3% 86% 5% 9%
1	H	199	4% 84% 7% 9%
1	I	199	3% 86% 11%
1	J	199	3% 85% 6% 9%
1	K	199	2% 86% 9%
1	L	199	2% 85% 5% 10%
1	M	199	3% 86% 10%
1	N	199	2% 88% 9%

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	ACT	J	201	-	-	X	-

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 21510 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 ATP-dependent Clp protease proteolytic subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	180	Total	C	N	O	S	0	0	0
			1375	866	234	269	6			
1	B	178	Total	C	N	O	S	0	0	0
			1371	863	233	269	6			
1	C	181	Total	C	N	O	S	0	1	0
			1388	873	237	272	6			
1	D	179	Total	C	N	O	S	0	1	0
			1374	866	236	266	6			
1	E	180	Total	C	N	O	S	0	0	0
			1379	869	234	270	6			
1	F	179	Total	C	N	O	S	0	1	0
			1368	862	231	269	6			
1	G	182	Total	C	N	O	S	0	1	0
			1400	881	238	275	6			
1	H	181	Total	C	N	O	S	0	0	0
			1376	868	235	267	6			
1	I	178	Total	C	N	O	S	0	0	0
			1369	862	233	268	6			
1	J	182	Total	C	N	O	S	0	1	0
			1388	876	238	268	6			
1	K	181	Total	C	N	O	S	0	1	0
			1383	873	237	267	6			
1	L	179	Total	C	N	O	S	0	1	0
			1382	870	235	271	6			
1	M	179	Total	C	N	O	S	0	2	0
			1376	868	233	268	7			
1	N	181	Total	C	N	O	S	0	0	0
			1387	875	236	270	6			

There are 84 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	194	HIS	-	expression tag	UNP A0A0N1MQL5

Continued on next page...

Continued from previous page...

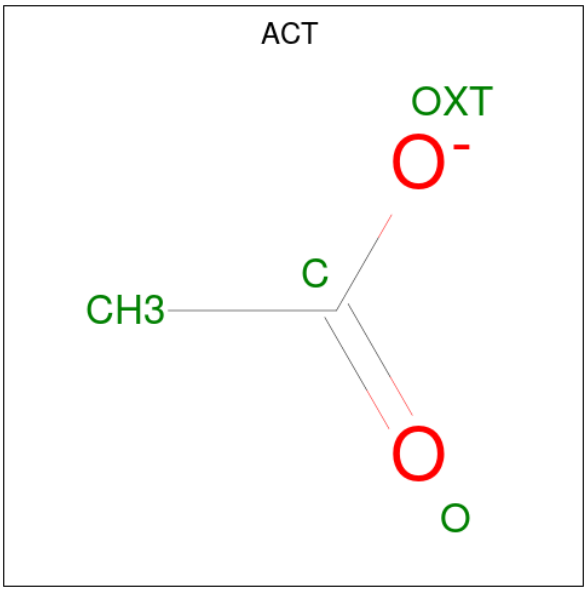
Chain	Residue	Modelled	Actual	Comment	Reference
A	195	HIS	-	expression tag	UNP A0A0N1MQL5
A	196	HIS	-	expression tag	UNP A0A0N1MQL5
A	197	HIS	-	expression tag	UNP A0A0N1MQL5
A	198	HIS	-	expression tag	UNP A0A0N1MQL5
A	199	HIS	-	expression tag	UNP A0A0N1MQL5
B	194	HIS	-	expression tag	UNP A0A0N1MQL5
B	195	HIS	-	expression tag	UNP A0A0N1MQL5
B	196	HIS	-	expression tag	UNP A0A0N1MQL5
B	197	HIS	-	expression tag	UNP A0A0N1MQL5
B	198	HIS	-	expression tag	UNP A0A0N1MQL5
B	199	HIS	-	expression tag	UNP A0A0N1MQL5
C	194	HIS	-	expression tag	UNP A0A0N1MQL5
C	195	HIS	-	expression tag	UNP A0A0N1MQL5
C	196	HIS	-	expression tag	UNP A0A0N1MQL5
C	197	HIS	-	expression tag	UNP A0A0N1MQL5
C	198	HIS	-	expression tag	UNP A0A0N1MQL5
C	199	HIS	-	expression tag	UNP A0A0N1MQL5
D	194	HIS	-	expression tag	UNP A0A0N1MQL5
D	195	HIS	-	expression tag	UNP A0A0N1MQL5
D	196	HIS	-	expression tag	UNP A0A0N1MQL5
D	197	HIS	-	expression tag	UNP A0A0N1MQL5
D	198	HIS	-	expression tag	UNP A0A0N1MQL5
D	199	HIS	-	expression tag	UNP A0A0N1MQL5
E	194	HIS	-	expression tag	UNP A0A0N1MQL5
E	195	HIS	-	expression tag	UNP A0A0N1MQL5
E	196	HIS	-	expression tag	UNP A0A0N1MQL5
E	197	HIS	-	expression tag	UNP A0A0N1MQL5
E	198	HIS	-	expression tag	UNP A0A0N1MQL5
E	199	HIS	-	expression tag	UNP A0A0N1MQL5
F	194	HIS	-	expression tag	UNP A0A0N1MQL5
F	195	HIS	-	expression tag	UNP A0A0N1MQL5
F	196	HIS	-	expression tag	UNP A0A0N1MQL5
F	197	HIS	-	expression tag	UNP A0A0N1MQL5
F	198	HIS	-	expression tag	UNP A0A0N1MQL5
F	199	HIS	-	expression tag	UNP A0A0N1MQL5
G	194	HIS	-	expression tag	UNP A0A0N1MQL5
G	195	HIS	-	expression tag	UNP A0A0N1MQL5
G	196	HIS	-	expression tag	UNP A0A0N1MQL5
G	197	HIS	-	expression tag	UNP A0A0N1MQL5
G	198	HIS	-	expression tag	UNP A0A0N1MQL5
G	199	HIS	-	expression tag	UNP A0A0N1MQL5
H	194	HIS	-	expression tag	UNP A0A0N1MQL5

Continued on next page...

Continued from previous page...

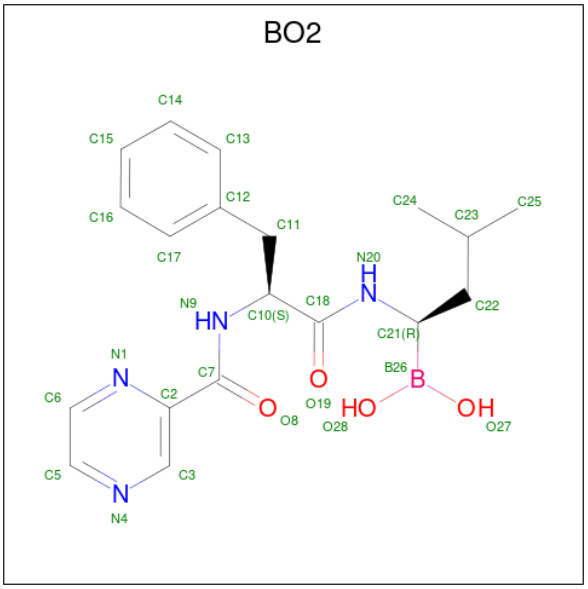
Chain	Residue	Modelled	Actual	Comment	Reference
H	195	HIS	-	expression tag	UNP A0A0N1MQL5
H	196	HIS	-	expression tag	UNP A0A0N1MQL5
H	197	HIS	-	expression tag	UNP A0A0N1MQL5
H	198	HIS	-	expression tag	UNP A0A0N1MQL5
H	199	HIS	-	expression tag	UNP A0A0N1MQL5
I	194	HIS	-	expression tag	UNP A0A0N1MQL5
I	195	HIS	-	expression tag	UNP A0A0N1MQL5
I	196	HIS	-	expression tag	UNP A0A0N1MQL5
I	197	HIS	-	expression tag	UNP A0A0N1MQL5
I	198	HIS	-	expression tag	UNP A0A0N1MQL5
I	199	HIS	-	expression tag	UNP A0A0N1MQL5
J	194	HIS	-	expression tag	UNP A0A0N1MQL5
J	195	HIS	-	expression tag	UNP A0A0N1MQL5
J	196	HIS	-	expression tag	UNP A0A0N1MQL5
J	197	HIS	-	expression tag	UNP A0A0N1MQL5
J	198	HIS	-	expression tag	UNP A0A0N1MQL5
J	199	HIS	-	expression tag	UNP A0A0N1MQL5
K	194	HIS	-	expression tag	UNP A0A0N1MQL5
K	195	HIS	-	expression tag	UNP A0A0N1MQL5
K	196	HIS	-	expression tag	UNP A0A0N1MQL5
K	197	HIS	-	expression tag	UNP A0A0N1MQL5
K	198	HIS	-	expression tag	UNP A0A0N1MQL5
K	199	HIS	-	expression tag	UNP A0A0N1MQL5
L	194	HIS	-	expression tag	UNP A0A0N1MQL5
L	195	HIS	-	expression tag	UNP A0A0N1MQL5
L	196	HIS	-	expression tag	UNP A0A0N1MQL5
L	197	HIS	-	expression tag	UNP A0A0N1MQL5
L	198	HIS	-	expression tag	UNP A0A0N1MQL5
L	199	HIS	-	expression tag	UNP A0A0N1MQL5
M	194	HIS	-	expression tag	UNP A0A0N1MQL5
M	195	HIS	-	expression tag	UNP A0A0N1MQL5
M	196	HIS	-	expression tag	UNP A0A0N1MQL5
M	197	HIS	-	expression tag	UNP A0A0N1MQL5
M	198	HIS	-	expression tag	UNP A0A0N1MQL5
M	199	HIS	-	expression tag	UNP A0A0N1MQL5
N	194	HIS	-	expression tag	UNP A0A0N1MQL5
N	195	HIS	-	expression tag	UNP A0A0N1MQL5
N	196	HIS	-	expression tag	UNP A0A0N1MQL5
N	197	HIS	-	expression tag	UNP A0A0N1MQL5
N	198	HIS	-	expression tag	UNP A0A0N1MQL5
N	199	HIS	-	expression tag	UNP A0A0N1MQL5

- Molecule 2 is ACETATE ION (CCD ID: ACT) (formula: $C_2H_3O_2$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	C	1	Total C O 4 2 2	0	0
2	D	1	Total C O 4 2 2	0	0
2	E	1	Total C O 4 2 2	0	0
2	F	1	Total C O 4 2 2	0	0
2	G	1	Total C O 4 2 2	0	0
2	H	1	Total C O 4 2 2	0	0
2	I	1	Total C O 4 2 2	0	0
2	J	1	Total C O 4 2 2	0	0
2	K	1	Total C O 4 2 2	0	0
2	L	1	Total C O 4 2 2	0	0
2	M	1	Total C O 4 2 2	0	0
2	N	1	Total C O 4 2 2	0	0

- Molecule 3 is N-[(1R)-1-(DIHYDROXYBORYL)-3-METHYLBUTYL]-N-(PYRAZIN-2-YL CARBONYL)-L-PHENYLALANINAMIDE (CCD ID: BO2) (formula: $C_{19}H_{25}BN_4O_4$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	B	C	N	O	0	0
			28	1	19	4	4		
3	B	1	Total	B	C	N	O	0	0
			28	1	19	4	4		
3	C	1	Total	B	C	N	O	0	0
			28	1	19	4	4		
3	D	1	Total	B	C	N	O	0	0
			28	1	19	4	4		
3	E	1	Total	B	C	N	O	0	0
			28	1	19	4	4		
3	F	1	Total	B	C	N	O	0	0
			28	1	19	4	4		
3	G	1	Total	B	C	N	O	0	0
			28	1	19	4	4		
3	H	1	Total	B	C	N	O	0	0
			28	1	19	4	4		
3	I	1	Total	B	C	N	O	0	0
			28	1	19	4	4		
3	J	1	Total	B	C	N	O	0	0
			28	1	19	4	4		
3	K	1	Total	B	C	N	O	0	0
			28	1	19	4	4		
3	L	1	Total	B	C	N	O	0	0
			28	1	19	4	4		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	M	1	Total	B	C	N	O	0	0
			28	1	19	4	4		
3	N	1	Total	B	C	N	O	0	0
			28	1	19	4	4		

- Molecule 4 is water.

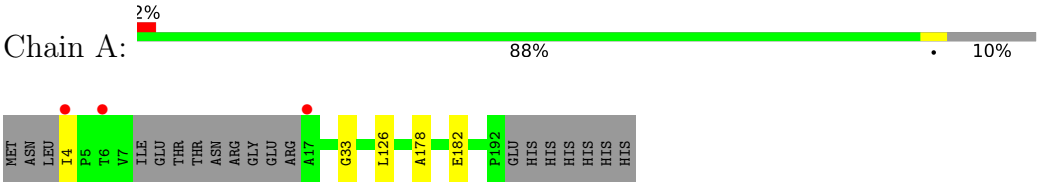
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	127	Total	O	0	0
			127	127		
4	B	129	Total	O	0	0
			129	129		
4	C	121	Total	O	0	0
			121	121		
4	D	132	Total	O	0	0
			132	132		
4	E	128	Total	O	0	0
			128	128		
4	F	133	Total	O	0	0
			133	133		
4	G	138	Total	O	0	0
			138	138		
4	H	97	Total	O	0	0
			97	97		
4	I	97	Total	O	0	0
			97	97		
4	J	131	Total	O	0	0
			131	131		
4	K	146	Total	O	0	0
			146	146		
4	L	140	Total	O	0	0
			140	140		
4	M	135	Total	O	0	0
			135	135		
4	N	92	Total	O	0	0
			92	92		

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.

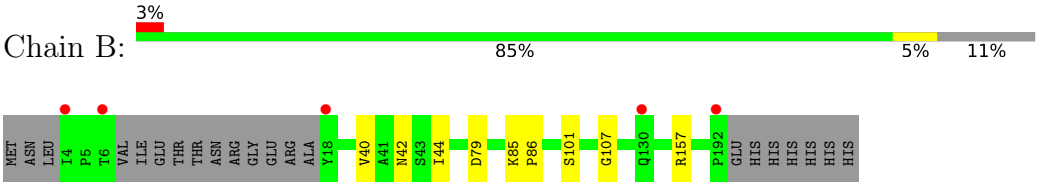
• Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain A:



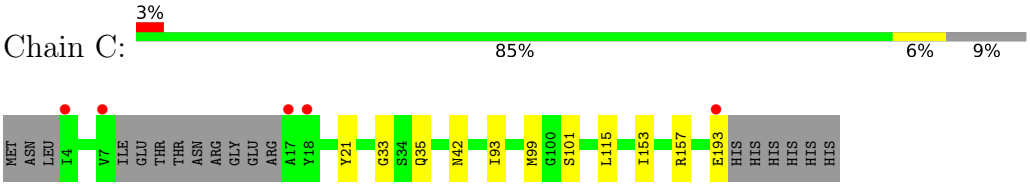
• Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain B:



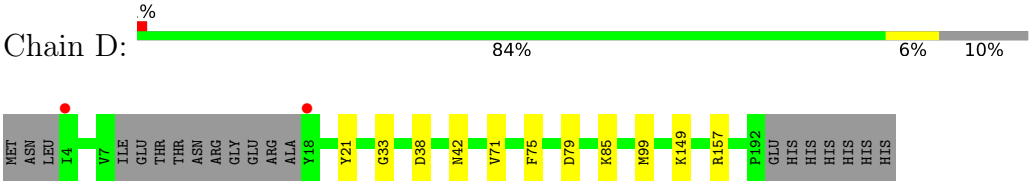
• Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain C:



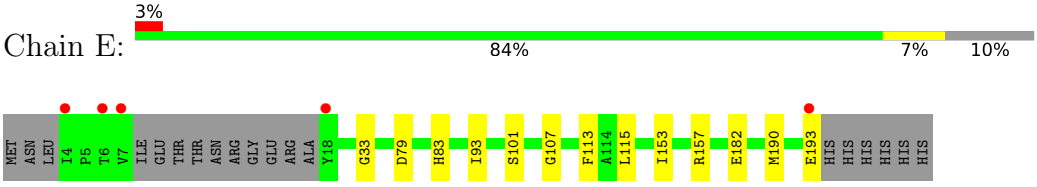
• Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain D:



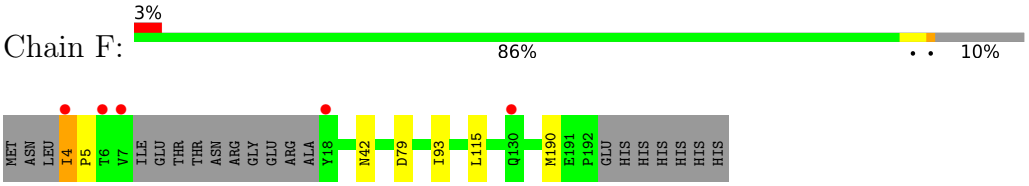
• Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain E:



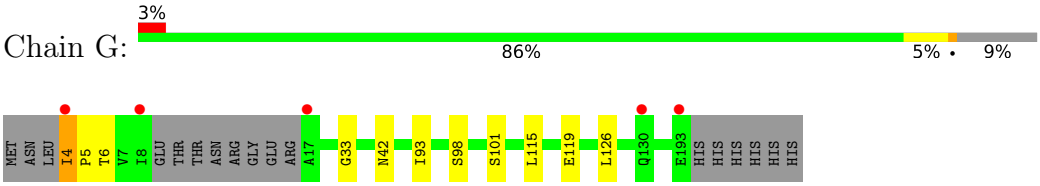
• Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain F:



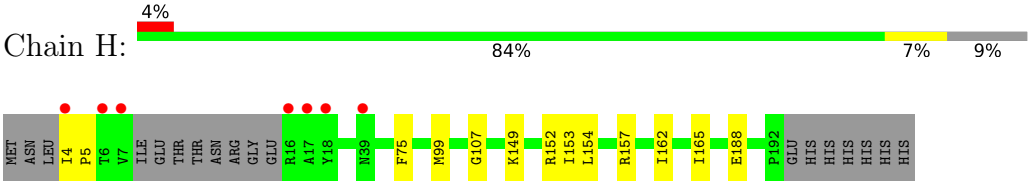
• Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain G:



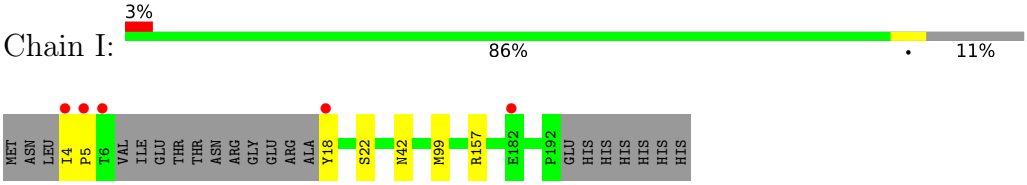
• Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain H:



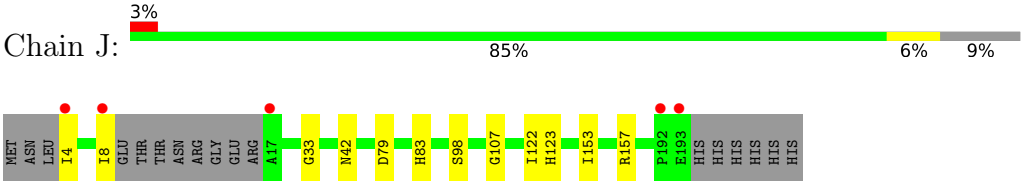
• Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain I:



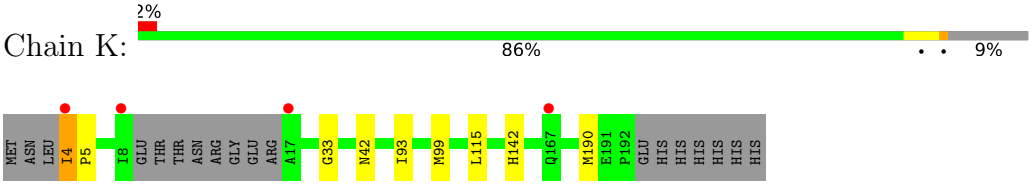
• Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain J:



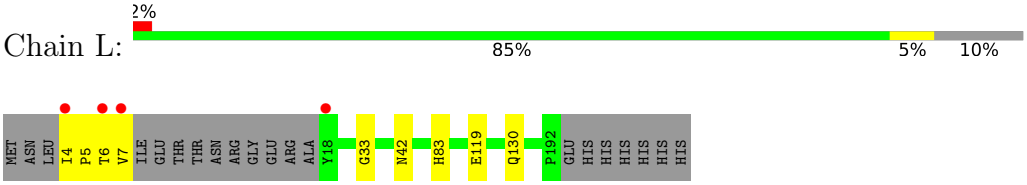
• Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain K:



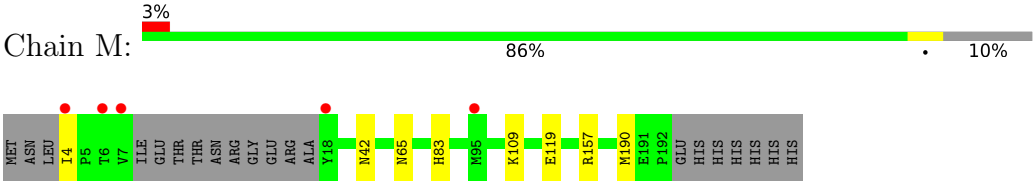
• Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain L:



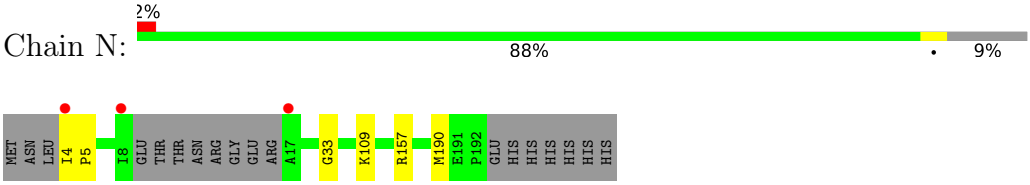
• Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain M:



• Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain N:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	95.34Å 124.00Å 127.84Å 90.00° 91.16° 90.00°	Depositor
Resolution (Å)	44.96 – 1.74 44.96 – 1.74	Depositor EDS
% Data completeness (in resolution range)	98.9 (44.96-1.74) 99.0 (44.96-1.74)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.34 (at 1.74Å)	Xtriage
Refinement program	PHENIX 1.21_5207	Depositor
R, R_{free}	0.178 , 0.207 0.178 , 0.207	Depositor DCC
R_{free} test set	3156 reflections (1.05%)	wwPDB-VP
Wilson B-factor (Å^2)	27.1	Xtriage
Anisotropy	0.340	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 40.4	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.000 for -h,l,k 0.011 for -h,-l,-k 0.019 for h,-k,-l	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	21510	wwPDB-VP
Average B, all atoms (Å^2)	31.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.48% 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: ACT, BO2

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	0.41	0/1393	0.60	0/1883
1	B	0.42	0/1389	0.56	0/1875
1	C	0.44	0/1406	0.60	0/1901
1	D	0.45	0/1392	0.59	0/1881
1	E	0.46	0/1397	0.61	0/1887
1	F	0.47	0/1386	0.60	0/1875
1	G	0.43	0/1418	0.57	0/1917
1	H	0.35	0/1394	0.53	0/1884
1	I	0.37	0/1387	0.54	0/1872
1	J	0.44	0/1406	0.60	0/1901
1	K	0.44	0/1401	0.58	0/1894
1	L	0.45	0/1400	0.60	0/1891
1	M	0.46	0/1394	0.61	0/1884
1	N	0.36	0/1405	0.55	0/1898
All	All	0.43	0/19568	0.58	0/26443

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1375	0	1376	3	0
1	B	1371	0	1377	10	0
1	C	1388	0	1383	13	0
1	D	1374	0	1379	10	0
1	E	1379	0	1382	11	0
1	F	1368	0	1359	7	0
1	G	1400	0	1398	10	0
1	H	1376	0	1379	9	0
1	I	1369	0	1372	6	0
1	J	1388	0	1391	11	0
1	K	1383	0	1389	8	0
1	L	1382	0	1385	6	0
1	M	1376	0	1374	8	0
1	N	1387	0	1398	4	0
2	A	4	0	3	0	0
2	B	4	0	3	1	0
2	C	4	0	3	1	0
2	D	4	0	3	0	0
2	E	4	0	3	1	0
2	F	4	0	3	0	0
2	G	4	0	3	1	0
2	H	4	0	3	0	0
2	I	4	0	3	0	0
2	J	4	0	3	3	0
2	K	4	0	3	0	0
2	L	4	0	3	0	0
2	M	4	0	3	0	0
2	N	4	0	3	0	0
3	A	28	0	25	1	0
3	B	28	0	25	0	0
3	C	28	0	25	1	0
3	D	28	0	25	2	0
3	E	28	0	25	0	0
3	F	28	0	25	1	0
3	G	28	0	25	1	0
3	H	28	0	25	1	0
3	I	28	0	25	1	0
3	J	28	0	25	0	0
3	K	28	0	25	1	0
3	L	28	0	25	0	0
3	M	28	0	25	0	0
3	N	28	0	25	0	0
4	A	127	0	0	0	1

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	129	0	0	0	1
4	C	121	0	0	1	1
4	D	132	0	0	2	0
4	E	128	0	0	1	0
4	F	133	0	0	0	0
4	G	138	0	0	2	1
4	H	97	0	0	1	0
4	I	97	0	0	0	0
4	J	131	0	0	0	1
4	K	146	0	0	0	0
4	L	140	0	0	1	1
4	M	135	0	0	1	0
4	N	92	0	0	0	0
All	All	21510	0	19734	92	3

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 2.

All (92) 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:H:152:ARG:HA	1:H:162:ILE:HD11	1.54	0.90
1:J:122:ILE:HA	2:J:201:ACT:H3	1.59	0.84
1:K:93:ILE:HG22	1:K:115:LEU:HD12	1.64	0.79
1:H:99:MET:HE2	3:H:202:BO2:H243	1.65	0.78
1:F:4:ILE:HG23	1:F:5:PRO:HD3	1.68	0.72
1:G:93:ILE:HG22	1:G:115:LEU:HD12	1.73	0.70
1:F:93:ILE:HG22	1:F:115:LEU:HD12	1.73	0.69
1:L:83:HIS:CE1	1:M:190:MET:HE3	2.27	0.69
1:J:123:HIS:H	2:J:201:ACT:H1	1.58	0.67
1:F:79:ASP:HB3	1:G:115:LEU:HD13	1.78	0.66
1:J:98:SER:HA	2:J:201:ACT:H2	1.76	0.65
1:M:109:LYS:HZ3	1:M:157:ARG:HH11	1.43	0.64
1:C:93:ILE:HG22	1:C:115:LEU:HD12	1.81	0.62
1:J:79:ASP:HB3	1:K:115:LEU:HD13	1.80	0.62
1:E:93:ILE:HG22	1:E:115:LEU:HD12	1.83	0.60
1:D:21:TYR:OH	4:D:301:HOH:O	2.16	0.59
1:K:42[B]:ASN:ND2	1:L:33:GLY:HA3	2.17	0.59
1:B:85:LYS:NZ	1:C:193:GLU:O	2.33	0.57
1:D:99:MET:SD	3:D:202:BO2:H243	2.44	0.57
1:M:119:GLU:OE2	4:M:301:HOH:O	2.17	0.57

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:99:MET:HE2	3:C:202:BO2:H243	1.85	0.57
1:M:42[A]:ASN:ND2	1:N:33:GLY:HA3	2.20	0.56
1:D:79:ASP:HB3	1:E:115:LEU:HD13	1.88	0.56
1:D:42[B]:ASN:ND2	1:E:33:GLY:HA3	2.22	0.55
1:H:154:LEU:HB3	1:H:165:ILE:HD13	1.87	0.55
1:B:79:ASP:HB3	1:C:115:LEU:HD13	1.89	0.54
1:I:18:TYR:HD1	1:I:22:SER:CB	2.21	0.54
1:A:33:GLY:HA3	1:G:42[B]:ASN:ND2	2.22	0.53
1:C:35:GLN:H	1:C:35:GLN:CD	2.17	0.53
1:L:42[A]:ASN:HD21	1:M:65:ASN:HD22	1.56	0.53
1:B:42:ASN:ND2	1:C:33:GLY:HA3	2.25	0.52
1:I:99:MET:HE2	3:I:202:BO2:H243	1.91	0.51
1:J:4:ILE:O	1:J:4:ILE:HG13	2.10	0.51
1:G:119:GLU:OE1	4:G:301:HOH:O	2.18	0.51
1:L:130:GLN:OE1	4:L:301:HOH:O	2.19	0.51
1:N:109:LYS:HZ1	1:N:157:ARG:NE	2.10	0.50
1:C:101:SER:OG	2:C:201:ACT:H1	2.12	0.50
1:E:182:GLU:OE1	4:E:301:HOH:O	2.19	0.50
1:C:21:TYR:OH	4:C:301:HOH:O	2.20	0.49
1:E:83:HIS:CE1	1:F:190:MET:HE3	2.48	0.49
1:E:101:SER:OG	2:E:201:ACT:H2	2.13	0.47
1:H:107:GLY:O	1:H:157:ARG:NH2	2.47	0.47
1:B:85:LYS:HZ3	1:C:193:GLU:C	2.22	0.47
1:J:83:HIS:NE2	1:K:190:MET:HE3	2.29	0.47
1:E:79:ASP:HB3	1:F:115:LEU:HD13	1.97	0.47
1:K:99:MET:SD	3:K:202:BO2:H243	2.55	0.46
1:G:6:THR:OG1	4:G:302:HOH:O	2.21	0.46
1:J:42[B]:ASN:ND2	1:K:33:GLY:HA3	2.31	0.46
1:A:126:LEU:O	3:A:202:BO2:H3	2.15	0.46
1:F:42[B]:ASN:ND2	1:G:33:GLY:HA3	2.31	0.46
1:G:93:ILE:HG22	1:G:115:LEU:CD1	2.44	0.46
1:B:101:SER:OG	2:B:201:ACT:H1	2.16	0.45
1:G:4:ILE:HG13	1:G:5:PRO:HD3	1.97	0.45
1:I:18:TYR:OH	1:J:8:ILE:HB	2.17	0.45
1:D:157:ARG:NH2	4:D:302:HOH:O	2.25	0.45
1:K:4:ILE:N	1:K:5:PRO:HD2	2.30	0.45
1:H:4:ILE:N	1:H:5:PRO:HD3	2.32	0.45
1:H:153:ILE:O	1:H:157:ARG:HG2	2.16	0.45
1:I:4:ILE:HB	1:I:5:PRO:HD3	1.99	0.45
1:D:38:ASP:O	1:D:42[B]:ASN:ND2	2.50	0.45
1:C:153:ILE:O	1:C:157:ARG:HG2	2.17	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:113:PHE:CD1	1:E:190:MET:HG3	2.52	0.44
1:H:162:ILE:HA	1:H:162:ILE:HD13	1.67	0.44
1:H:188:GLU:OE2	4:H:301:HOH:O	2.21	0.44
1:B:85:LYS:NZ	1:C:193:GLU:C	2.76	0.44
1:G:98:SER:CB	3:G:202:BO2:O28	2.60	0.44
1:L:4:ILE:HG23	1:L:5:PRO:HD3	2.00	0.44
1:K:142:HIS:HE1	1:L:119:GLU:OE2	1.99	0.44
1:E:153:ILE:O	1:E:157:ARG:HG2	2.18	0.43
1:I:18:TYR:HD1	1:I:22:SER:HB3	1.82	0.43
1:D:85:LYS:NZ	1:E:193:GLU:O	2.51	0.43
1:C:42[B]:ASN:ND2	1:D:33:GLY:HA3	2.34	0.43
1:D:71:VAL:HG22	3:D:202:BO2:H222	2.00	0.43
1:E:107:GLY:O	1:E:157:ARG:NH2	2.50	0.43
1:J:107:GLY:O	1:J:157:ARG:NH2	2.52	0.43
1:I:42:ASN:ND2	1:J:33:GLY:HA3	2.33	0.42
1:B:40:VAL:O	1:B:44:ILE:HG12	2.19	0.42
1:M:83:HIS:NE2	1:N:190:MET:HE3	2.34	0.42
1:A:178:ALA:O	1:A:182:GLU:HG3	2.18	0.42
1:H:75:PHE:CE2	1:H:149:LYS:HE3	2.55	0.42
1:F:93:ILE:HG22	1:F:115:LEU:CD1	2.48	0.42
1:C:115:LEU:HD23	1:C:115:LEU:HA	1.93	0.41
3:F:202:BO2:H243	3:F:202:BO2:H21	1.96	0.41
1:B:107:GLY:O	1:B:157:ARG:NH2	2.52	0.41
1:D:75:PHE:CE2	1:D:149:LYS:HE3	2.56	0.41
1:M:109:LYS:HD3	1:M:109:LYS:HA	1.81	0.41
1:G:101:SER:OG	2:G:201:ACT:H1	2.21	0.41
1:B:85:LYS:HA	1:B:85:LYS:HD3	1.91	0.41
1:M:4:ILE:O	1:M:4:ILE:HG13	2.20	0.41
1:J:153:ILE:O	1:J:157:ARG:HG2	2.20	0.41
1:N:4:ILE:N	1:N:5:PRO:HD2	2.36	0.41
1:B:85:LYS:HB2	1:B:86:PRO:HD3	2.03	0.40

All (3) 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)
4:A:398:HOH:O	4:J:398:HOH:O[2_555]	2.06	0.14
4:C:313:HOH:O	4:L:328:HOH:O[2_656]	2.06	0.14
4:B:313:HOH:O	4:G:362:HOH:O[2_555]	2.18	0.02

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	176/199 (88%)	173 (98%)	3 (2%)	0	100	100
1	B	174/199 (87%)	172 (99%)	2 (1%)	0	100	100
1	C	178/199 (89%)	174 (98%)	4 (2%)	0	100	100
1	D	176/199 (88%)	173 (98%)	3 (2%)	0	100	100
1	E	176/199 (88%)	174 (99%)	2 (1%)	0	100	100
1	F	176/199 (88%)	174 (99%)	2 (1%)	0	100	100
1	G	179/199 (90%)	177 (99%)	2 (1%)	0	100	100
1	H	177/199 (89%)	175 (99%)	2 (1%)	0	100	100
1	I	174/199 (87%)	171 (98%)	3 (2%)	0	100	100
1	J	179/199 (90%)	176 (98%)	3 (2%)	0	100	100
1	K	178/199 (89%)	174 (98%)	4 (2%)	0	100	100
1	L	176/199 (88%)	173 (98%)	3 (2%)	0	100	100
1	M	177/199 (89%)	175 (99%)	2 (1%)	0	100	100
1	N	177/199 (89%)	175 (99%)	2 (1%)	0	100	100
All	All	2473/2786 (89%)	2436 (98%)	37 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	146/166 (88%)	145 (99%)	1 (1%)	81 74
1	B	147/166 (89%)	147 (100%)	0	100 100
1	C	147/166 (89%)	147 (100%)	0	100 100
1	D	146/166 (88%)	146 (100%)	0	100 100
1	E	147/166 (89%)	147 (100%)	0	100 100
1	F	145/166 (87%)	144 (99%)	1 (1%)	81 74
1	G	149/166 (90%)	147 (99%)	2 (1%)	65 48
1	H	145/166 (87%)	145 (100%)	0	100 100
1	I	146/166 (88%)	145 (99%)	1 (1%)	81 74
1	J	146/166 (88%)	146 (100%)	0	100 100
1	K	146/166 (88%)	145 (99%)	1 (1%)	81 74
1	L	148/166 (89%)	146 (99%)	2 (1%)	62 45
1	M	146/166 (88%)	146 (100%)	0	100 100
1	N	148/166 (89%)	148 (100%)	0	100 100
All	All	2052/2324 (88%)	2044 (100%)	8 (0%)	89 85

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	4	ILE
1	F	4	ILE
1	G	4	ILE
1	G	126	LEU
1	I	157	ARG
1	K	4	ILE
1	L	6	THR
1	L	7	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (33) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	151	ASN
1	B	42	ASN
1	B	83	HIS
1	B	151	ASN
1	B	166	GLN
1	C	151	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	D	54	GLN
1	D	130	GLN
1	D	151	ASN
1	D	167	GLN
1	E	151	ASN
1	F	65	ASN
1	F	151	ASN
1	F	167	GLN
1	G	151	ASN
1	H	65	ASN
1	H	83	HIS
1	H	130	GLN
1	H	151	ASN
1	I	42	ASN
1	I	151	ASN
1	J	65	ASN
1	J	130	GLN
1	J	151	ASN
1	J	166	GLN
1	K	151	ASN
1	K	166	GLN
1	L	117	ASN
1	L	151	ASN
1	M	65	ASN
1	M	151	ASN
1	M	166	GLN
1	N	142	HIS

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

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

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

28 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	BO2	L	202	1	25,29,29	0.47	0	32,38,38	0.89	1 (3%)
2	ACT	D	201	-	3,3,3	1.18	0	3,3,3	1.14	0
2	ACT	F	201	-	3,3,3	0.93	0	3,3,3	1.23	0
2	ACT	E	201	-	3,3,3	0.88	0	3,3,3	1.19	0
3	BO2	A	202	1	25,29,29	0.50	0	32,38,38	1.06	2 (6%)
2	ACT	A	201	-	3,3,3	1.05	0	3,3,3	1.35	0
2	ACT	N	201	-	3,3,3	1.14	0	3,3,3	1.25	0
2	ACT	L	201	-	3,3,3	1.21	0	3,3,3	1.07	0
2	ACT	M	201	-	3,3,3	1.13	0	3,3,3	1.05	0
2	ACT	J	201	-	3,3,3	0.82	0	3,3,3	1.99	2 (66%)
3	BO2	H	202	1	25,29,29	0.48	0	32,38,38	0.97	1 (3%)
3	BO2	G	202	1	25,29,29	0.46	0	32,38,38	0.88	2 (6%)
2	ACT	C	201	-	3,3,3	0.95	0	3,3,3	1.59	1 (33%)
3	BO2	B	202	1	25,29,29	0.54	0	32,38,38	0.77	0
3	BO2	I	202	1	25,29,29	0.50	0	32,38,38	1.06	2 (6%)
2	ACT	G	201	-	3,3,3	1.11	0	3,3,3	1.24	0
2	ACT	K	201	-	3,3,3	0.90	0	3,3,3	1.55	1 (33%)
3	BO2	F	202	1	25,29,29	0.51	0	32,38,38	0.69	0
3	BO2	C	202	1	25,29,29	0.48	0	32,38,38	1.22	1 (3%)
3	BO2	D	202	1	25,29,29	0.49	0	32,38,38	1.47	3 (9%)
3	BO2	N	202	1	25,29,29	0.46	0	32,38,38	0.97	1 (3%)
2	ACT	H	201	-	3,3,3	1.01	0	3,3,3	1.36	0
2	ACT	B	201	-	3,3,3	1.09	0	3,3,3	1.26	0
3	BO2	K	202	1	25,29,29	0.51	0	32,38,38	1.31	1 (3%)
3	BO2	J	202	1	25,29,29	0.49	0	32,38,38	1.04	1 (3%)
3	BO2	E	202	1	25,29,29	0.54	0	32,38,38	0.80	0
3	BO2	M	202	1	25,29,29	0.49	0	32,38,38	1.29	3 (9%)
2	ACT	I	201	-	3,3,3	0.95	0	3,3,3	1.56	1 (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
3	BO2	L	202	1	-	5/22/28/28	0/2/2/2
3	BO2	N	202	1	-	7/22/28/28	0/2/2/2
3	BO2	F	202	1	-	6/22/28/28	0/2/2/2
3	BO2	C	202	1	-	7/22/28/28	0/2/2/2
3	BO2	A	202	1	-	7/22/28/28	0/2/2/2
3	BO2	H	202	1	-	7/22/28/28	0/2/2/2
3	BO2	K	202	1	-	7/22/28/28	0/2/2/2
3	BO2	J	202	1	-	7/22/28/28	0/2/2/2
3	BO2	M	202	1	-	7/22/28/28	0/2/2/2
3	BO2	G	202	1	-	6/22/28/28	0/2/2/2
3	BO2	B	202	1	-	6/22/28/28	0/2/2/2
3	BO2	E	202	1	-	5/22/28/28	0/2/2/2
3	BO2	I	202	1	-	7/22/28/28	0/2/2/2
3	BO2	D	202	1	-	7/22/28/28	0/2/2/2

There are no bond length outliers.

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	D	202	BO2	C21-C22-C23	6.21	123.19	115.39
3	K	202	BO2	C21-C22-C23	6.06	123.01	115.39
3	M	202	BO2	C21-C22-C23	4.69	121.29	115.39
3	A	202	BO2	C21-C22-C23	4.30	120.80	115.39
3	C	202	BO2	C21-C22-C23	4.13	120.58	115.39
3	J	202	BO2	C21-C22-C23	3.74	120.09	115.39
3	I	202	BO2	C21-C22-C23	3.70	120.04	115.39
3	N	202	BO2	C21-C22-C23	3.70	120.04	115.39
2	J	201	ACT	OXT-C-O	2.68	131.95	122.05
3	H	202	BO2	C21-C22-C23	2.68	118.76	115.39
3	M	202	BO2	C12-C11-C10	-2.38	106.81	113.39
3	D	202	BO2	C12-C11-C10	-2.34	106.93	113.39
3	L	202	BO2	C24-C23-C22	2.24	119.33	111.11
3	G	202	BO2	C21-C22-C23	2.22	118.18	115.39
2	C	201	ACT	O-C-CH3	-2.18	113.84	122.33
3	G	202	BO2	C24-C23-C22	2.18	119.11	111.11

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	K	201	ACT	O-C-CH3	-2.15	113.95	122.33
2	J	201	ACT	O-C-CH3	-2.14	113.99	122.33
2	I	201	ACT	O-C-CH3	-2.14	113.99	122.33
3	A	202	BO2	C12-C11-C10	-2.13	107.51	113.39
3	M	202	BO2	C25-C23-C22	2.07	118.73	111.11
3	I	202	BO2	C24-C23-C22	2.06	118.67	111.11
3	D	202	BO2	C7-C2-N1	2.01	119.85	117.48

There are no chirality outliers.

All (91) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	202	BO2	C3-C2-C7-O8
3	A	202	BO2	C21-C22-C23-C25
3	B	202	BO2	N1-C2-C7-O8
3	B	202	BO2	C3-C2-C7-O8
3	B	202	BO2	C3-C2-C7-N9
3	C	202	BO2	N1-C2-C7-O8
3	C	202	BO2	C3-C2-C7-O8
3	C	202	BO2	C3-C2-C7-N9
3	C	202	BO2	C21-C22-C23-C24
3	C	202	BO2	C21-C22-C23-C25
3	D	202	BO2	C3-C2-C7-O8
3	D	202	BO2	C3-C2-C7-N9
3	D	202	BO2	C21-C22-C23-C24
3	D	202	BO2	C21-C22-C23-C25
3	E	202	BO2	N1-C2-C7-O8
3	E	202	BO2	C3-C2-C7-O8
3	E	202	BO2	C3-C2-C7-N9
3	F	202	BO2	C3-C2-C7-N9
3	G	202	BO2	N1-C2-C7-O8
3	G	202	BO2	C3-C2-C7-O8
3	G	202	BO2	C3-C2-C7-N9
3	H	202	BO2	C21-C22-C23-C24
3	H	202	BO2	C21-C22-C23-C25
3	I	202	BO2	N1-C2-C7-O8
3	I	202	BO2	C3-C2-C7-O8
3	I	202	BO2	C3-C2-C7-N9
3	I	202	BO2	C21-C22-C23-C25
3	J	202	BO2	N1-C2-C7-O8
3	J	202	BO2	C3-C2-C7-O8
3	J	202	BO2	C3-C2-C7-N9

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
3	J	202	BO2	C21-C22-C23-C25
3	K	202	BO2	N1-C2-C7-N9
3	K	202	BO2	C3-C2-C7-O8
3	K	202	BO2	C3-C2-C7-N9
3	K	202	BO2	C21-C22-C23-C24
3	K	202	BO2	C21-C22-C23-C25
3	L	202	BO2	C3-C2-C7-O8
3	L	202	BO2	C3-C2-C7-N9
3	M	202	BO2	N1-C2-C7-O8
3	M	202	BO2	C3-C2-C7-O8
3	M	202	BO2	C3-C2-C7-N9
3	M	202	BO2	C21-C22-C23-C24
3	M	202	BO2	C21-C22-C23-C25
3	N	202	BO2	C3-C2-C7-O8
3	N	202	BO2	C3-C2-C7-N9
3	N	202	BO2	C21-C22-C23-C24
3	N	202	BO2	C21-C22-C23-C25
3	N	202	BO2	N1-C2-C7-O8
3	B	202	BO2	N1-C2-C7-N9
3	C	202	BO2	N1-C2-C7-N9
3	G	202	BO2	N1-C2-C7-N9
3	I	202	BO2	N1-C2-C7-N9
3	J	202	BO2	N1-C2-C7-N9
3	M	202	BO2	N1-C2-C7-N9
3	A	202	BO2	N1-C2-C7-O8
3	K	202	BO2	N1-C2-C7-O8
3	A	202	BO2	N1-C2-C7-N9
3	E	202	BO2	N1-C2-C7-N9
3	N	202	BO2	N1-C2-C7-N9
3	K	202	BO2	N20-C21-C22-C23
3	I	202	BO2	N20-C21-C22-C23
3	L	202	BO2	N1-C2-C7-N9
3	D	202	BO2	N1-C2-C7-N9
3	H	202	BO2	N20-C21-C22-C23
3	A	202	BO2	N20-C21-C22-C23
3	D	202	BO2	N20-C21-C22-C23
3	J	202	BO2	N20-C21-C22-C23
3	N	202	BO2	N20-C21-C22-C23
3	C	202	BO2	N20-C21-C22-C23
3	M	202	BO2	N20-C21-C22-C23
3	A	202	BO2	C3-C2-C7-N9
3	H	202	BO2	C3-C2-C7-N9

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
3	L	202	BO2	N1-C2-C7-O8
3	D	202	BO2	N1-C2-C7-O8
3	B	202	BO2	N20-C21-C22-C23
3	G	202	BO2	N20-C21-C22-C23
3	E	202	BO2	N20-C21-C22-C23
3	F	202	BO2	N20-C21-C22-C23
3	L	202	BO2	N20-C21-C22-C23
3	H	202	BO2	C3-C2-C7-O8
3	F	202	BO2	C3-C2-C7-O8
3	F	202	BO2	N1-C2-C7-N9
3	H	202	BO2	N1-C2-C7-O8
3	H	202	BO2	N1-C2-C7-N9
3	B	202	BO2	C21-C22-C23-C24
3	F	202	BO2	C21-C22-C23-C24
3	G	202	BO2	C21-C22-C23-C24
3	F	202	BO2	N1-C2-C7-O8
3	A	202	BO2	C21-C22-C23-C24
3	I	202	BO2	C21-C22-C23-C24
3	J	202	BO2	C21-C22-C23-C24

There are no ring outliers.

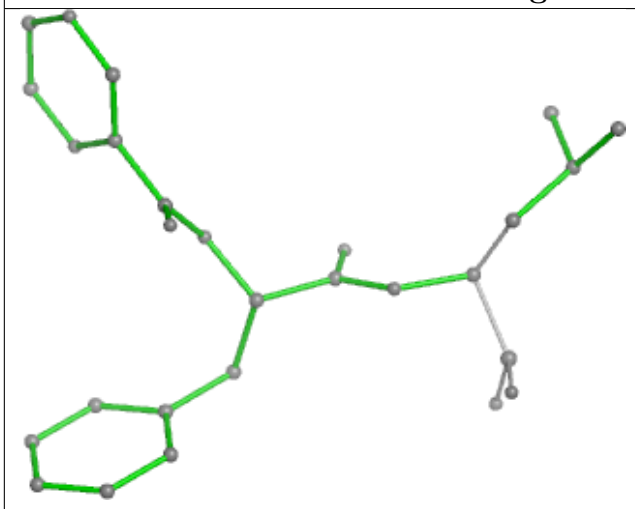
13 monomers are involved in 16 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	201	ACT	1	0
3	A	202	BO2	1	0
2	J	201	ACT	3	0
3	H	202	BO2	1	0
3	G	202	BO2	1	0
2	C	201	ACT	1	0
3	I	202	BO2	1	0
2	G	201	ACT	1	0
3	F	202	BO2	1	0
3	C	202	BO2	1	0
3	D	202	BO2	2	0
2	B	201	ACT	1	0
3	K	202	BO2	1	0

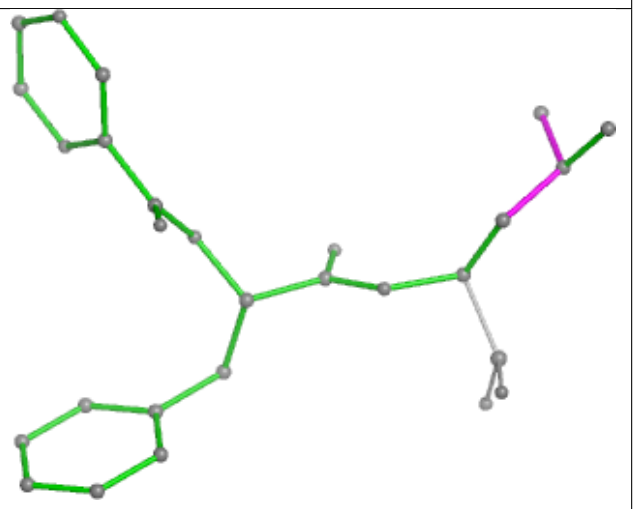
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

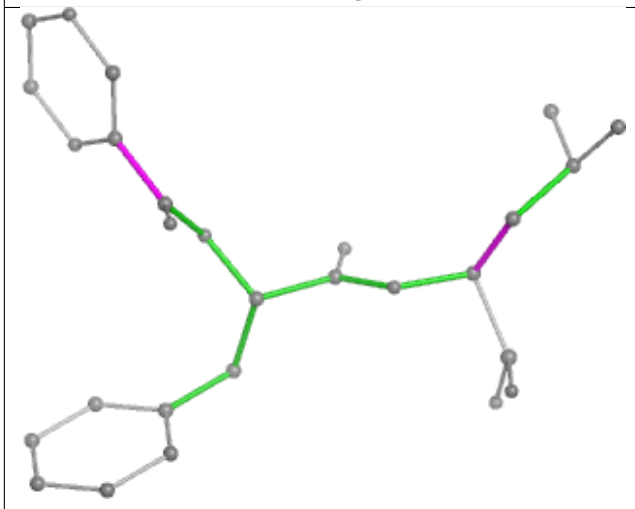
Ligand BO2 L 202



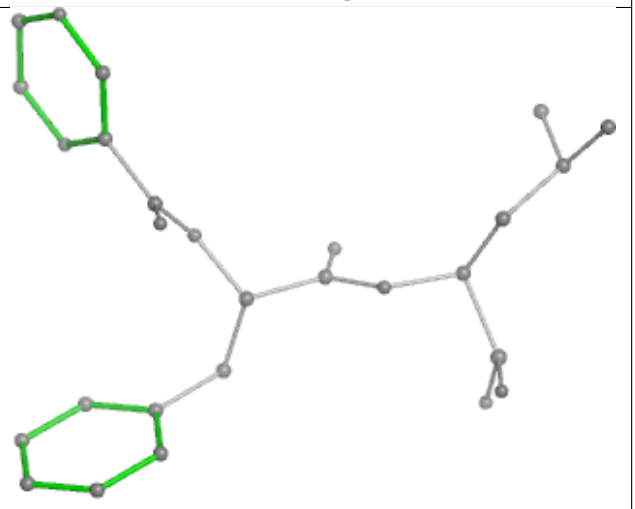
Bond lengths



Bond angles

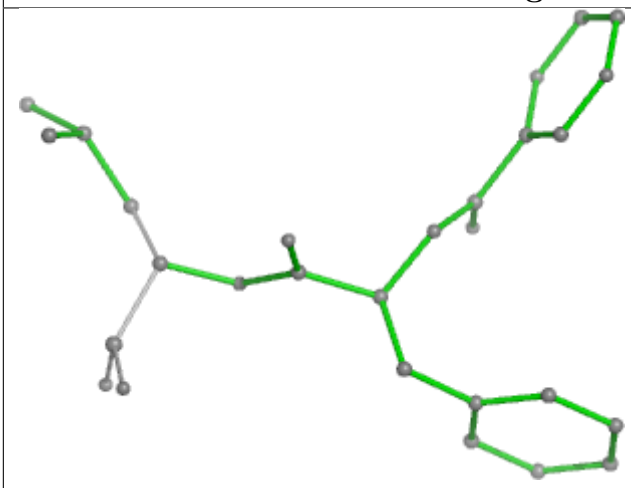


Torsions

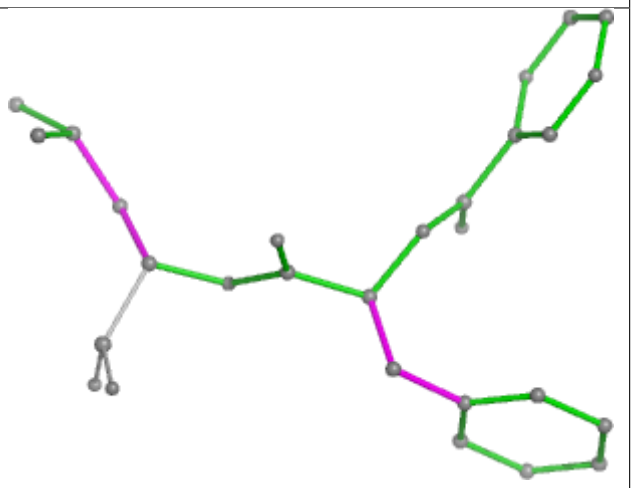


Rings

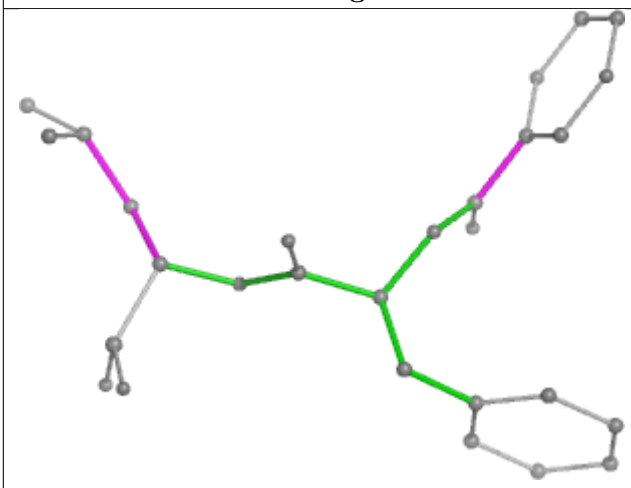
Ligand BO2 A 202



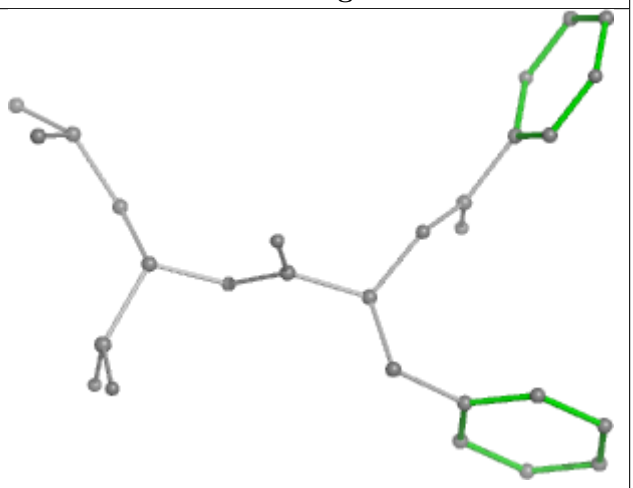
Bond lengths



Bond angles

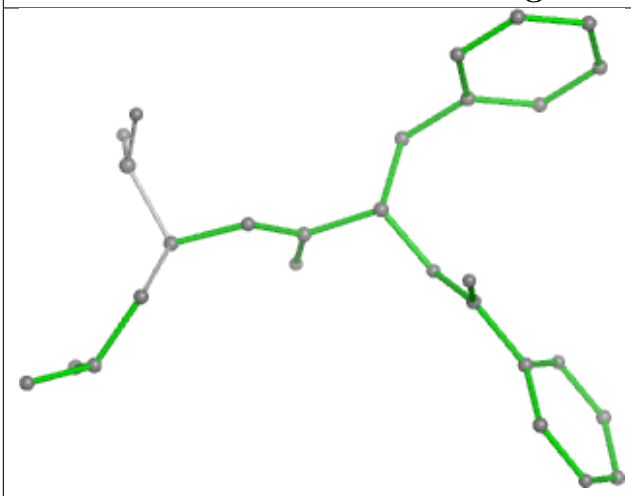


Torsions

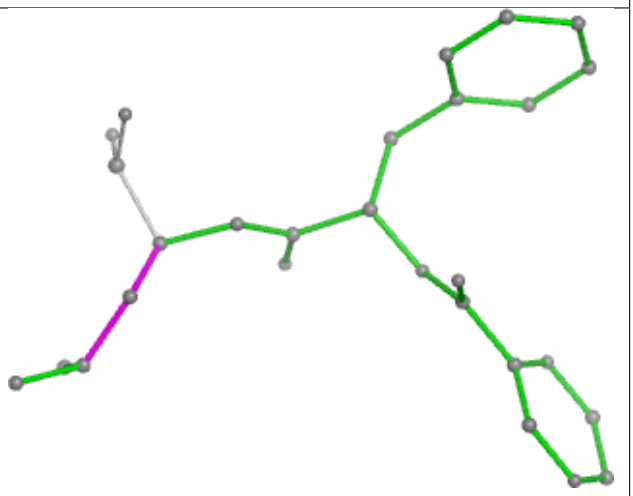


Rings

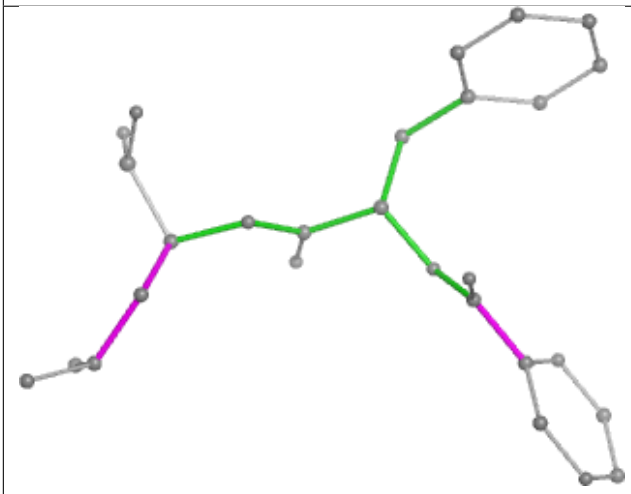
Ligand BO2 H 202



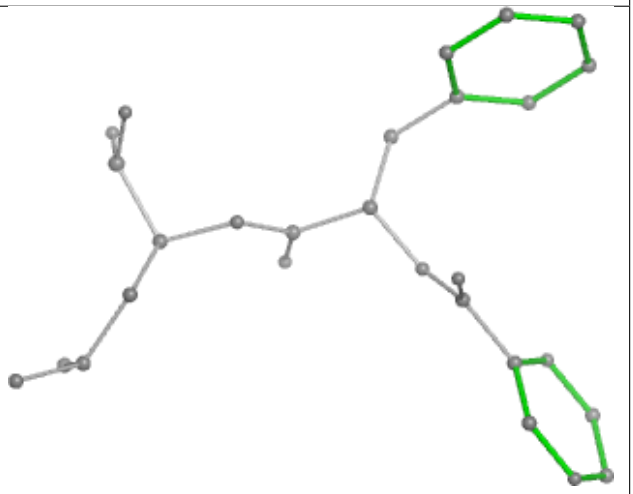
Bond lengths



Bond angles

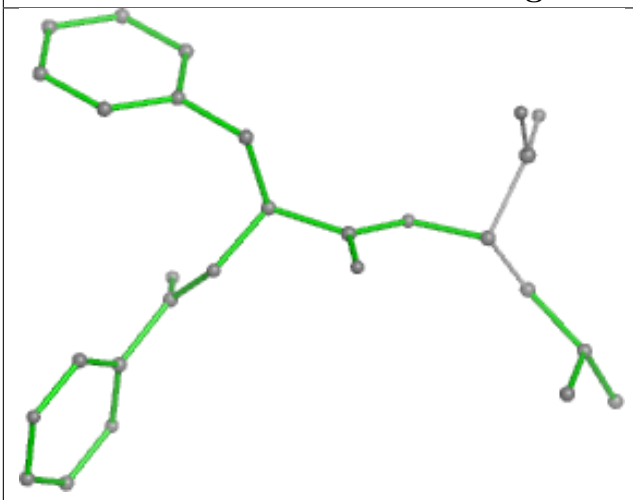


Torsions

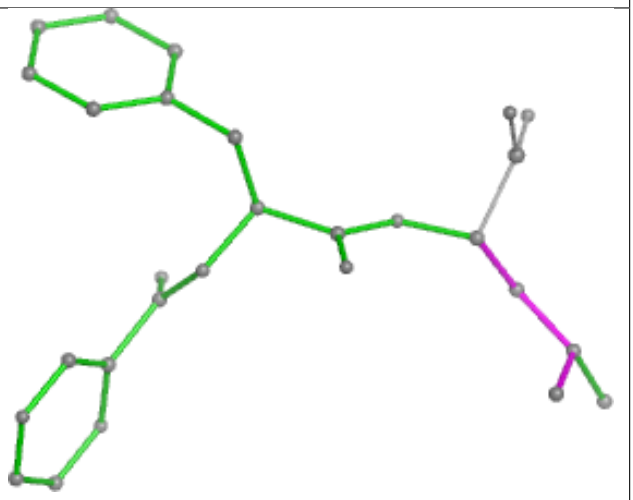


Rings

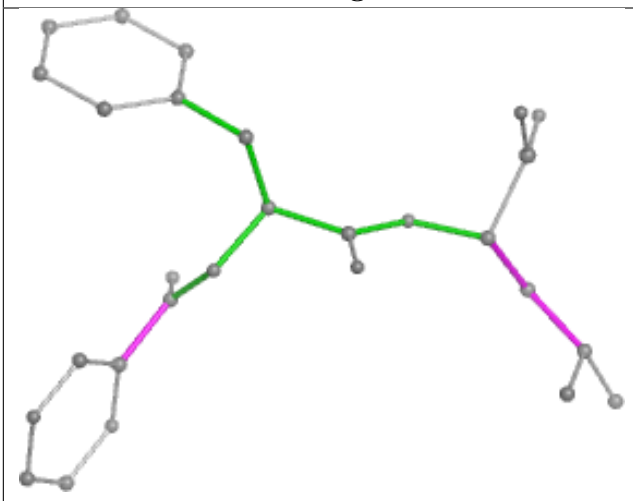
Ligand BO2 G 202



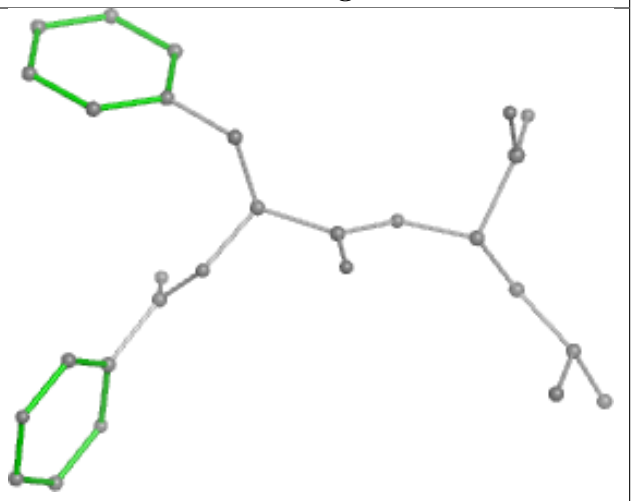
Bond lengths



Bond angles

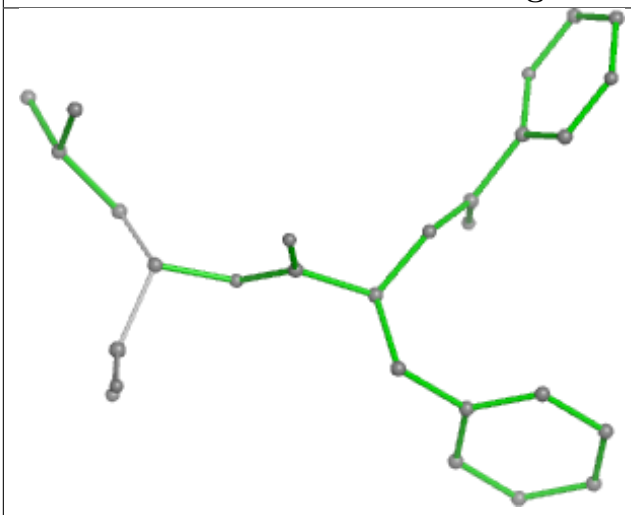


Torsions

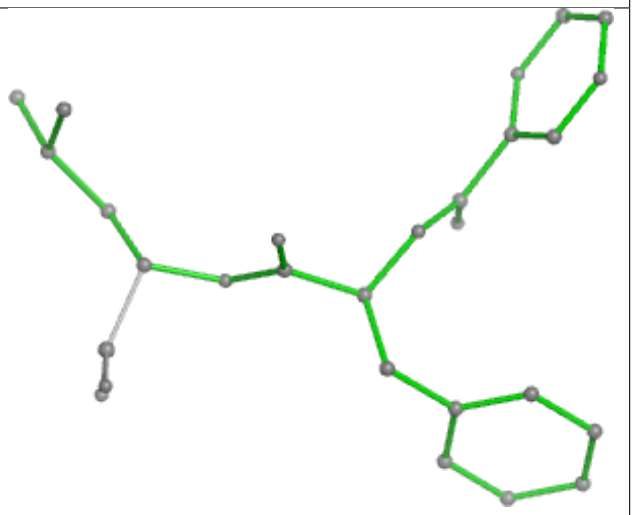


Rings

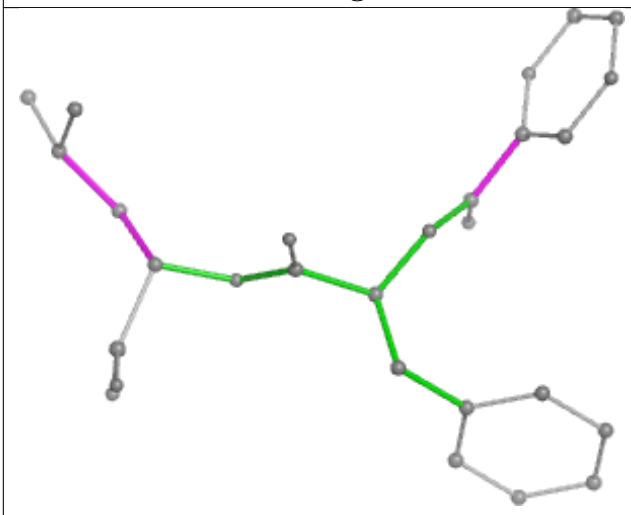
Ligand BO2 B 202



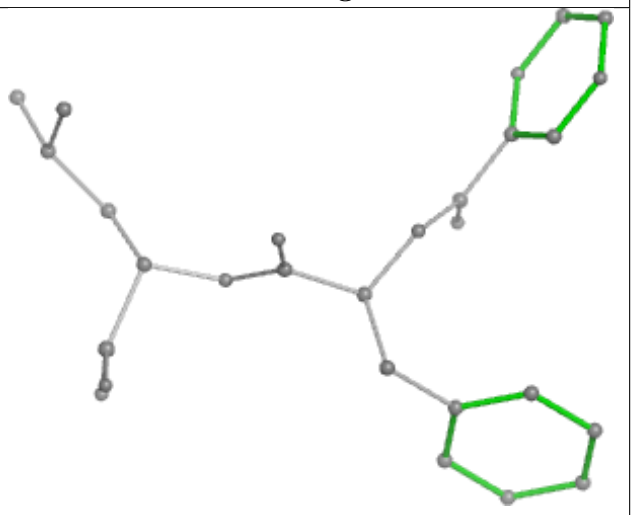
Bond lengths



Bond angles

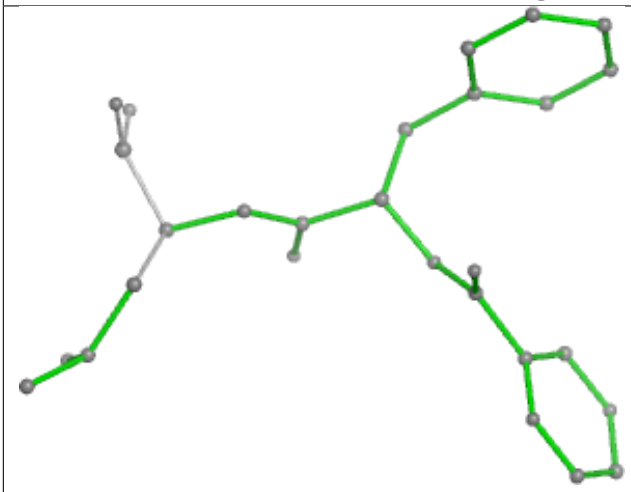


Torsions

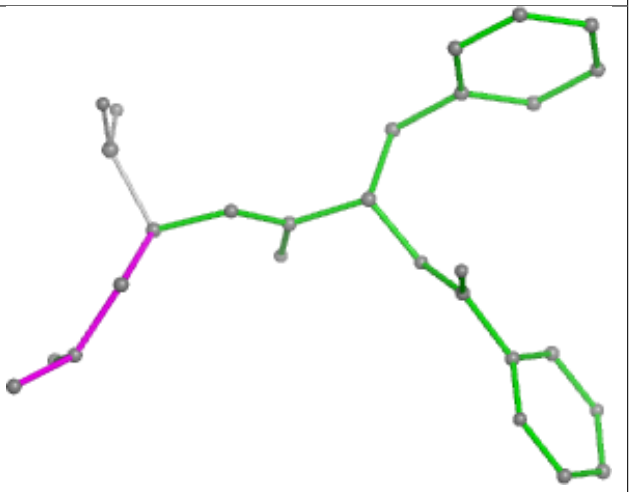


Rings

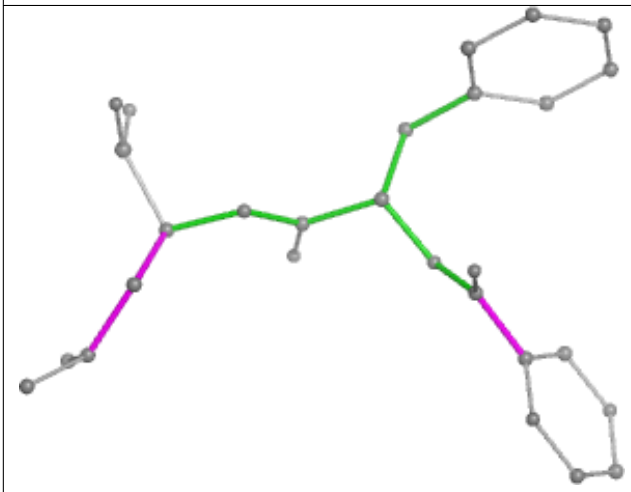
Ligand BO2 I 202



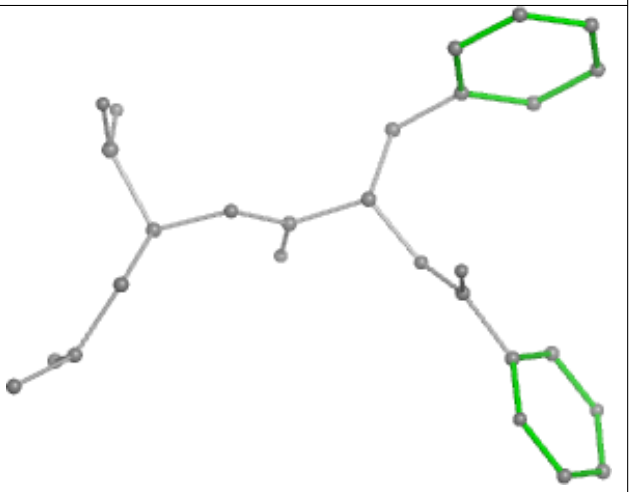
Bond lengths



Bond angles

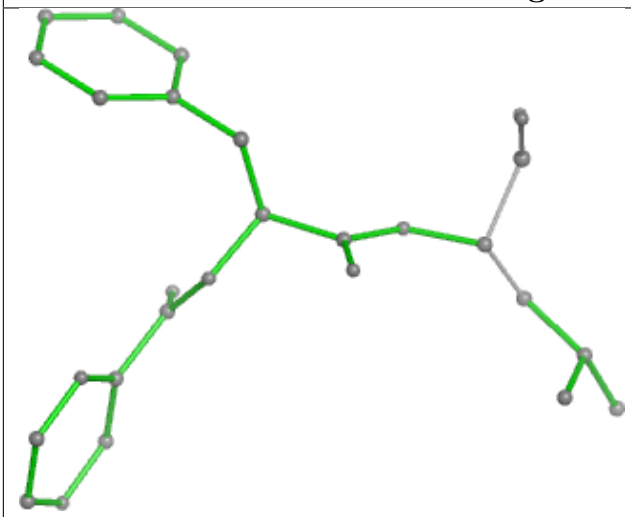


Torsions

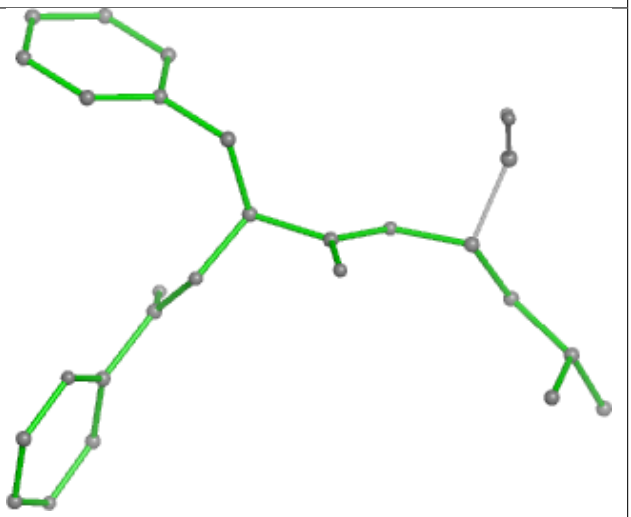


Rings

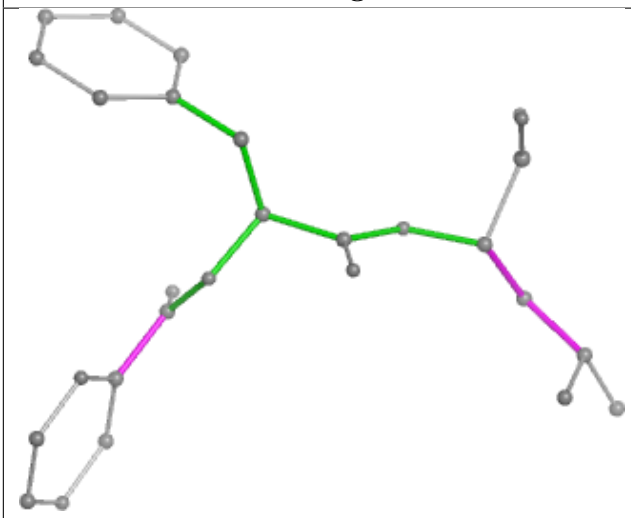
Ligand BO2 F 202



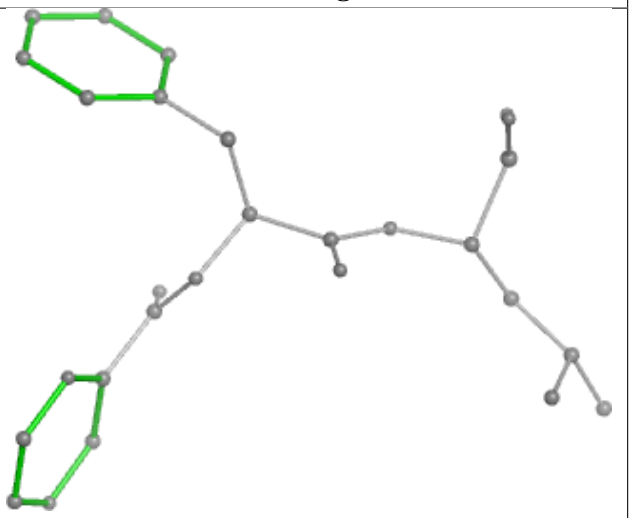
Bond lengths



Bond angles

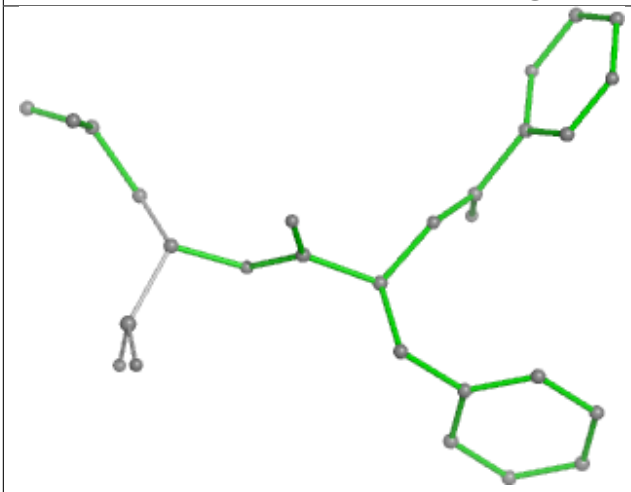


Torsions

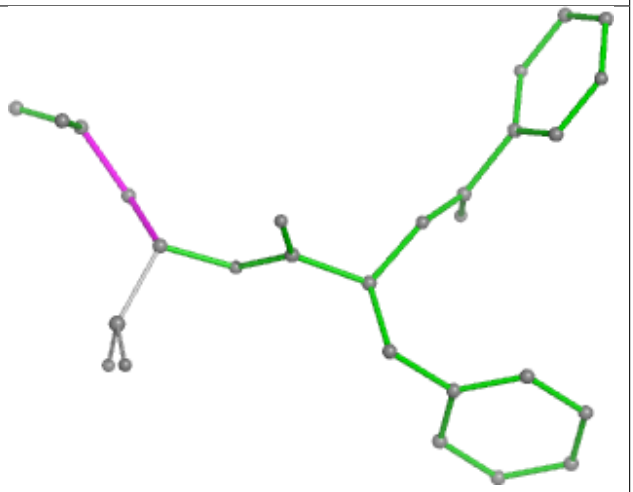


Rings

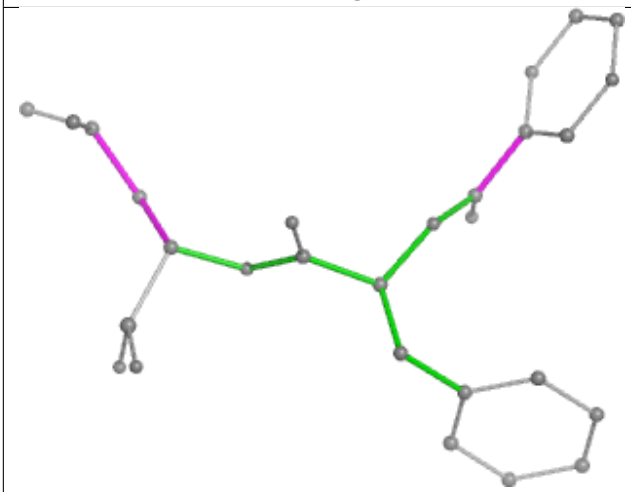
Ligand BO2 C 202



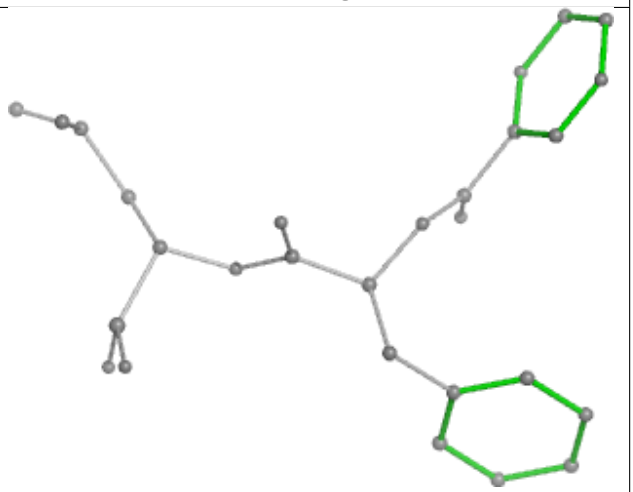
Bond lengths



Bond angles

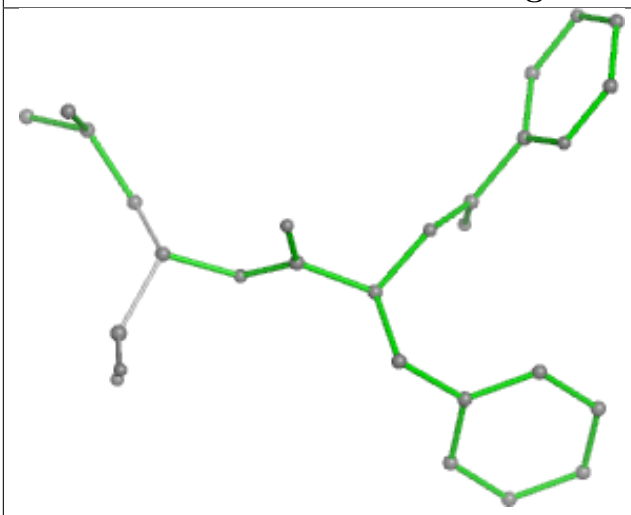


Torsions

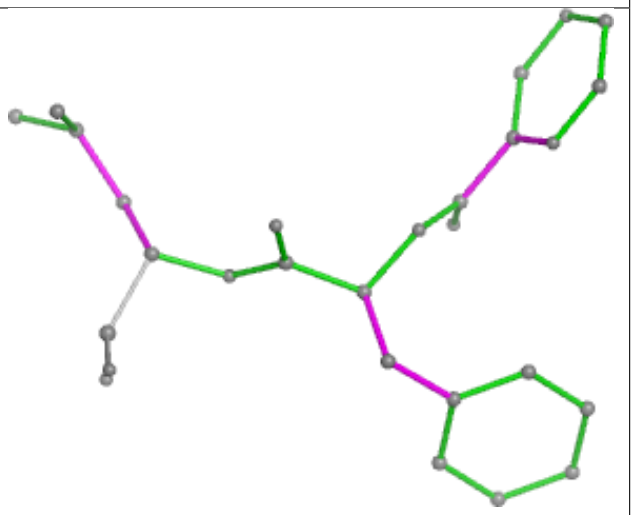


Rings

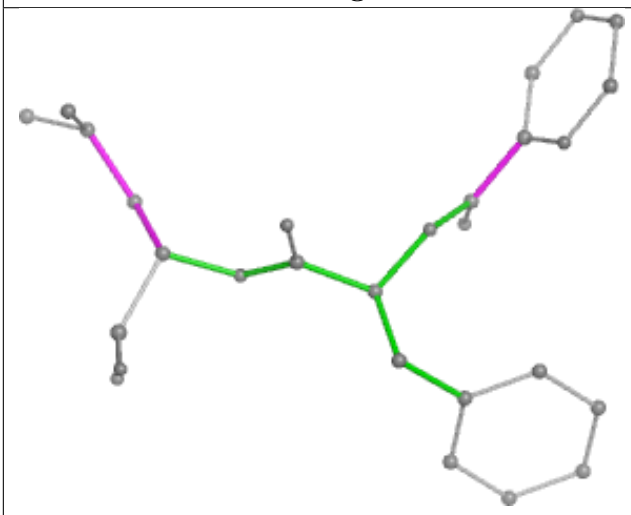
Ligand BO2 D 202



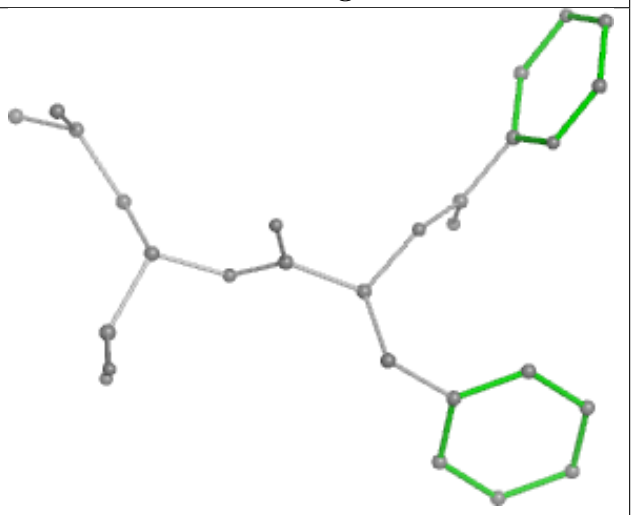
Bond lengths



Bond angles

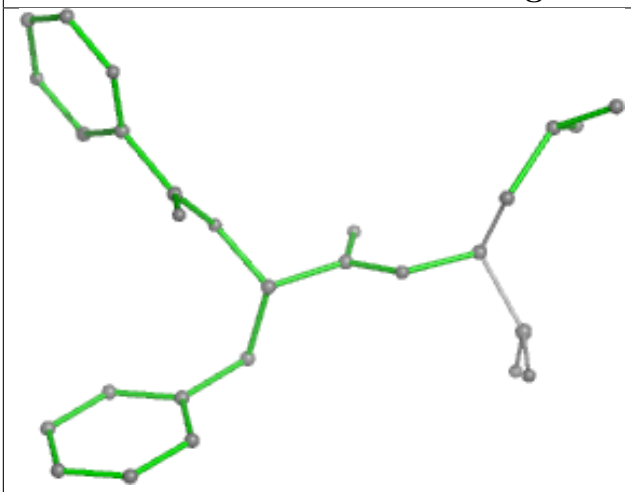


Torsions

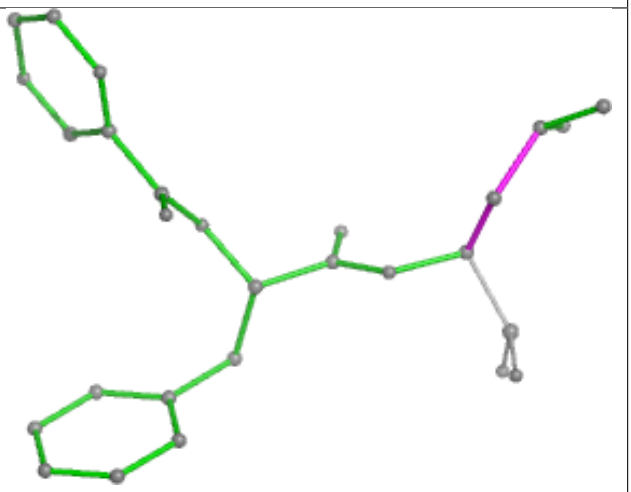


Rings

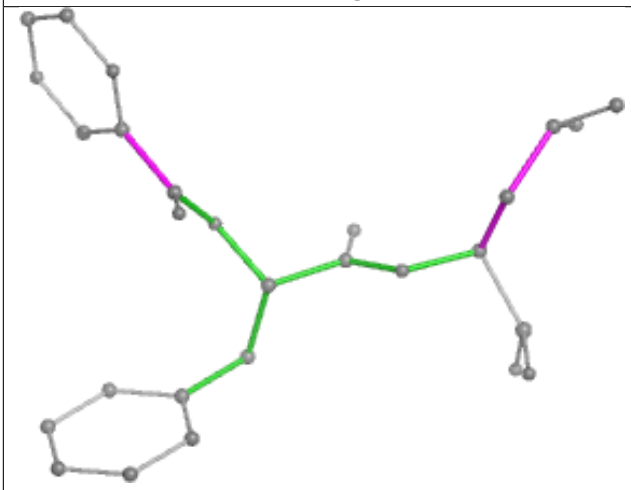
Ligand BO2 N 202



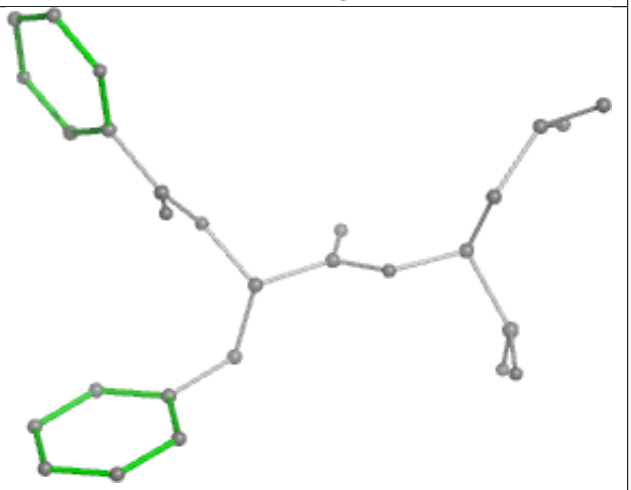
Bond lengths



Bond angles

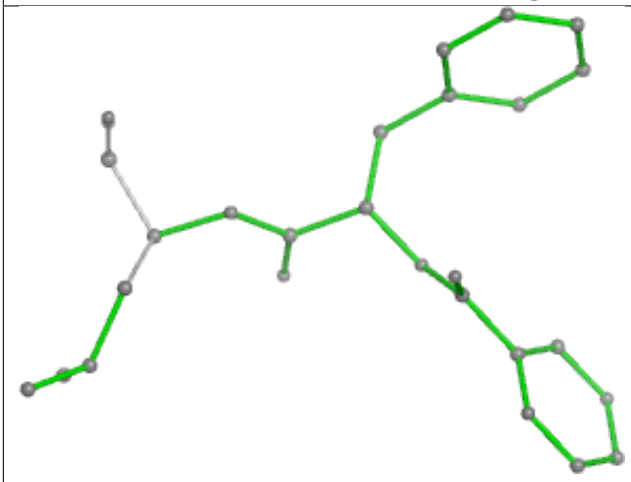


Torsions

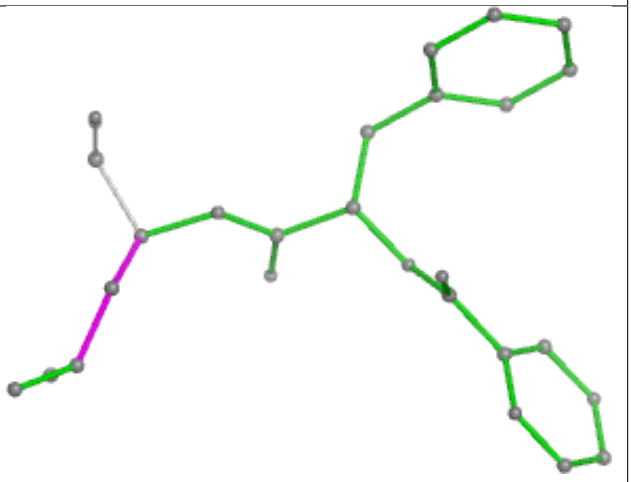


Rings

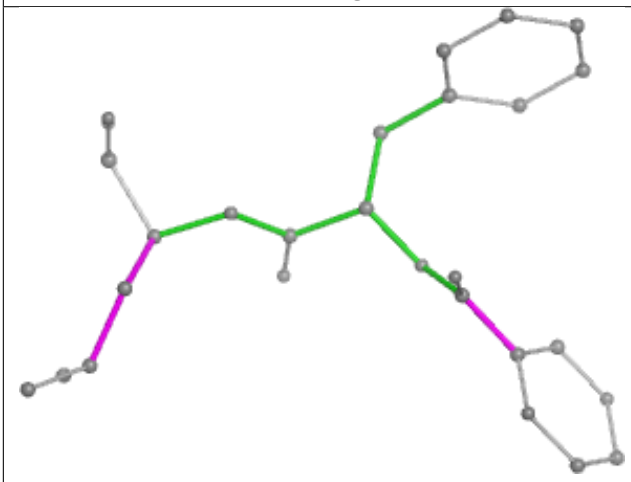
Ligand BO2 K 202



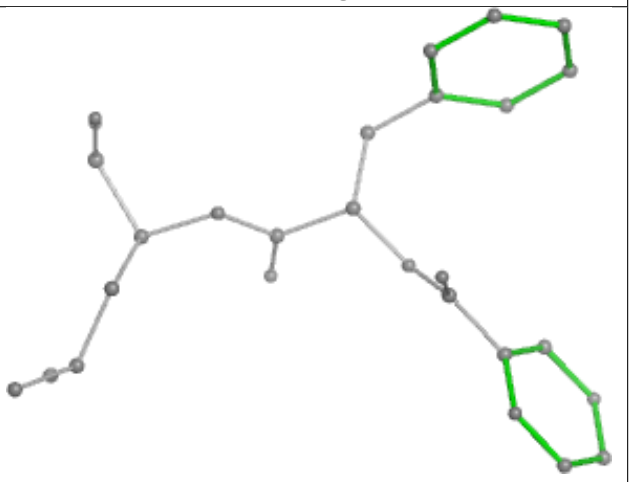
Bond lengths



Bond angles

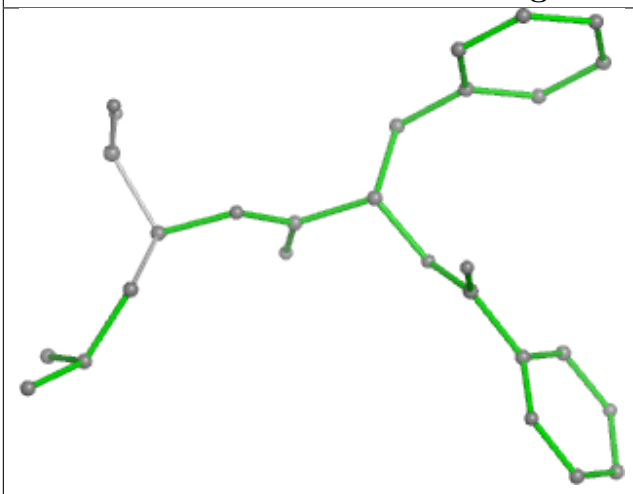


Torsions

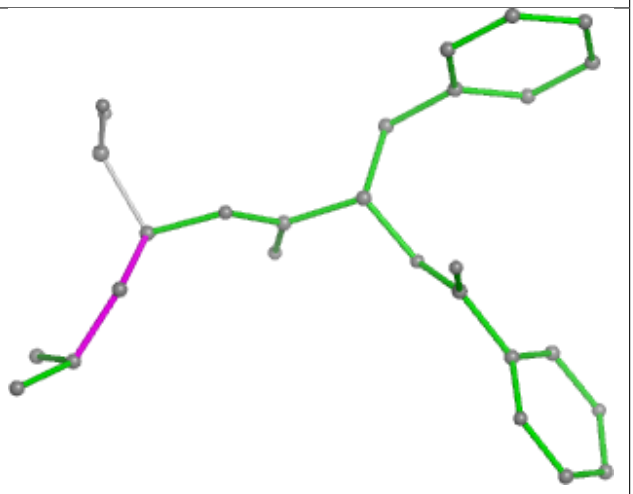


Rings

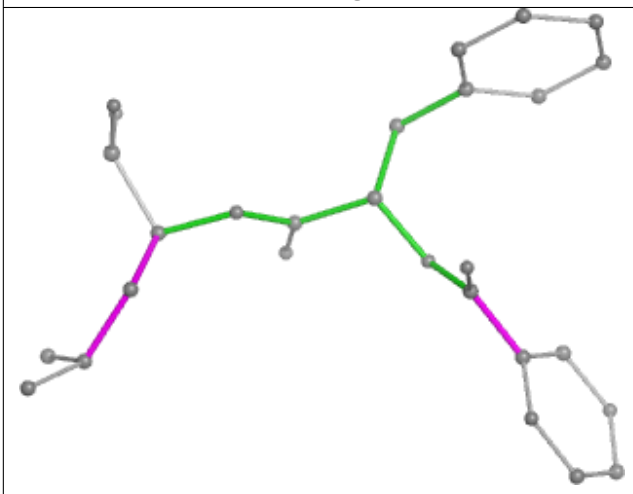
Ligand BO2 J 202



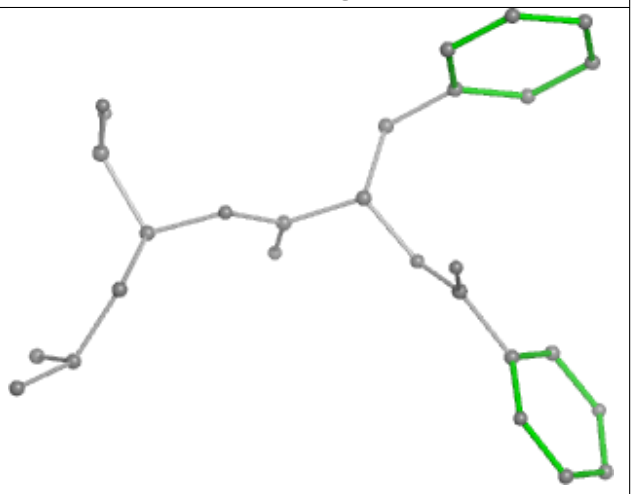
Bond lengths



Bond angles

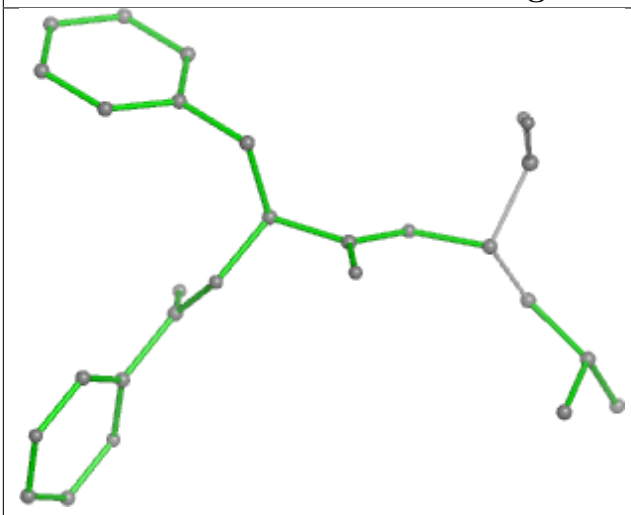


Torsions

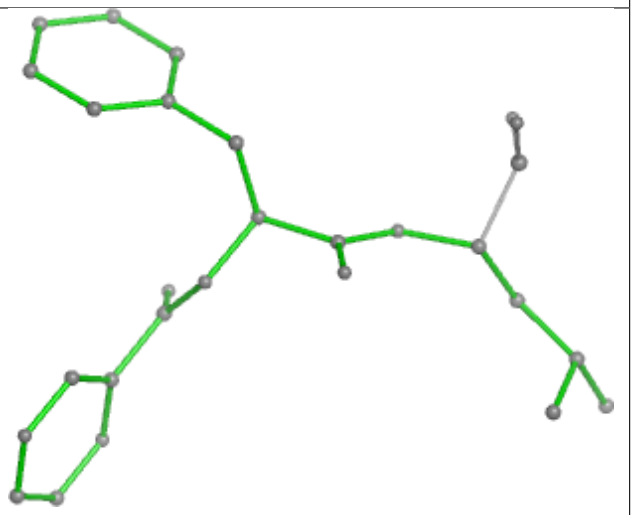


Rings

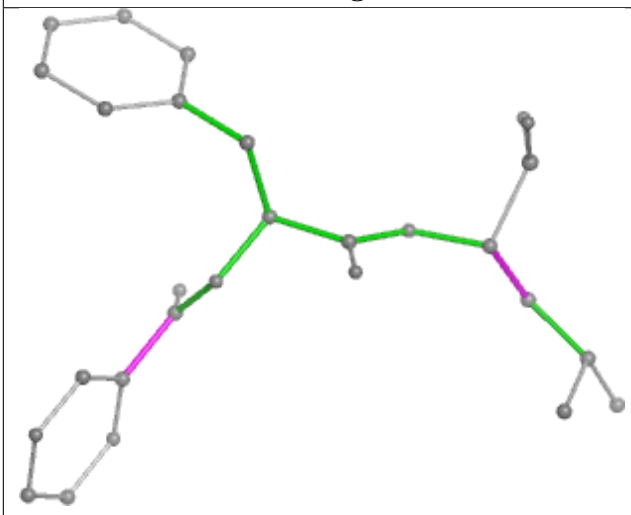
Ligand BO2 E 202



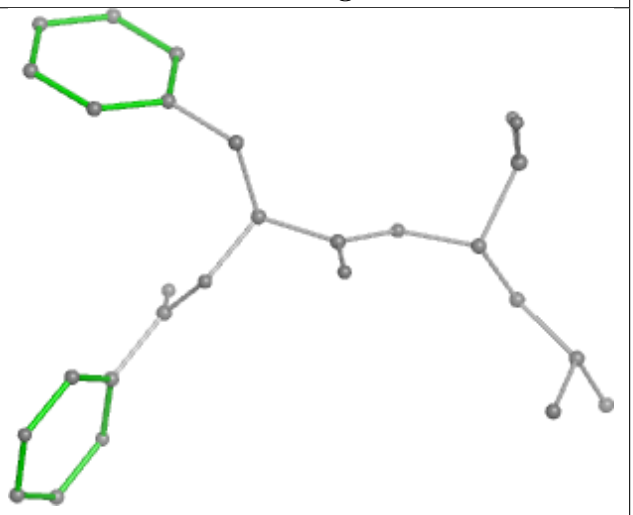
Bond lengths



Bond angles

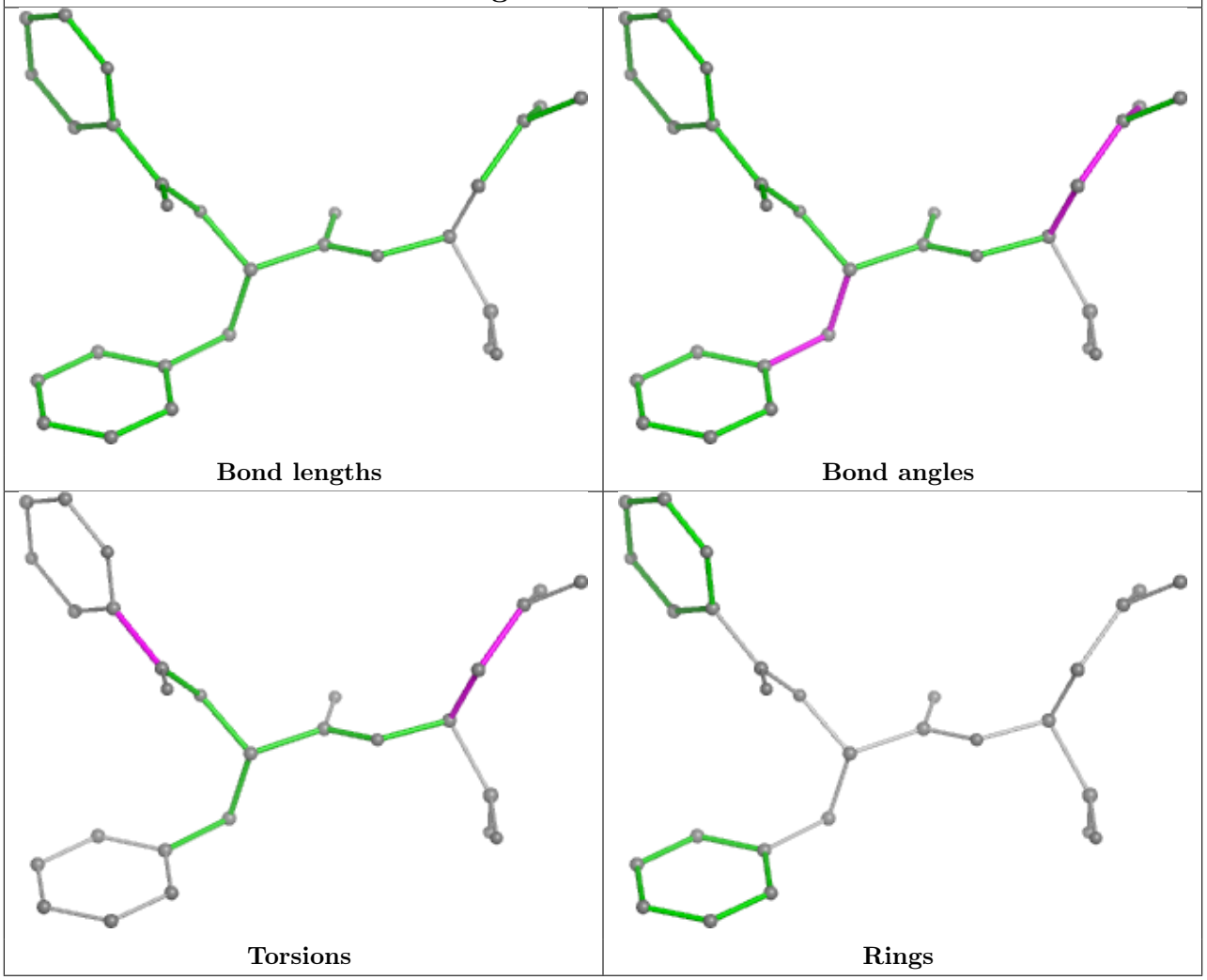


Torsions



Rings

Ligand BO2 M 202



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95^{th} percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	180/199 (90%)	-0.02	3 (1%)	69	75	23, 29, 41, 51	0
1	B	178/199 (89%)	0.01	5 (2%)	55	63	23, 29, 42, 53	1 (0%)
1	C	181/199 (90%)	-0.02	5 (2%)	55	63	14, 29, 41, 60	2 (1%)
1	D	179/199 (89%)	-0.10	2 (1%)	77	84	14, 27, 39, 47	1 (0%)
1	E	180/199 (90%)	-0.06	5 (2%)	55	63	21, 27, 42, 60	1 (0%)
1	F	179/199 (89%)	-0.01	5 (2%)	55	63	13, 27, 40, 50	1 (0%)
1	G	182/199 (91%)	-0.02	5 (2%)	56	63	14, 28, 41, 71	2 (1%)
1	H	181/199 (90%)	0.25	7 (3%)	44	51	27, 34, 48, 76	0
1	I	178/199 (89%)	0.21	5 (2%)	55	63	25, 35, 47, 59	1 (0%)
1	J	182/199 (91%)	0.02	5 (2%)	56	63	15, 29, 43, 77	1 (0%)
1	K	181/199 (90%)	-0.13	4 (2%)	62	68	13, 27, 40, 69	1 (0%)
1	L	179/199 (89%)	-0.07	4 (2%)	62	68	13, 27, 42, 51	3 (1%)
1	M	179/199 (89%)	-0.03	5 (2%)	55	63	13, 27, 39, 48	2 (1%)
1	N	181/199 (90%)	0.10	3 (1%)	69	75	27, 32, 44, 62	1 (0%)
All	All	2520/2786 (90%)	0.01	63 (2%)	58	65	13, 29, 44, 77	17 (0%)

All (63) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	8	ILE	8.0
1	J	8	ILE	7.5
1	F	4	ILE	5.9
1	I	18	TYR	5.9
1	H	4	ILE	5.8
1	L	7	VAL	5.8
1	B	4	ILE	5.7
1	L	4	ILE	5.4

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	C	4	ILE	5.4
1	K	4	ILE	4.8
1	B	18	TYR	4.7
1	K	17	ALA	4.7
1	E	4	ILE	4.6
1	A	17	ALA	4.6
1	I	4	ILE	4.2
1	L	18	TYR	4.1
1	B	6	THR	4.1
1	G	4	ILE	4.1
1	D	4	ILE	4.0
1	H	18	TYR	3.9
1	A	4	ILE	3.9
1	I	6	THR	3.7
1	F	18	TYR	3.7
1	N	4	ILE	3.7
1	C	17	ALA	3.6
1	N	8	ILE	3.6
1	J	4	ILE	3.6
1	E	7	VAL	3.5
1	M	7	VAL	3.5
1	H	17	ALA	3.4
1	F	7	VAL	3.3
1	E	18	TYR	3.3
1	F	6	THR	3.2
1	C	7	VAL	3.2
1	M	4	ILE	3.1
1	M	18	TYR	3.0
1	G	130	GLN	3.0
1	I	5	PRO	2.9
1	G	17	ALA	2.9
1	E	193	GLU	2.9
1	L	6	THR	2.8
1	K	8	ILE	2.7
1	G	193	GLU	2.7
1	H	7	VAL	2.7
1	H	16	ARG	2.6
1	E	6	THR	2.6
1	M	6	THR	2.6
1	F	130	GLN	2.5
1	H	6	THR	2.4
1	D	18	TYR	2.3

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	B	130	GLN	2.2
1	I	182	GLU	2.2
1	N	17	ALA	2.2
1	A	6	THR	2.2
1	J	193	GLU	2.2
1	M	95[A]	MET	2.2
1	J	192	PRO	2.2
1	J	17	ALA	2.1
1	C	193	GLU	2.1
1	B	192	PRO	2.1
1	K	167	GLN	2.1
1	C	18	TYR	2.1
1	H	39	ASN	2.0

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

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

6.3 Carbohydrates (i)

There are no oligosaccharides 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
3	BO2	A	202	28/28	0.84	0.13	31,38,46,55	2
3	BO2	M	202	28/28	0.85	0.13	30,35,45,52	2
3	BO2	D	202	28/28	0.86	0.12	29,33,48,50	3
3	BO2	H	202	28/28	0.86	0.13	37,40,50,55	3
3	BO2	I	202	28/28	0.86	0.12	34,39,50,55	3
3	BO2	C	202	28/28	0.86	0.12	31,35,43,49	3
3	BO2	E	202	28/28	0.87	0.12	28,34,45,53	2
3	BO2	F	202	28/28	0.87	0.12	32,36,45,50	2
3	BO2	J	202	28/28	0.87	0.12	30,35,46,50	3
3	BO2	K	202	28/28	0.87	0.12	30,34,44,47	2

Continued on next page...

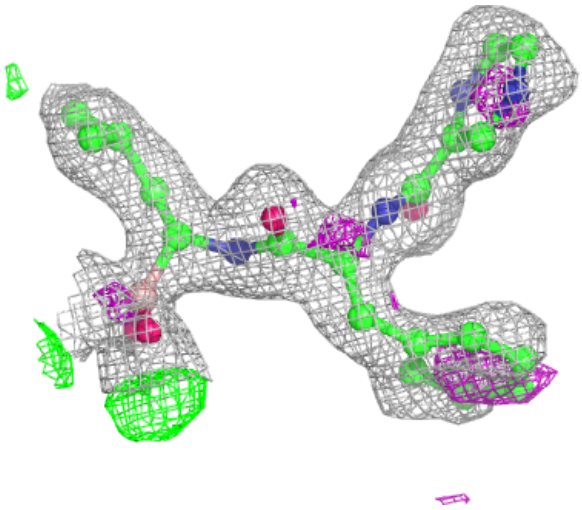
Continued from previous page...

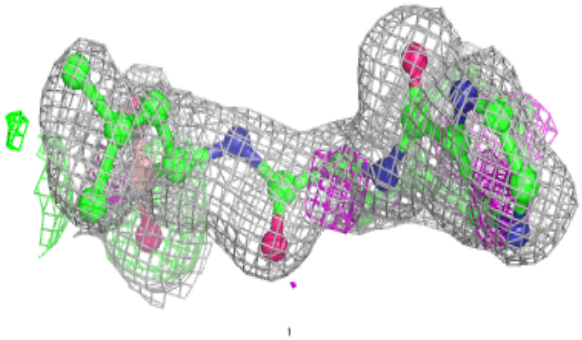
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	BO2	L	202	28/28	0.87	0.12	29,34,46,51	2
3	BO2	G	202	28/28	0.87	0.12	31,36,45,48	2
3	BO2	B	202	28/28	0.88	0.12	30,37,47,54	2
3	BO2	N	202	28/28	0.88	0.12	33,39,46,50	2
2	ACT	J	201	4/4	0.89	0.14	21,35,35,43	0
2	ACT	I	201	4/4	0.92	0.12	34,36,37,39	0
2	ACT	B	201	4/4	0.92	0.11	29,29,33,41	0
2	ACT	E	201	4/4	0.94	0.10	27,29,31,41	0
2	ACT	M	201	4/4	0.94	0.12	27,31,33,34	0
2	ACT	H	201	4/4	0.95	0.10	35,37,38,38	0
2	ACT	F	201	4/4	0.95	0.10	28,29,34,37	0
2	ACT	C	201	4/4	0.96	0.09	28,29,35,39	0
2	ACT	N	201	4/4	0.96	0.16	33,36,36,37	0
2	ACT	A	201	4/4	0.96	0.12	29,32,32,33	0
2	ACT	L	201	4/4	0.96	0.09	30,31,32,32	0
2	ACT	K	201	4/4	0.97	0.12	26,31,31,34	0
2	ACT	G	201	4/4	0.97	0.08	27,30,32,41	0
2	ACT	D	201	4/4	0.97	0.11	29,31,33,36	0

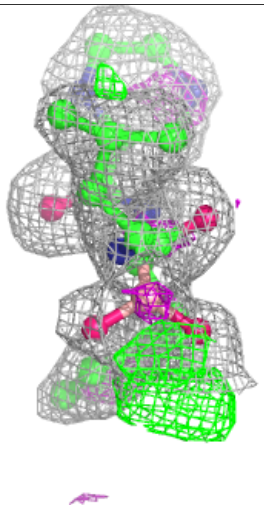
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around BO2 A 202:

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

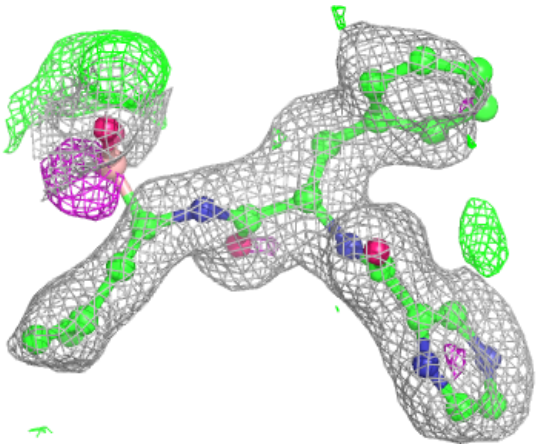


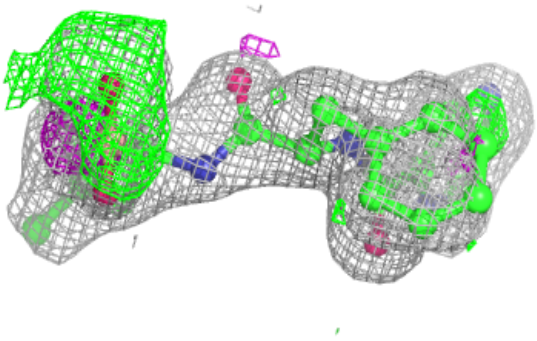


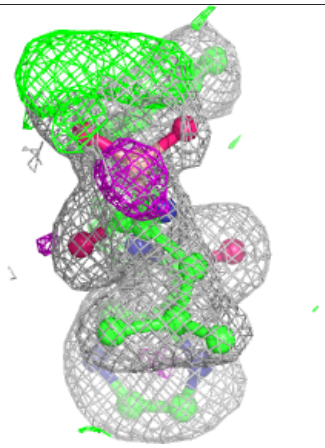


Electron density around BO2 M 202:

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

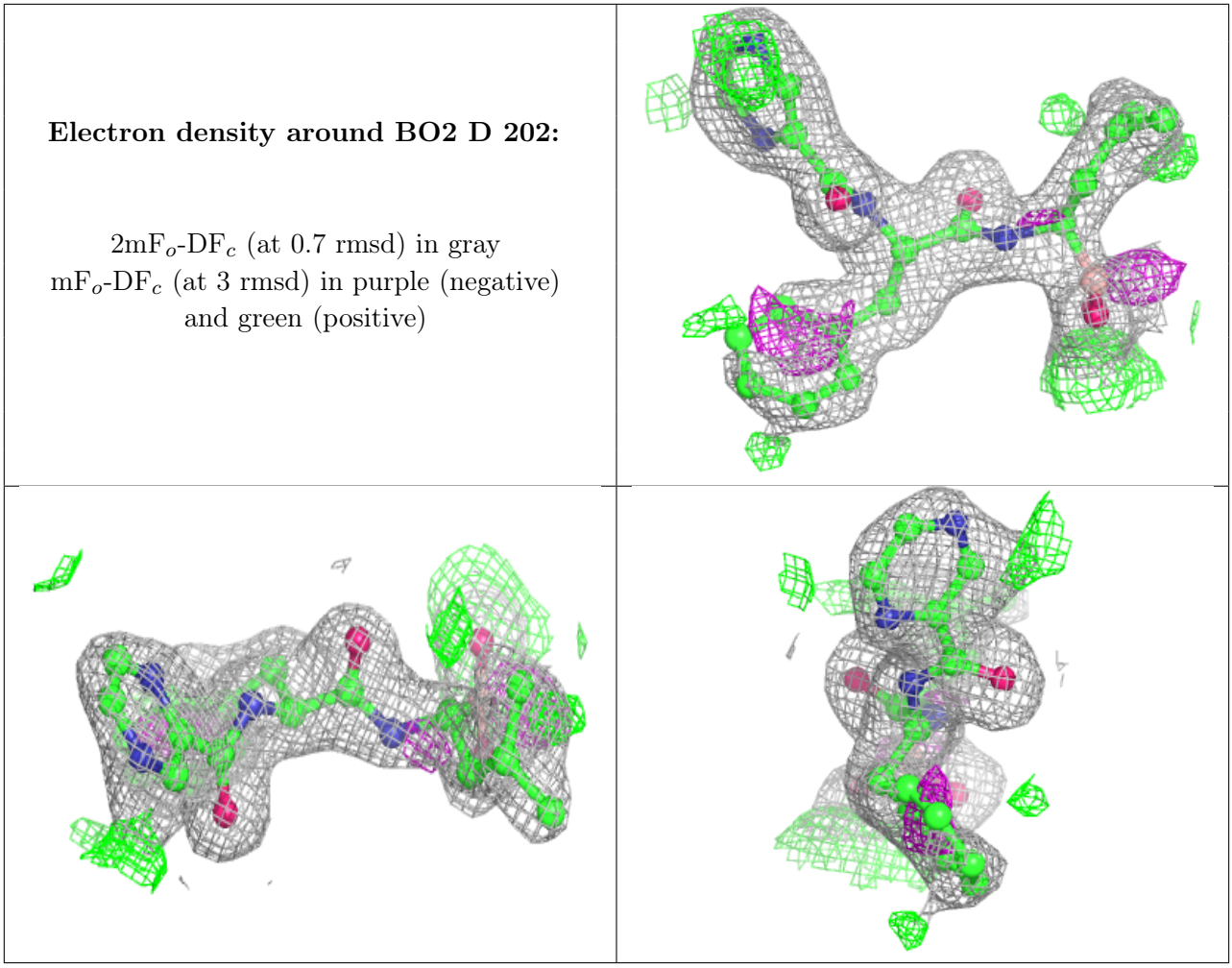






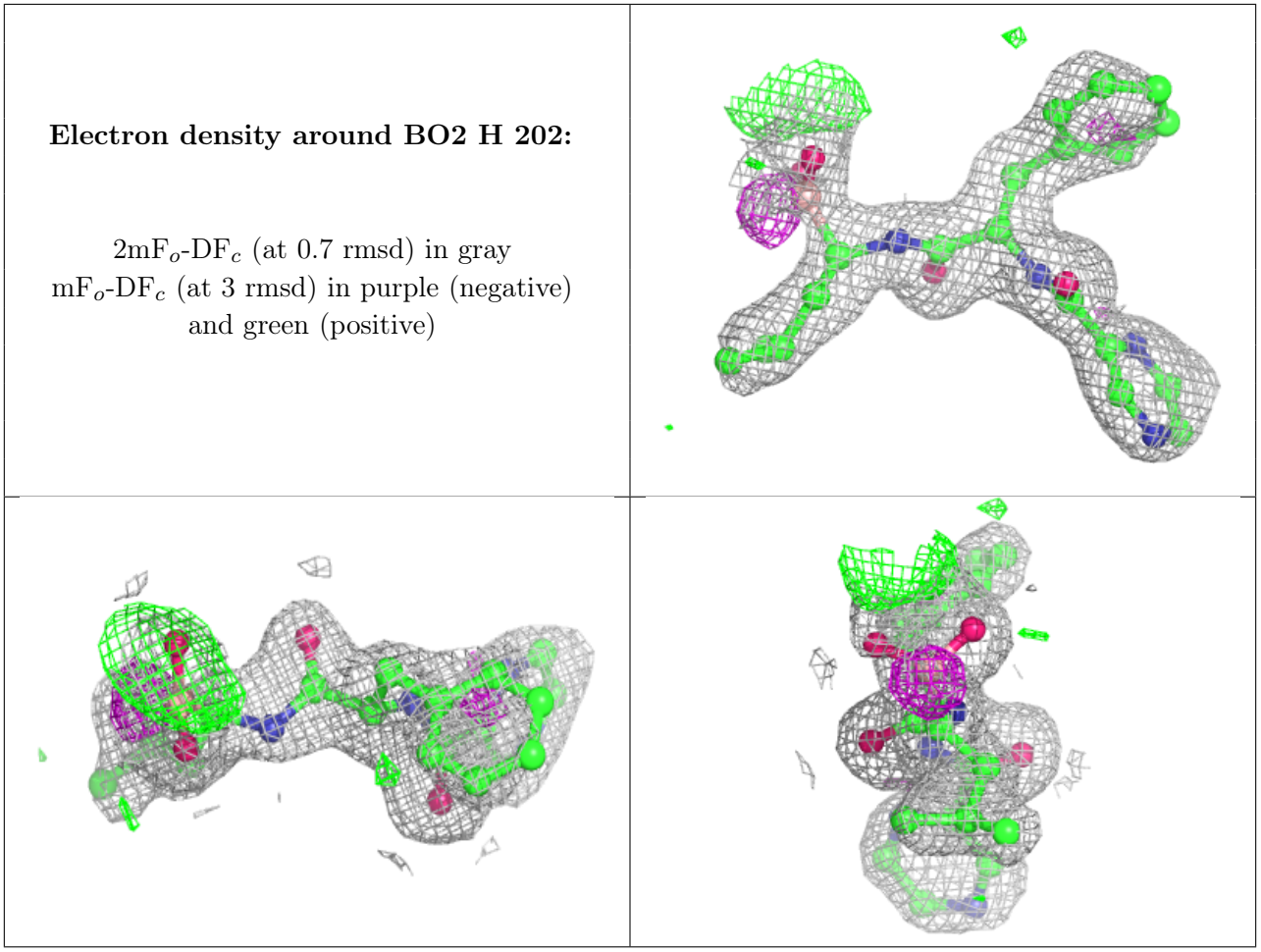
Electron density around BO2 D 202:

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



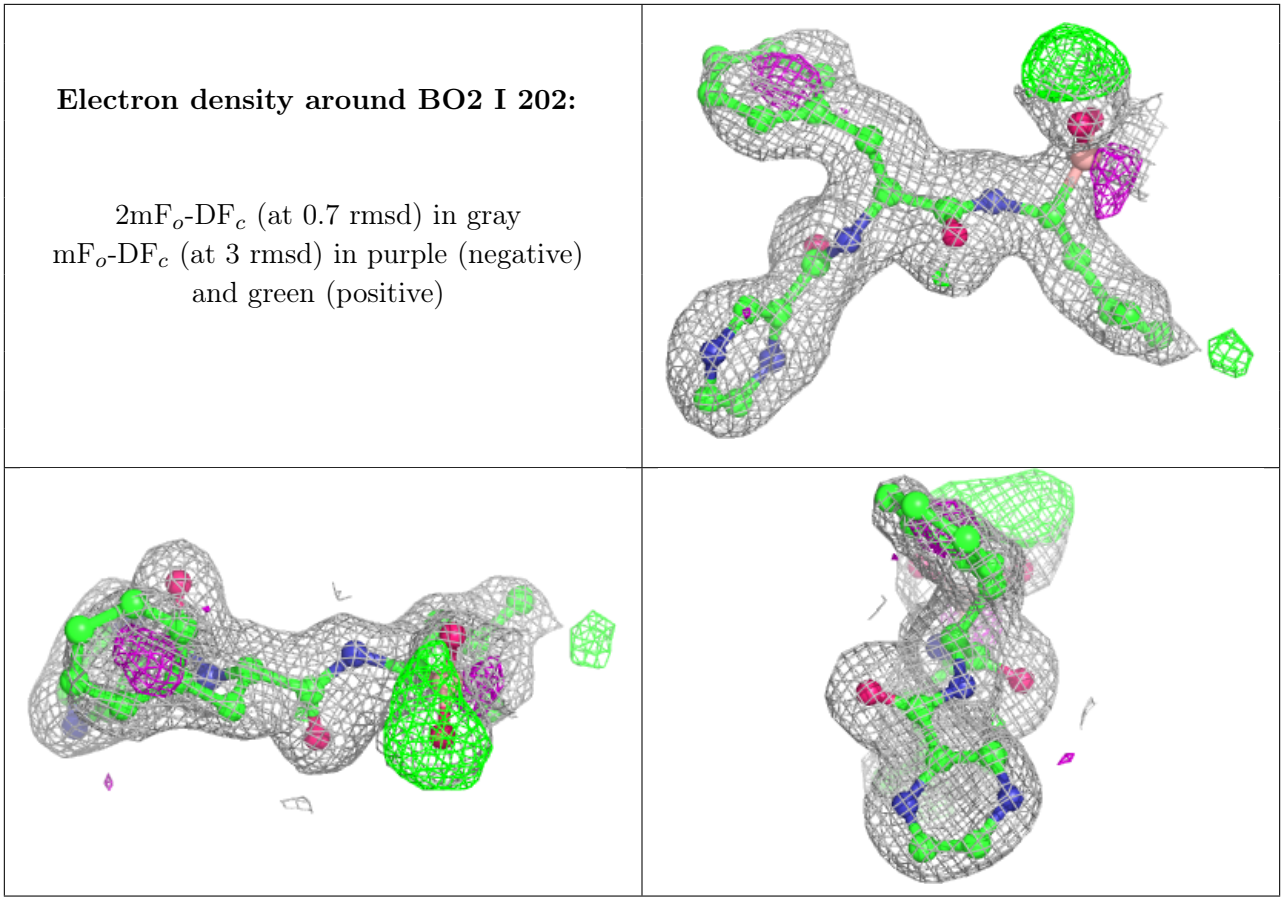
Electron density around BO2 H 202:

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



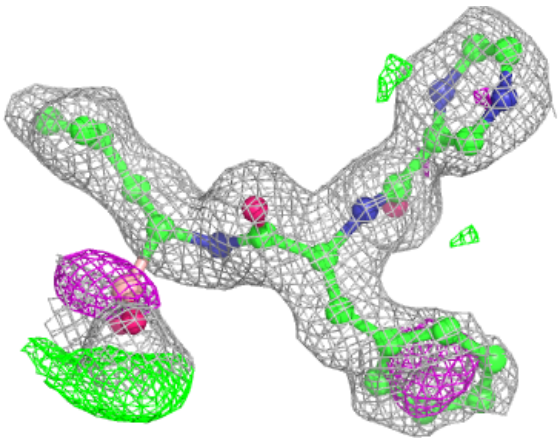
Electron density around BO2 I 202:

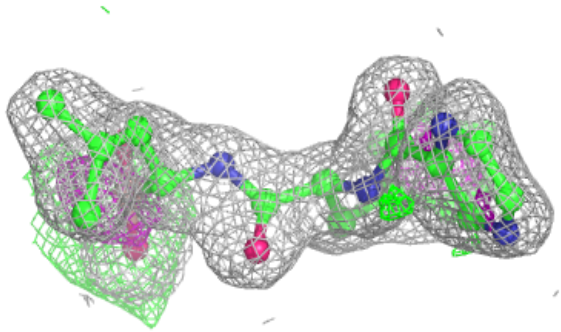
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

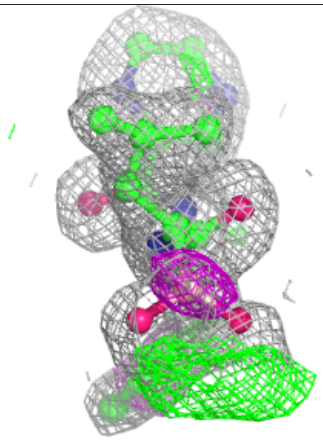


Electron density around BO2 C 202:

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

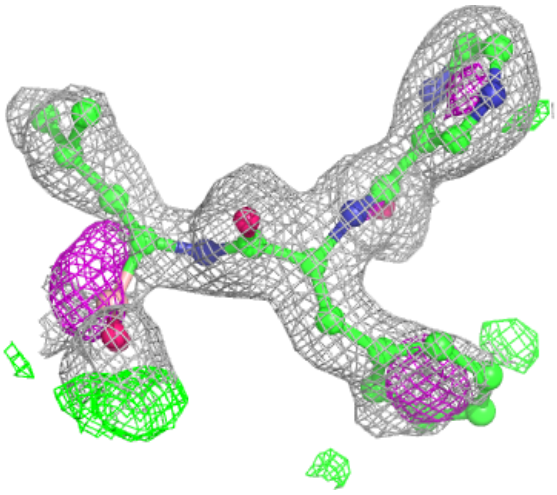


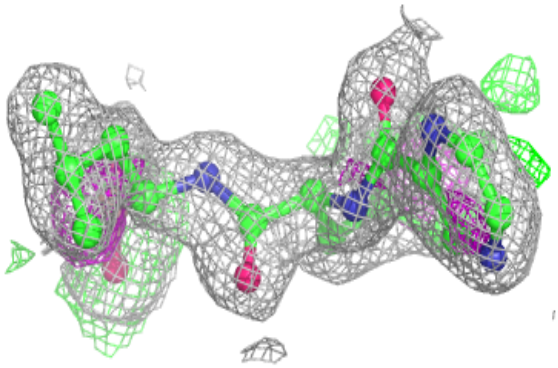


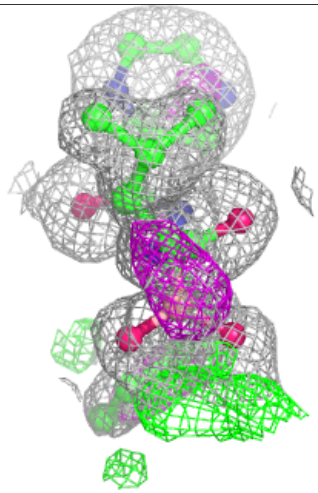


Electron density around BO2 E 202:

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

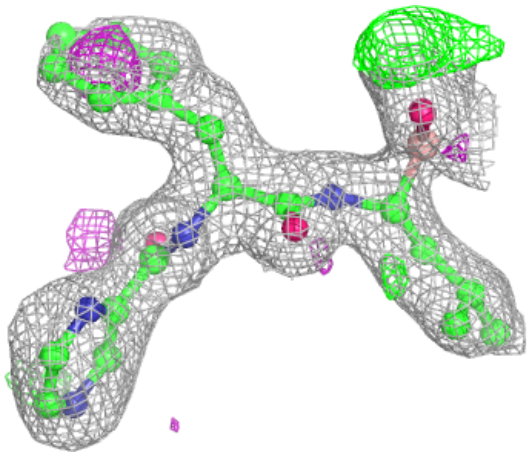


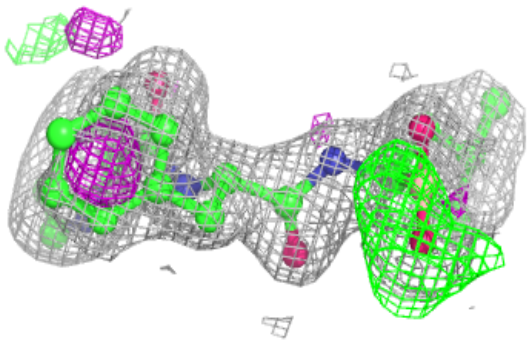


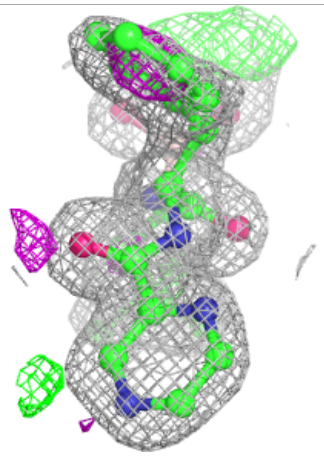


Electron density around BO2 F 202:

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

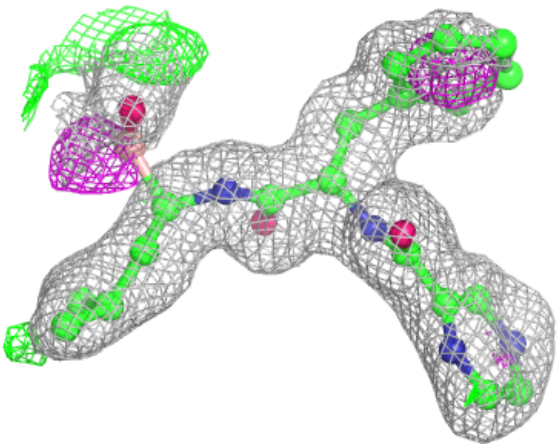


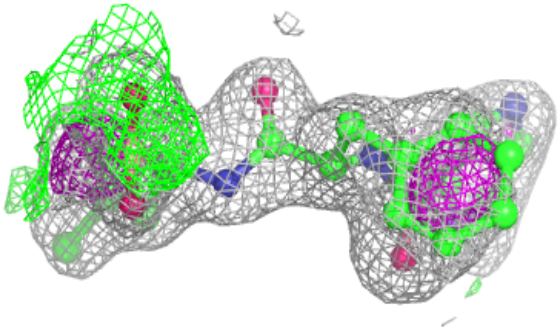


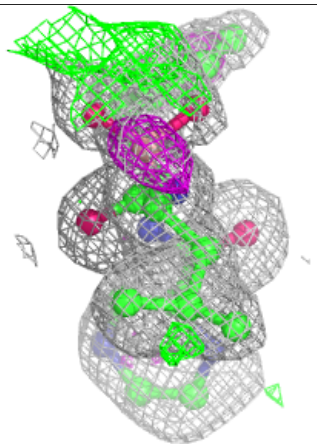


Electron density around BO2 J 202:

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

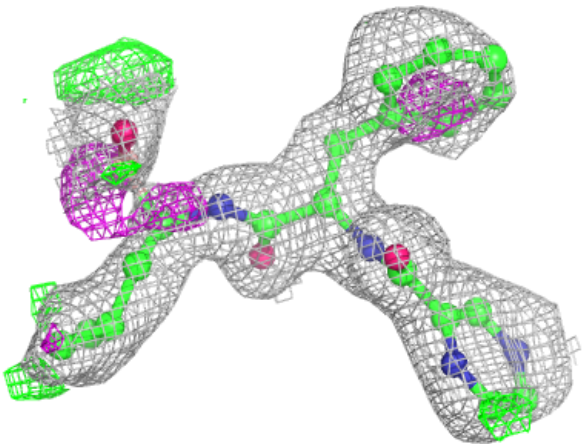


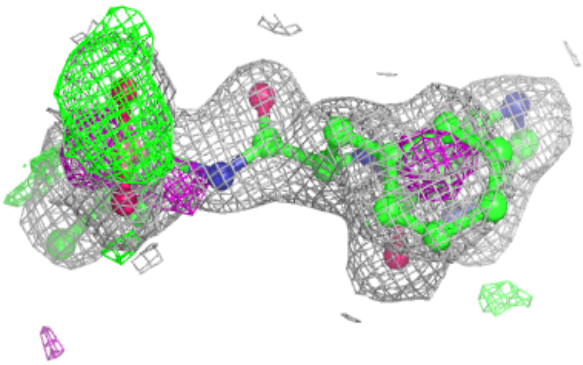


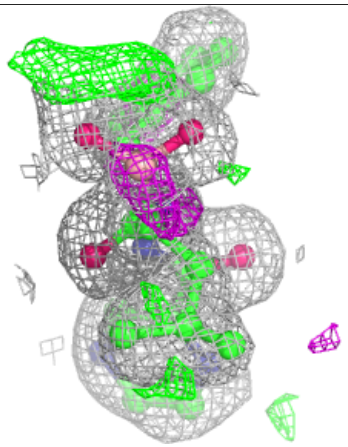


Electron density around BO2 K 202:

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

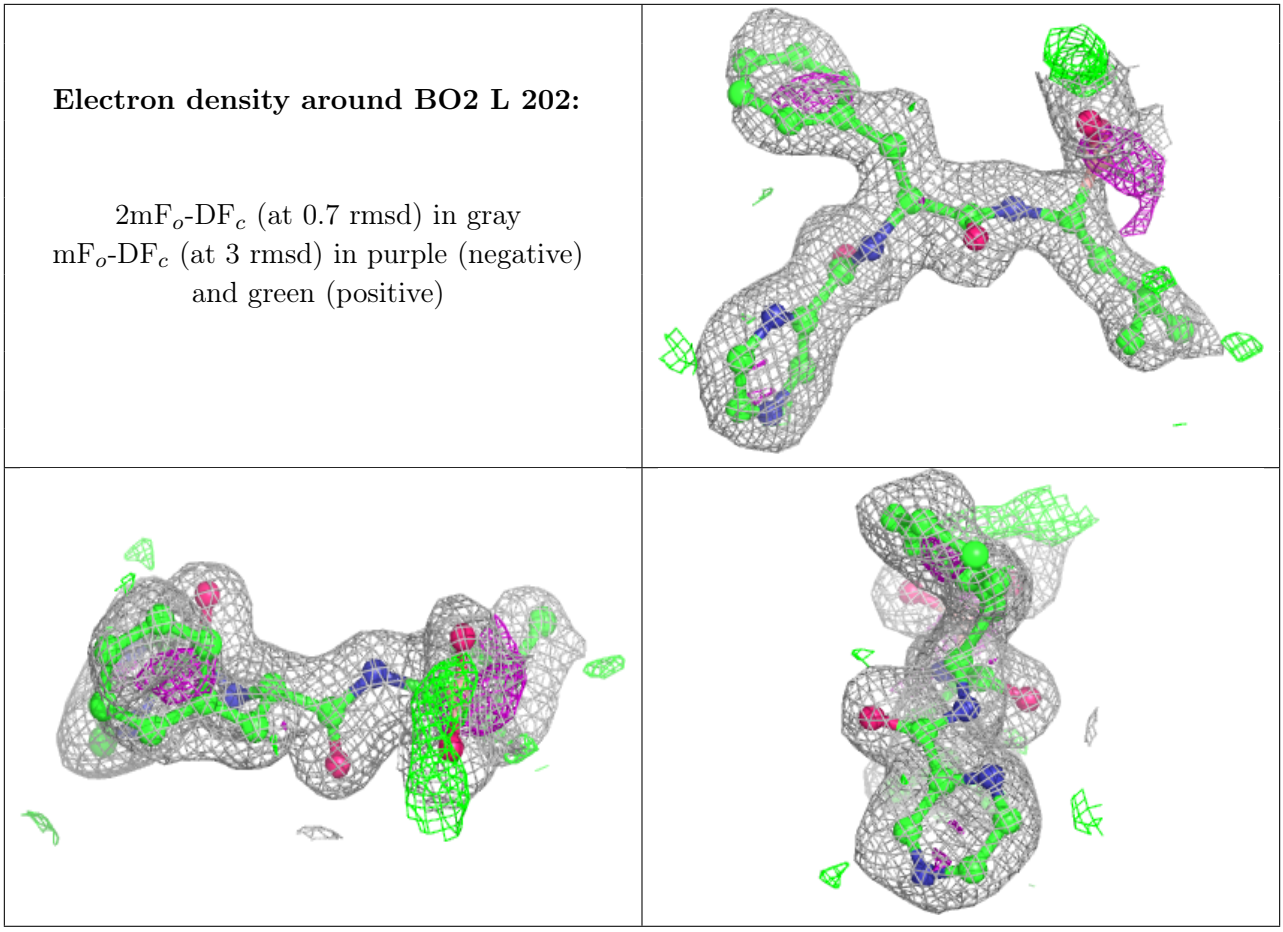






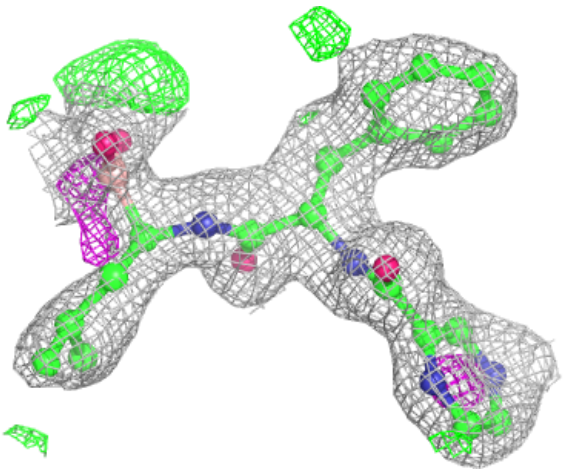
Electron density around BO2 L 202:

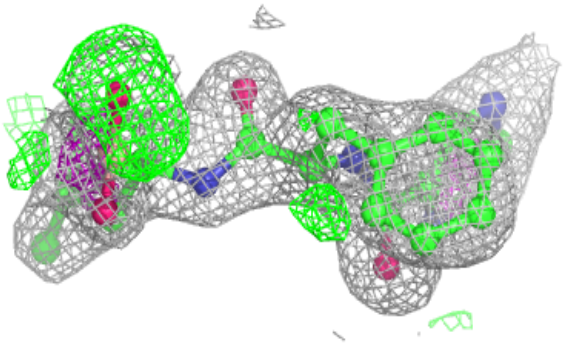
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

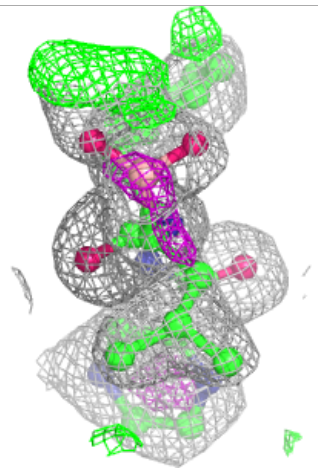


Electron density around BO2 G 202:

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

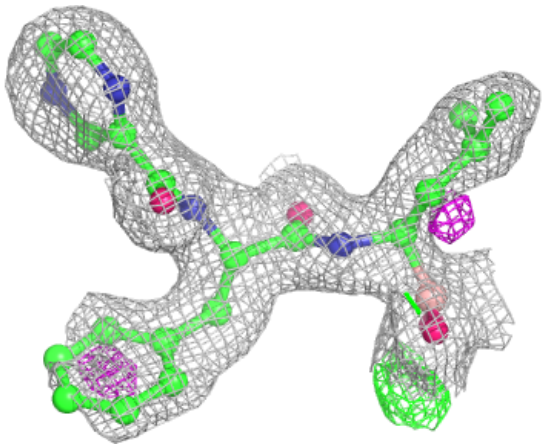


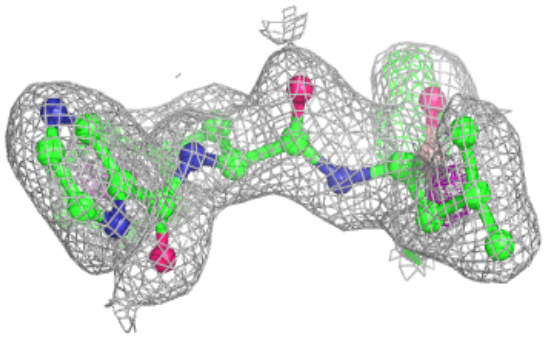


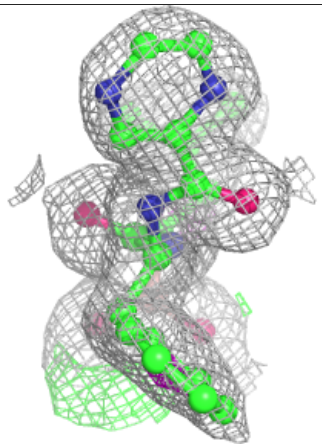


Electron density around BO2 B 202:

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

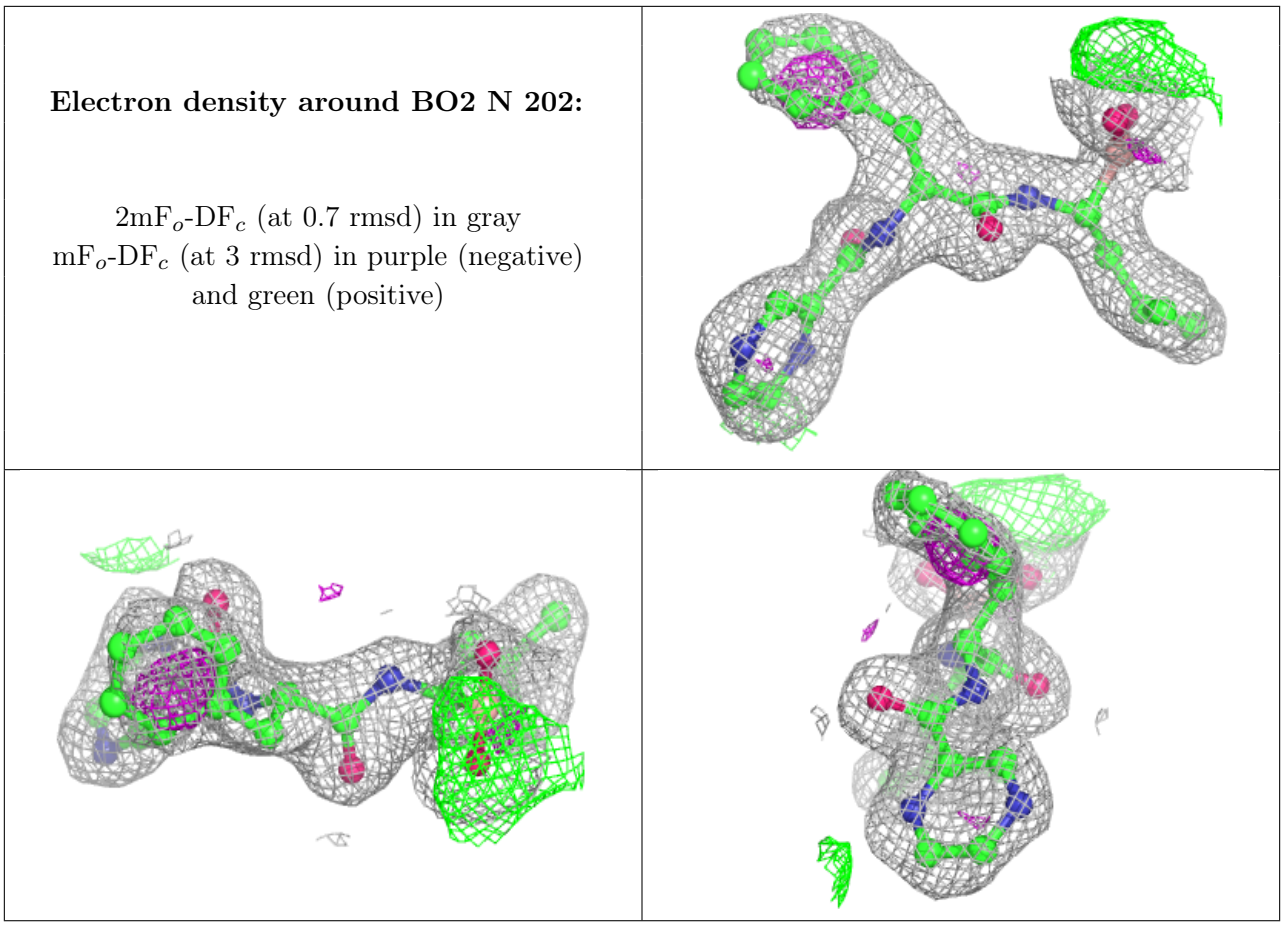






Electron density around BO2 N 202:

$2mF_o$-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.