wwPDB X-ray Structure Validation Summary Report (i)

Feb 3, 2024 – 10:08 PM EST

PDB ID	:	1NAQ
Title	:	Crystal structure of CUTA1 from E.coli at 1.7 A resolution
Authors	:	Calderone, V.; Mangani, S.; Benvenuti, M.; Viezzoli, M.S.; Banci, L.; Bertini, I.; Structural Proteomics in Europe (SPINE)
Deposited on	:	2002-11-28
Resolution	:	1.70 Å(reported)

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

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

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

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

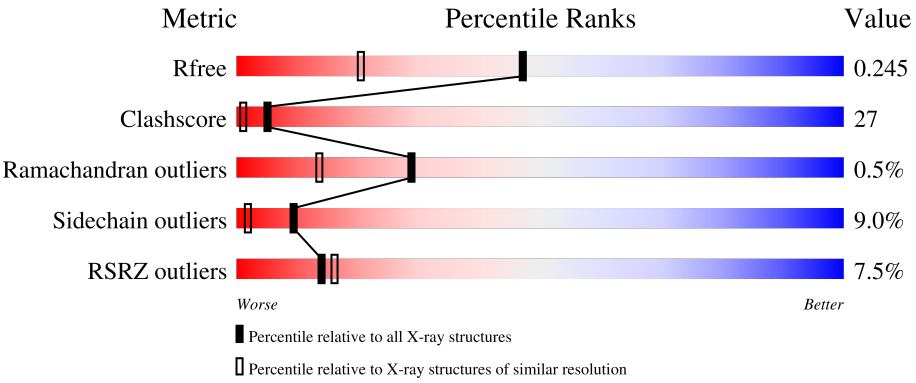
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 1.70 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	4298 (1.70-1.70)
Clashscore	141614	4695 (1.70-1.70)
Ramachandran outliers	138981	4610 (1.70-1.70)
Sidechain outliers	138945	4610 (1.70-1.70)
RSRZ outliers	127900	4222 (1.70-1.70)

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	112	4% 69% 20% 5% • 5%
1	B	112	11% 56% 25% 10% • 8%
1	C	112	7% 71% 21% •• 6%
1	D	112	5% 64% 23% • • 7%
1	E	112	7% 67% 24% • 6%

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Mol	Chain	Length	Quality of chain
1	F	112	7% 65% 24% 6%

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	MBO	A	987	-	-	X	-
3	MBO	A	988	-	-	X	-
3	MBO	B	989	-	-	X	-
3	MBO	B	990	-	-	X	-
3	MBO	C	991	-	-	X	-
3	MBO	D	992	-	-	X	-
3	MBO	E	995	-	-	X	-
3	MBO	E	996	-	-	X	-
3	MBO	F	997	-	-	X	-
3	MBO	F	998	-	-	X	-

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 5287 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.

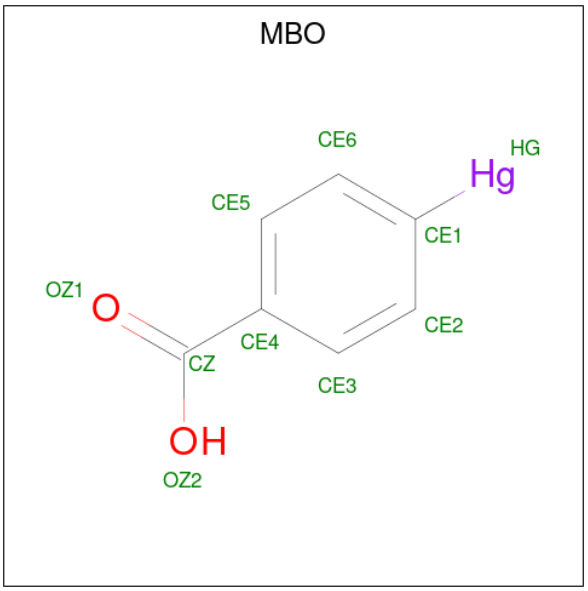
- Molecule 1 is a protein called Periplasmic divalent cation tolerance protein cutA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	106	Total	C	N	O	S	0	0	0
			816	520	132	160	4			
1	B	103	Total	C	N	O	S	0	0	0
			791	507	125	155	4			
1	C	105	Total	C	N	O	S	0	0	0
			810	517	131	158	4			
1	D	104	Total	C	N	O	S	0	0	0
			799	511	127	157	4			
1	E	105	Total	C	N	O	S	0	0	0
			805	514	128	159	4			
1	F	105	Total	C	N	O	S	0	0	0
			810	517	131	158	4			

- Molecule 2 is MERCURY (II) ION (three-letter code: HG) (formula: Hg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Hg	0	1
			2	2		
2	B	1	Total	Hg	0	1
			2	2		
2	C	2	Total	Hg	0	1
			3	3		
2	D	2	Total	Hg	0	1
			3	3		
2	E	1	Total	Hg	0	0
			1	1		
2	F	1	Total	Hg	0	1
			2	2		

- Molecule 3 is MERCURIBENZOIC ACID (three-letter code: MBO) (formula: $C_7H_5HgO_2$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C Hg O 10 7 1 2	0	0
3	A	1	Total C Hg O 10 7 1 2	0	0
3	B	1	Total C Hg O 10 7 1 2	0	0
3	B	1	Total C Hg O 10 7 1 2	0	0
3	C	1	Total C Hg O 10 7 1 2	0	0
3	D	1	Total C Hg O 10 7 1 2	0	0
3	E	1	Total C Hg O 10 7 1 2	0	0
3	E	1	Total C Hg O 10 7 1 2	0	0
3	F	1	Total C Hg O 10 7 1 2	0	0
3	F	1	Total C Hg O 10 7 1 2	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	53	Total O 53 53	0	0
4	B	50	Total O 50 50	0	0

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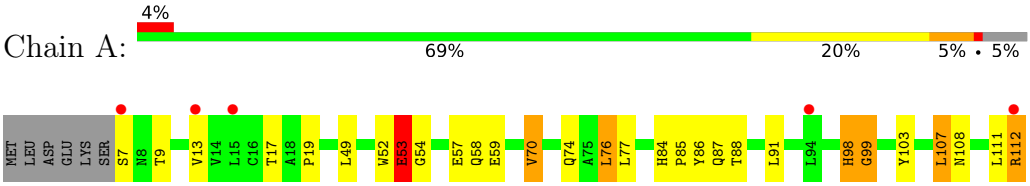
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	C	45	Total O 45 45	0	0
4	D	56	Total O 56 56	0	0
4	E	73	Total O 73 73	0	0
4	F	66	Total O 66 66	0	0

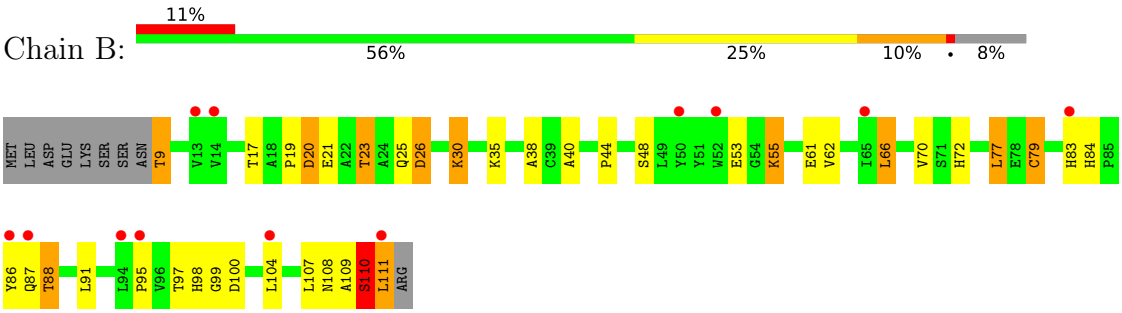
3 Residue-property plots (i)

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.

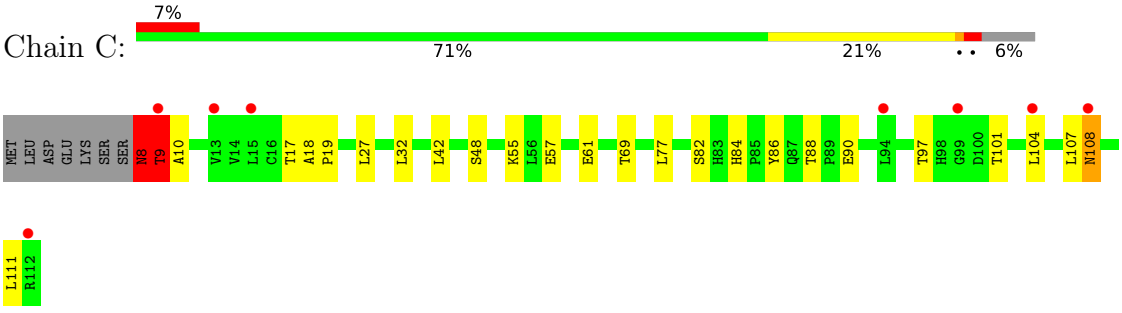
• Molecule 1: Periplasmic divalent cation tolerance protein cutA



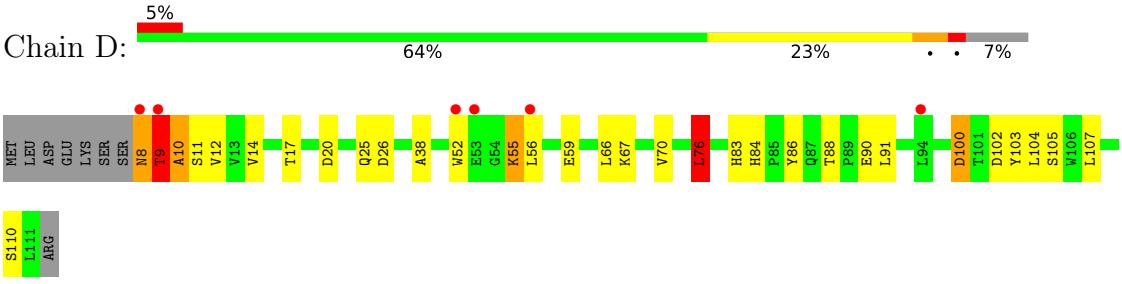
• Molecule 1: Periplasmic divalent cation tolerance protein cutA



• Molecule 1: Periplasmic divalent cation tolerance protein cutA

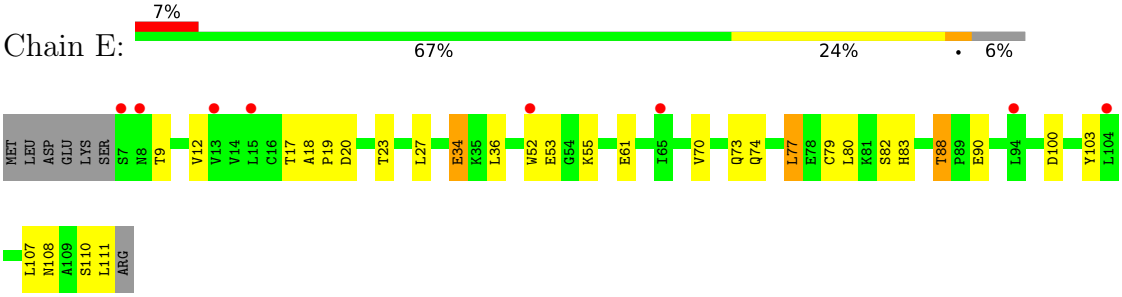


• Molecule 1: Periplasmic divalent cation tolerance protein cutA



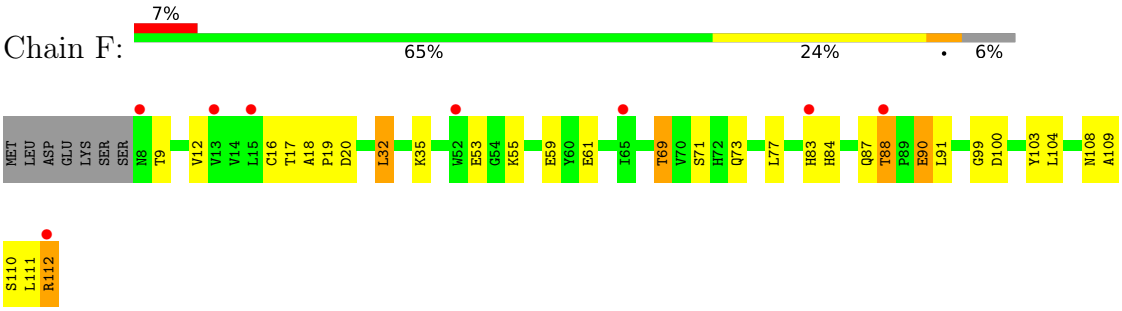
• Molecule 1: Periplasmic divalent cation tolerance protein cutA

Chain E:



• Molecule 1: Periplasmic divalent cation tolerance protein cutA

Chain F:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	55.99Å 89.56Å 122.29Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.96 – 1.70 36.13 – 1.70	Depositor EDS
% Data completeness (in resolution range)	97.6 (19.96-1.70) 73.1 (36.13-1.70)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	0.09	Depositor
$< I/\sigma(I) >$ [1]	2.48 (at 1.70Å)	Xtriage
Refinement program	REFMAC 5.1.80	Depositor
R, R_{free}	0.203 , 0.255 0.195 , 0.245	Depositor DCC
R_{free} test set	4190 reflections (8.37%)	wwPDB-VP
Wilson B-factor (Å^2)	17.5	Xtriage
Anisotropy	0.125	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.39 , 50.9	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	5287	wwPDB-VP
Average B, all atoms (Å^2)	20.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.29% 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: MBO, HG

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	0.97	1/833 (0.1%)	1.09	2/1141 (0.2%)
1	B	0.89	1/808 (0.1%)	1.12	6/1108 (0.5%)
1	C	0.93	1/827 (0.1%)	1.14	6/1133 (0.5%)
1	D	0.82	0/816	1.05	7/1119 (0.6%)
1	E	0.95	2/822 (0.2%)	1.01	4/1127 (0.4%)
1	F	0.97	1/827 (0.1%)	1.05	3/1133 (0.3%)
All	All	0.92	6/4933 (0.1%)	1.08	28/6761 (0.4%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2
1	B	0	2
1	C	0	3
1	D	0	1
All	All	0	8

The worst 5 of 6 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	E	34	GLU	CD-OE1	9.79	1.36	1.25
1	B	79	CYS	CA-CB	7.32	1.70	1.53
1	F	61	GLU	CD-OE1	6.76	1.33	1.25
1	A	70	VAL	CB-CG2	-6.41	1.39	1.52
1	C	10	ALA	N-CA	6.12	1.58	1.46

The worst 5 of 28 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	9	THR	O-C-N	-15.76	97.49	122.70
1	C	8	ASN	C-N-CA	11.42	150.25	121.70
1	B	79	CYS	CA-CB-SG	10.46	132.84	114.00
1	D	102	ASP	CB-CG-OD2	8.59	126.03	118.30
1	C	8	ASN	N-CA-CB	8.31	125.56	110.60

There are no chirality outliers.

5 of 8 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	53	GLU	Peptide
1	A	98	HIS	Peptide
1	B	109	ALA	Peptide
1	B	110	SER	Peptide
1	C	8	ASN	Mainchain

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	816	0	810	35	0
1	B	791	0	787	31	1
1	C	810	0	806	28	0
1	D	799	0	793	31	0
1	E	805	0	797	29	0
1	F	810	0	805	36	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
2	C	3	0	0	0	0
2	D	3	0	0	0	0
2	E	1	0	0	0	0
2	F	2	0	0	0	0
3	A	20	0	8	24	0
3	B	20	0	8	24	0
3	C	10	0	4	13	0
3	D	10	0	4	16	0
3	E	20	0	8	12	0
3	F	20	0	8	24	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	A	53	0	0	7	0
4	B	50	0	0	4	0
4	C	45	0	0	1	2
4	D	56	0	0	9	0
4	E	73	0	0	4	0
4	F	66	0	0	4	1
All	All	5287	0	4838	262	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 27.

The worst 5 of 262 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:72:HIS:CE1	1:B:111:LEU:HD13	1.68	1.28
3:A:988:MBO:HE3	3:A:988:MBO:CE4	2.04	1.25
3:A:987:MBO:HE5	3:A:987:MBO:CE6	2.03	1.25
3:C:991:MBO:HE3	3:C:991:MBO:CE4	2.03	1.25
3:D:992:MBO:HE3	3:D:992:MBO:CE4	2.05	1.25

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:B:30:LYS:NZ	4:C:1892:HOH:O[3_745]	1.84	0.36
4:C:1912:HOH:O	4:F:3063:HOH:O[2_654]	2.09	0.11

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	104/112 (93%)	101 (97%)	2 (2%)	1 (1%)	15 4
1	B	101/112 (90%)	100 (99%)	1 (1%)	0	100 100
1	C	103/112 (92%)	101 (98%)	2 (2%)	0	100 100
1	D	102/112 (91%)	98 (96%)	2 (2%)	2 (2%)	7 1
1	E	103/112 (92%)	102 (99%)	1 (1%)	0	100 100
1	F	103/112 (92%)	102 (99%)	1 (1%)	0	100 100
All	All	616/672 (92%)	604 (98%)	9 (2%)	3 (0%)	29 13

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	9	THR
1	D	10	ALA
1	A	99	GLY

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	90/96 (94%)	83 (92%)	7 (8%)	12 3
1	B	87/96 (91%)	71 (82%)	16 (18%)	1 0
1	C	89/96 (93%)	85 (96%)	4 (4%)	27 10
1	D	88/96 (92%)	83 (94%)	5 (6%)	20 6
1	E	89/96 (93%)	83 (93%)	6 (7%)	16 4
1	F	89/96 (93%)	79 (89%)	10 (11%)	6 1
All	All	532/576 (92%)	484 (91%)	48 (9%)	9 2

5 of 48 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	52	TRP
1	E	53	GLU

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Mol	Chain	Res	Type
1	D	55	LYS
1	E	12	VAL
1	E	88	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 28 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	58	GLN
1	F	98	HIS
1	D	84	HIS
1	F	25	GLN
1	D	74	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 23 ligands modelled in this entry, 13 are monoatomic - leaving 10 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	$\#\|Z\| > 2$
3	MBO	F	997	1	7,10,10	2.04	1 (14%)	11,13,13	2.54	3 (27%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
3	MBO	F	998	1	7,10,10	1.46	1 (14%)	11,13,13	2.04	4 (36%)
3	MBO	B	989	4,1	7,10,10	1.63	1 (14%)	11,13,13	1.71	2 (18%)
3	MBO	E	995	1	7,10,10	1.90	1 (14%)	11,13,13	1.91	3 (27%)
3	MBO	A	987	1	7,10,10	1.51	1 (14%)	11,13,13	2.35	5 (45%)
3	MBO	C	991	1	7,10,10	1.97	1 (14%)	11,13,13	2.40	2 (18%)
3	MBO	A	988	1	7,10,10	1.91	1 (14%)	11,13,13	2.12	4 (36%)
3	MBO	B	990	1	7,10,10	1.65	1 (14%)	11,13,13	2.18	3 (27%)
3	MBO	E	996	4,1	7,10,10	1.89	1 (14%)	11,13,13	1.99	2 (18%)
3	MBO	D	992	1	7,10,10	1.52	1 (14%)	11,13,13	1.67	2 (18%)

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	MBO	F	997	1	-	0/4/4/4	0/1/1/1
3	MBO	F	998	1	-	0/4/4/4	0/1/1/1
3	MBO	B	989	4,1	-	0/4/4/4	0/1/1/1
3	MBO	E	995	1	-	4/4/4/4	0/1/1/1
3	MBO	A	987	1	-	0/4/4/4	0/1/1/1
3	MBO	C	991	1	-	4/4/4/4	0/1/1/1
3	MBO	A	988	1	-	0/4/4/4	0/1/1/1
3	MBO	B	990	1	-	4/4/4/4	0/1/1/1
3	MBO	E	996	4,1	-	0/4/4/4	0/1/1/1
3	MBO	D	992	1	-	3/4/4/4	0/1/1/1

The worst 5 of 10 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	F	997	MBO	CE3-CE2	5.13	1.48	1.38
3	C	991	MBO	CE3-CE2	4.82	1.47	1.38
3	A	988	MBO	CE3-CE2	4.82	1.47	1.38
3	E	995	MBO	CE3-CE2	4.77	1.47	1.38
3	E	996	MBO	CE3-CE2	4.62	1.47	1.38

The worst 5 of 30 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	F	997	MBO	CE3-CE2-CE1	-6.29	109.30	121.56
3	C	991	MBO	CE3-CE2-CE1	-6.09	109.69	121.56
3	B	990	MBO	CE3-CE2-CE1	-4.91	111.99	121.56
3	E	996	MBO	CE3-CE2-CE1	-4.83	112.15	121.56
3	A	988	MBO	CE3-CE2-CE1	-4.61	112.58	121.56

There are no chirality outliers.

5 of 15 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	991	MBO	CE3-CE4-CZ-OZ1
3	C	991	MBO	CE3-CE4-CZ-OZ2
3	C	991	MBO	CE5-CE4-CZ-OZ1
3	C	991	MBO	CE5-CE4-CZ-OZ2
3	B	990	MBO	CE5-CE4-CZ-OZ2

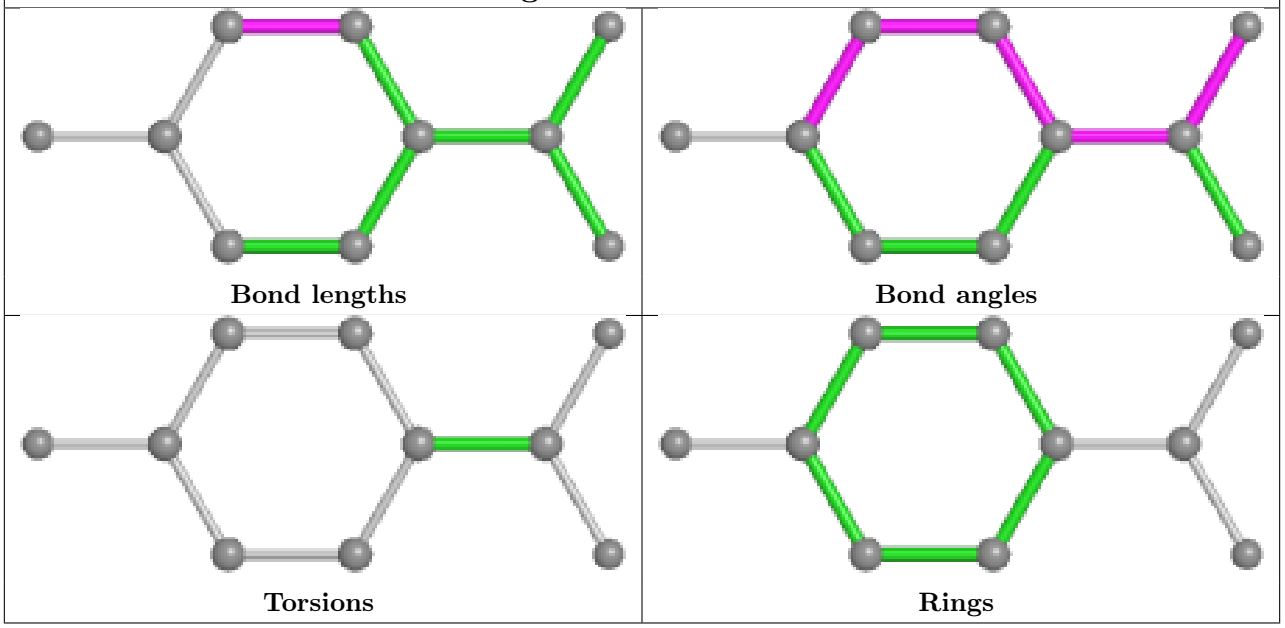
There are no ring outliers.

10 monomers are involved in 113 short contacts:

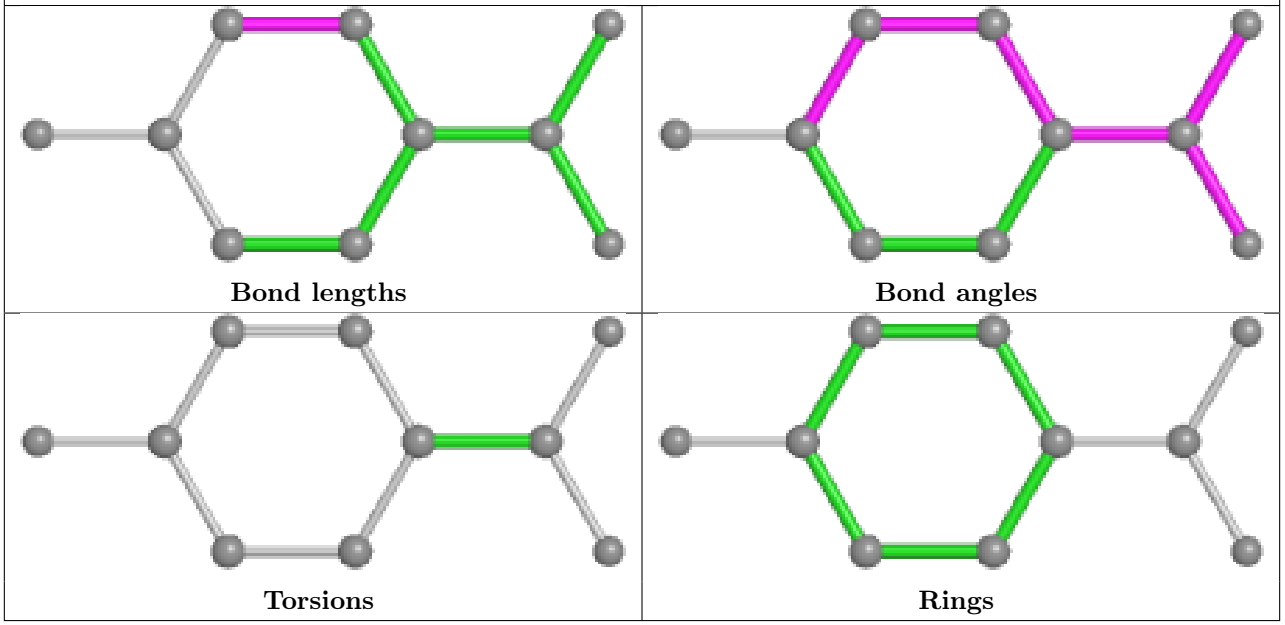
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	F	997	MBO	14	0
3	F	998	MBO	10	0
3	B	989	MBO	13	0
3	E	995	MBO	5	0
3	A	987	MBO	13	0
3	C	991	MBO	13	0
3	A	988	MBO	11	0
3	B	990	MBO	11	0
3	E	996	MBO	7	0
3	D	992	MBO	16	0

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.

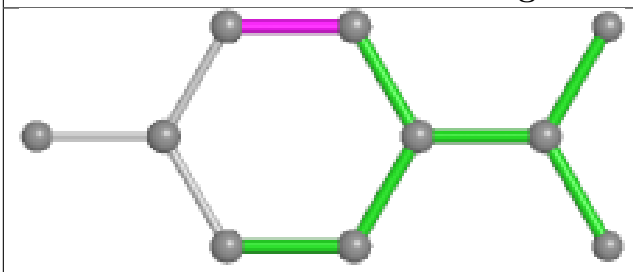
Ligand MBO F 997



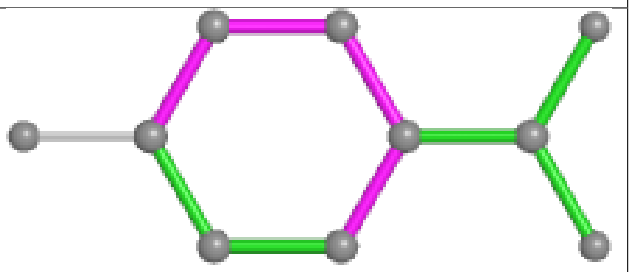
Ligand MBO F 998



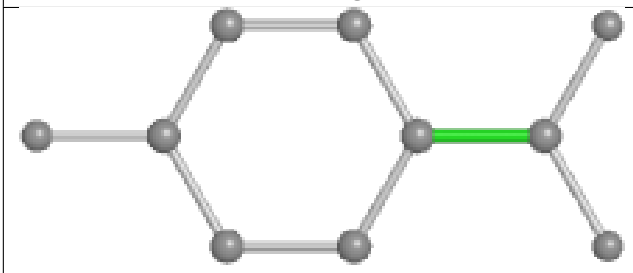
Ligand MBO B 989



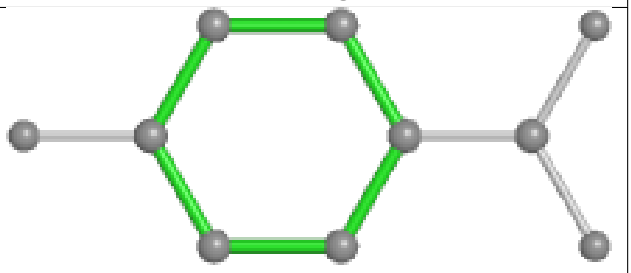
Bond lengths



Bond angles

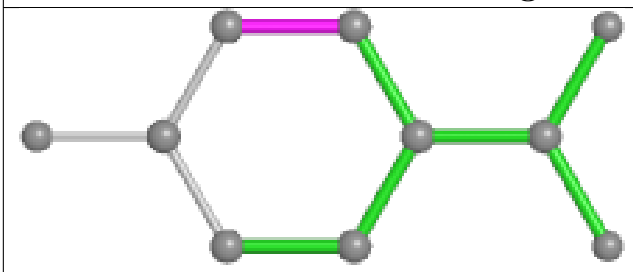


Torsions

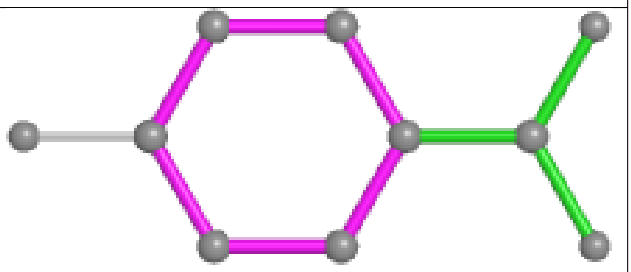


Rings

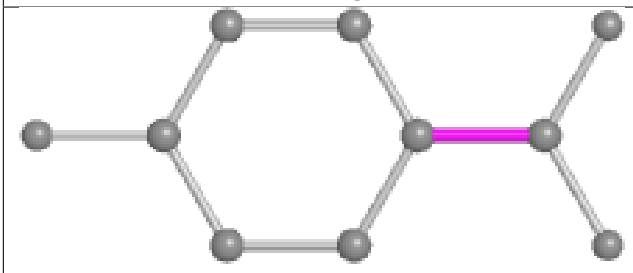
Ligand MBO E 995



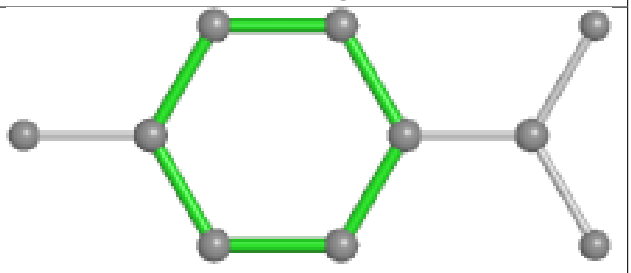
Bond lengths



Bond angles

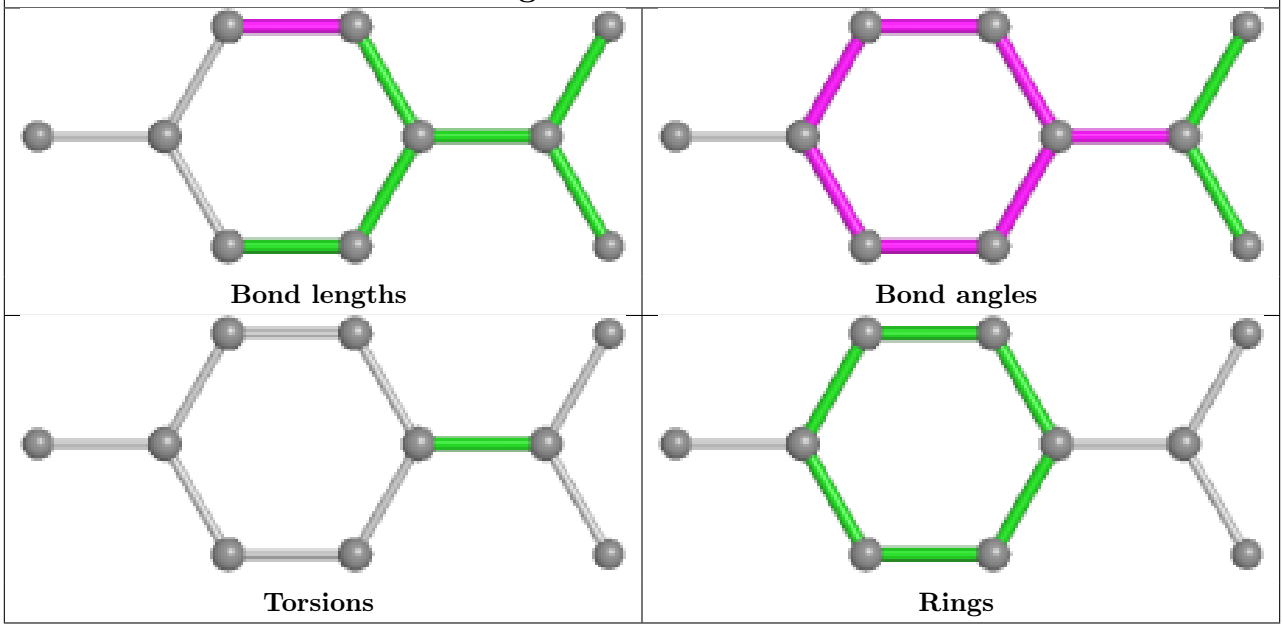


Torsions

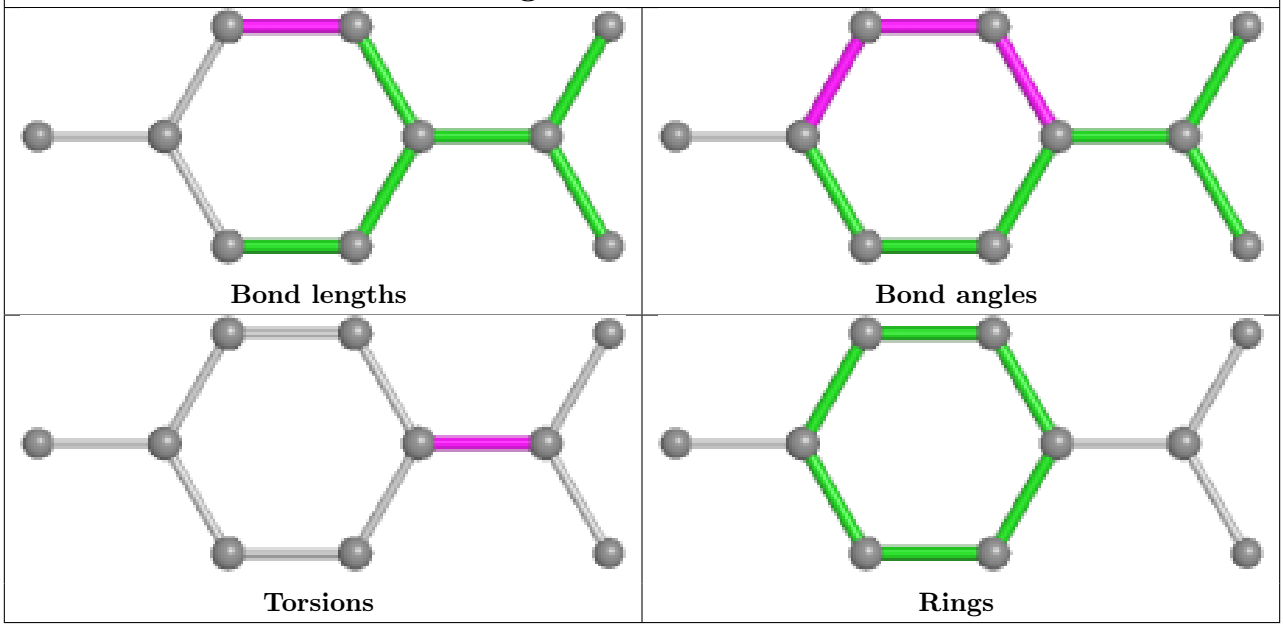


Rings

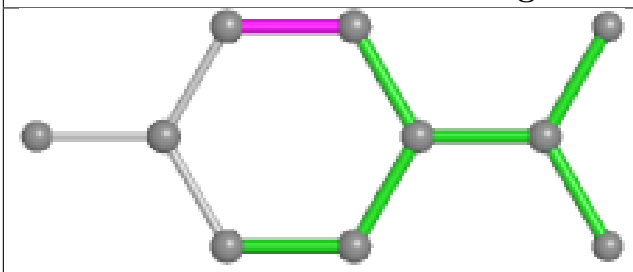
Ligand MBO A 987



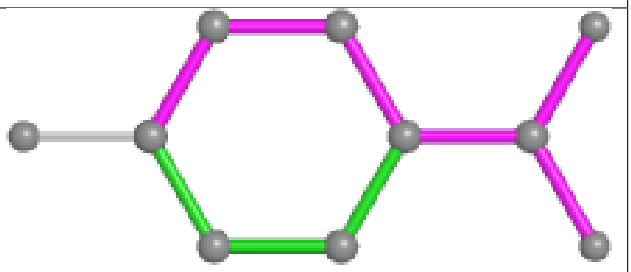
Ligand MBO C 991



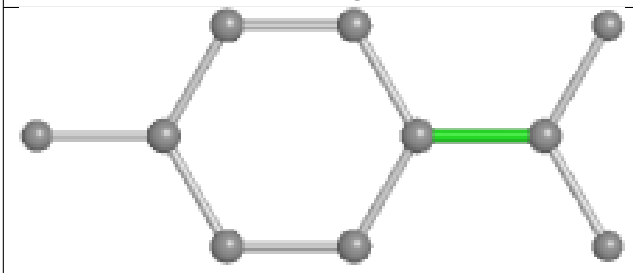
Ligand MBO A 988



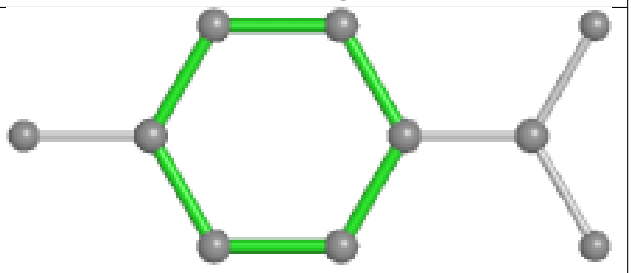
Bond lengths



Bond angles

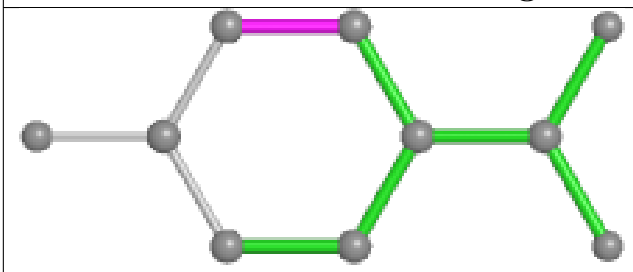


Torsions

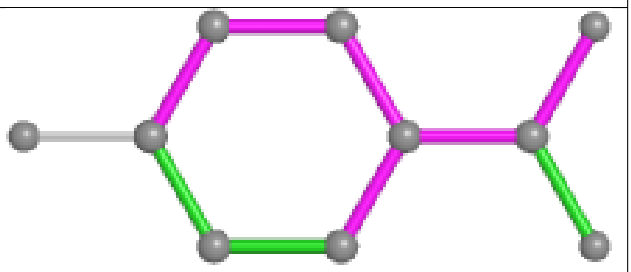


Rings

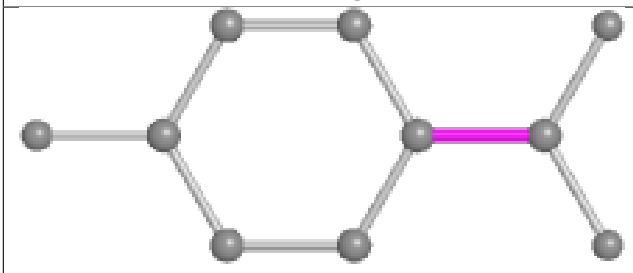
Ligand MBO B 990



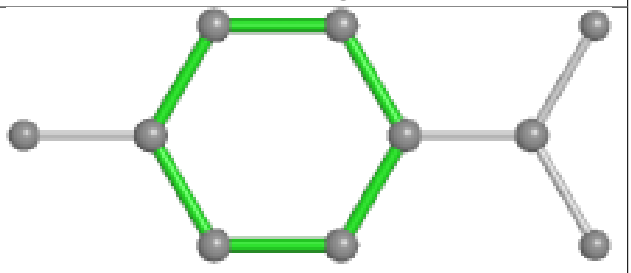
Bond lengths



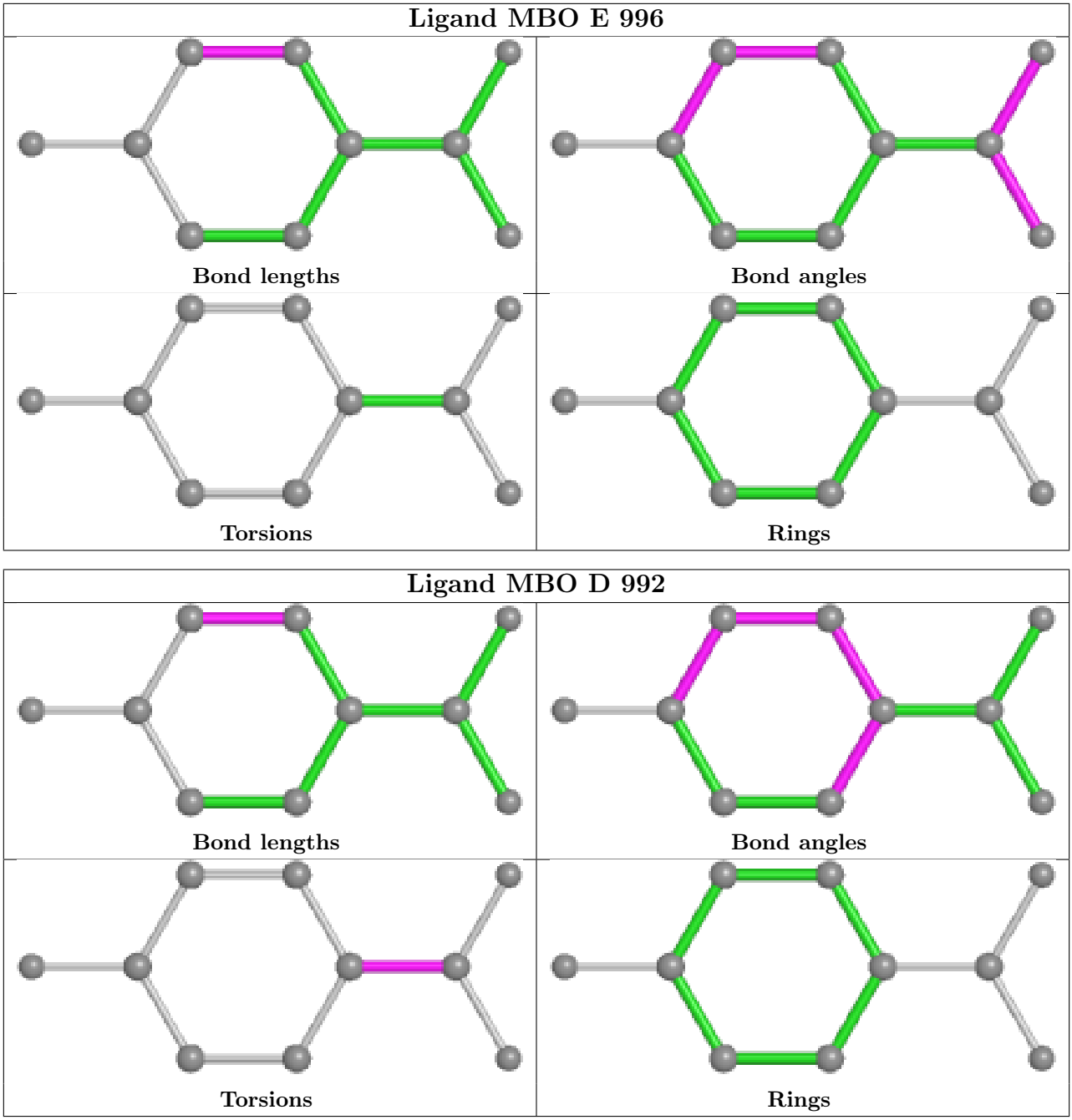
Bond angles



Torsions



Rings



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	106/112 (94%)	0.26	5 (4%) 31 35	11, 16, 26, 38	0
1	B	103/112 (91%)	0.62	12 (11%) 4 5	12, 21, 34, 41	0
1	C	105/112 (93%)	0.40	8 (7%) 13 16	12, 17, 29, 44	0
1	D	104/112 (92%)	0.48	6 (5%) 23 25	12, 19, 30, 40	0
1	E	105/112 (93%)	0.33	8 (7%) 13 16	13, 18, 28, 38	0
1	F	105/112 (93%)	0.46	8 (7%) 13 16	11, 18, 32, 38	0
All	All	628/672 (93%)	0.42	47 (7%) 14 16	11, 18, 32, 44	0

The worst 5 of 47 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	52	TRP	5.5
1	D	8	ASN	5.4
1	B	52	TRP	5.3
1	A	112	ARG	5.0
1	B	86	TYR	4.5

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

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

6.3 Carbohydrates

There are no monosaccharides in this entry.

6.4 Ligands (i)

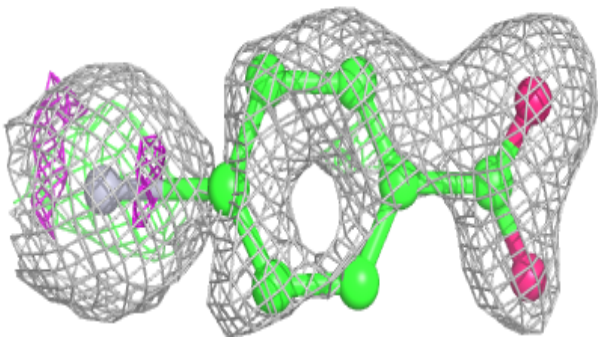
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

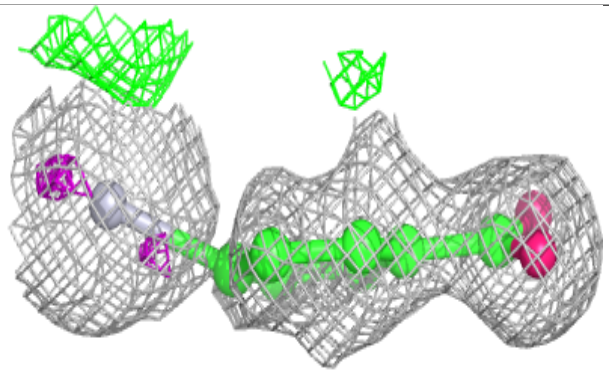
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	HG	F	2999[A]	1/1	0.93	0.09	40,40,40,40	1
2	HG	F	2999[B]	1/1	0.93	0.09	54,54,54,54	1
2	HG	C	1119	1/1	0.96	0.08	48,48,48,48	0
2	HG	A	1333[B]	1/1	0.98	0.05	40,40,40,40	1
2	HG	A	1333[A]	1/1	0.98	0.05	26,26,26,26	1
2	HG	C	1888[B]	1/1	0.99	0.07	59,59,59,59	1
2	HG	B	1666[A]	1/1	0.99	0.13	34,34,34,34	1
2	HG	B	1666[B]	1/1	0.99	0.13	89,89,89,89	1
2	HG	C	1888[A]	1/1	0.99	0.07	18,18,18,18	1
3	MBO	B	989	10/10	0.99	0.11	29,39,43,44	0
2	HG	E	2226	1/1	1.00	0.09	34,34,34,34	0
2	HG	D	2222[A]	1/1	1.00	0.02	20,20,20,20	1
2	HG	D	2222[B]	1/1	1.00	0.02	19,19,19,19	1
3	MBO	A	987	10/10	1.00	0.08	17,20,28,28	0
3	MBO	A	988	10/10	1.00	0.10	22,26,28,28	0
2	HG	D	2223	1/1	1.00	0.06	37,37,37,37	0
3	MBO	B	990	10/10	1.00	0.08	18,20,23,26	0
3	MBO	C	991	10/10	1.00	0.09	9,19,24,25	0
3	MBO	D	992	10/10	1.00	0.07	16,21,25,29	0
3	MBO	E	995	10/10	1.00	0.07	16,20,28,28	0
3	MBO	E	996	10/10	1.00	0.08	17,21,24,26	0
3	MBO	F	997	10/10	1.00	0.07	14,18,21,22	0
3	MBO	F	998	10/10	1.00	0.06	14,18,23,23	0

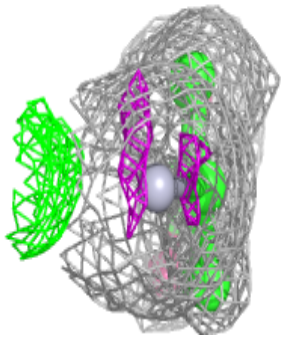
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around MBO B 989:

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

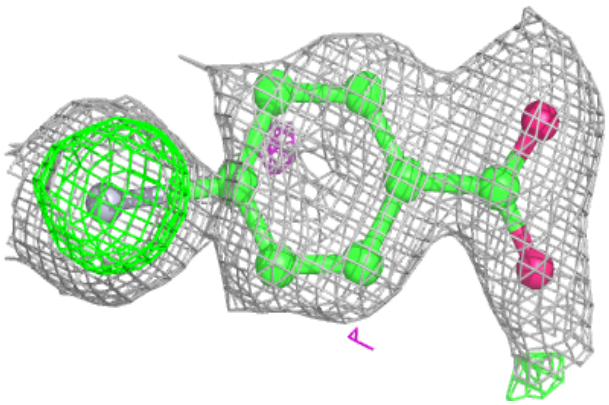


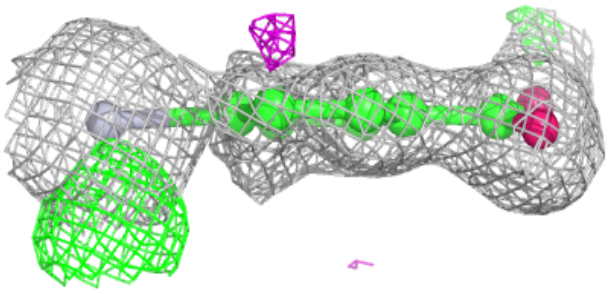


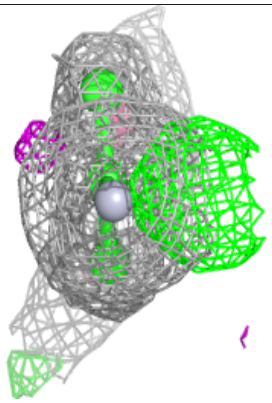


Electron density around MBO A 987:

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

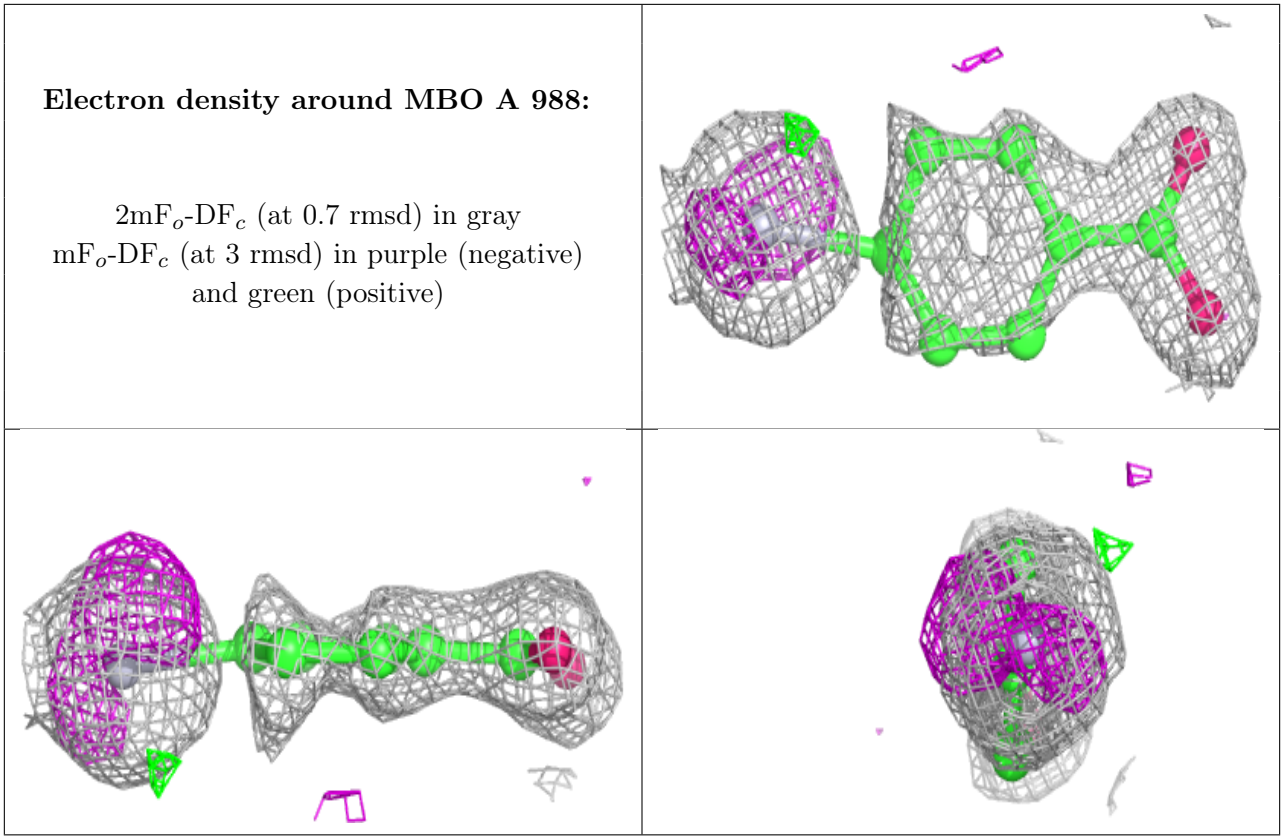






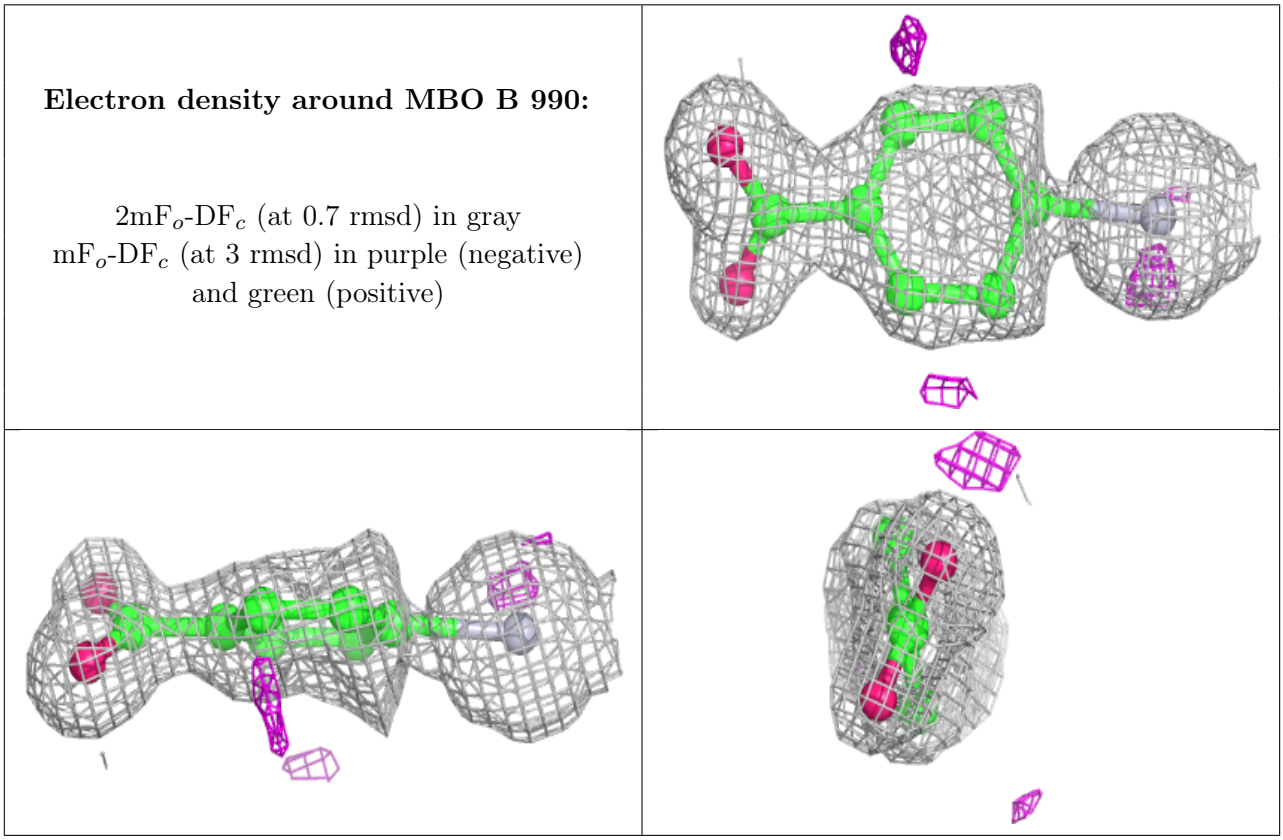
Electron density around MBO A 988:

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



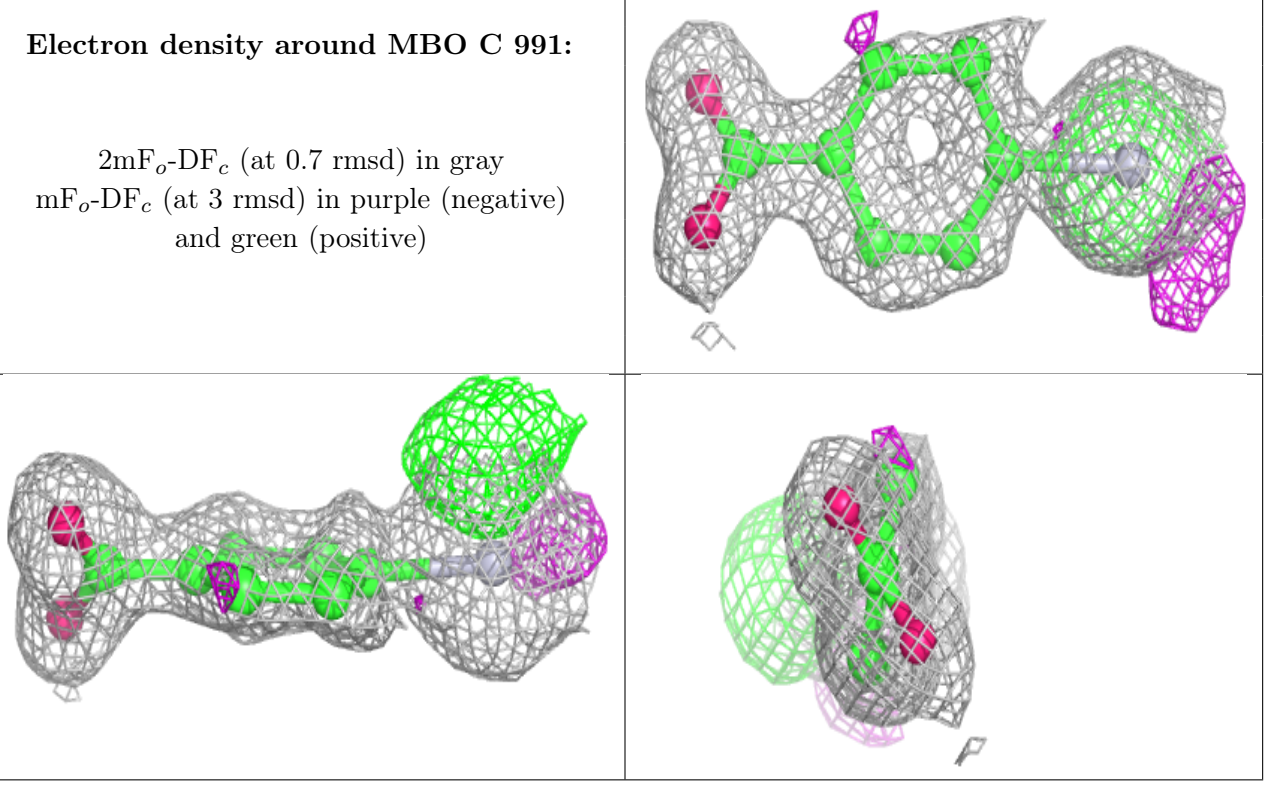
Electron density around MBO B 990:

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



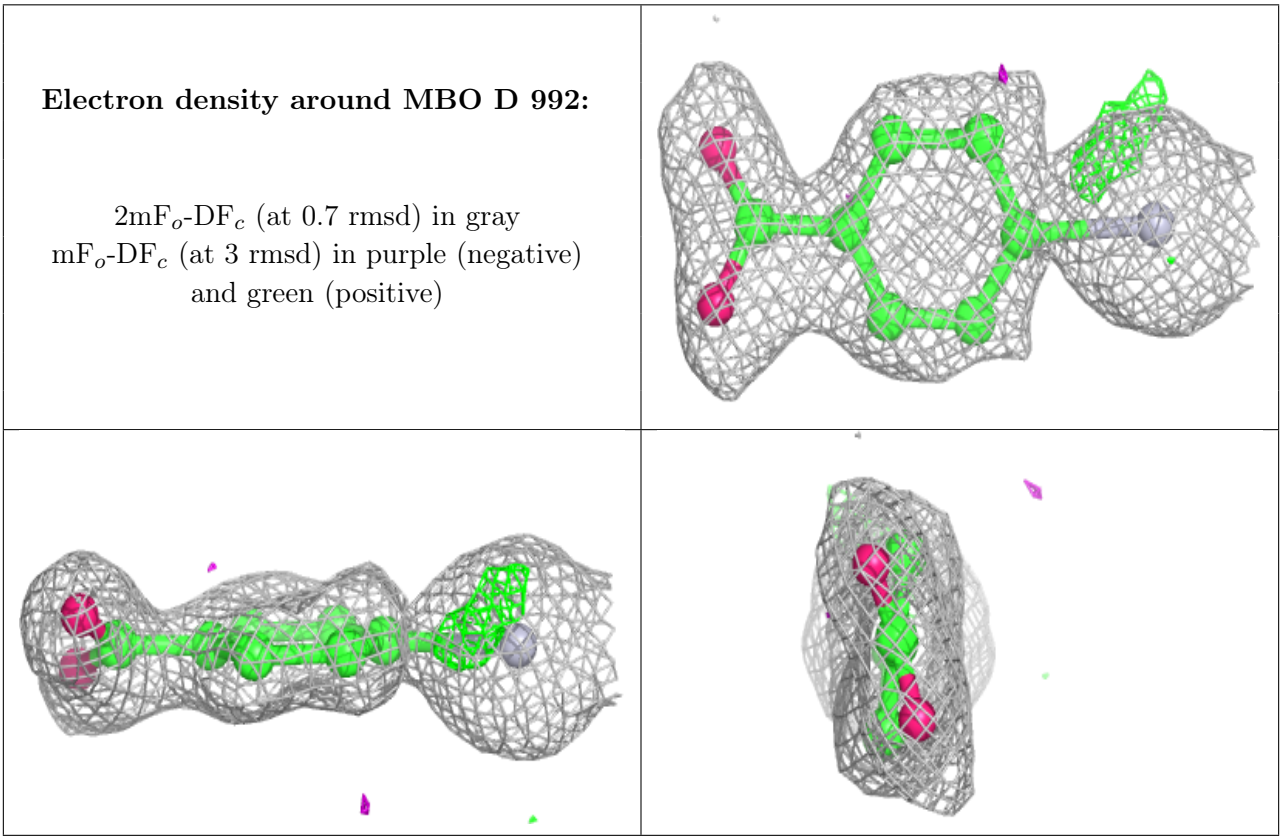
Electron density around MBO C 991:

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



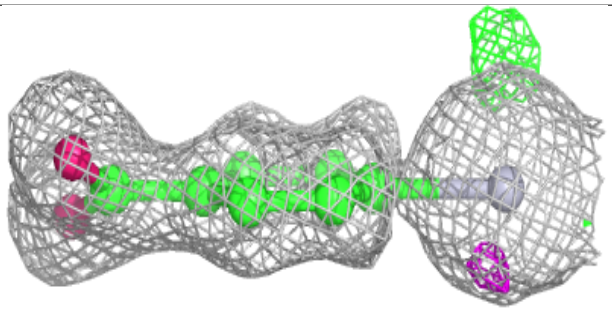
Electron density around MBO D 992:

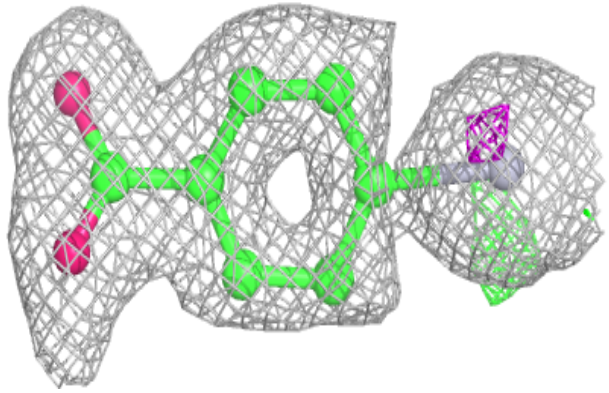
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

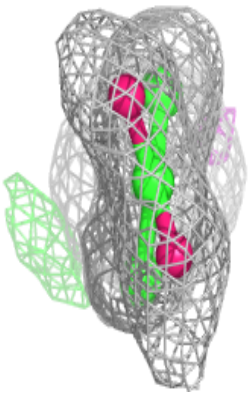


Electron density around MBO E 995:

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

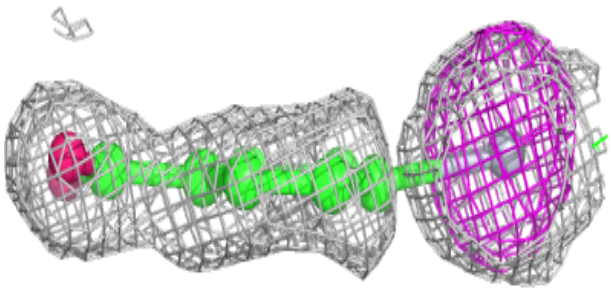


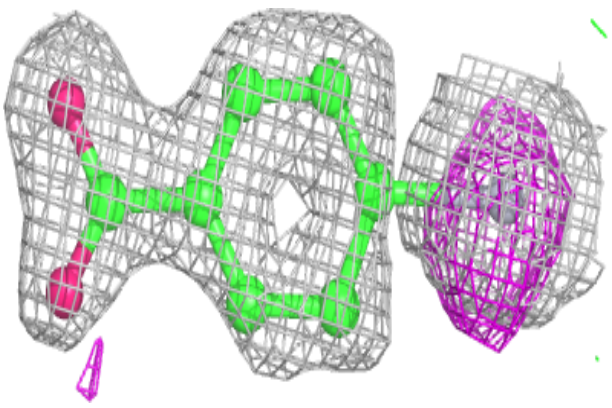


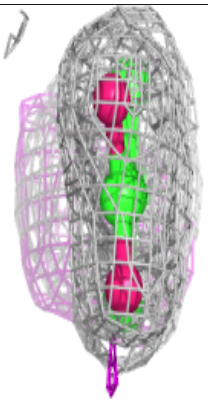


Electron density around MBO E 996:

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

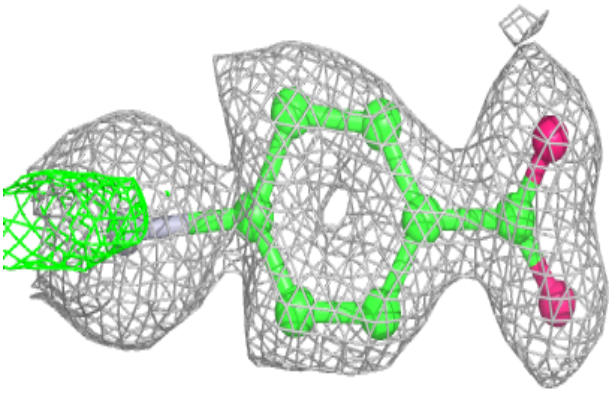


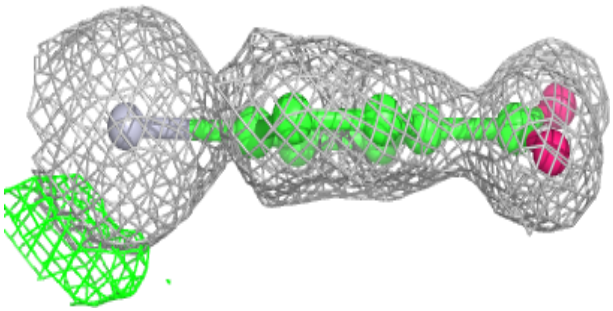


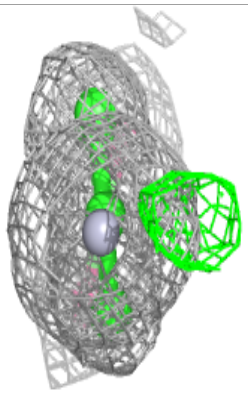


Electron density around MBO F 997:

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

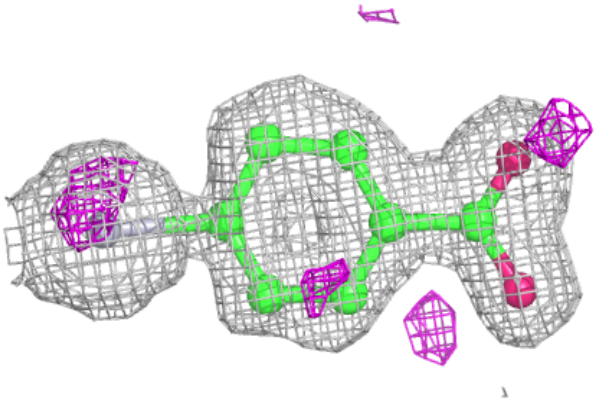


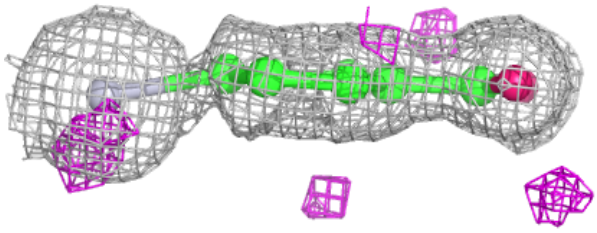


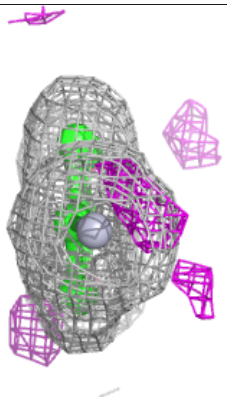


Electron density around MBO F 998:

$2mF_o$-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.