



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 9, 2026 – 10:05 PM UTC

PDB ID : 6FTW / pdb_00006ftw
Title : Crystal structure of human phosphodiesterase 4D2 catalytic domain with inhibitor NPD-048
Authors : Singh, A.K.; Brown, D.G.
Deposited on : 2018-02-24
Resolution : 2.16 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 ⓘ 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 Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtrriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

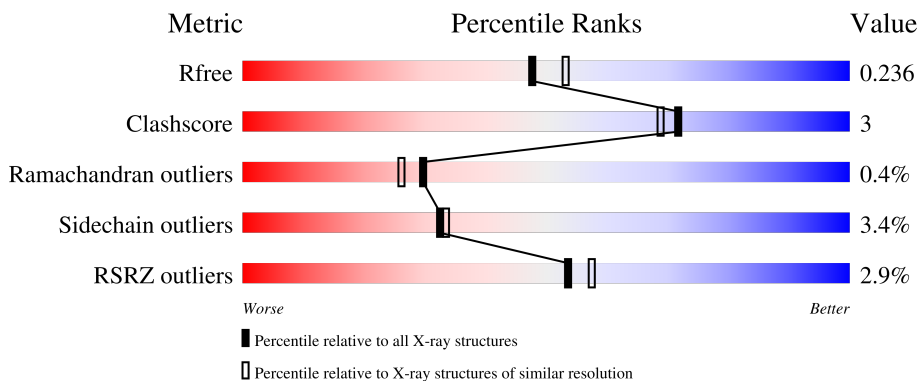
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

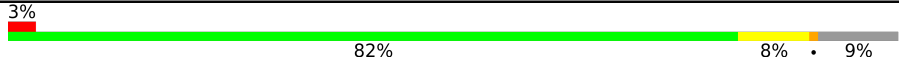



The reported resolution of this entry is 2.16 Å.

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}	180053	2057 (2.16-2.16)
Clashscore	190562	2159 (2.16-2.16)
Ramachandran outliers	187476	2134 (2.16-2.16)
Sidechain outliers	187428	2133 (2.16-2.16)
RSRZ outliers	180081	2059 (2.16-2.16)

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 $\leq 5\%$. 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	364	 3% 82% 8% • 9%
1	B	364	 3% 79% 9% • 11%
1	C	364	 2% 79% 9% • 11%
1	D	364	 2% 80% 9% 11%

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
4	EDO	B	506	-	-	X	-
5	EPE	B	508	-	-	-	X
5	EPE	D	514	-	-	-	X

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 11460 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 cAMP-specific 3',5'-cyclic phosphodiesterase 4D.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	331	Total 2680	C 1696	N 459	O 511	S 14	0	0	0
1	B	324	Total 2628	C 1662	N 449	O 503	S 14	0	1	0
1	C	324	Total 2622	C 1659	N 448	O 501	S 14	0	0	0
1	D	325	Total 2631	C 1664	N 450	O 503	S 14	0	0	0

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	75	GLY	-	expression tag	UNP Q08499
A	76	SER	-	expression tag	UNP Q08499
A	77	HIS	-	expression tag	UNP Q08499
A	78	MET	-	expression tag	UNP Q08499
B	75	GLY	-	expression tag	UNP Q08499
B	76	SER	-	expression tag	UNP Q08499
B	77	HIS	-	expression tag	UNP Q08499
B	78	MET	-	expression tag	UNP Q08499
C	75	GLY	-	expression tag	UNP Q08499
C	76	SER	-	expression tag	UNP Q08499
C	77	HIS	-	expression tag	UNP Q08499
C	78	MET	-	expression tag	UNP Q08499
D	75	GLY	-	expression tag	UNP Q08499
D	76	SER	-	expression tag	UNP Q08499
D	77	HIS	-	expression tag	UNP Q08499
D	78	MET	-	expression tag	UNP Q08499

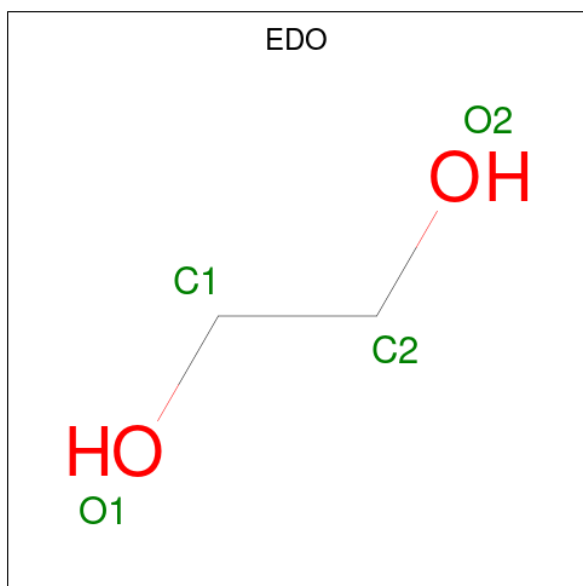
- Molecule 2 is ZINC ION (CCD ID: ZN) (formula: Zn).

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

- Molecule 3 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Mg	0	0
			1	1		
3	B	1	Total	Mg	0	0
			1	1		
3	C	1	Total	Mg	0	0
			1	1		
3	D	1	Total	Mg	0	0
			1	1		

- Molecule 4 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



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

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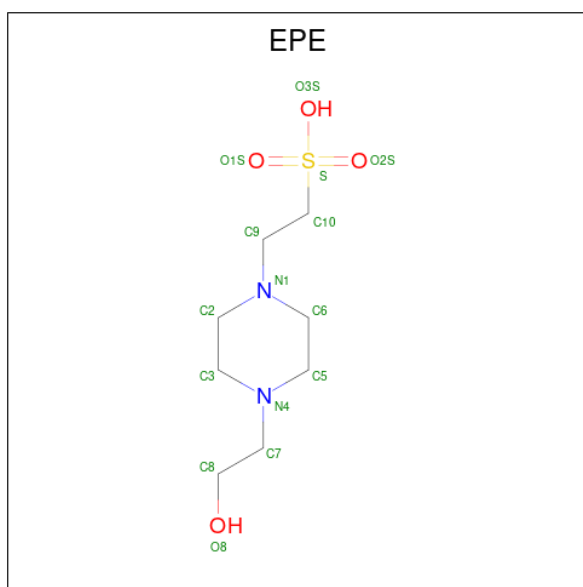
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total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

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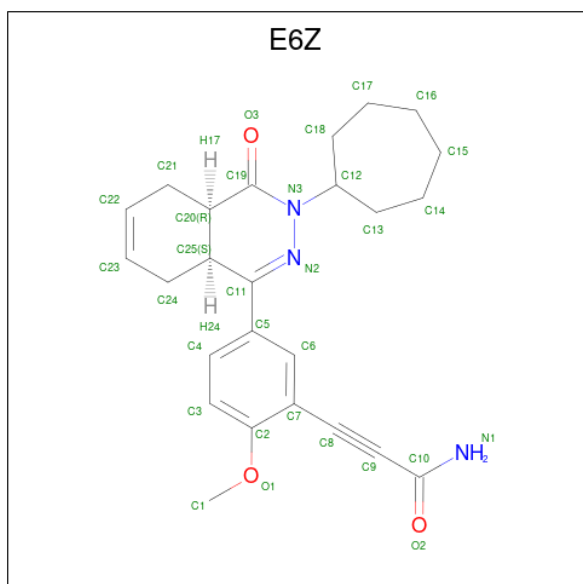
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0
4	D	1	Total C O 4 2 2	0	0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

- Molecule 5 is 4-(2-HYDROXYETHYL)-1-PIPERAZINE ETHANESULFONIC ACID (CCD ID: EPE) (formula: C₈H₁₈N₂O₄S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
5	A	1	Total	C	N	O	S	0	0
			15	8	2	4	1		
5	B	1	Total	C	N	O	S	0	0
			15	8	2	4	1		
5	C	1	Total	C	N	O	S	0	0
			15	8	2	4	1		
5	D	1	Total	C	N	O	S	0	0
			15	8	2	4	1		

- Molecule 6 is 3-{5-[(4aR,8aS)-3-cycloheptyl-4-oxo-3,4,4a,5,8,8a-hexahydrophthalazin-1-yl]-2-methoxyphenyl}prop-2-ynamide (CCD ID: E6Z) (formula: C₂₅H₂₉N₃O₃) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	1	Total	C	N	O	0	0
			31	25	3	3		
6	B	1	Total	C	N	O	0	0
			31	25	3	3		
6	C	1	Total	C	N	O	0	0
			31	25	3	3		
6	D	1	Total	C	N	O	0	0
			31	25	3	3		

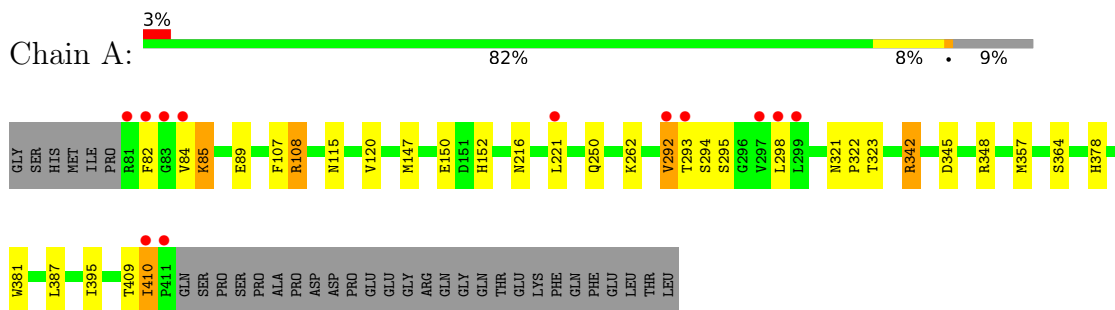
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	156	Total	O	0	0
			156	156		
7	B	121	Total	O	0	0
			121	121		
7	C	98	Total	O	0	0
			98	98		
7	D	176	Total	O	0	0
			176	176		

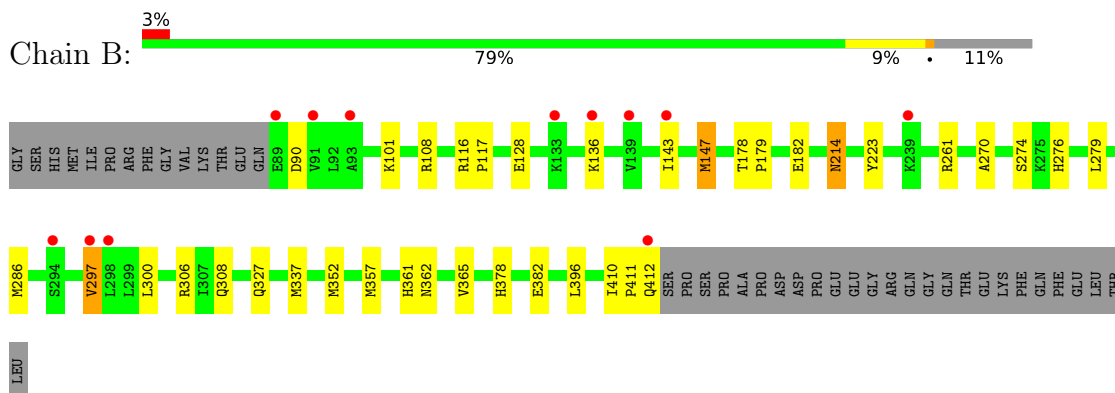
3 Residue-property plots [i](#)

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.

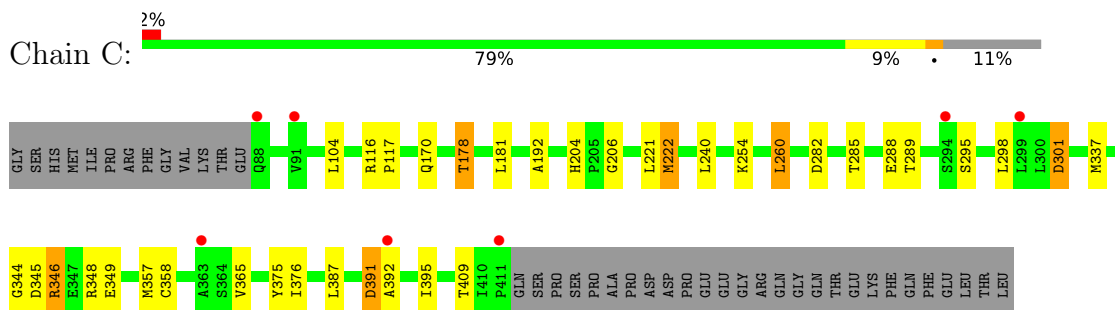
- Molecule 1: cAMP-specific 3',5'-cyclic phosphodiesterase 4D



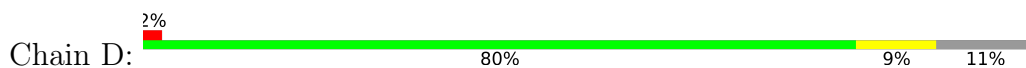
- Molecule 1: cAMP-specific 3',5'-cyclic phosphodiesterase 4D

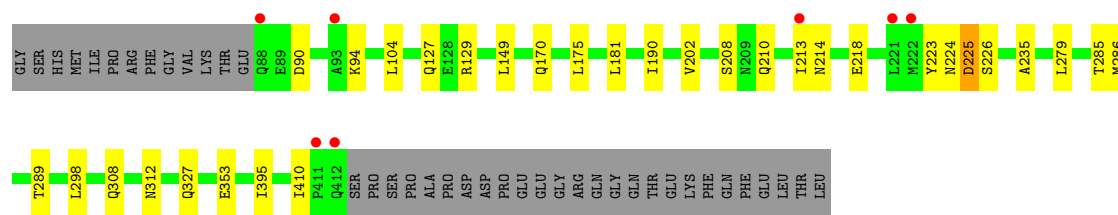


- Molecule 1: cAMP-specific 3',5'-cyclic phosphodiesterase 4D



- Molecule 1: cAMP-specific 3',5'-cyclic phosphodiesterase 4D





4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	99.14Å 111.43Å 160.06Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	65.00 – 2.16 65.00 – 2.16	Depositor EDS
% Data completeness (in resolution range)	99.9 (65.00-2.16) 99.9 (65.00-2.16)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.77 (at 2.16Å)	Xtrriage
Refinement program	REFMAC 5.8.0189	Depositor
R, R_{free}	0.182 , 0.233 0.192 , 0.236	Depositor DCC
R_{free} test set	4729 reflections (4.95%)	wwPDB-VP
Wilson B-factor (Å ²)	40.8	Xtrriage
Anisotropy	0.127	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 31.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	11460	wwPDB-VP
Average B, all atoms (Å ²)	48.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.03% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality i

5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: EDO, MG, E6Z, ZN, EPE

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	1.19	1/2735 (0.0%)	1.07	4/3714 (0.1%)
1	B	1.16	3/2682 (0.1%)	1.11	3/3644 (0.1%)
1	C	1.15	1/2676 (0.0%)	1.10	1/3636 (0.0%)
1	D	1.31	5/2685 (0.2%)	1.09	5/3648 (0.1%)
All	All	1.20	10/10778 (0.1%)	1.09	13/14642 (0.1%)

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	250	GLN	C-O	-6.99	1.15	1.24
1	D	225	ASP	N-CA	6.35	1.54	1.46
1	D	127	GLN	N-CA	5.94	1.53	1.46
1	D	225	ASP	CA-C	5.64	1.60	1.52
1	B	214	ASN	C-O	-5.57	1.17	1.24

The worst 5 of 13 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	276	HIS	N-CA-C	6.18	118.53	111.11
1	A	378	HIS	CA-C-N	-6.11	112.27	119.05
1	A	378	HIS	C-N-CA	-6.11	112.27	119.05
1	D	395	ILE	N-CA-C	-5.75	105.12	110.53
1	A	381	TRP	N-CA-C	5.72	117.51	111.28

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	2680	0	2638	23	0
1	B	2628	0	2582	13	0
1	C	2622	0	2578	21	0
1	D	2631	0	2586	14	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	A	52	0	78	5	0
4	B	20	0	30	4	0
4	C	36	0	54	1	0
4	D	48	0	72	3	0
5	A	15	0	17	2	0
5	B	15	0	18	0	0
5	C	15	0	18	0	0
5	D	15	0	18	0	0
6	A	31	0	0	1	0
6	B	31	0	0	1	0
6	C	31	0	0	1	0
6	D	31	0	0	0	0
7	A	156	0	0	2	0
7	B	121	0	0	0	0
7	C	98	0	0	1	0
7	D	176	0	0	1	0
All	All	11460	0	10689	71	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

The worst 5 of 71 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:357:MET:SD	6:B:509:E6Z:N1	2.24	1.09
1:C:345:ASP:OD2	1:C:348:ARG:NH2	1.89	1.06
1:A:342:ARG:HH11	1:A:342:ARG:HG2	1.29	0.96
1:B:214:ASN:HD22	4:B:506:EDO:H11	1.38	0.87
1:C:204:HIS:HD2	1:C:206:GLY:H	1.26	0.84

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	329/364 (90%)	318 (97%)	8 (2%)	3 (1%)	14	9
1	B	323/364 (89%)	310 (96%)	12 (4%)	1 (0%)	36	34
1	C	322/364 (88%)	312 (97%)	9 (3%)	1 (0%)	36	34
1	D	323/364 (89%)	312 (97%)	11 (3%)	0	100	100
All	All	1297/1456 (89%)	1252 (96%)	40 (3%)	5 (0%)	30	26

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	90	ASP
1	C	301	ASP
1	A	292	VAL
1	A	82	PHE
1	A	294	SER

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	302/331 (91%)	292 (97%)	10 (3%)	33	34
1	B	297/331 (90%)	282 (95%)	15 (5%)	21	18
1	C	296/331 (89%)	285 (96%)	11 (4%)	30	30
1	D	297/331 (90%)	292 (98%)	5 (2%)	53	60
All	All	1192/1324 (90%)	1151 (97%)	41 (3%)	32	33

5 of 41 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	254	LYS
1	C	391	ASP
1	C	260	LEU
1	C	295	SER
1	D	94	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 23 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	242	GLN
1	D	105	HIS
1	C	302	ASN
1	D	214	ASN
1	B	210	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 oligosaccharides in this entry.

5.6 Ligand geometry

Of 55 ligands modelled in this entry, 8 are monoatomic - leaving 47 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
4	EDO	C	508	-	3,3,3	0.38	0	2,2,2	1.15	0
4	EDO	C	505	-	3,3,3	0.44	0	2,2,2	0.64	0
4	EDO	A	507	-	3,3,3	0.62	0	2,2,2	0.51	0
4	EDO	D	510	-	3,3,3	0.23	0	2,2,2	0.59	0
4	EDO	C	504	-	3,3,3	0.75	0	2,2,2	0.66	0
4	EDO	D	506	-	3,3,3	0.53	0	2,2,2	0.37	0
4	EDO	C	510	-	3,3,3	2.01	1 (33%)	2,2,2	0.78	0
4	EDO	D	512	-	3,3,3	0.53	0	2,2,2	0.26	0
5	EPE	B	508	-	15,15,15	1.90	1 (6%)	19,20,20	1.39	1 (5%)
4	EDO	B	505	-	3,3,3	0.46	0	2,2,2	0.34	0
4	EDO	D	515	-	3,3,3	0.88	0	2,2,2	0.24	0
4	EDO	C	503	-	3,3,3	0.34	0	2,2,2	0.59	0
6	E6Z	D	516	-	32,34,34	0.70	0	38,47,47	1.05	2 (5%)
6	E6Z	A	517	-	32,34,34	0.63	1 (3%)	38,47,47	0.87	2 (5%)
4	EDO	D	509	-	3,3,3	0.51	0	2,2,2	0.20	0
4	EDO	A	513	-	3,3,3	0.52	0	2,2,2	0.38	0
4	EDO	C	513	-	3,3,3	0.64	0	2,2,2	0.34	0
5	EPE	D	514	-	15,15,15	1.86	1 (6%)	19,20,20	1.31	4 (21%)
6	E6Z	C	512	-	32,34,34	0.72	0	38,47,47	1.37	4 (10%)
4	EDO	A	506	-	3,3,3	0.38	0	2,2,2	0.85	0
4	EDO	A	516	-	3,3,3	0.42	0	2,2,2	0.03	0
4	EDO	C	506	-	3,3,3	0.88	0	2,2,2	0.85	0
4	EDO	D	507	-	3,3,3	0.69	0	2,2,2	0.30	0
4	EDO	A	509	-	3,3,3	0.36	0	2,2,2	0.38	0
4	EDO	A	512	-	3,3,3	0.45	0	2,2,2	0.36	0
4	EDO	B	507	-	3,3,3	0.50	0	2,2,2	0.16	0
4	EDO	A	504	-	3,3,3	0.62	0	2,2,2	0.22	0
4	EDO	D	508	-	3,3,3	0.40	0	2,2,2	0.04	0
4	EDO	D	505	-	3,3,3	0.23	0	2,2,2	0.92	0
5	EPE	A	515	-	15,15,15	2.51	2 (13%)	19,20,20	1.97	7 (36%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	EDO	B	506	-	3,3,3	0.44	0	2,2,2	0.56	0
4	EDO	D	504	-	3,3,3	0.16	0	2,2,2	1.46	0
4	EDO	A	505	-	3,3,3	0.42	0	2,2,2	0.48	0
4	EDO	B	504	-	3,3,3	0.39	0	2,2,2	0.34	0
4	EDO	A	508	-	3,3,3	0.48	0	2,2,2	0.41	0
4	EDO	D	513	-	3,3,3	0.38	0	2,2,2	0.82	0
4	EDO	A	510	-	3,3,3	0.93	0	2,2,2	0.75	0
6	E6Z	B	509	-	32,34,34	0.79	1 (3%)	38,47,47	1.00	3 (7%)
4	EDO	D	511	-	3,3,3	0.40	0	2,2,2	0.82	0
4	EDO	B	503	-	3,3,3	0.32	0	2,2,2	1.21	0
4	EDO	C	509	-	3,3,3	1.08	0	2,2,2	0.60	0
5	EPE	C	511	-	15,15,15	1.75	1 (6%)	19,20,20	1.29	2 (10%)
4	EDO	C	507	-	3,3,3	0.54	0	2,2,2	0.58	0
4	EDO	A	503	-	3,3,3	0.37	0	2,2,2	1.22	0
4	EDO	D	503	-	3,3,3	0.58	0	2,2,2	0.51	0
4	EDO	A	511	-	3,3,3	0.30	0	2,2,2	1.01	0
4	EDO	A	514	-	3,3,3	0.41	0	2,2,2	0.53	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	EDO	C	508	-	-	0/1/1/1	-
4	EDO	C	505	-	-	0/1/1/1	-
4	EDO	A	507	-	-	1/1/1/1	-
4	EDO	D	510	-	-	1/1/1/1	-
4	EDO	C	504	-	-	1/1/1/1	-
4	EDO	D	506	-	-	0/1/1/1	-
4	EDO	C	510	-	-	1/1/1/1	-
4	EDO	D	512	-	-	1/1/1/1	-
5	EPE	B	508	-	-	5/9/19/19	0/1/1/1
4	EDO	B	505	-	-	1/1/1/1	-
4	EDO	D	515	-	-	0/1/1/1	-
4	EDO	C	503	-	-	0/1/1/1	-
6	E6Z	D	516	-	-	2/10/51/51	0/4/4/4
6	E6Z	A	517	-	-	2/10/51/51	0/4/4/4
4	EDO	D	509	-	-	1/1/1/1	-
4	EDO	A	513	-	-	1/1/1/1	-
4	EDO	C	513	-	-	0/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	EPE	D	514	-	-	8/9/19/19	0/1/1/1
6	E6Z	C	512	-	-	2/10/51/51	0/4/4/4
4	EDO	A	506	-	-	1/1/1/1	-
4	EDO	A	516	-	-	0/1/1/1	-
4	EDO	C	506	-	-	1/1/1/1	-
4	EDO	D	507	-	-	1/1/1/1	-
4	EDO	A	509	-	-	0/1/1/1	-
4	EDO	A	512	-	-	0/1/1/1	-
4	EDO	B	507	-	-	0/1/1/1	-
4	EDO	A	504	-	-	0/1/1/1	-
4	EDO	D	508	-	-	1/1/1/1	-
4	EDO	D	505	-	-	0/1/1/1	-
5	EPE	A	515	-	-	3/9/19/19	0/1/1/1
4	EDO	B	506	-	-	0/1/1/1	-
4	EDO	D	504	-	-	0/1/1/1	-
4	EDO	A	505	-	-	1/1/1/1	-
4	EDO	B	504	-	-	0/1/1/1	-
4	EDO	A	508	-	-	0/1/1/1	-
4	EDO	D	513	-	-	1/1/1/1	-
4	EDO	A	510	-	-	1/1/1/1	-
6	E6Z	B	509	-	-	2/10/51/51	0/4/4/4
4	EDO	D	511	-	-	1/1/1/1	-
4	EDO	B	503	-	-	0/1/1/1	-
4	EDO	C	509	-	-	1/1/1/1	-
5	EPE	C	511	-	-	0/9/19/19	0/1/1/1
4	EDO	C	507	-	-	1/1/1/1	-
4	EDO	A	503	-	-	0/1/1/1	-
4	EDO	D	503	-	-	1/1/1/1	-
4	EDO	A	511	-	-	0/1/1/1	-
4	EDO	A	514	-	-	0/1/1/1	-

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	515	EPE	C10-S	-9.22	1.64	1.77
5	B	508	EPE	C10-S	-7.03	1.67	1.77
5	D	514	EPE	C10-S	-6.85	1.68	1.77
5	C	511	EPE	C10-S	-6.00	1.69	1.77
4	C	510	EDO	O2-C2	3.25	1.58	1.42

The worst 5 of 25 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	508	EPE	O3S-S-C10	4.91	115.61	106.00
6	C	512	E6Z	C6-C5-C11	-4.30	114.90	120.24
5	A	515	EPE	O3S-S-C10	4.21	114.24	106.00
6	C	512	E6Z	C4-C5-C11	4.18	125.75	120.74
6	D	516	E6Z	C6-C5-C11	-3.60	115.78	120.24

There are no chirality outliers.

5 of 43 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	B	508	EPE	C10-C9-N1-C6
5	D	514	EPE	C9-C10-S-O1S
6	A	517	E6Z	C2-C7-C8-C9
5	D	514	EPE	N4-C7-C8-O8
5	D	514	EPE	C9-C10-S-O3S

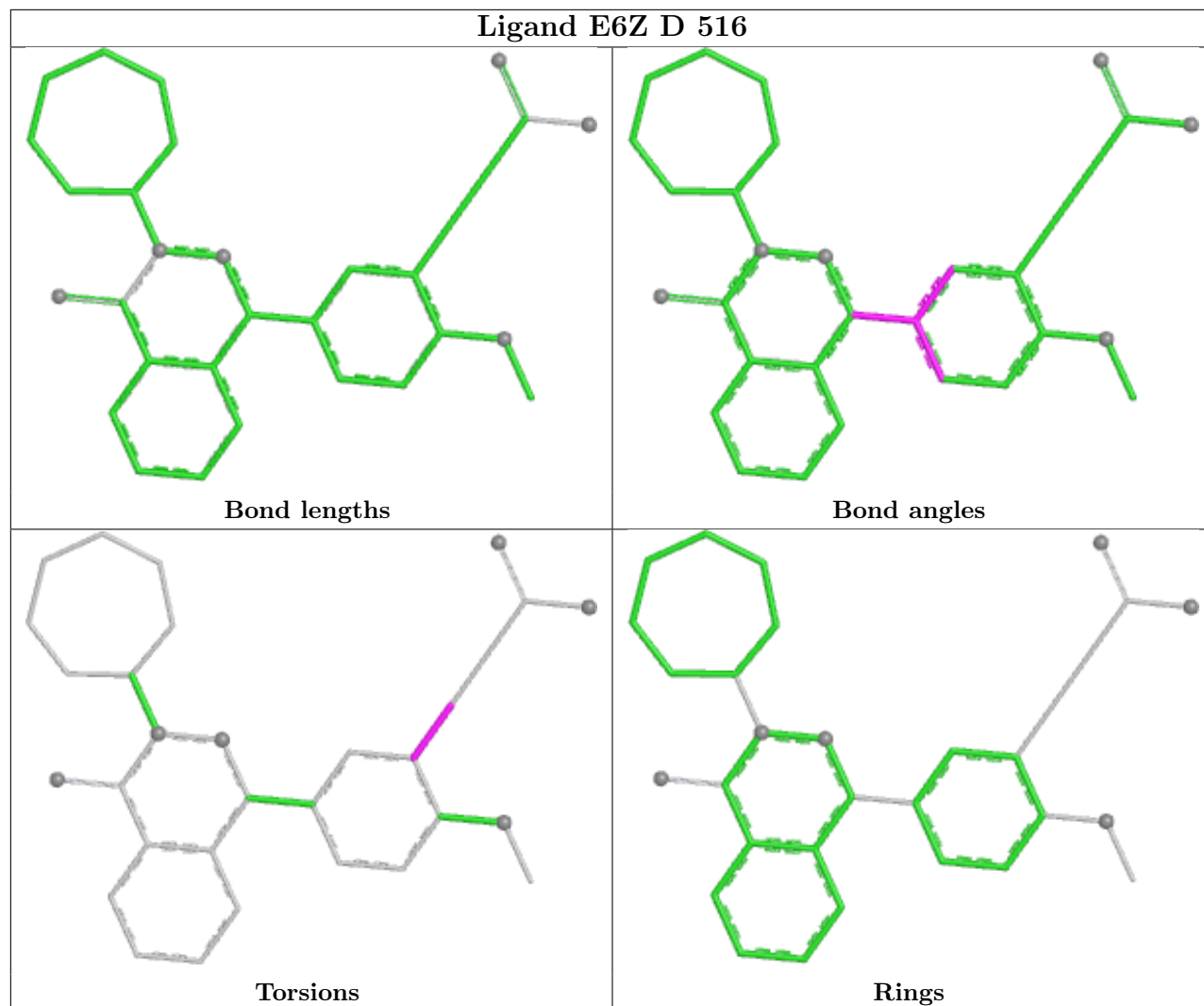
There are no ring outliers.

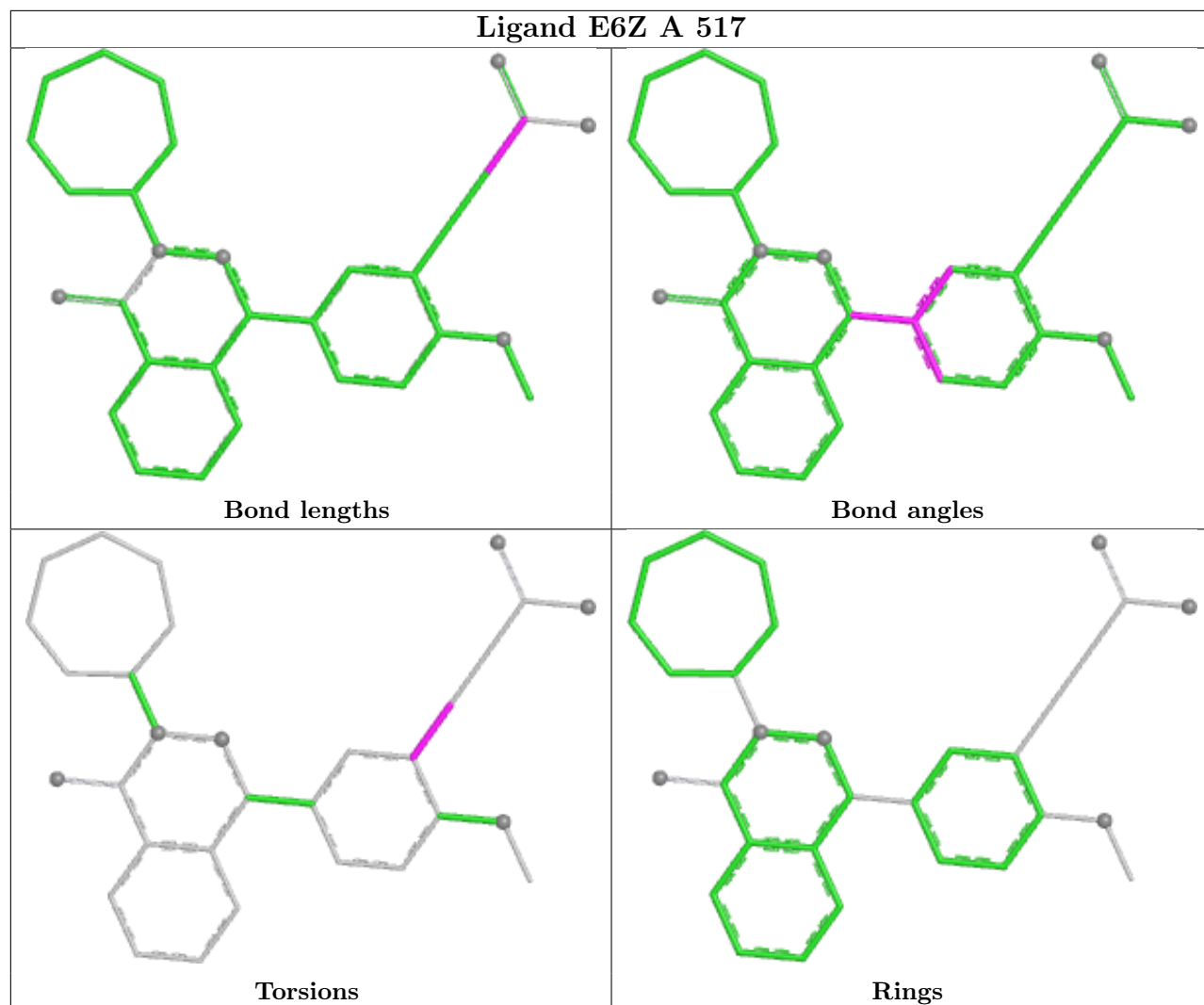
11 monomers are involved in 18 short contacts:

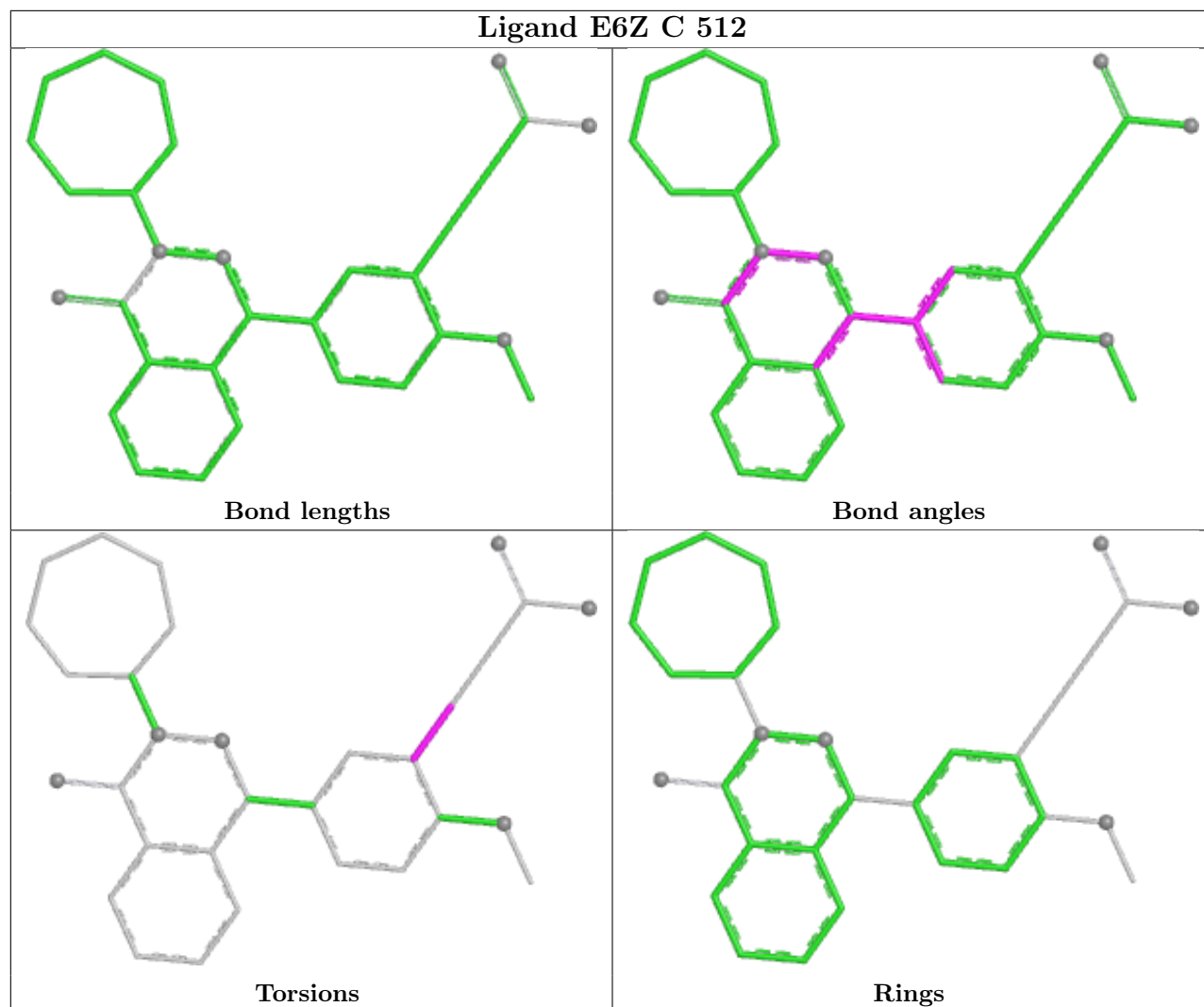
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	D	510	EDO	2	0
4	C	510	EDO	1	0
6	A	517	E6Z	1	0
4	A	513	EDO	1	0
6	C	512	E6Z	1	0
4	A	512	EDO	1	0
4	D	508	EDO	1	0
5	A	515	EPE	2	0
4	B	506	EDO	4	0
4	A	510	EDO	3	0
6	B	509	E6Z	1	0

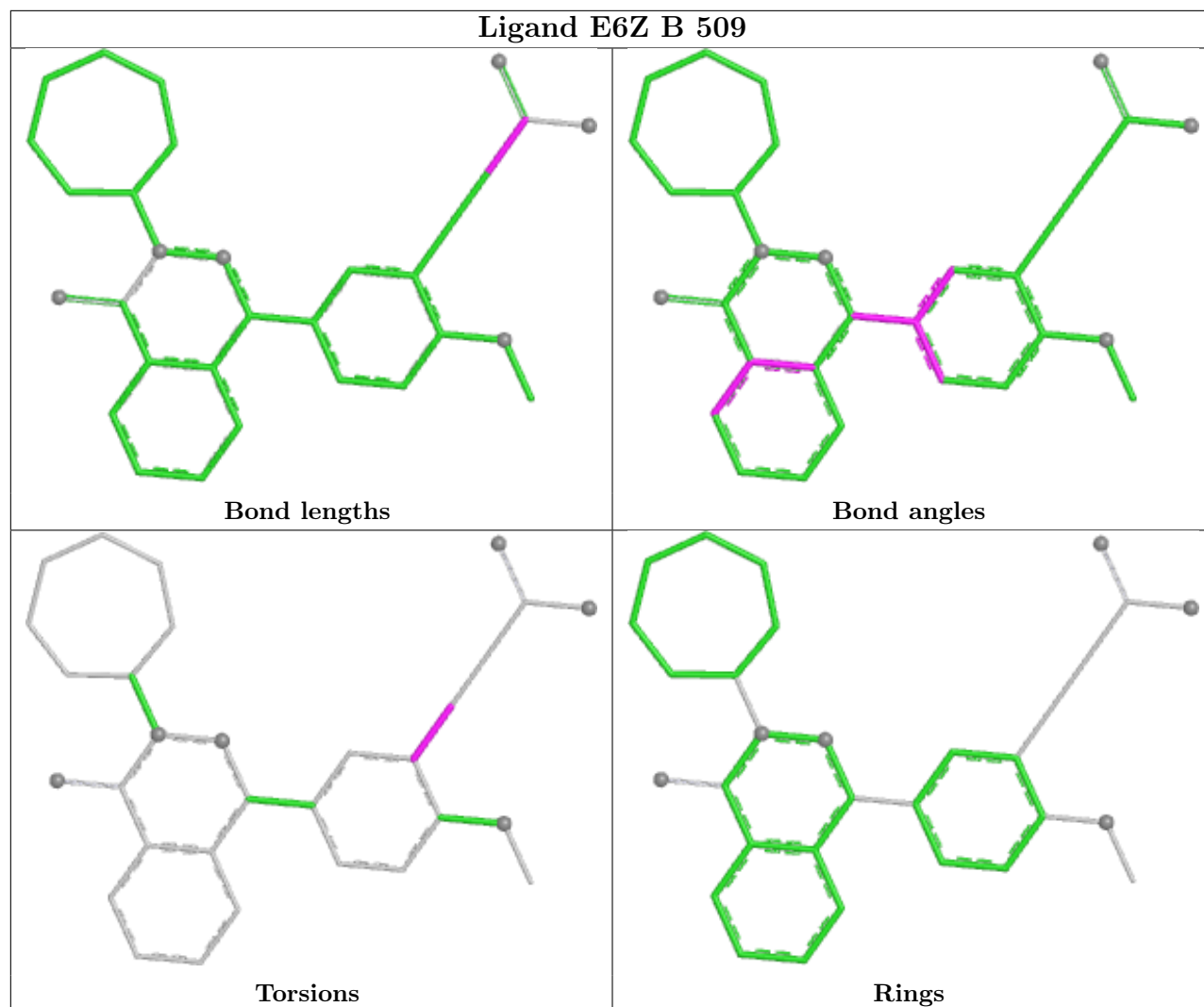
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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









5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [\(i\)](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	331/364 (90%)	-0.06	12 (3%) 46 50	27, 41, 75, 122	0
1	B	324/364 (89%)	0.46	12 (3%) 45 49	24, 53, 76, 107	1 (0%)
1	C	324/364 (89%)	0.30	7 (2%) 62 66	29, 50, 84, 123	0
1	D	325/364 (89%)	-0.07	7 (2%) 62 66	26, 38, 66, 90	0
All	All	1304/1456 (89%)	0.16	38 (2%) 53 57	24, 46, 75, 123	1 (0%)

The worst 5 of 38 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	412	GLN	5.3
1	B	412	GLN	4.1
1	C	411	PRO	3.9
1	C	392	ALA	3.9
1	A	83	GLY	3.9

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, 95th percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q < 0.9’ lists the number of atoms with occupancy less than 0.9.

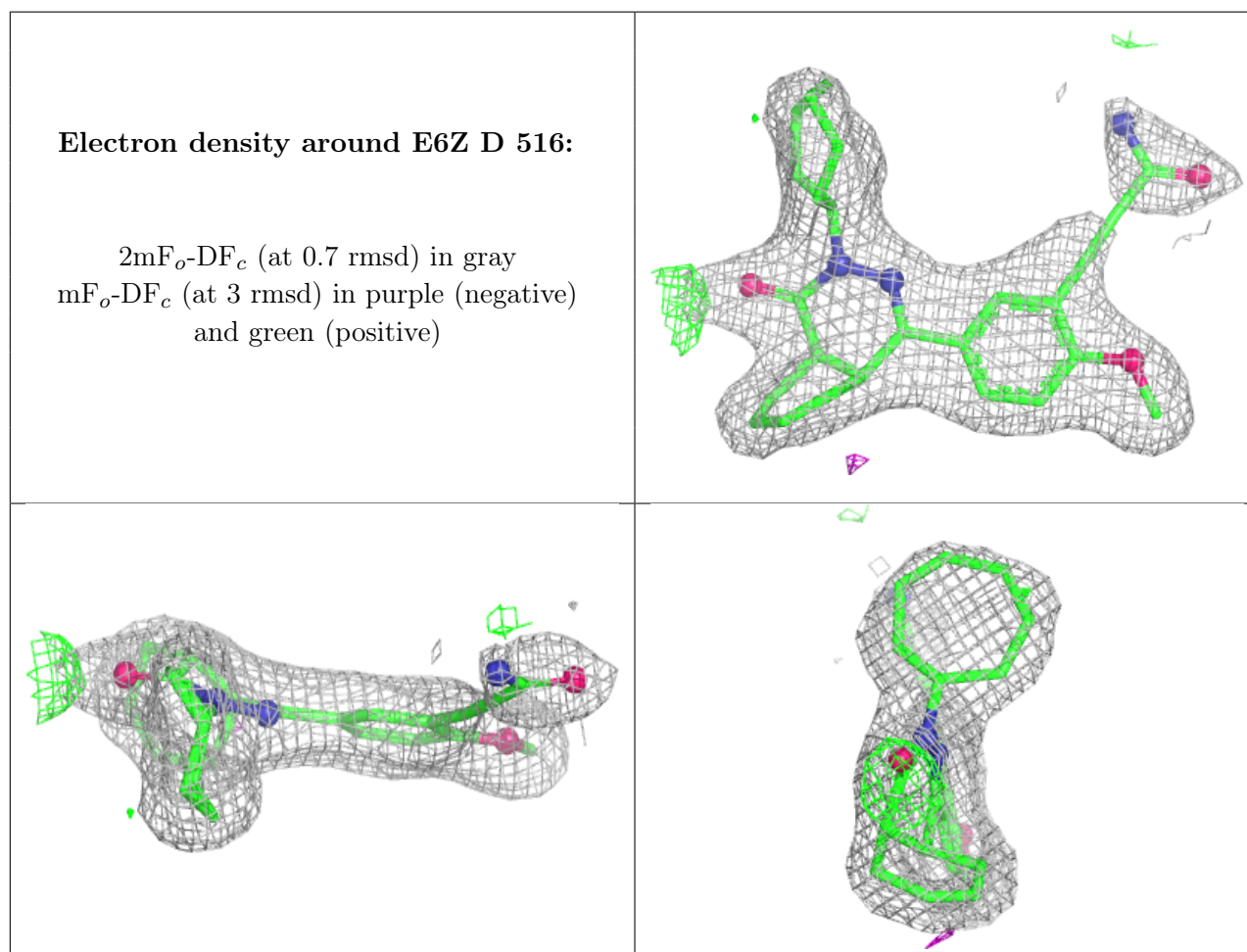
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	EDO	A	514	4/4	0.56	0.26	108,111,113,118	0
4	EDO	C	510	4/4	0.66	0.33	97,107,113,130	0
5	EPE	B	508	15/15	0.68	0.75	64,73,103,113	11
5	EPE	A	515	15/15	0.77	0.29	46,117,144,147	0
5	EPE	D	514	15/15	0.79	0.53	42,58,68,73	11
4	EDO	D	509	4/4	0.85	0.15	63,67,71,72	0
4	EDO	D	510	4/4	0.86	0.18	41,44,48,54	0
4	EDO	D	513	4/4	0.86	0.21	71,80,86,86	0
4	EDO	C	507	4/4	0.86	0.19	60,63,64,68	0
4	EDO	A	506	4/4	0.86	0.19	68,68,70,73	0
4	EDO	A	504	4/4	0.86	0.18	67,72,73,77	0
4	EDO	C	513	4/4	0.87	0.15	59,59,64,65	0
4	EDO	B	505	4/4	0.88	0.20	77,80,82,87	0
4	EDO	C	505	4/4	0.88	0.19	63,65,66,76	0
4	EDO	C	506	4/4	0.88	0.15	52,58,58,60	0
6	E6Z	D	516	31/31	0.88	0.14	48,57,77,82	0
4	EDO	A	513	4/4	0.89	0.17	54,62,73,81	0
4	EDO	A	503	4/4	0.89	0.18	57,59,63,78	0
4	EDO	D	504	4/4	0.89	0.19	63,63,66,76	0
4	EDO	A	507	4/4	0.89	0.13	46,54,58,61	0
6	E6Z	B	509	31/31	0.89	0.14	46,57,68,69	0
4	EDO	C	509	4/4	0.89	0.15	51,53,53,56	0
4	EDO	C	508	4/4	0.90	0.16	50,55,56,68	0
4	EDO	A	510	4/4	0.90	0.14	38,43,51,53	0
5	EPE	C	511	15/15	0.90	0.15	54,94,110,111	0
4	EDO	B	507	4/4	0.90	0.18	59,64,70,71	0
4	EDO	D	512	4/4	0.90	0.15	67,80,81,82	0
4	EDO	C	504	4/4	0.90	0.13	57,59,65,68	0
4	EDO	D	515	4/4	0.91	0.14	40,41,45,59	0
6	E6Z	C	512	31/31	0.91	0.12	45,52,70,76	0
6	E6Z	A	517	31/31	0.91	0.12	43,58,71,81	0
4	EDO	B	503	4/4	0.92	0.12	43,45,48,55	0
4	EDO	C	503	4/4	0.92	0.17	69,74,75,78	0
4	EDO	D	507	4/4	0.92	0.19	60,69,70,75	0
4	EDO	A	512	4/4	0.92	0.13	56,56,65,71	0
4	EDO	B	506	4/4	0.93	0.21	42,50,51,57	0
4	EDO	D	503	4/4	0.93	0.11	48,49,49,50	0
4	EDO	A	509	4/4	0.93	0.11	38,42,44,47	0
4	EDO	D	511	4/4	0.93	0.10	35,43,44,49	0
4	EDO	D	505	4/4	0.93	0.14	42,44,50,60	0
4	EDO	D	508	4/4	0.94	0.11	46,47,49,49	0
4	EDO	A	508	4/4	0.94	0.12	46,56,60,63	0
4	EDO	A	511	4/4	0.94	0.10	43,45,46,47	0

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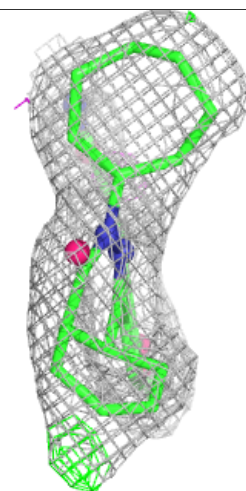
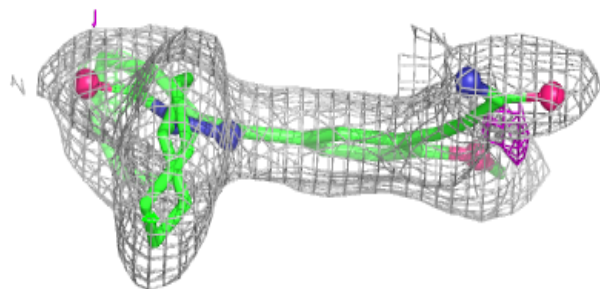
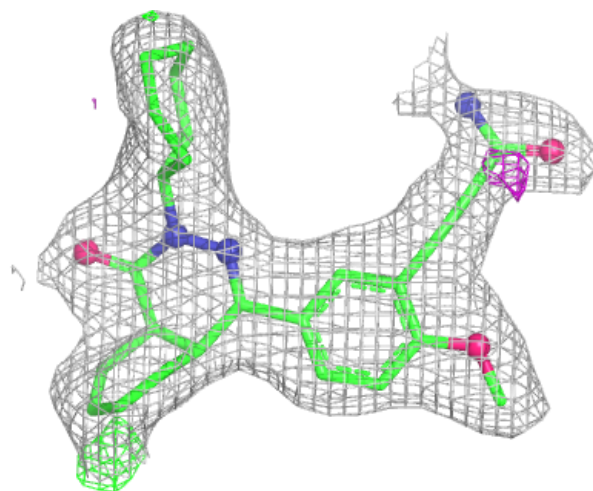
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	EDO	A	505	4/4	0.94	0.12	42,61,64,65	0
4	EDO	B	504	4/4	0.94	0.10	53,55,59,60	0
4	EDO	A	516	4/4	0.96	0.07	36,40,40,40	0
4	EDO	D	506	4/4	0.96	0.08	41,43,43,43	0
3	MG	B	502	1/1	0.99	0.02	32,32,32,32	0
3	MG	A	502	1/1	0.99	0.02	26,26,26,26	0
3	MG	D	502	1/1	1.00	0.03	29,29,29,29	0
2	ZN	C	501	1/1	1.00	0.01	41,41,41,41	0
2	ZN	D	501	1/1	1.00	0.01	38,38,38,38	0
2	ZN	A	501	1/1	1.00	0.01	36,36,36,36	0
2	ZN	B	501	1/1	1.00	0.03	44,44,44,44	0
3	MG	C	502	1/1	1.00	0.02	27,27,27,27	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.



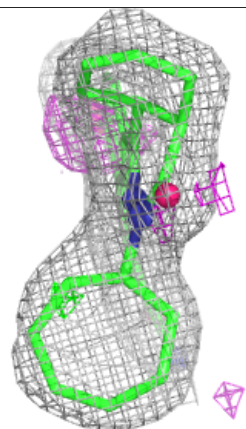
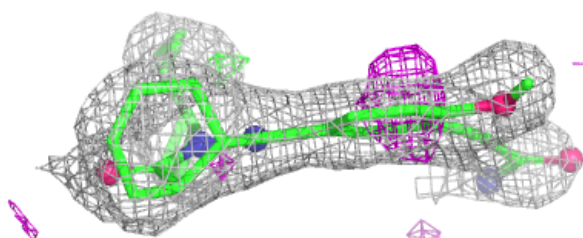
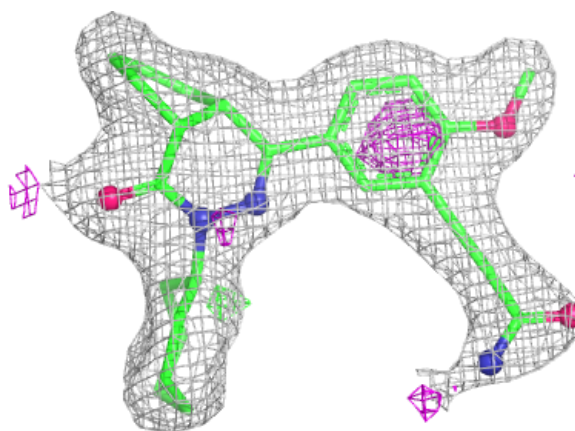
Electron density around E6Z B 509:

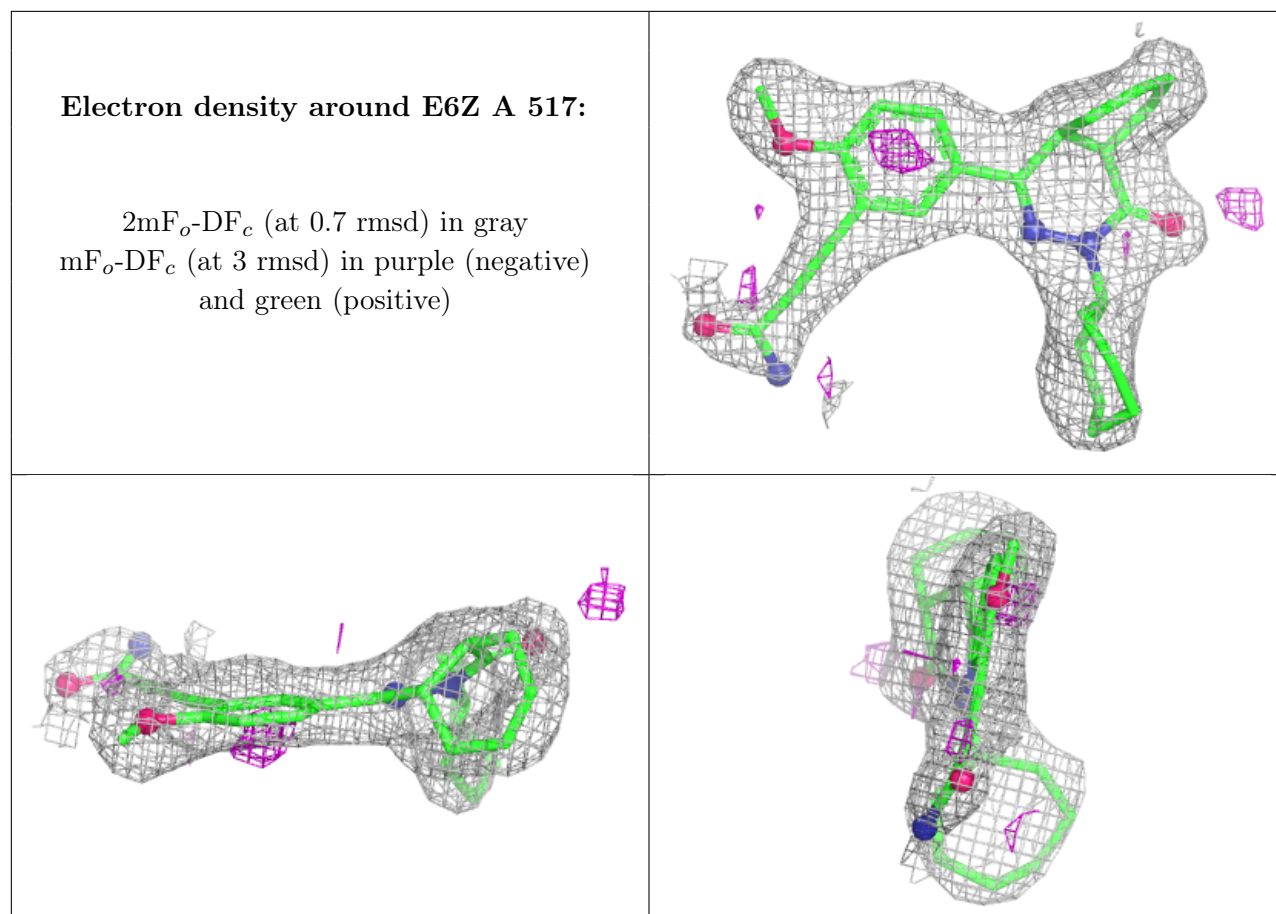
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around E6Z C 512:

$2mF_o-DF_c$ (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.