Full wwPDB X-ray Structure Validation Report ⓘ

Oct 14, 2025 – 10:07 AM EDT

PDB ID	:	9PZJ / pdb_00009pzj
Title	:	Benzylsuccinate synthase alpha-beta-gamma complex with bound toluene and fumarate
Authors	:	Liu, J.; Andorfer, M.C.
Deposited on	:	2025-08-11
Resolution	:	2.90 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:

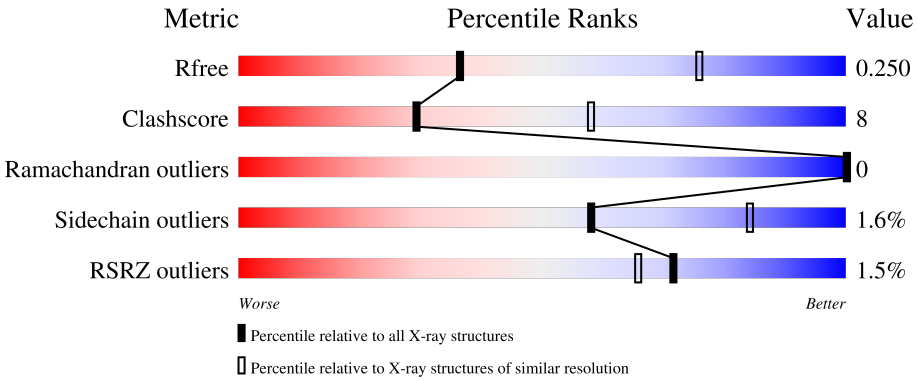
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.46

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.90 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	2335 (2.90-2.90)
Clashscore	180529	2564 (2.90-2.90)
Ramachandran outliers	177936	2514 (2.90-2.90)
Sidechain outliers	177891	2516 (2.90-2.90)
RSRZ outliers	164620	2337 (2.90-2.90)

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	878	78% 19%
1	D	878	% 78% 19%
2	B	102	% 51% 16% 33%
2	E	102	6% 52% 16% 32%
3	C	60	5% 75% 17% 8%

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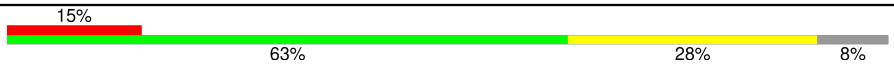
Mol	Chain	Length	Quality of chain
3	F	60	

2 Entry composition (i)

There are 8 unique types of molecules in this entry. The entry contains 15700 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 benzylsuccinate synthase alpha chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	857	Total	C	N	O	S	100	0	0
			6809	4299	1179	1293	38			
1	D	857	Total	C	N	O	S	35	0	0
			6809	4299	1179	1293	38			

There are 30 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	789	ILE	MET	engineered mutation	UNP O68395
A	866	SER	-	expression tag	UNP O68395
A	867	GLY	-	expression tag	UNP O68395
A	868	THR	-	expression tag	UNP O68395
A	869	GLY	-	expression tag	UNP O68395
A	870	SER	-	expression tag	UNP O68395
A	871	GLY	-	expression tag	UNP O68395
A	872	SER	-	expression tag	UNP O68395
A	873	SER	-	expression tag	UNP O68395
A	874	HIS	-	expression tag	UNP O68395
A	875	HIS	-	expression tag	UNP O68395
A	876	HIS	-	expression tag	UNP O68395
A	877	HIS	-	expression tag	UNP O68395
A	878	HIS	-	expression tag	UNP O68395
A	879	HIS	-	expression tag	UNP O68395
D	789	ILE	MET	engineered mutation	UNP O68395
D	866	SER	-	expression tag	UNP O68395
D	867	GLY	-	expression tag	UNP O68395
D	868	THR	-	expression tag	UNP O68395
D	869	GLY	-	expression tag	UNP O68395
D	870	SER	-	expression tag	UNP O68395
D	871	GLY	-	expression tag	UNP O68395
D	872	SER	-	expression tag	UNP O68395
D	873	SER	-	expression tag	UNP O68395
D	874	HIS	-	expression tag	UNP O68395

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Chain	Residue	Modelled	Actual	Comment	Reference
D	875	HIS	-	expression tag	UNP O68395
D	876	HIS	-	expression tag	UNP O68395
D	877	HIS	-	expression tag	UNP O68395
D	878	HIS	-	expression tag	UNP O68395
D	879	HIS	-	expression tag	UNP O68395

- Molecule 2 is a protein called benzylsuccinate synthase beta chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	68	Total	C	N	O	S	17	0	0
			551	331	114	101	5			
2	E	69	Total	C	N	O	S	17	0	0
			560	336	116	103	5			

There are 44 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-20	MET	-	initiating methionine	UNP O68396
B	-19	ALA	-	expression tag	UNP O68396
B	-18	SER	-	expression tag	UNP O68396
B	-17	SER	-	expression tag	UNP O68396
B	-16	HIS	-	expression tag	UNP O68396
B	-15	HIS	-	expression tag	UNP O68396
B	-14	HIS	-	expression tag	UNP O68396
B	-13	HIS	-	expression tag	UNP O68396
B	-12	HIS	-	expression tag	UNP O68396
B	-11	HIS	-	expression tag	UNP O68396
B	-10	ASP	-	expression tag	UNP O68396
B	-9	PRO	-	expression tag	UNP O68396
B	-8	THR	-	expression tag	UNP O68396
B	-7	THR	-	expression tag	UNP O68396
B	-6	GLU	-	expression tag	UNP O68396
B	-5	ASN	-	expression tag	UNP O68396
B	-4	LEU	-	expression tag	UNP O68396
B	-3	TYR	-	expression tag	UNP O68396
B	-2	PHE	-	expression tag	UNP O68396
B	-1	GLN	-	expression tag	UNP O68396
B	0	GLY	-	expression tag	UNP O68396
B	1	SER	-	expression tag	UNP O68396
E	-20	MET	-	initiating methionine	UNP O68396
E	-19	ALA	-	expression tag	UNP O68396
E	-18	SER	-	expression tag	UNP O68396

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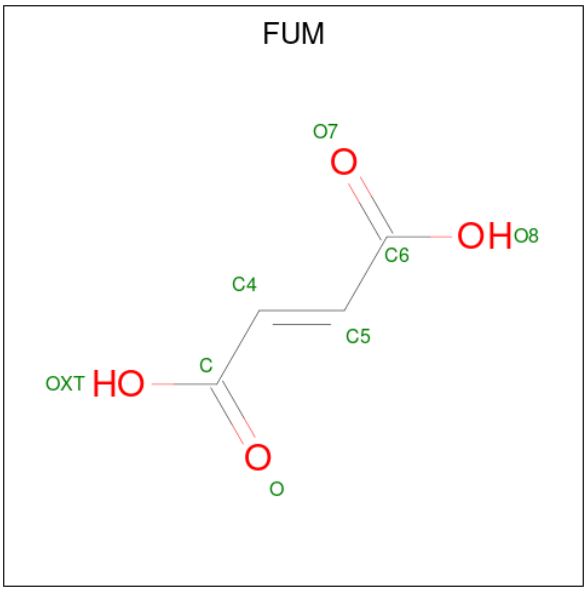
Chain	Residue	Modelled	Actual	Comment	Reference
E	-17	SER	-	expression tag	UNP O68396
E	-16	HIS	-	expression tag	UNP O68396
E	-15	HIS	-	expression tag	UNP O68396
E	-14	HIS	-	expression tag	UNP O68396
E	-13	HIS	-	expression tag	UNP O68396
E	-12	HIS	-	expression tag	UNP O68396
E	-11	HIS	-	expression tag	UNP O68396
E	-10	ASP	-	expression tag	UNP O68396
E	-9	PRO	-	expression tag	UNP O68396
E	-8	THR	-	expression tag	UNP O68396
E	-7	THR	-	expression tag	UNP O68396
E	-6	GLU	-	expression tag	UNP O68396
E	-5	ASN	-	expression tag	UNP O68396
E	-4	LEU	-	expression tag	UNP O68396
E	-3	TYR	-	expression tag	UNP O68396
E	-2	PHE	-	expression tag	UNP O68396
E	-1	GLN	-	expression tag	UNP O68396
E	0	GLY	-	expression tag	UNP O68396
E	1	SER	-	expression tag	UNP O68396

- Molecule 3 is a protein called benzylsuccinate synthase gamma chain.

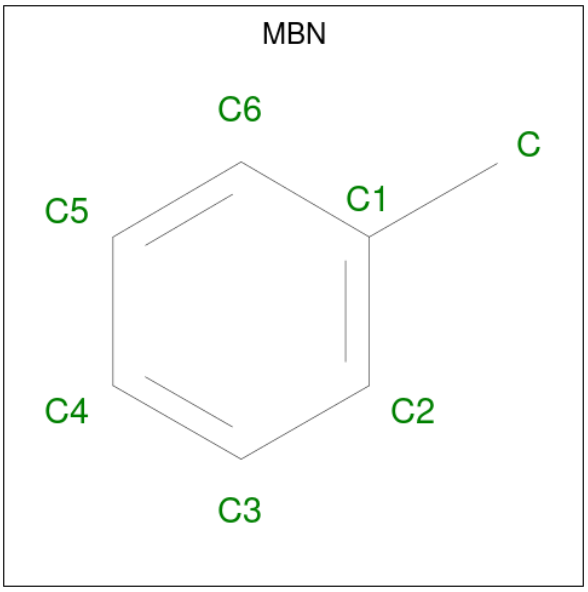
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	55	Total	C	N	O	S	24	0	0
			441	277	72	88	4			
3	F	55	Total	C	N	O	S	41	0	0
			441	277	72	88	4			

- Molecule 4 is FUMARIC ACID (CCD ID: FUM) (formula: $C_4H_4O_4$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 8 4 4	0	0
4	D	1	Total C O 8 4 4	0	0

- Molecule 5 is TOLUENE (CCD ID: MBN) (formula: C_7H_8) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C 7 7	0	0

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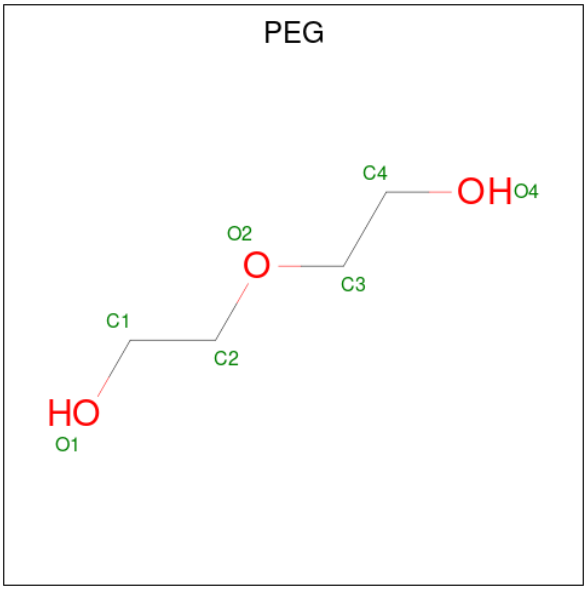
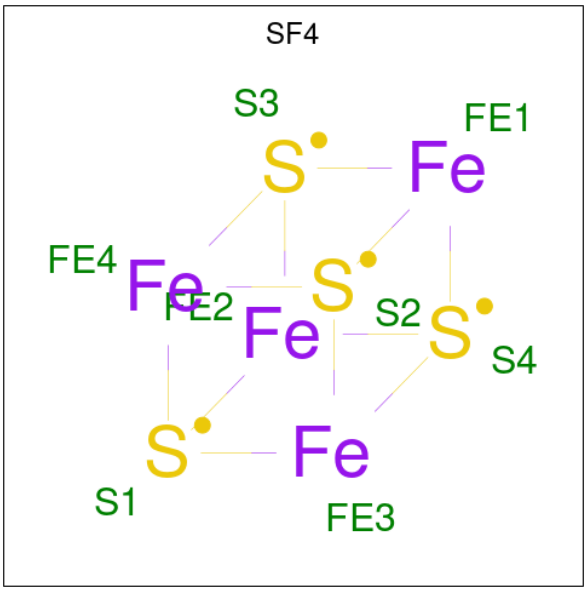
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	D	1	Total C 7 7	0	0

- Molecule 6 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C O 7 4 3	0	0
6	D	1	Total C O 7 4 3	0	0

- Molecule 7 is IRON/SULFUR CLUSTER (CCD ID: SF4) (formula: Fe_4S_4) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	B	1	Total Fe S 8 4 4	0	0
7	C	1	Total Fe S 8 4 4	0	0
7	E	1	Total Fe S 8 4 4	0	0
7	F	1	Total Fe S 8 4 4	0	0

- Molecule 8 is water.

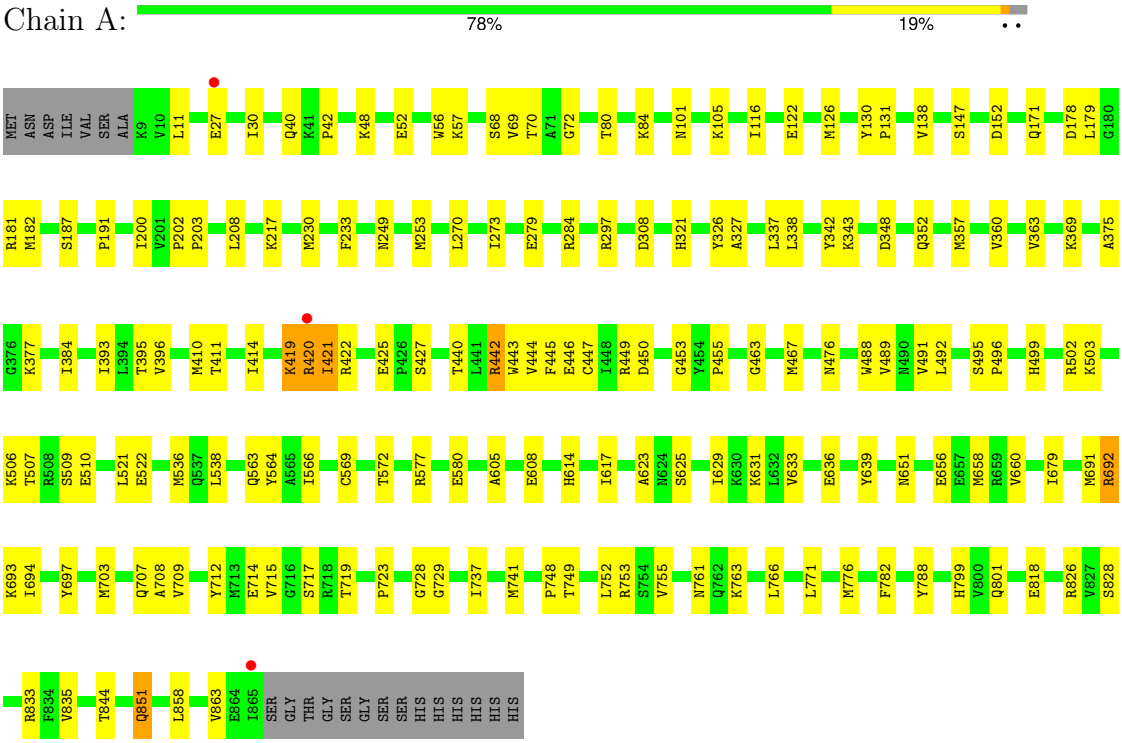
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	3	Total O 3 3	0	0
8	D	10	Total O 10 10	0	0

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.

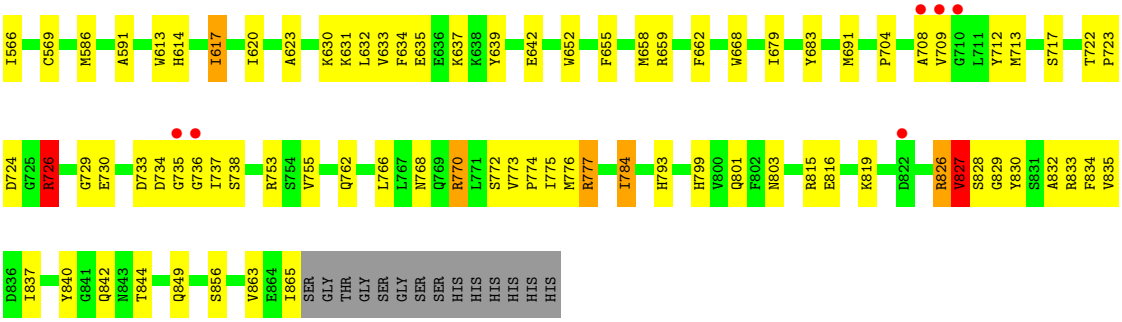
• Molecule 1: benzylsuccinate synthase alpha chain

Chain A:

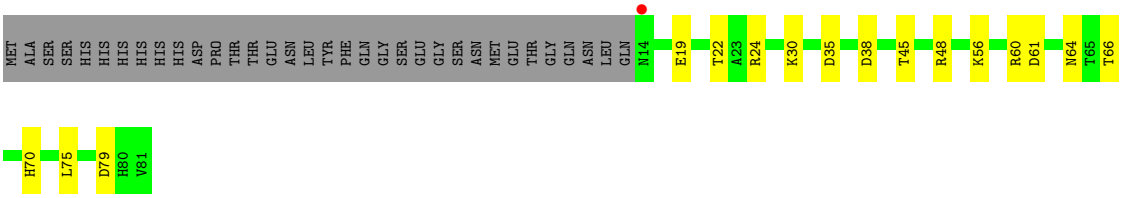


• Molecule 1: benzylsuccinate synthase alpha chain

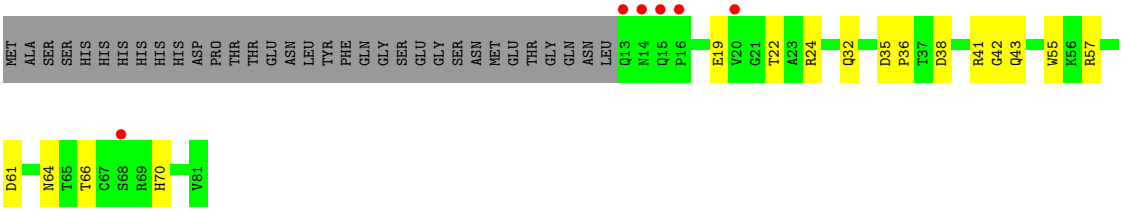
Chain D:



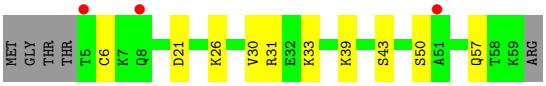
• Molecule 2: benzylsuccinate synthase beta chain



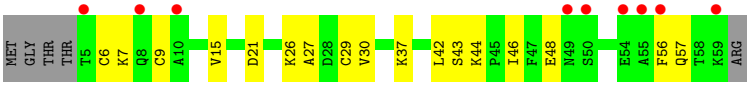
• Molecule 2: benzylsuccinate synthase beta chain



• Molecule 3: benzylsuccinate synthase gamma chain



• Molecule 3: benzylsuccinate synthase gamma chain



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α, β, γ	146.40Å 118.53Å 124.93Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	33.68 – 2.90 33.68 – 2.90	Depositor EDS
% Data completeness (in resolution range)	99.9 (33.68-2.90) 91.0 (33.68-2.90)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.92 (at 2.90Å)	Xtriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.212 , 0.246 0.217 , 0.250	Depositor DCC
R_{free} test set	1464 reflections (3.00%)	wwPDB-VP
Wilson B-factor (Å^2)	35.6	Xtriage
Anisotropy	0.624	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 26.5	EDS
L-test for twinning[2]	$< \|L\| > = 0.47$, $< L^2 > = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.90	EDS
Total number of atoms	15700	wwPDB-VP
Average B, all atoms (Å^2)	45.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.97% 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: FUM, MBN, PEG, SF4

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	0.22	0/6965	0.44	4/9409 (0.0%)
1	D	0.40	0/6965	0.60	2/9409 (0.0%)
2	B	0.16	0/567	0.31	0/767
2	E	0.22	0/576	0.34	0/779
3	C	0.15	0/451	0.41	0/605
3	F	0.29	0/451	0.51	0/605
All	All	0.31	0/15975	0.51	6/21574 (0.0%)

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	3
1	D	0	5
All	All	0	8

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	443	TRP	N-CA-C	-8.95	101.61	111.36
1	A	693	LYS	N-CA-C	-6.05	104.69	111.28
1	D	827	VAL	CA-C-N	-5.83	113.08	121.42
1	D	827	VAL	C-N-CA	-5.83	113.08	121.42
1	A	421	ILE	N-CA-CB	5.51	116.54	110.53
1	A	443	TRP	N-CA-CB	5.14	117.77	110.16

There are no chirality outliers.

All (8) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	420	ARG	Sidechain
1	A	442	ARG	Sidechain
1	A	692	ARG	Sidechain
1	D	726	ARG	Sidechain
1	D	753	ARG	Sidechain
1	D	770	ARG	Sidechain
1	D	777	ARG	Sidechain
1	D	826	ARG	Sidechain

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	6809	0	6668	110	0
1	D	6809	0	6668	121	0
2	B	551	0	510	9	0
2	E	560	0	518	11	0
3	C	441	0	409	6	0
3	F	441	0	409	10	0
4	A	8	0	1	1	0
4	D	8	0	1	2	0
5	A	7	0	8	1	0
5	D	7	0	8	2	0
6	A	7	0	10	0	0
6	D	7	0	10	0	0
7	B	8	0	0	0	0
7	C	8	0	0	0	0
7	E	8	0	0	0	0
7	F	8	0	0	0	0
8	A	3	0	0	0	0
8	D	10	0	0	0	0
All	All	15700	0	15220	258	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 8.

All (258) 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:D:737:ILE:HD13	1:D:755:VAL:HG13	1.14	1.13
1:D:737:ILE:CD1	1:D:755:VAL:HG13	1.81	1.09
1:A:692:ARG:HD2	1:A:703:MET:HE3	1.43	1.00
1:D:801:GLN:CD	1:D:826:ARG:HE	1.72	0.97
1:D:801:GLN:NE2	1:D:826:ARG:HE	1.69	0.89
1:A:692:ARG:CD	1:A:703:MET:HE3	2.02	0.89
1:D:737:ILE:HD13	1:D:755:VAL:CG1	2.03	0.86
1:D:772:SER:OG	1:D:775:ILE:HD13	1.76	0.86
1:D:617:ILE:HG23	1:D:708:ALA:HA	1.55	0.85
3:F:29:CYS:HB2	3:F:46:ILE:HD13	1.64	0.80
1:A:357:MET:SD	1:A:420:ARG:NH1	2.53	0.79
1:D:826:ARG:HG2	1:D:827:VAL:O	1.82	0.79
1:A:692:ARG:HD2	1:A:703:MET:CE	2.14	0.77
1:A:395:THR:HB	1:A:489:VAL:HG12	1.68	0.76
1:A:360:VAL:HG11	1:A:420:ARG:HH11	1.51	0.75
1:A:342:TYR:HB2	1:A:410:MET:HE2	1.69	0.73
1:D:826:ARG:NH1	1:D:830:TYR:N	2.38	0.70
1:D:801:GLN:CD	1:D:826:ARG:NE	2.50	0.68
1:A:617:ILE:HG23	1:A:708:ALA:HA	1.74	0.68
1:A:510:GLU:OE1	1:A:577:ARG:NH1	2.25	0.67
1:A:737:ILE:HG12	1:A:755:VAL:HG13	1.76	0.67
1:A:858:LEU:HD22	1:A:863:VAL:HG21	1.77	0.66
1:A:521:LEU:CD2	1:A:625:SER:HB2	2.26	0.66
2:B:45:THR:HG22	2:B:56:LYS:HD3	1.76	0.66
1:A:748:PRO:HG3	1:A:851:GLN:HB3	1.75	0.66
1:A:297:ARG:NH2	1:A:308:ASP:OD2	2.29	0.66
1:D:826:ARG:NH1	1:D:830:TYR:CA	2.60	0.65
1:D:816:GLU:HB3	1:D:819:LYS:HG3	1.78	0.65
2:B:30:LYS:HE3	2:B:75:LEU:HD21	1.80	0.64
1:D:623:ALA:HB1	1:D:679:ILE:HG12	1.82	0.62
1:A:48:LYS:O	1:A:52:GLU:HG2	2.00	0.62
3:F:21:ASP:O	3:F:26:LYS:HE3	2.00	0.61
1:D:444:VAL:HG13	1:D:455:PRO:HG2	1.83	0.61
1:D:708:ALA:HB1	1:D:712:TYR:HB3	1.82	0.61
1:D:717:SER:HA	1:D:729:GLY:HA2	1.83	0.60
1:D:642:GLU:OE1	1:D:642:GLU:N	2.31	0.59
1:D:801:GLN:HE22	1:D:829:GLY:H	1.50	0.59
1:A:709:VAL:HG11	5:A:902:MBN:C6	2.32	0.59
1:A:818:GLU:CD	1:A:818:GLU:H	2.11	0.59
1:A:639:TYR:CE2	1:A:658:MET:HG3	2.38	0.58
1:D:734:ASP:OD1	1:D:735:GLY:N	2.36	0.58
2:E:24:ARG:HD2	2:E:70:HIS:CE1	2.38	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:492:LEU:HB2	4:A:901:FUM:C5	2.33	0.58
1:D:768:ASN:HD21	1:D:828:SER:HA	1.67	0.58
1:D:566:ILE:HG12	1:D:691:MET:HG3	1.86	0.58
1:D:297:ARG:NH2	1:D:308:ASP:OD2	2.35	0.58
1:A:393:ILE:HD13	1:A:427:SER:HB3	1.86	0.57
1:A:442:ARG:HA	1:A:782:PHE:HE1	1.67	0.57
1:D:734:ASP:OD1	1:D:738:SER:HB2	2.03	0.57
2:B:24:ARG:HB3	2:B:70:HIS:CE1	2.40	0.57
1:D:440:THR:O	1:D:444:VAL:HG23	2.04	0.57
1:A:27:GLU:HA	1:A:30:ILE:HG22	1.86	0.57
1:D:840:TYR:O	1:D:844:THR:HG23	2.05	0.56
1:D:492:LEU:HD13	5:D:902:MBN:H3A	1.87	0.56
1:A:656:GLU:O	1:A:660:VAL:HG23	2.05	0.56
1:A:40:GLN:HG3	1:A:42:PRO:HD3	1.87	0.56
1:D:249:ASN:O	1:D:253:MET:HG3	2.06	0.55
2:E:55:TRP:CG	2:E:57:ARG:HH12	2.24	0.55
1:D:313:LYS:NZ	1:D:366:GLU:OE2	2.39	0.55
1:A:771:LEU:HD13	1:A:776:MET:HE3	1.89	0.55
1:D:53:ARG:O	1:D:53:ARG:HG2	2.06	0.55
1:A:72:GLY:HA2	1:A:126:MET:HE3	1.89	0.54
1:A:623:ALA:HB1	1:A:679:ILE:HG12	1.90	0.54
1:A:442:ARG:HA	1:A:782:PHE:CE1	2.41	0.54
3:F:9:CYS:HA	3:F:57:GLN:O	2.08	0.54
3:C:21:ASP:OD2	3:C:26:LYS:NZ	2.42	0.53
1:D:734:ASP:OD1	1:D:738:SER:CB	2.57	0.53
1:D:826:ARG:HH11	1:D:830:TYR:C	2.16	0.53
1:A:338:LEU:HB3	1:A:410:MET:HE3	1.90	0.53
1:A:453:GLY:HA3	1:A:826:ARG:HB2	1.90	0.53
1:D:784:ILE:HD13	1:D:863:VAL:HG11	1.91	0.53
1:A:360:VAL:HG11	1:A:420:ARG:NH1	2.20	0.52
1:A:617:ILE:HG12	1:A:707:GLN:O	2.08	0.52
2:E:35:ASP:HB2	2:E:41:ARG:HB2	1.90	0.52
1:D:655:PHE:HB3	1:D:658:MET:HE3	1.91	0.52
1:A:442:ARG:CA	1:A:782:PHE:HE1	2.23	0.52
1:D:395:THR:HB	1:D:489:VAL:HG12	1.91	0.52
1:A:273:ILE:HG21	3:C:30:VAL:HG21	1.90	0.52
1:A:442:ARG:HG2	1:A:782:PHE:CE1	2.45	0.52
1:A:692:ARG:CG	1:A:703:MET:HE3	2.40	0.52
1:D:737:ILE:HD11	1:D:755:VAL:HA	1.92	0.52
1:A:200:ILE:HG13	1:A:506:LYS:HA	1.92	0.52
1:A:80:THR:HG22	1:A:84:LYS:HE2	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:717:SER:HA	1:A:729:GLY:HA2	1.93	0.51
1:A:741:MET:HE1	1:A:844:THR:HG22	1.90	0.51
1:D:469:GLU:OE2	1:D:472:LYS:NZ	2.43	0.51
1:D:520:LEU:O	1:D:524:SER:OG	2.27	0.51
2:B:48:ARG:NH1	2:B:79:ASP:O	2.30	0.51
1:A:444:VAL:HG13	1:A:455:PRO:HG2	1.92	0.50
1:D:737:ILE:CD1	1:D:755:VAL:CG1	2.74	0.50
2:E:36:PRO:HD3	2:E:43:GLN:NE2	2.26	0.50
1:A:629:ILE:O	1:A:633:VAL:HB	2.11	0.50
2:E:24:ARG:O	2:E:66:THR:HB	2.12	0.50
2:B:19:GLU:HB3	2:B:22:THR:HB	1.94	0.50
1:D:396:VAL:HB	1:D:411:THR:HG23	1.92	0.50
1:A:363:VAL:HG11	1:A:414:ILE:HA	1.94	0.50
1:D:770:ARG:HB3	1:D:849:GLN:O	2.12	0.50
1:D:152:ASP:OD1	1:D:152:ASP:N	2.43	0.50
1:A:178:ASP:OD1	1:A:564:TYR:OH	2.28	0.50
1:D:834:PHE:O	1:D:842:GLN:NE2	2.42	0.50
1:A:799:HIS:HE2	1:A:801:GLN:HE21	1.60	0.49
1:D:269:ARG:O	1:D:273:ILE:HG13	2.13	0.49
1:A:422:ARG:HH12	1:A:450:ASP:HB3	1.77	0.49
1:A:629:ILE:HD11	1:A:723:PRO:HG2	1.94	0.49
1:D:419:LYS:HD2	1:D:446:GLU:HB3	1.93	0.49
1:D:709:VAL:HG11	5:D:902:MBN:C6	2.42	0.49
1:A:737:ILE:HG13	1:A:737:ILE:O	2.13	0.49
1:D:662:PHE:HB3	1:D:723:PRO:O	2.13	0.49
1:A:396:VAL:HB	1:A:411:THR:HG23	1.94	0.49
1:A:715:VAL:O	1:A:719:THR:OG1	2.24	0.49
1:D:449:ARG:NH2	1:D:776:MET:O	2.44	0.48
1:D:772:SER:HG	1:D:775:ILE:HD13	1.74	0.48
1:A:703:MET:HB2	1:A:763:LYS:HB2	1.95	0.48
1:D:724:ASP:OD1	1:D:726:ARG:HB2	2.14	0.48
1:A:187:SER:HB3	1:A:538:LEU:HD21	1.96	0.48
1:A:321:HIS:HA	1:A:327:ALA:HB3	1.96	0.48
1:A:208:LEU:HD22	1:A:337:LEU:HD11	1.96	0.48
1:D:253:MET:HB3	1:D:591:ALA:HB2	1.96	0.48
1:D:773:VAL:N	1:D:774:PRO:HD2	2.29	0.48
1:A:308:ASP:OD1	1:A:352:GLN:NE2	2.44	0.48
1:A:343:LYS:NZ	1:A:348:ASP:OD2	2.47	0.48
1:D:270:LEU:HD13	3:F:43:SER:HB2	1.96	0.47
1:A:384:ILE:HG22	1:A:714:GLU:HG3	1.96	0.47
1:D:766:LEU:HG	1:D:799:HIS:CE1	2.49	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:772:SER:OG	1:D:775:ILE:CD1	2.56	0.47
1:D:467:MET:HE3	1:D:496:PRO:HB2	1.96	0.47
1:A:488:TRP:CE3	1:A:496:PRO:HB3	2.49	0.47
1:A:447:CYS:HB2	1:A:455:PRO:HD3	1.96	0.47
1:A:491:VAL:HG23	1:A:495:SER:O	2.15	0.47
1:D:352:GLN:O	1:D:354:MET:HG3	2.15	0.47
2:E:61:ASP:OD1	2:E:64:ASN:N	2.35	0.46
3:C:31:ARG:NH2	3:C:33:LYS:HZ1	2.12	0.46
3:C:39:LYS:HB3	3:C:39:LYS:HE2	1.69	0.46
1:D:458:LYS:HD2	1:D:799:HIS:HB2	1.97	0.46
1:D:460:ASP:HA	1:D:488:TRP:HZ2	1.80	0.46
2:E:35:ASP:HB3	2:E:38:ASP:O	2.15	0.46
1:A:178:ASP:O	1:A:182:MET:HG3	2.15	0.46
1:A:801:GLN:NE2	1:A:826:ARG:HH21	2.12	0.46
1:D:683:TYR:OH	1:D:736:GLY:O	2.32	0.46
1:A:217:LYS:HA	1:A:217:LYS:HD3	1.75	0.46
1:A:752:LEU:HD11	1:A:788:TYR:OH	2.16	0.46
1:A:181:ARG:HG2	1:A:538:LEU:HD12	1.97	0.46
1:A:279:GLU:HG2	1:A:284:ARG:HG3	1.97	0.46
1:A:489:VAL:HG22	1:A:499:HIS:HB3	1.96	0.46
2:E:38:ASP:HB3	2:E:41:ARG:HG2	1.98	0.46
1:A:521:LEU:CD2	1:A:625:SER:CB	2.92	0.46
1:D:212:LEU:HB2	1:D:261:ILE:HD11	1.97	0.46
1:D:833:ARG:HG2	1:D:835:VAL:HG22	1.98	0.46
1:D:363:VAL:HG11	1:D:414:ILE:HA	1.97	0.45
1:A:233:PHE:CZ	1:D:563:GLN:HG2	2.52	0.45
1:A:419:LYS:HD3	1:A:446:GLU:HG3	1.98	0.45
1:D:826:ARG:HH12	1:D:830:TYR:HA	1.81	0.45
1:A:566:ILE:HG12	1:A:691:MET:HG3	1.99	0.45
1:D:42:PRO:HG2	1:D:48:LYS:HG3	1.99	0.45
1:D:483:GLU:H	1:D:483:GLU:CD	2.23	0.45
1:D:488:TRP:CE3	1:D:496:PRO:HB3	2.52	0.45
1:D:613:TRP:HZ2	4:D:901:FUM:C5	2.29	0.45
1:A:171:GLN:HG2	1:A:179:LEU:HD13	1.98	0.45
2:B:61:ASP:OD2	2:B:64:ASN:ND2	2.50	0.45
1:D:483:GLU:CD	1:D:483:GLU:N	2.74	0.45
1:D:569:CYS:HB3	1:D:614:HIS:CE1	2.51	0.45
1:A:101:ASN:OD1	1:A:105:LYS:HE3	2.17	0.45
1:D:514:SER:HB3	1:D:617:ILE:HG13	1.99	0.45
1:A:375:ALA:HB3	1:A:377:LYS:HE3	1.98	0.45
1:D:53:ARG:HG3	3:F:37:LYS:O	2.16	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:569:CYS:HB3	1:A:614:HIS:CE1	2.52	0.45
1:A:651:ASN:HD21	1:A:728:GLY:H	1.65	0.45
2:B:24:ARG:O	2:B:66:THR:OG1	2.35	0.45
1:D:517:PRO:HD2	1:D:617:ILE:O	2.16	0.45
1:A:708:ALA:HB1	1:A:712:TYR:HB3	1.98	0.44
1:D:801:GLN:OE1	1:D:826:ARG:NH2	2.50	0.44
3:F:7:LYS:HG3	3:F:48:GLU:HG2	1.98	0.44
1:A:440:THR:O	1:A:444:VAL:HG23	2.16	0.44
1:D:187:SER:C	1:D:188:MET:HG3	2.42	0.44
1:D:586:MET:HE3	1:D:586:MET:HB2	1.76	0.44
1:A:463:GLY:O	1:A:467:MET:HG2	2.16	0.44
1:D:492:LEU:HB2	4:D:901:FUM:C5	2.47	0.44
1:D:69:VAL:HG12	1:D:127:PHE:HE2	1.83	0.44
1:D:132:GLU:HG2	1:D:133:LEU:HD23	2.00	0.44
1:D:218:LEU:HD12	1:D:218:LEU:HA	1.86	0.44
1:A:152:ASP:OD1	1:A:152:ASP:N	2.48	0.44
1:A:270:LEU:HD13	3:C:43:SER:HB2	1.99	0.44
1:D:171:GLN:HG2	1:D:179:LEU:HD13	1.99	0.44
1:D:421:ILE:HG23	1:D:423:THR:HG23	1.98	0.44
3:F:30:VAL:HA	3:F:42:LEU:O	2.17	0.43
1:A:56:TRP:CD1	1:A:56:TRP:H	2.35	0.43
1:D:393:ILE:HD13	1:D:427:SER:HB3	1.98	0.43
1:D:633:VAL:HA	1:D:639:TYR:O	2.18	0.43
1:A:249:ASN:O	1:A:253:MET:HG3	2.18	0.43
1:D:307:LYS:HD2	1:D:352:GLN:HG2	2.00	0.43
1:D:105:LYS:O	3:F:44:LYS:NZ	2.44	0.43
1:D:421:ILE:HD12	1:D:421:ILE:HA	1.90	0.43
1:A:445:PHE:CE2	1:A:449:ARG:HD2	2.53	0.43
1:A:692:ARG:NH1	1:A:761:ASN:OD1	2.52	0.43
1:D:359:ALA:O	1:D:363:VAL:HG23	2.19	0.43
1:D:832:ALA:HB3	1:D:837:ILE:HD11	2.00	0.43
1:A:703:MET:HE2	1:A:703:MET:HB3	1.87	0.42
1:D:375:ALA:HB3	1:D:377:LYS:HE3	2.01	0.42
3:F:15:VAL:HG23	3:F:27:ALA:HA	2.01	0.42
1:A:131:PRO:HA	1:A:138:VAL:HG21	2.00	0.42
1:D:40:GLN:C	1:D:41:LYS:HG2	2.44	0.42
1:D:346:VAL:O	1:D:349:LYS:NZ	2.51	0.42
2:E:19:GLU:HB3	2:E:22:THR:HB	2.01	0.42
2:B:35:ASP:HB3	2:B:38:ASP:O	2.19	0.42
1:A:833:ARG:HG2	1:A:835:VAL:HG12	2.01	0.42
1:D:202:PRO:HA	1:D:203:PRO:HD3	1.90	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:279:GLU:OE1	1:D:279:GLU:HA	2.19	0.42
1:D:726:ARG:HG2	1:D:730:GLU:HB2	2.02	0.42
1:D:652:TRP:CD2	1:D:659:ARG:HG3	2.55	0.42
3:F:6:CYS:HA	3:F:56:PHE:HE2	1.83	0.42
1:A:563:GLN:HG2	1:D:233:PHE:CZ	2.55	0.42
1:D:230:MET:HE3	1:D:230:MET:HB3	1.83	0.42
1:D:431:ARG:HG2	1:D:488:TRP:CH2	2.54	0.42
1:D:630:LYS:NZ	1:D:635:GLU:OE2	2.45	0.42
1:D:709:VAL:N	1:D:828:SER:OG	2.48	0.42
1:A:70:THR:HG22	1:A:126:MET:HG2	2.01	0.42
2:E:32:GLN:HE21	2:E:42:GLY:HA3	1.84	0.42
1:A:536:MET:HE2	2:B:60:ARG:NH2	2.35	0.42
1:D:704:PRO:HG2	1:D:762:GLN:HA	2.02	0.42
1:D:803:ASN:HD21	1:D:826:ARG:H	1.68	0.42
1:A:442:ARG:O	1:A:446:GLU:N	2.46	0.41
1:A:766:LEU:HG	1:A:799:HIS:CE1	2.56	0.41
1:D:631:LYS:HG3	1:D:632:LEU:HD23	2.01	0.41
1:D:713:MET:HB3	1:D:840:TYR:CE2	2.55	0.41
1:A:116:ILE:O	1:A:369:LYS:HE2	2.20	0.41
1:D:461:GLU:OE1	1:D:793:HIS:NE2	2.47	0.41
1:A:191:PRO:HB3	1:A:572:THR:HB	2.02	0.41
1:A:509:SER:OG	1:A:580:GLU:OE2	2.36	0.41
1:D:516:PHE:HA	1:D:617:ILE:O	2.20	0.41
2:E:35:ASP:CB	2:E:41:ARG:HB2	2.50	0.41
1:A:57:LYS:HD2	1:A:69:VAL:HG13	2.02	0.41
1:A:476:ASN:HD21	1:A:608:GLU:HG2	1.84	0.41
1:A:502:ARG:HG2	1:A:503:LYS:HG3	2.03	0.41
1:D:208:LEU:HD22	1:D:337:LEU:HD11	2.03	0.41
1:D:387:GLY:HA3	1:D:832:ALA:HB1	2.03	0.41
1:D:634:PHE:O	1:D:637:LYS:HD2	2.20	0.41
1:A:230:MET:HE3	1:A:230:MET:HB3	1.91	0.41
1:A:521:LEU:HD21	1:A:625:SER:CB	2.49	0.41
1:D:668:TRP:HB2	1:D:679:ILE:HD13	2.02	0.41
1:A:749:THR:O	1:A:753:ARG:HG3	2.20	0.41
1:A:130:TYR:CZ	1:A:326:TYR:HB2	2.56	0.41
1:A:202:PRO:HA	1:A:203:PRO:HD3	1.89	0.41
1:A:631:LYS:O	1:A:636:GLU:HG3	2.20	0.41
3:C:6:CYS:HB2	3:C:50:SER:O	2.20	0.41
1:D:400:ASN:HD21	1:D:404:GLU:HB2	1.85	0.41
1:D:453:GLY:HA3	1:D:826:ARG:HB2	2.03	0.41
1:D:803:ASN:ND2	1:D:826:ARG:H	2.19	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:233:PHE:CE2	1:D:563:GLN:HG2	2.57	0.40
1:A:605:ALA:O	1:A:697:TYR:OH	2.36	0.40
1:A:709:VAL:H	1:A:828:SER:HB2	1.86	0.40
1:D:65:ILE:HD13	1:D:65:ILE:HA	1.89	0.40
1:D:16:LYS:HE2	1:D:865:ILE:HG22	2.04	0.40
1:A:122:GLU:H	1:A:122:GLU:HG2	1.70	0.40
1:A:130:TYR:CE2	1:A:326:TYR:HB2	2.56	0.40
1:D:772:SER:OG	1:D:775:ILE:HB	2.22	0.40
1:D:56:TRP:HH2	1:D:423:THR:HG22	1.87	0.40
1:D:86:SER:HB2	1:D:94:ARG:HG2	2.02	0.40
1:D:310:MET:HE3	1:D:362:LEU:HD23	2.02	0.40

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	855/878 (97%)	832 (97%)	23 (3%)	0	100	100
1	D	855/878 (97%)	832 (97%)	23 (3%)	0	100	100
2	B	66/102 (65%)	63 (96%)	3 (4%)	0	100	100
2	E	67/102 (66%)	64 (96%)	3 (4%)	0	100	100
3	C	53/60 (88%)	51 (96%)	2 (4%)	0	100	100
3	F	53/60 (88%)	51 (96%)	2 (4%)	0	100	100
All	All	1949/2080 (94%)	1893 (97%)	56 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	724/741 (98%)	714 (99%)	10 (1%)	62 86
1	D	724/741 (98%)	708 (98%)	16 (2%)	47 78
2	B	60/90 (67%)	60 (100%)	0	100 100
2	E	61/90 (68%)	61 (100%)	0	100 100
3	C	47/51 (92%)	46 (98%)	1 (2%)	48 78
3	F	47/51 (92%)	47 (100%)	0	100 100
All	All	1663/1764 (94%)	1636 (98%)	27 (2%)	58 84

All (27) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	11	LEU
1	A	68	SER
1	A	147	SER
1	A	419	LYS
1	A	421	ILE
1	A	425	GLU
1	A	507	THR
1	A	522	GLU
1	A	694	ILE
1	A	851	GLN
3	C	57	GLN
1	D	73	ILE
1	D	289	LEU
1	D	393	ILE
1	D	394	LEU
1	D	521	LEU
1	D	532	SER
1	D	617	ILE
1	D	620	ILE
1	D	722	THR
1	D	726	ARG
1	D	733	ASP

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Mol	Chain	Res	Type
1	D	777	ARG
1	D	784	ILE
1	D	815	ARG
1	D	827	VAL
1	D	856	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	285	GLN
1	A	651	ASN
1	A	707	GLN
1	A	769	GLN
1	A	801	GLN
2	B	40	HIS
1	D	149	GLN
1	D	167	GLN
1	D	171	GLN
1	D	581	GLN
1	D	707	GLN
1	D	762	GLN
1	D	765	ASN
1	D	768	ASN
1	D	801	GLN
1	D	803	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

10 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	$\#\|Z\| > 2$
5	MBN	A	902	-	7,7,7	0.38	0	8,8,8	0.18	0
4	FUM	A	901	-	7,7,7	1.42	2 (28%)	8,8,8	1.19	0
5	MBN	D	902	-	7,7,7	0.38	0	8,8,8	0.16	0
4	FUM	D	901	-	7,7,7	1.35	0	8,8,8	1.09	0
7	SF4	B	101	2	0,12,12	-	-	-		
6	PEG	A	903	-	6,6,6	0.11	0	5,5,5	0.10	0
7	SF4	C	101	3	0,12,12	-	-	-		
7	SF4	E	101	2	0,12,12	-	-	-		
7	SF4	F	101	3	0,12,12	-	-	-		
6	PEG	D	903	-	6,6,6	0.07	0	5,5,5	0.15	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	MBN	A	902	-	-	-	0/1/1/1
4	FUM	A	901	-	-	0/5/5/5	-
5	MBN	D	902	-	-	-	0/1/1/1
4	FUM	D	901	-	-	0/5/5/5	-
7	SF4	B	101	2	-	-	0/6/5/5
6	PEG	A	903	-	-	2/4/4/4	-
7	SF4	C	101	3	-	-	0/6/5/5
7	SF4	E	101	2	-	-	0/6/5/5
7	SF4	F	101	3	-	-	0/6/5/5
6	PEG	D	903	-	-	2/4/4/4	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	901	FUM	OXT-C	-2.05	1.25	1.30
4	A	901	FUM	O8-C6	-2.05	1.25	1.30

There are no bond angle outliers.

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	D	903	PEG	O1-C1-C2-O2
6	D	903	PEG	C1-C2-O2-C3
6	A	903	PEG	C4-C3-O2-C2
6	A	903	PEG	C1-C2-O2-C3

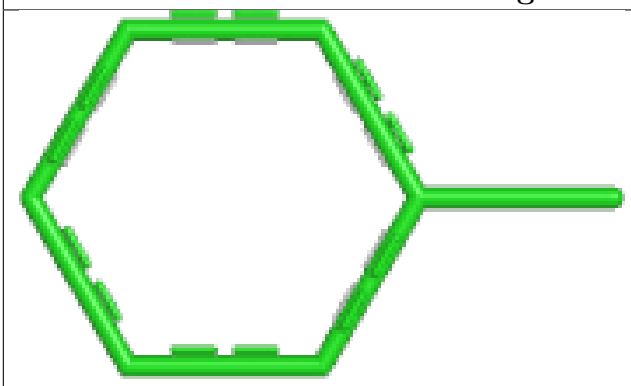
There are no ring outliers.

4 monomers are involved in 6 short contacts:

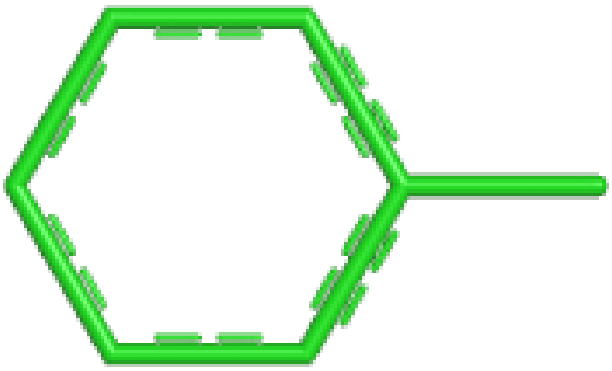
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	902	MBN	1	0
4	A	901	FUM	1	0
5	D	902	MBN	2	0
4	D	901	FUM	2	0

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.

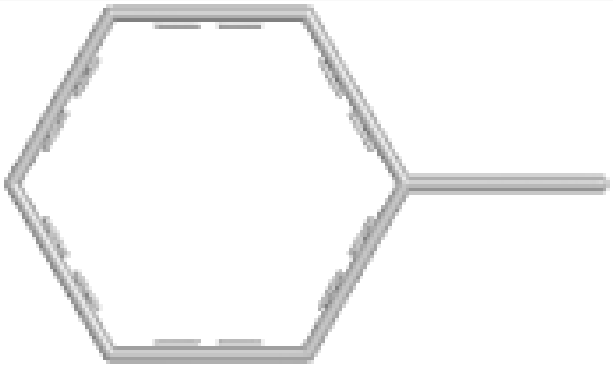
Ligand MBN A 902



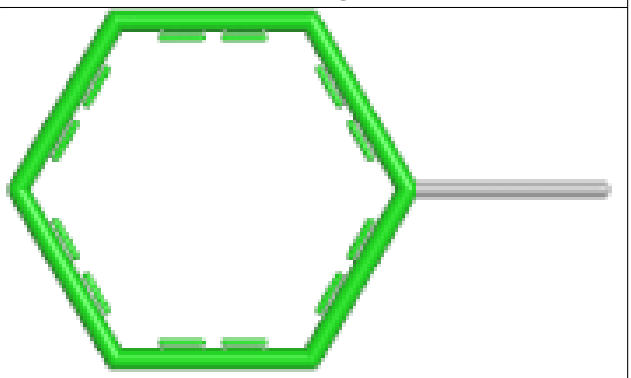
Bond lengths



Bond angles

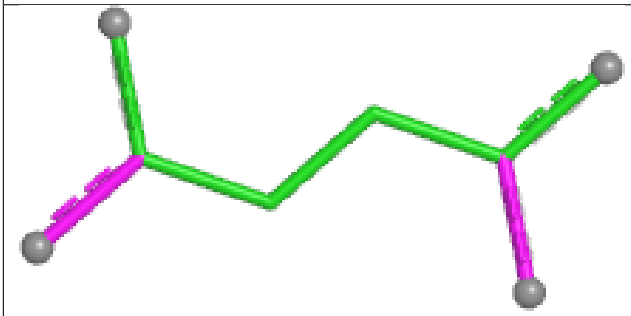


Torsions

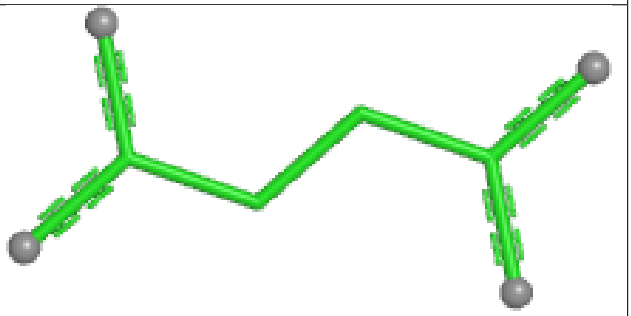


Rings

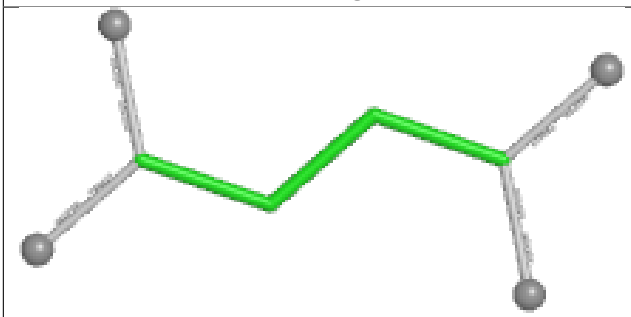
Ligand FUM A 901



Bond lengths



Bond angles



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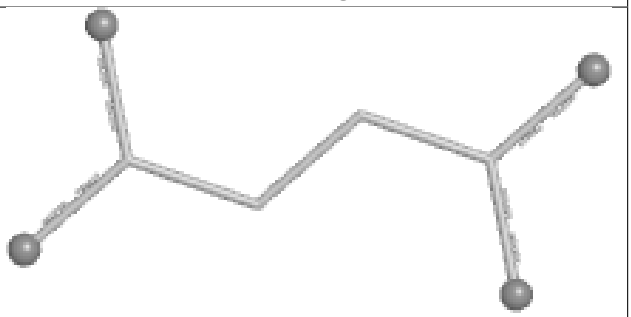
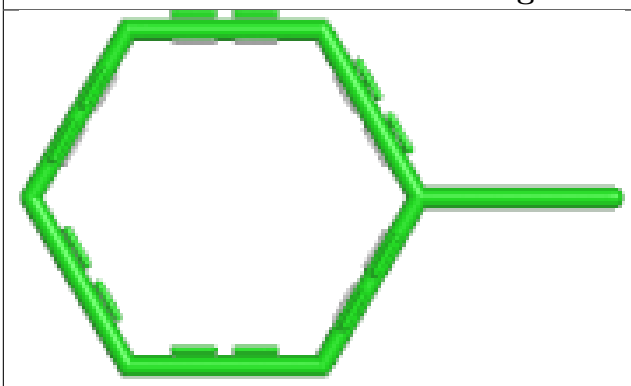
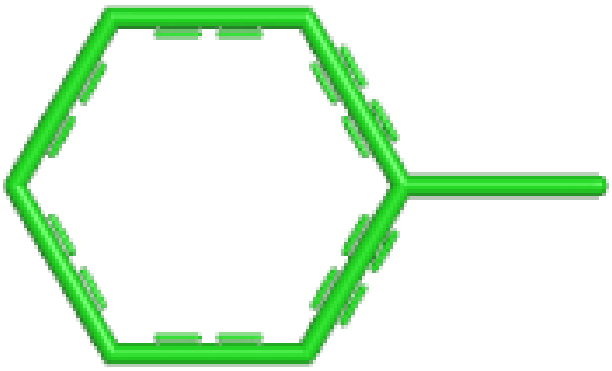


Rings

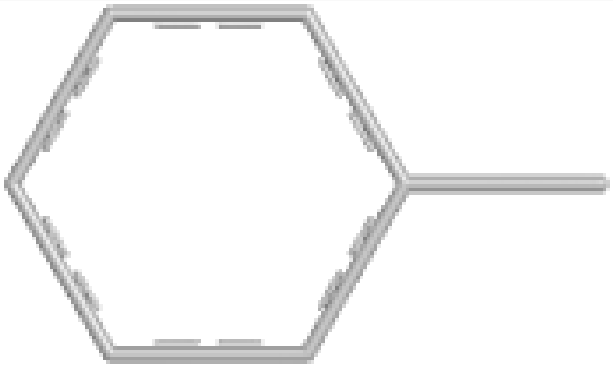
Ligand MBN D 902



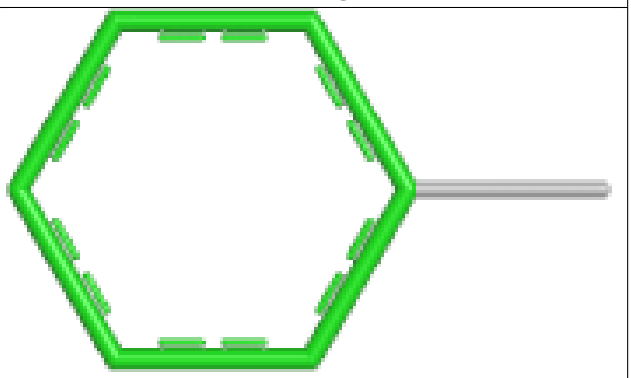
Bond lengths



Bond angles

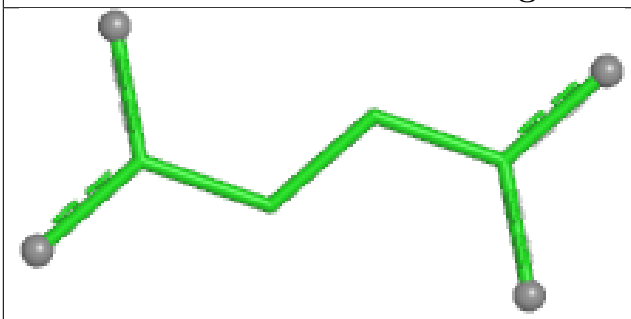


Torsions

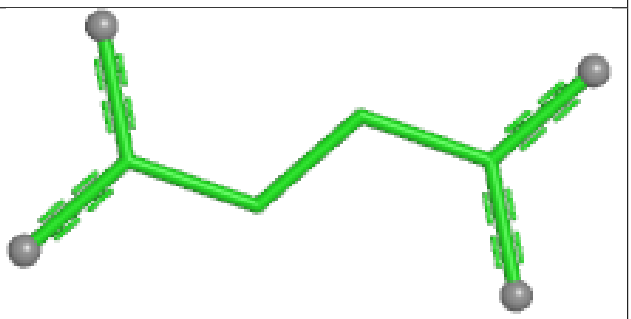


Rings

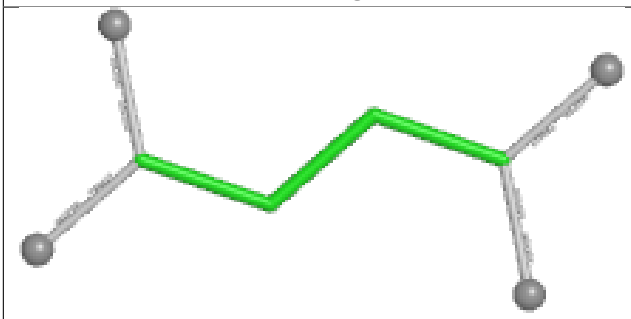
Ligand FUM D 901



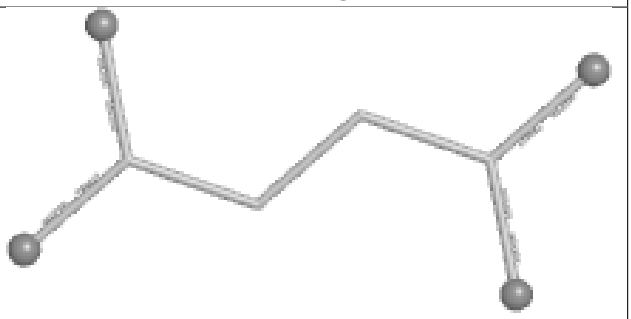
Bond lengths



Bond angles

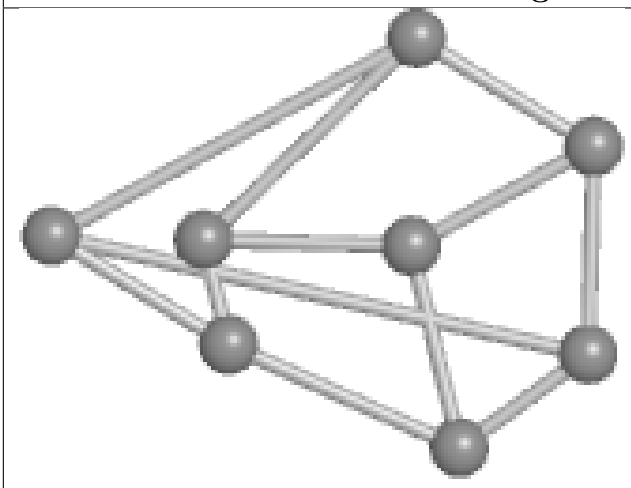


Torsions

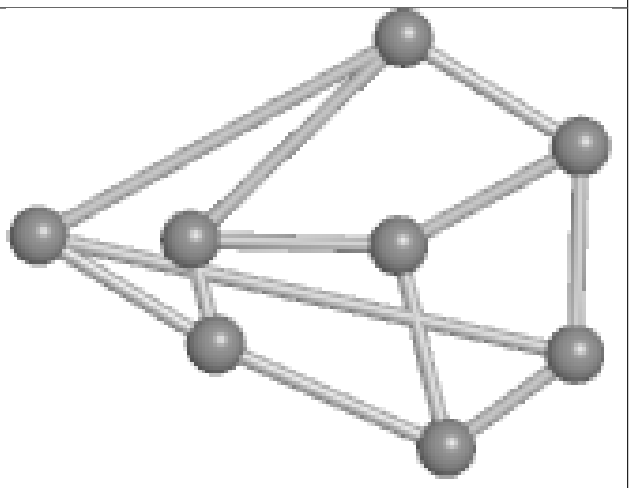


Rings

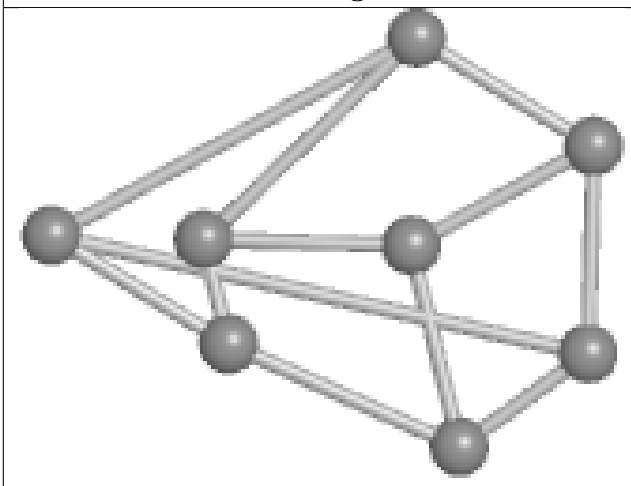
Ligand SF4 B 101



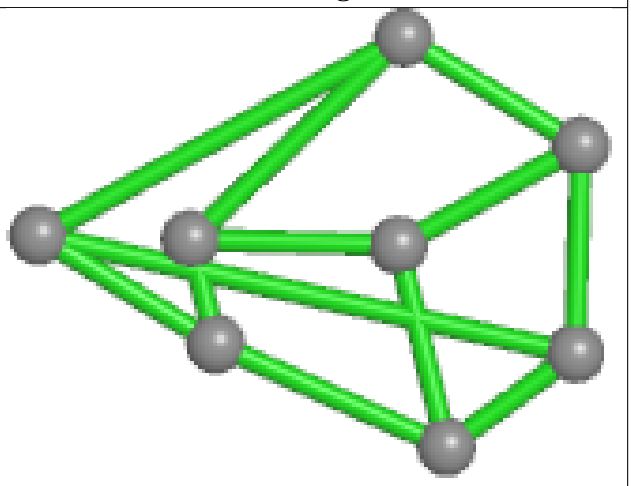
Bond lengths



Bond angles

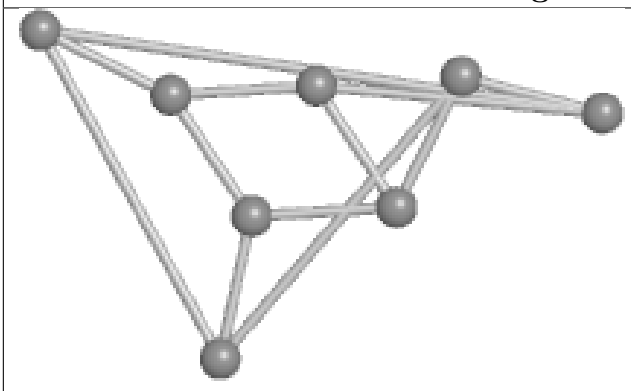


Torsions

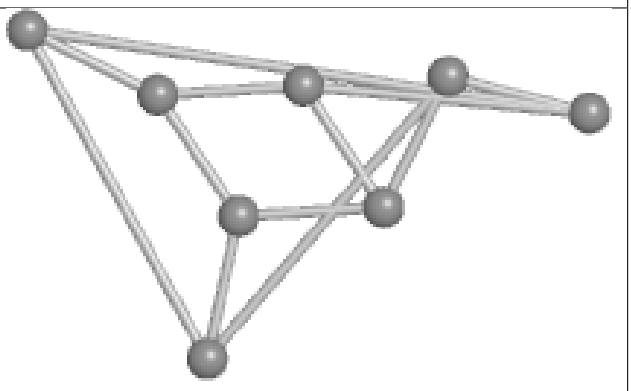


Rings

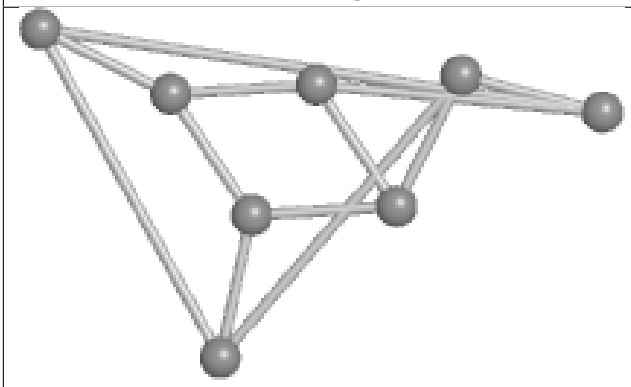
Ligand SF4 C 101



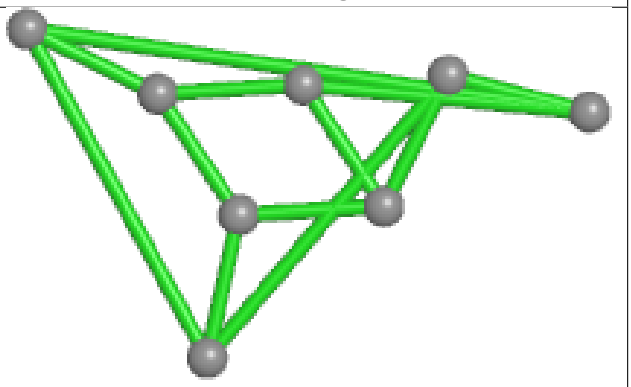
Bond lengths



Bond angles

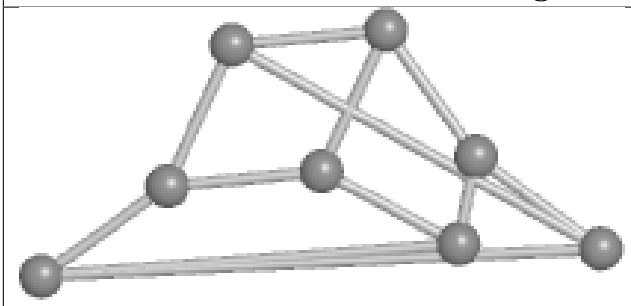


Torsions

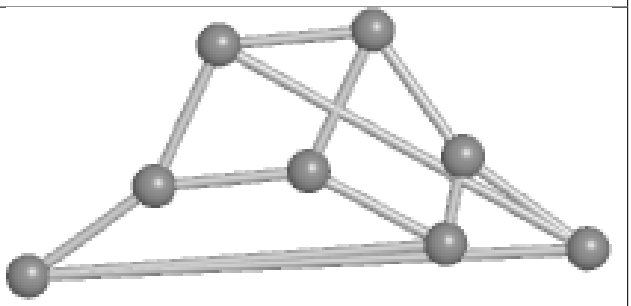


Rings

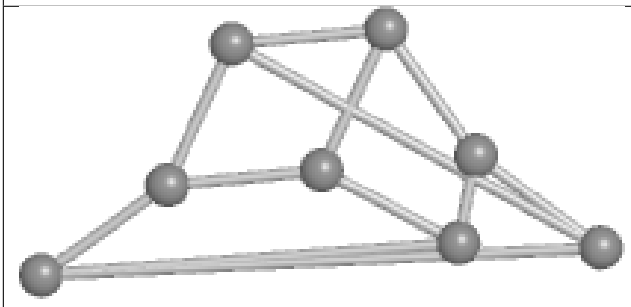
Ligand SF4 E 101



Bond lengths



Bond angles



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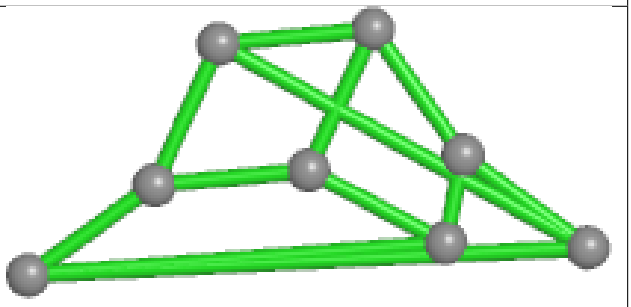
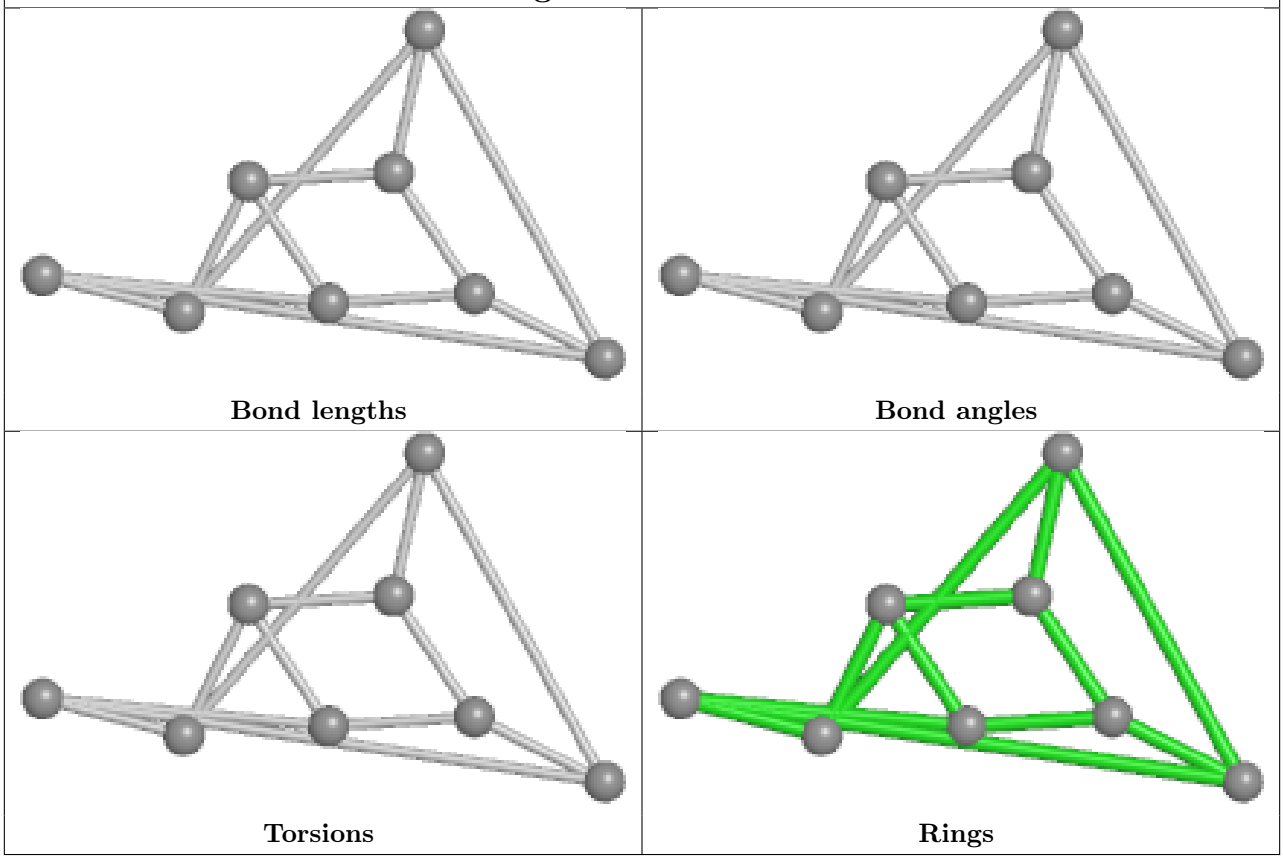


Rings

Ligand SF4 F 101



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	857/878 (97%)	0.04	3 (0%) 89 86	23, 42, 65, 92	24 (2%)
1	D	857/878 (97%)	-0.02	8 (0%) 81 76	20, 39, 60, 87	9 (1%)
2	B	68/102 (66%)	0.29	1 (1%) 71 66	30, 50, 73, 95	4 (5%)
2	E	69/102 (67%)	0.33	6 (8%) 17 15	35, 49, 71, 82	4 (5%)
3	C	55/60 (91%)	0.50	3 (5%) 32 27	28, 57, 76, 82	5 (9%)
3	F	55/60 (91%)	1.02	9 (16%) 5 5	15, 57, 98, 124	9 (16%)
All	All	1961/2080 (94%)	0.07	30 (1%) 71 66	15, 42, 67, 124	55 (2%)

All (30) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	F	49	ASN	6.8
3	F	50	SER	5.2
2	B	14	ASN	4.7
2	E	13	GLN	4.0
2	E	14	ASN	3.8
1	D	735	GLY	3.4
3	F	8	GLN	3.4
2	E	15	GLN	3.3
3	F	54	GLU	3.2
2	E	20	VAL	3.1
1	A	27	GLU	3.0
1	D	709	VAL	3.0
1	D	736	GLY	3.0
3	C	5	THR	2.8
3	F	59	LYS	2.8
3	F	56	PHE	2.7
3	F	55	ALA	2.6
3	F	5	THR	2.6
2	E	16	PRO	2.6

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Mol	Chain	Res	Type	RSRZ
3	F	10	ALA	2.5
1	A	420	ARG	2.4
2	E	68	SER	2.3
1	D	26	ALA	2.3
1	D	708	ALA	2.3
3	C	8	GLN	2.2
1	A	865	ILE	2.2
3	C	51	ALA	2.1
1	D	710	GLY	2.1
1	D	20	PHE	2.1
1	D	822	ASP	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.

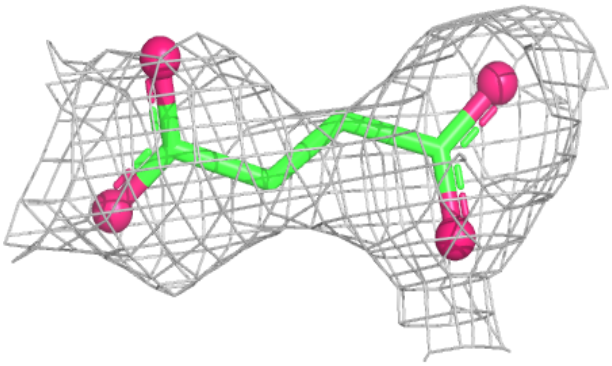
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
6	PEG	D	903	7/7	0.75	0.22	51,54,60,62	0
6	PEG	A	903	7/7	0.88	0.10	36,37,41,42	0
4	FUM	D	901	8/8	0.89	0.11	31,35,37,39	0
5	MBN	D	902	7/7	0.89	0.24	51,53,56,60	0
7	SF4	F	101	8/8	0.92	0.07	100,117,123,126	0
5	MBN	A	902	7/7	0.93	0.23	39,45,48,49	0
4	FUM	A	901	8/8	0.94	0.09	34,36,38,39	0
7	SF4	B	101	8/8	0.96	0.06	42,52,59,60	0
7	SF4	C	101	8/8	0.97	0.05	52,58,69,70	0
7	SF4	E	101	8/8	0.98	0.05	49,56,63,66	0

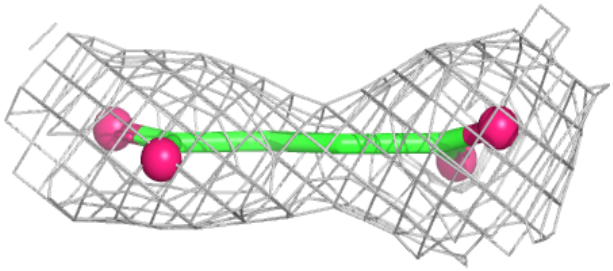
The following is a graphical depiction of the model fit to experimental electron density of all

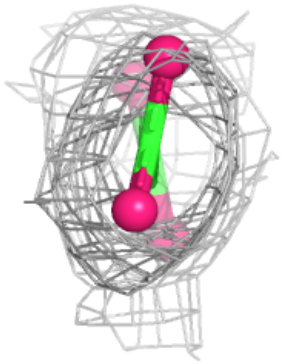
instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around FUM D 901:

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

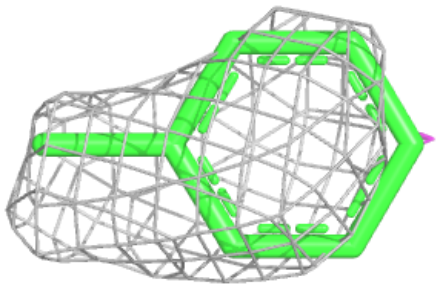


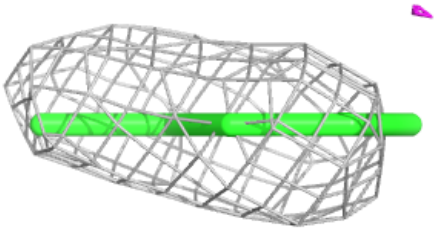


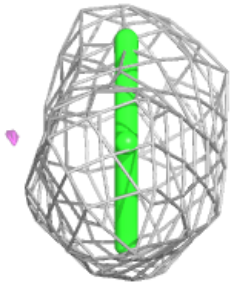


Electron density around MBN D 902:

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

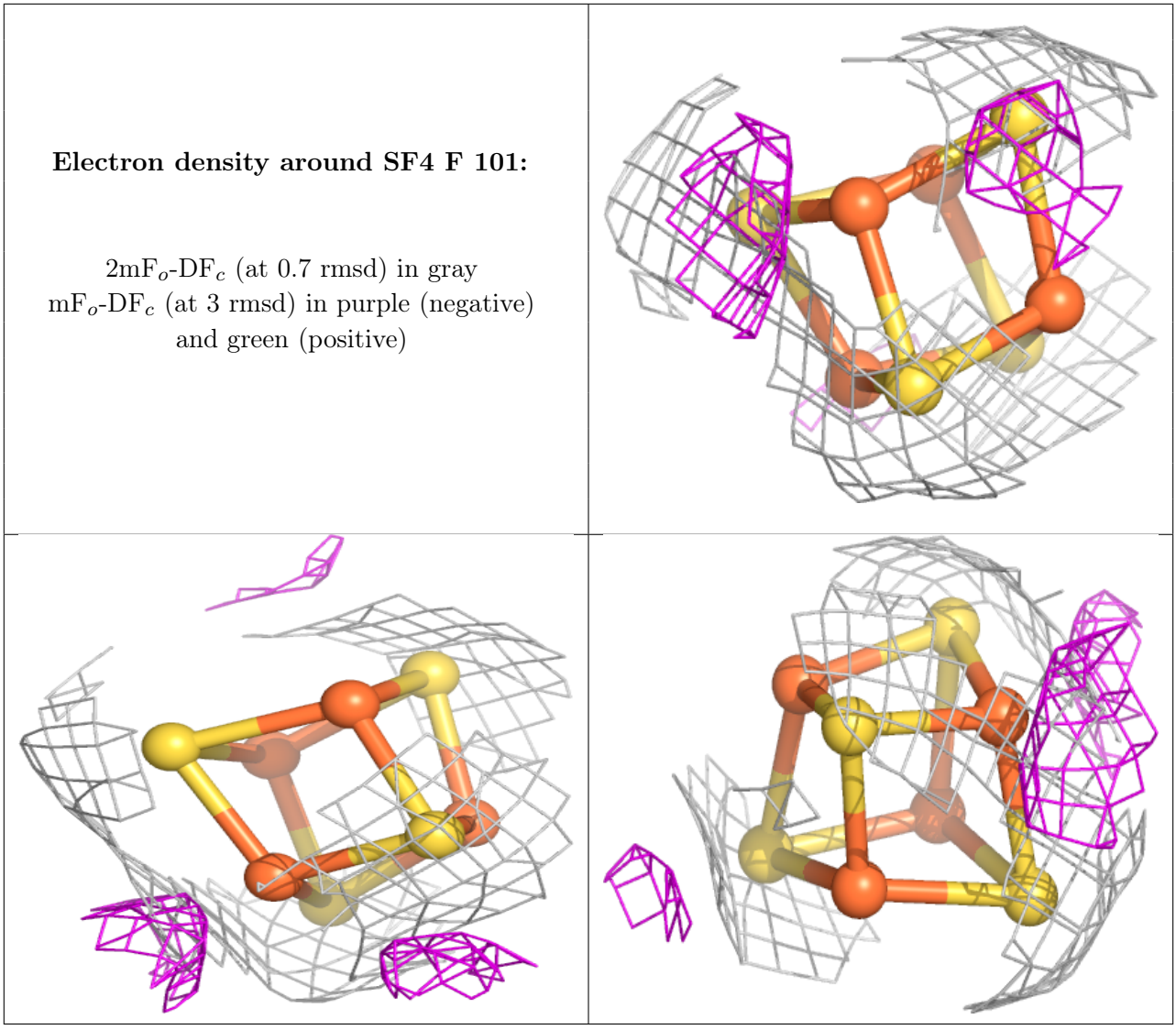






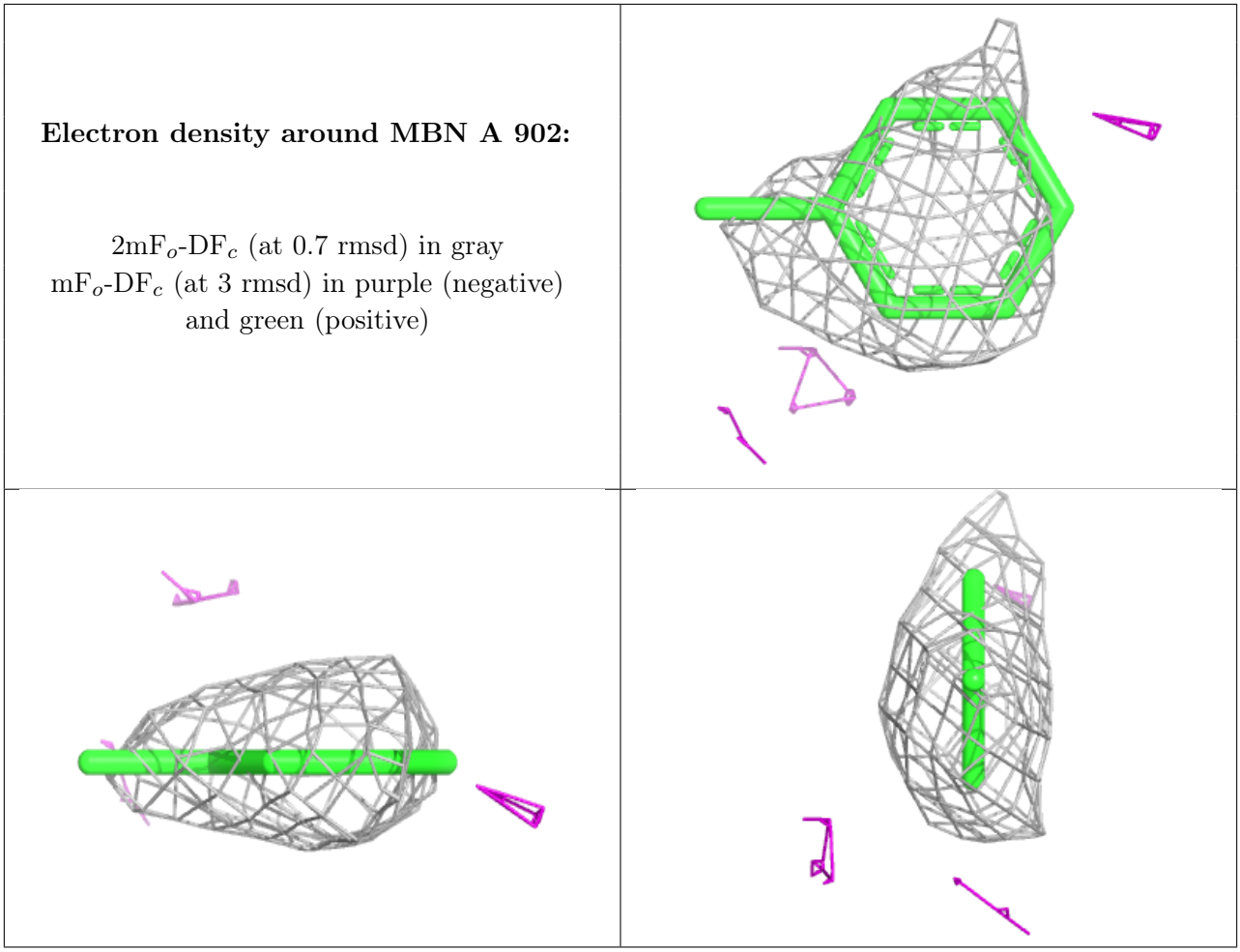
Electron density around SF4 F 101:

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



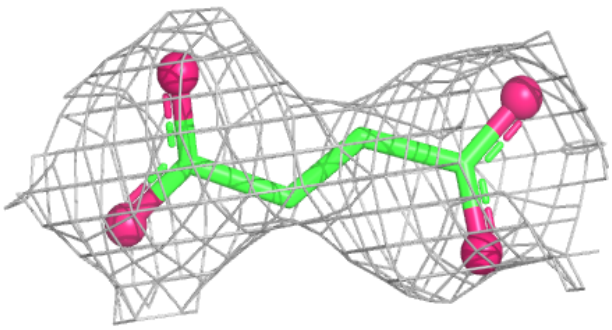
Electron density around MBN A 902:

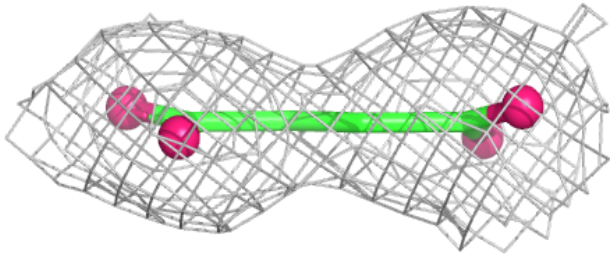
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

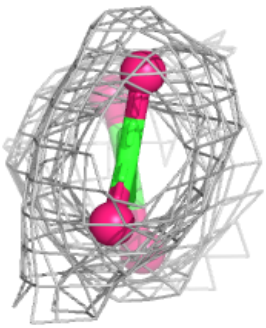


Electron density around FUM A 901:

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

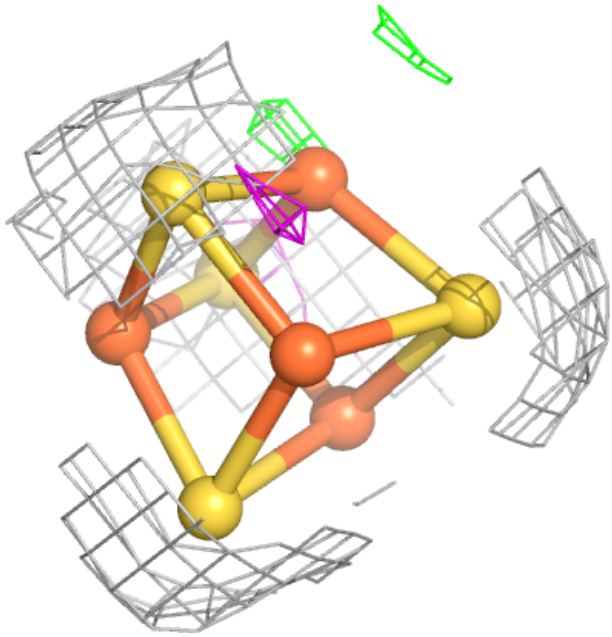


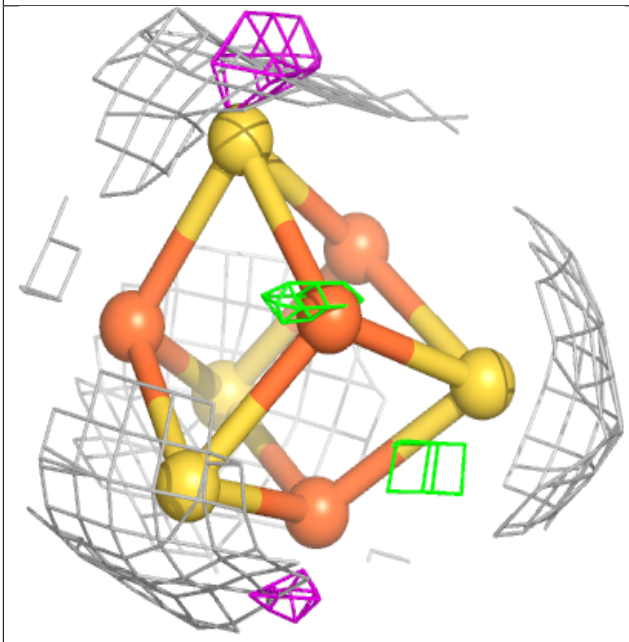


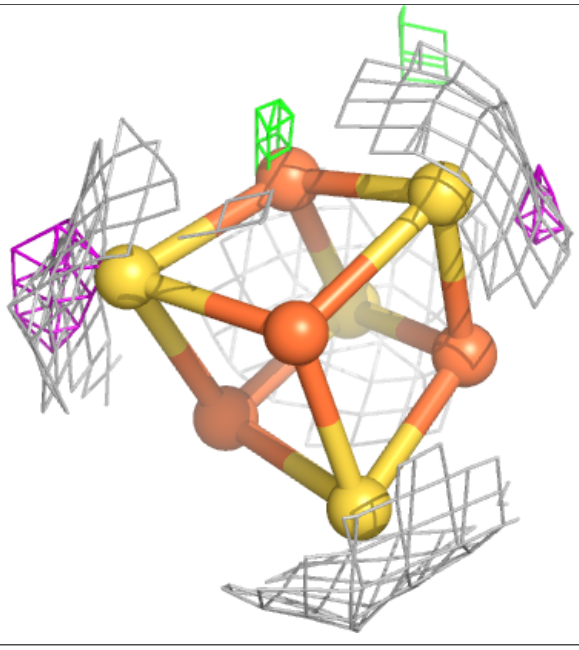


Electron density around SF4 B 101:

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

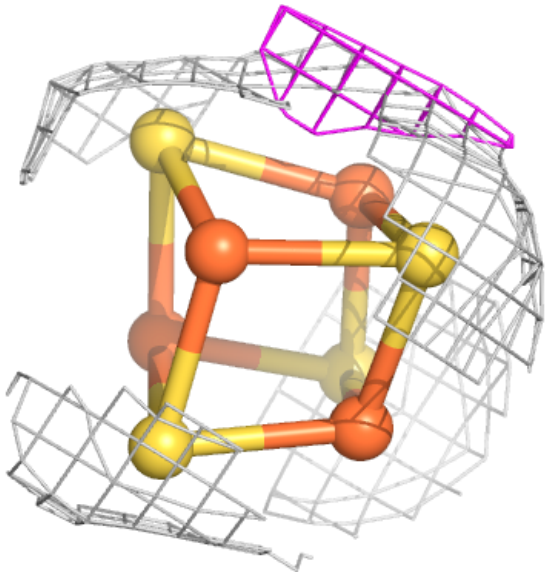


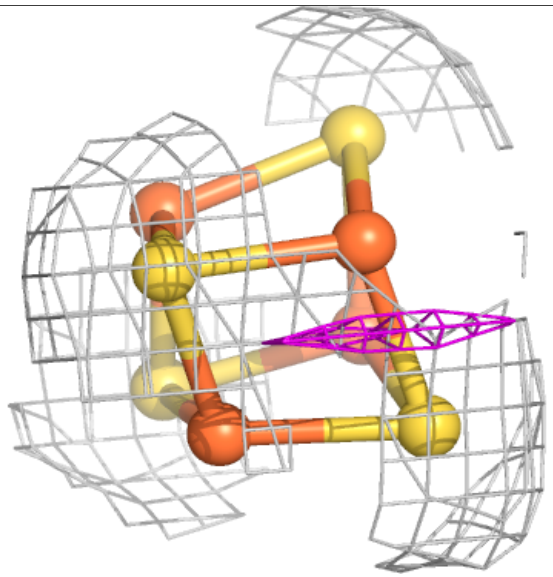


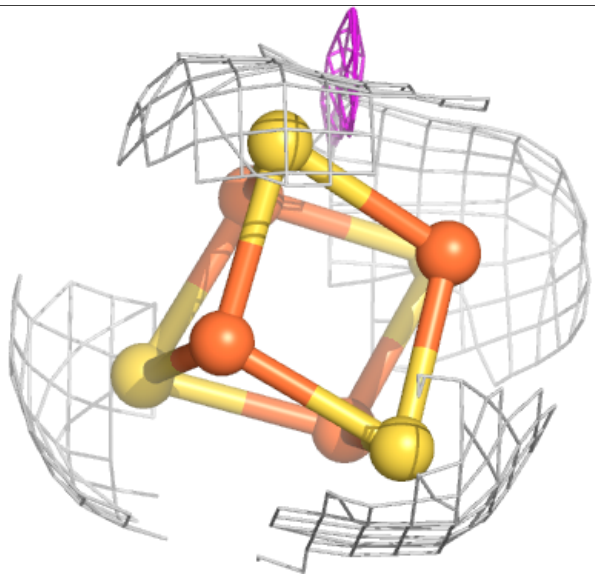


Electron density around SF4 C 101:

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

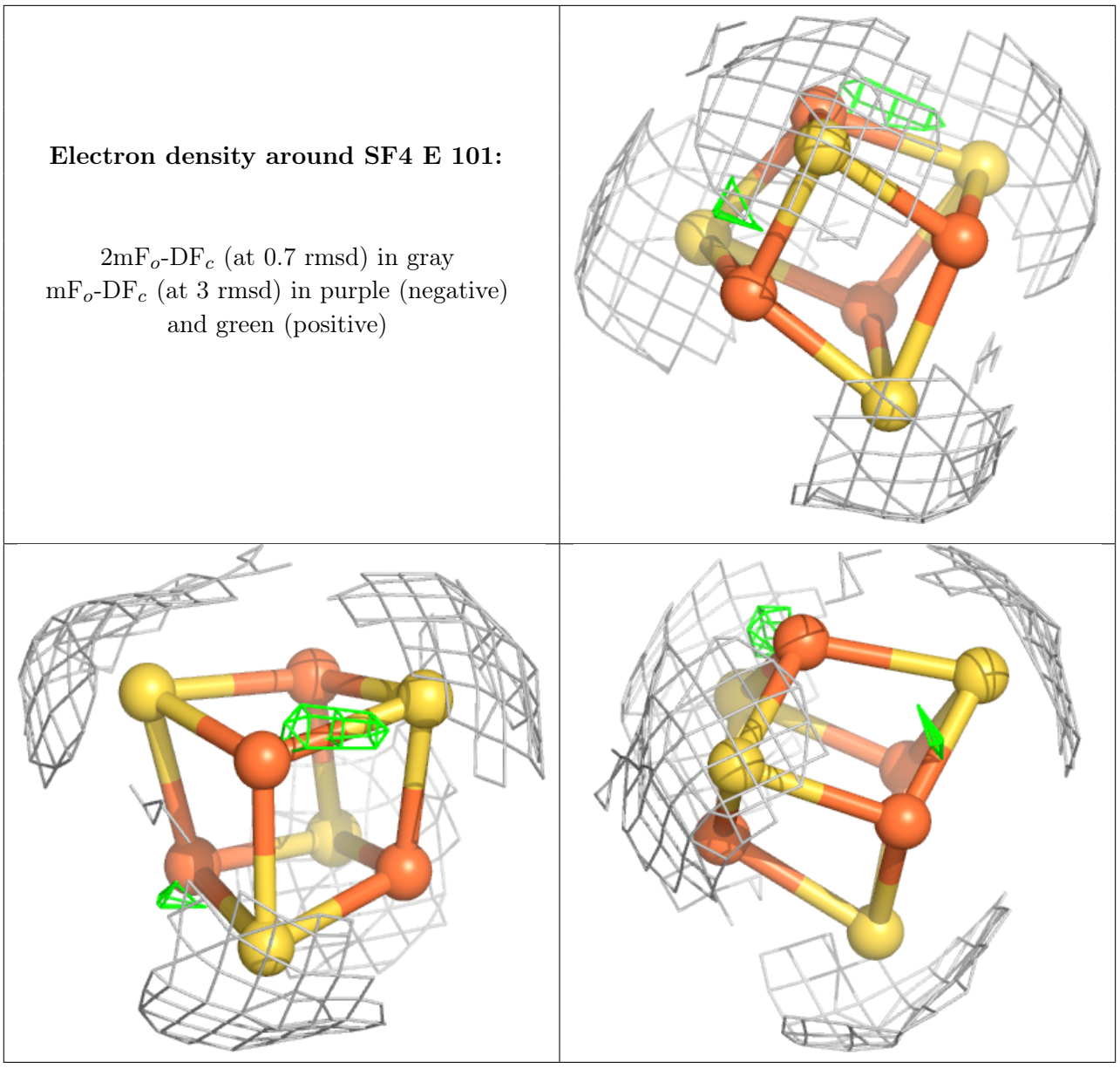






Electron density around SF4 E 101:

$2mF_o$-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.