



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 5, 2026 – 10:39 PM EDT

PDB ID : 3MM8 / pdb_00003mm8
Title : Dissimilatory sulfite reductase nitrate complex
Authors : Parey, K.; Warkentin, E.; Kroneck, P.M.H.; Ermler, U.
Deposited on : 2010-04-19
Resolution : 2.28 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	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.015 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.50

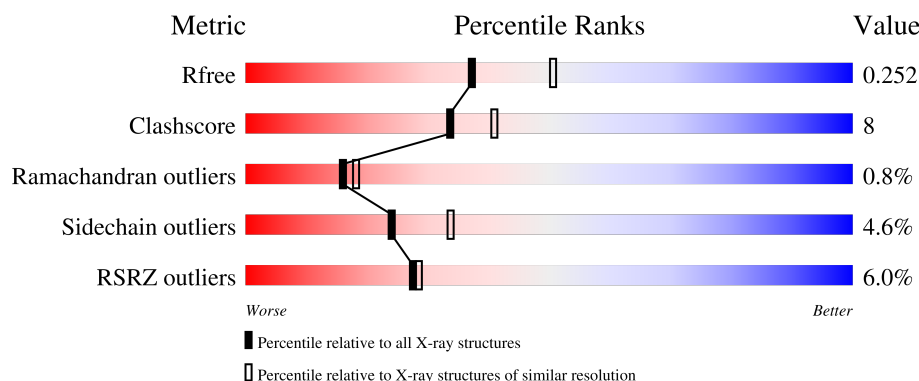
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.28 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	9078 (2.30-2.26)
Clashscore	190562	9802 (2.30-2.26)
Ramachandran outliers	187476	9690 (2.30-2.26)
Sidechain outliers	187428	9691 (2.30-2.26)
RSRZ outliers	180081	9085 (2.30-2.26)

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	418	7% 85% 13% ..
1	D	418	6% 85% 13% ..
2	B	366	4% 81% 17% ..
2	E	366	7% 73% 24% ...

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	SRM	A	580	X	-	-	-
3	SRM	B	570	X	-	-	-
3	SRM	D	580	X	-	-	-
3	SRM	E	570	X	-	-	-
4	SF4	D	576	-	-	X	-
4	SF4	E	585	-	-	X	-

2 Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 12915 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.

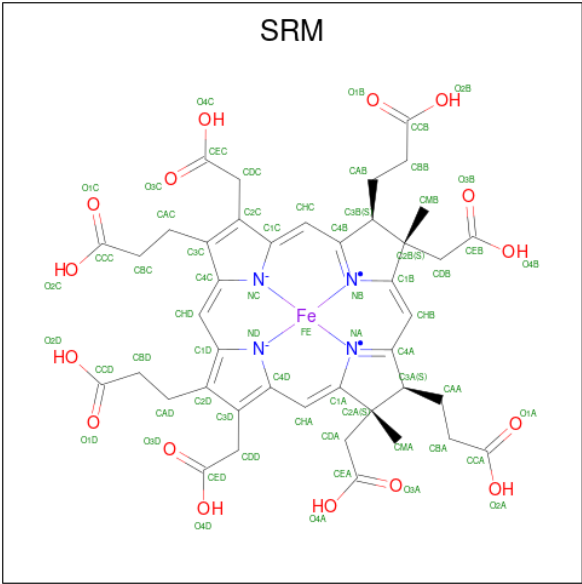
- Molecule 1 is a protein called Sulfite reductase, dissimilatory-type subunit alpha.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	417	Total	C	N	O	S	0	0	0
			3329	2134	557	612	26			
1	D	417	Total	C	N	O	S	0	0	0
			3329	2134	557	612	26			

- Molecule 2 is a protein called Sulfite reductase, dissimilatory-type subunit beta.

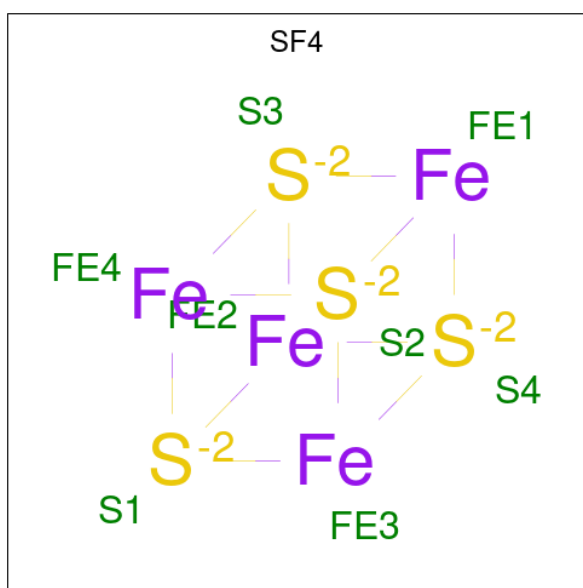
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	363	Total	C	N	O	S	0	0	0
			2900	1862	491	525	22			
2	E	363	Total	C	N	O	S	0	0	0
			2900	1862	491	525	22			

- Molecule 3 is SIROHEME (CCD ID: SRM) (formula: C₄₂H₄₄FeN₄O₁₆).



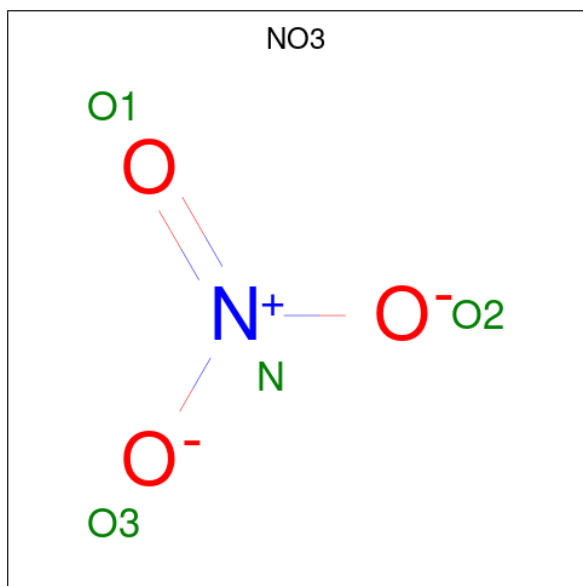
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	Fe	N	O	
			63	42	1	4	16	
3	B	1	Total	C	Fe	N	O	
			63	42	1	4	16	
3	D	1	Total	C	Fe	N	O	
			63	42	1	4	16	
3	E	1	Total	C	Fe	N	O	
			63	42	1	4	16	

- Molecule 4 is IRON/SULFUR CLUSTER (CCD ID: SF4) (formula: Fe_4S_4).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	Fe	S		
			8	4	4	0	0
4	A	1	Total	Fe	S		
			8	4	4	0	0
4	B	1	Total	Fe	S		
			8	4	4	0	0
4	B	1	Total	Fe	S		
			8	4	4	0	0
4	D	1	Total	Fe	S		
			8	4	4	0	0
4	D	1	Total	Fe	S		
			8	4	4	0	0
4	E	1	Total	Fe	S		
			8	4	4	0	0
4	E	1	Total	Fe	S		
			8	4	4	0	0

- Molecule 5 is NITRATE ION (CCD ID: NO3) (formula: NO_3).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	N	O	0	0
			4	1	3		

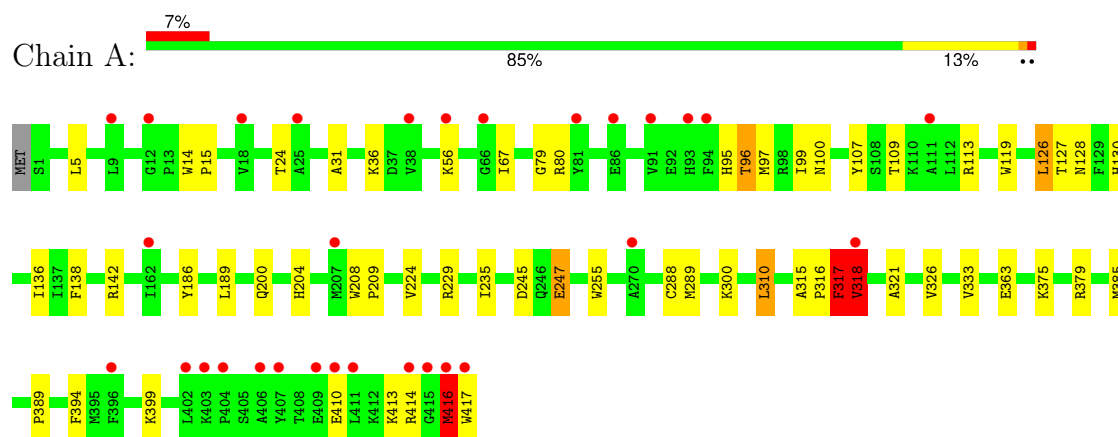
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	64	Total	O	0	0
			64	64		
6	B	62	Total	O	0	0
			62	62		
6	D	10	Total	O	0	0
			10	10		
6	E	1	Total	O	0	0
			1	1		

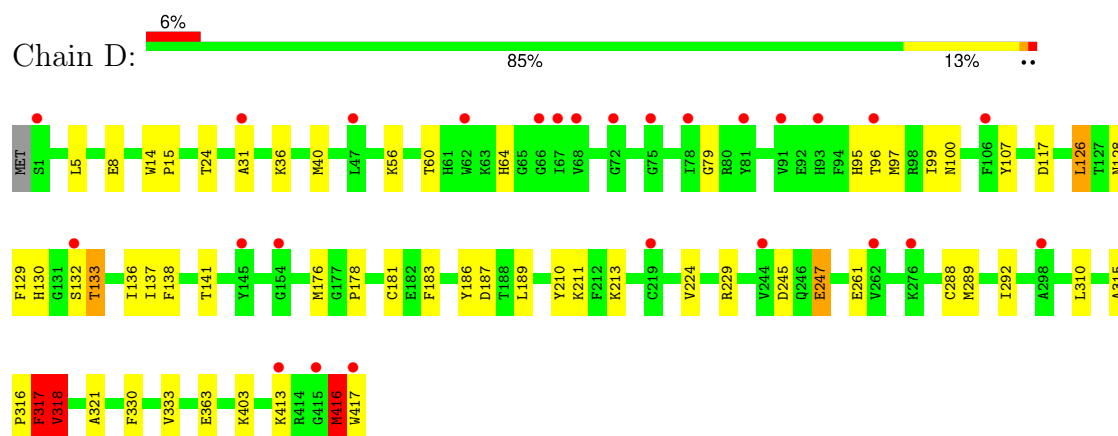
3 Residue-property plots [i](#)

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.

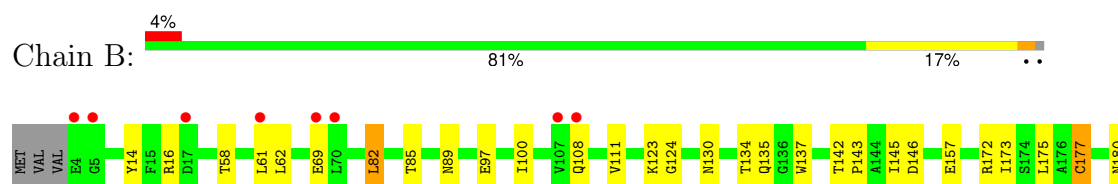
- Molecule 1: Sulfite reductase, dissimilatory-type subunit alpha

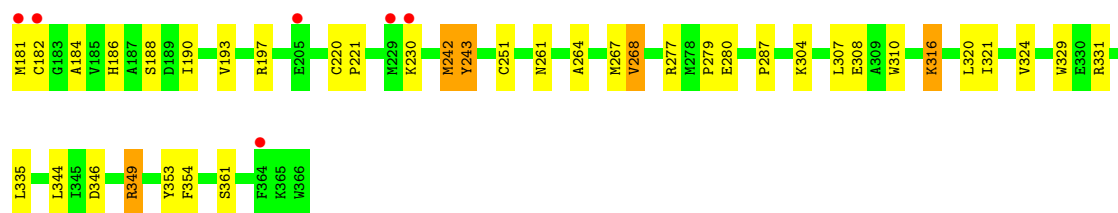


- Molecule 1: Sulfite reductase, dissimilatory-type subunit alpha

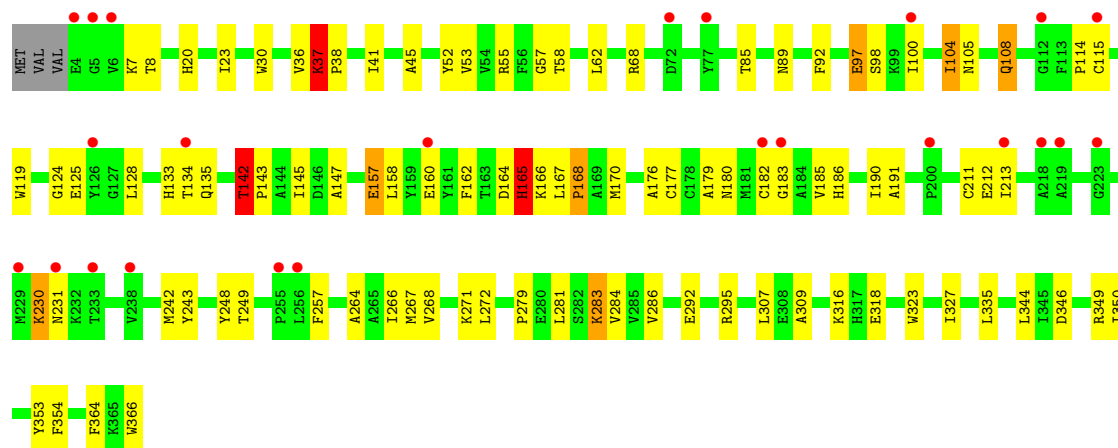


- Molecule 2: Sulfite reductase, dissimilatory-type subunit beta





● Molecule 2: Sulfite reductase, dissimilatory-type subunit beta



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	94.60Å 68.90Å 145.10Å 90.00° 107.50° 90.00°	Depositor
Resolution (Å)	30.00 – 2.28 30.00 – 2.28	Depositor EDS
% Data completeness (in resolution range)	100.0 (30.00-2.28) 96.6 (30.00-2.28)	Depositor EDS
R_{merge}	0.21	Depositor
R_{sym}	0.15	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.72 (at 2.29Å)	Xtriage
Refinement program	REFMAC 5.6.0046	Depositor
R, R_{free}	0.198 , 0.231 0.222 , 0.252	Depositor DCC
R_{free} test set	3947 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	33.5	Xtriage
Anisotropy	0.316	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 38.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.29$	Xtriage
Estimated twinning fraction	0.028 for h,-k,-h-l	Xtriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	12915	wwPDB-VP
Average B, all atoms (Å ²)	25.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.87% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SRM, SF4, NO3

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	0.62	0/3416	0.86	1/4610 (0.0%)
1	D	0.47	0/3416	0.82	1/4610 (0.0%)
2	B	0.79	1/2983 (0.0%)	0.97	3/4058 (0.1%)
2	E	0.60	3/2983 (0.1%)	0.92	12/4058 (0.3%)
All	All	0.63	4/12798 (0.0%)	0.89	17/17336 (0.1%)

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	1
1	D	0	1
2	E	0	1
All	All	0	3

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	308	GLU	C-N	11.46	1.48	1.33
2	E	98	SER	C-O	6.90	1.32	1.24
2	E	165	HIS	C-N	6.31	1.42	1.33
2	E	213	ILE	CA-CB	5.36	1.56	1.54

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	317	PHE	N-CA-C	8.63	122.74	110.23
1	D	317	PHE	N-CA-C	8.60	122.70	110.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	37	LYS	CA-C-N	-7.96	111.13	120.13
2	E	37	LYS	C-N-CA	-7.96	111.13	120.13
2	E	309	ALA	O-C-N	-6.41	115.36	122.03
2	E	364	PHE	O-C-N	6.29	129.87	123.26
2	E	292	GLU	CA-C-N	-6.26	115.09	119.66
2	E	292	GLU	C-N-CA	-6.26	115.09	119.66
2	E	309	ALA	CA-C-N	6.03	128.68	120.54
2	E	309	ALA	C-N-CA	6.03	128.68	120.54
2	E	230	LYS	CA-C-N	5.58	131.75	121.70
2	E	230	LYS	C-N-CA	5.58	131.75	121.70
2	E	230	LYS	N-CA-C	5.53	119.61	111.04
2	B	100	ILE	N-CA-C	5.46	115.91	110.23
2	B	251	CYS	CA-C-N	5.08	126.19	119.84
2	B	251	CYS	C-N-CA	5.08	126.19	119.84
2	E	133	HIS	N-CA-C	5.00	114.84	108.24

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	317	PHE	Peptide
1	D	317	PHE	Peptide
2	E	165	HIS	Mainchain

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	3329	0	3276	43	0
1	D	3329	0	3276	47	0
2	B	2900	0	2836	54	0
2	E	2900	0	2838	66	0
3	A	63	0	34	6	0
3	B	63	0	34	7	0
3	D	63	0	34	16	0
3	E	63	0	34	8	0
4	A	16	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	16	0	0	0	0
4	D	16	0	0	3	0
4	E	16	0	0	2	0
5	A	4	0	0	0	0
6	A	64	0	0	3	0
6	B	62	0	0	0	0
6	D	10	0	0	3	0
6	E	1	0	0	0	0
All	All	12915	0	12362	193	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 (193) 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)
2:E:230:LYS:HB2	2:E:231:ASN:HB2	1.07	1.07
3:E:570:SRM:HDD2	3:E:570:SRM:HBD2	1.35	1.04
3:D:580:SRM:HMB3	2:E:182:CYS:HA	1.36	1.01
2:E:230:LYS:CB	2:E:231:ASN:HB2	1.93	0.97
2:E:230:LYS:HB2	2:E:231:ASN:CB	1.97	0.90
3:B:570:SRM:HDD2	3:B:570:SRM:HBD2	1.53	0.90
1:D:213:LYS:HZ2	3:D:580:SRM:HDB2	1.43	0.83
2:B:134:THR:OG1	2:B:177:CYS:SG	2.37	0.83
2:E:134:THR:HG21	2:E:182:CYS:HB2	1.60	0.82
2:B:261:ASN:HD21	1:D:403:LYS:H	1.30	0.78
2:E:85:THR:HB	3:E:570:SRM:HAB2	1.66	0.77
2:E:124:GLY:HA3	2:E:316:LYS:HD2	1.65	0.77
2:B:197:ARG:HH21	2:B:261:ASN:HD22	1.32	0.76
1:D:213:LYS:NZ	3:D:580:SRM:HDB2	2.01	0.76
1:A:317:PHE:CD2	2:B:180:ASN:HB3	2.22	0.74
1:D:213:LYS:HZ3	3:D:580:SRM:HDB1	1.53	0.74
1:D:213:LYS:NZ	3:D:580:SRM:CDB	2.51	0.73
2:B:349:ARG:NH2	2:E:350:ILE:O	2.23	0.72
1:A:128:ASN:ND2	2:B:135:GLN:HE22	1.88	0.72
1:A:107:TYR:OH	1:A:130:HIS:HE1	1.74	0.71
1:D:64:HIS:NE2	2:E:248:TYR:O	2.22	0.71
3:A:580:SRM:HBA1	3:A:580:SRM:HHB	1.72	0.70
4:D:576:SF4:S4	6:D:423:HOH:O	2.48	0.70
2:E:7:LYS:HE2	2:E:8:THR:H	1.57	0.69
1:D:178:PRO:HG3	1:D:187:ASP:HA	1.74	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:85:THR:HB	3:B:570:SRM:HAB2	1.72	0.69
2:E:104:ILE:HG23	2:E:115:CYS:HB2	1.74	0.68
1:A:255:TRP:HZ3	2:B:123:LYS:HD3	1.59	0.68
1:D:60:THR:HG22	2:E:257:PHE:CE1	2.28	0.68
1:A:229:ARG:HG3	2:B:184:ALA:HB2	1.77	0.67
2:B:85:THR:HB	3:B:570:SRM:CAB	2.24	0.66
1:A:317:PHE:HD2	2:B:180:ASN:HB3	1.58	0.66
2:B:82:LEU:N	2:B:82:LEU:HD23	2.10	0.66
1:A:96:THR:HG21	6:A:426:HOH:O	1.94	0.66
2:E:37:LYS:HB2	2:E:38:PRO:CD	2.26	0.65
1:D:107:TYR:OH	1:D:130:HIS:HE1	1.80	0.65
4:D:576:SF4:S2	6:D:423:HOH:O	2.55	0.64
2:E:55:ARG:HH22	3:E:570:SRM:HBA2	1.62	0.64
3:A:580:SRM:HBB2	3:A:580:SRM:HMB1	1.80	0.64
3:D:580:SRM:CMB	2:E:182:CYS:HA	2.22	0.64
2:E:52:TYR:CE1	2:E:97:GLU:HG2	2.35	0.62
1:A:394:PHE:CE2	2:E:179:ALA:HB1	2.35	0.62
1:D:60:THR:HG22	2:E:257:PHE:HE1	1.64	0.60
3:A:580:SRM:HAD1	2:B:180:ASN:HB2	1.84	0.60
1:D:213:LYS:HZ3	3:D:580:SRM:CDB	2.11	0.60
3:A:580:SRM:HMB1	3:A:580:SRM:CBB	2.32	0.59
2:B:157:GLU:OE2	2:B:304:LYS:NZ	2.35	0.59
2:E:281:LEU:O	2:E:283:LYS:HE2	2.03	0.59
1:A:128:ASN:HD21	2:B:135:GLN:HE22	1.50	0.58
2:B:277:ARG:NH2	2:B:280:GLU:OE1	2.36	0.58
3:D:580:SRM:HAB1	2:E:183:GLY:H	1.68	0.56
1:D:183:PHE:CE1	1:D:292:ILE:HG22	2.40	0.56
2:E:142:THR:N	2:E:143:PRO:HD3	2.21	0.56
1:D:210:TYR:OH	3:D:580:SRM:HDA1	2.05	0.56
3:E:570:SRM:HBD2	3:E:570:SRM:CDD	2.24	0.56
2:B:197:ARG:NH2	2:B:261:ASN:HD22	2.02	0.55
1:A:255:TRP:CZ3	2:B:123:LYS:HD3	2.41	0.55
2:E:37:LYS:HB2	2:E:38:PRO:HD3	1.89	0.55
1:A:394:PHE:HE2	2:E:179:ALA:HB1	1.70	0.54
2:B:277:ARG:NH1	2:B:321:ILE:HG13	2.23	0.54
1:A:14:TRP:CD2	1:A:15:PRO:HD2	2.42	0.54
2:B:137:TRP:CE3	2:B:146:ASP:HB2	2.42	0.54
2:E:134:THR:CG2	2:E:182:CYS:HB2	2.34	0.53
1:D:183:PHE:HD2	4:D:575:SF4:S4	2.31	0.53
2:B:69:GLU:OE2	2:B:111:VAL:HG12	2.07	0.53
2:E:145:ILE:HG21	2:E:264:ALA:HB2	1.91	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:279:PRO:HD2	2:B:361:SER:HB2	1.91	0.52
2:E:272:LEU:HB2	3:E:570:SRM:CCC	2.39	0.52
1:D:417:TRP:HB3	6:D:421:HOH:O	2.09	0.52
2:B:124:GLY:HA3	2:B:316:LYS:CD	2.40	0.52
2:B:261:ASN:HD21	1:D:403:LYS:N	2.03	0.51
1:A:300:LYS:HG2	6:A:434:HOH:O	2.11	0.51
2:B:124:GLY:HA3	2:B:316:LYS:HD2	1.92	0.51
1:D:14:TRP:CD2	1:D:15:PRO:HD2	2.45	0.51
2:E:104:ILE:HG23	2:E:115:CYS:CB	2.41	0.51
2:E:157:GLU:O	2:E:158:LEU:HD23	2.09	0.51
1:A:416:MET:O	1:A:417:TRP:CB	2.58	0.50
2:E:267:MET:HG2	2:E:284:VAL:HG22	1.93	0.50
1:A:235:ILE:HD12	1:A:310:LEU:HD22	1.93	0.50
2:B:181:MET:SD	2:B:186:HIS:HB3	2.51	0.50
2:B:145:ILE:HG21	2:B:264:ALA:HB2	1.92	0.50
1:D:132:SER:H	3:D:580:SRM:CDC	2.25	0.49
2:B:82:LEU:HD23	2:B:82:LEU:H	1.75	0.49
1:A:389:PRO:HB2	2:E:283:LYS:HB3	1.94	0.49
1:D:245:ASP:OD1	1:D:247:GLU:HG2	2.12	0.49
2:E:125:GLU:C	2:E:165:HIS:HB3	2.37	0.49
1:D:416:MET:O	1:D:417:TRP:CB	2.59	0.49
1:A:186:TYR:CD1	1:A:333:VAL:HG11	2.48	0.49
1:A:24:THR:HG21	1:A:126:LEU:HD13	1.94	0.49
2:B:82:LEU:N	2:B:82:LEU:CD2	2.75	0.49
2:B:197:ARG:HA	2:B:243:TYR:CD2	2.47	0.48
1:A:288:CYS:O	1:A:289:MET:HB2	2.13	0.48
1:A:245:ASP:OD1	1:A:247:GLU:HG2	2.13	0.47
1:D:181:CYS:SG	1:D:183:PHE:HB2	2.54	0.47
2:E:177:CYS:HB2	4:E:585:SF4:S3	2.55	0.47
2:E:185:VAL:HG13	2:E:191:ALA:HB1	1.96	0.47
1:D:317:PHE:CD2	2:E:180:ASN:ND2	2.82	0.47
2:E:30:TRP:HA	2:E:45:ALA:HA	1.96	0.47
2:E:142:THR:N	2:E:143:PRO:CD	2.78	0.47
1:D:315:ALA:HB1	1:D:316:PRO:HD2	1.96	0.47
1:A:80:ARG:NH2	3:A:580:SRM:O2A	2.43	0.47
1:D:416:MET:O	1:D:417:TRP:HB3	2.15	0.47
1:A:315:ALA:HB1	1:A:316:PRO:HD2	1.97	0.47
2:B:346:ASP:HB3	2:E:354:PHE:HB2	1.96	0.47
1:D:176:MET:HE3	1:D:181:CYS:HB2	1.95	0.47
3:A:580:SRM:HHB	3:A:580:SRM:CBA	2.41	0.46
1:A:318:VAL:HB	1:A:363:GLU:OE2	2.16	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:97:MET:HB2	1:D:138:PHE:HB2	1.96	0.46
1:D:99:ILE:HB	1:D:136:ILE:HB	1.97	0.46
2:E:128:LEU:O	2:E:162:PHE:HA	2.16	0.46
1:A:109:THR:O	1:A:113:ARG:HG3	2.15	0.46
1:A:379:ARG:HH11	1:A:379:ARG:HG2	1.81	0.46
1:A:416:MET:O	1:A:417:TRP:HB3	2.16	0.46
1:D:211:LYS:NZ	3:D:580:SRM:HDA2	2.31	0.46
1:A:200:GLN:NE2	1:A:204:HIS:NE2	2.64	0.46
1:D:24:THR:HG21	1:D:126:LEU:HD13	1.97	0.46
2:E:230:LYS:CA	2:E:231:ASN:HB2	2.44	0.46
2:B:142:THR:N	2:B:143:PRO:CD	2.79	0.46
2:E:176:ALA:HB2	2:E:185:VAL:HG21	1.98	0.46
3:B:570:SRM:HDD2	3:B:570:SRM:CBD	2.34	0.46
2:B:354:PHE:HB2	2:E:346:ASP:HB3	1.97	0.45
2:E:119:TRP:CE2	2:E:170:MET:HE1	2.51	0.45
1:D:288:CYS:O	1:D:289:MET:HB2	2.16	0.45
1:A:31:ALA:HB1	1:A:36:LYS:HD2	1.98	0.45
2:E:20:HIS:HB3	2:E:23:ILE:HD12	1.99	0.45
1:D:40:MET:SD	1:D:141:THR:HA	2.56	0.45
2:B:134:THR:HG21	2:B:182:CYS:HB2	1.98	0.45
1:D:8:GLU:O	2:E:295:ARG:NH2	2.39	0.45
1:D:213:LYS:NZ	3:D:580:SRM:HDB1	2.19	0.45
1:D:318:VAL:HB	1:D:363:GLU:OE2	2.17	0.45
2:E:323:TRP:CE2	2:E:327:ILE:HD13	2.52	0.45
2:B:85:THR:HB	3:B:570:SRM:HAB1	1.97	0.45
1:D:186:TYR:CD1	1:D:333:VAL:HG11	2.52	0.45
2:B:242:MET:C	2:B:243:TYR:CG	2.95	0.44
2:B:354:PHE:HE2	2:E:349:ARG:HG2	1.82	0.44
2:E:108:GLN:HE22	2:E:114:PRO:HA	1.82	0.44
1:A:229:ARG:CG	2:B:184:ALA:HB2	2.46	0.44
1:A:79:GLY:HA2	1:A:95:HIS:ND1	2.33	0.44
1:A:208:TRP:HB3	1:A:209:PRO:CD	2.47	0.44
2:B:123:LYS:HA	2:B:123:LYS:HD2	1.82	0.44
1:A:316:PRO:HA	1:A:321:ALA:N	2.32	0.44
1:A:127:THR:O	2:B:61:LEU:HD12	2.18	0.43
2:B:307:LEU:HD12	2:B:310:TRP:CE3	2.53	0.43
3:D:580:SRM:HDD1	3:D:580:SRM:HAD1	1.85	0.43
2:B:193:VAL:HG21	2:B:267:MET:SD	2.59	0.43
2:E:271:LYS:HB3	2:E:279:PRO:HA	2.01	0.43
1:A:99:ILE:HB	1:A:136:ILE:HB	1.99	0.43
2:B:268:VAL:HG13	2:B:320:LEU:HD22	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:128:ASN:HB2	1:D:137:ILE:HB	2.00	0.43
1:A:375:LYS:N	1:A:375:LYS:HD2	2.34	0.43
1:A:416:MET:H	1:A:416:MET:HG2	1.73	0.43
1:A:97:MET:HB2	1:A:138:PHE:HB2	2.01	0.43
2:B:172:ARG:HH21	3:B:570:SRM:C2C	2.31	0.43
2:E:85:THR:HB	3:E:570:SRM:CAB	2.43	0.43
3:E:570:SRM:HAC2	3:E:570:SRM:HCD1	1.75	0.43
2:B:324:VAL:HG11	2:B:329:TRP:CE2	2.53	0.43
1:D:117:ASP:OD1	2:E:68:ARG:NH2	2.52	0.43
1:D:64:HIS:HE1	2:E:249:THR:O	2.02	0.42
2:E:307:LEU:C	2:E:307:LEU:HD23	2.44	0.42
2:B:220:CYS:HA	2:B:221:PRO:HD3	1.83	0.42
3:B:570:SRM:HCD1	3:B:570:SRM:HAC2	1.82	0.42
1:D:31:ALA:HB1	1:D:36:LYS:HD2	2.01	0.42
1:A:119:TRP:CH2	1:A:138:PHE:HB3	2.55	0.42
2:B:331:ARG:NH2	2:E:366:TRP:O	2.52	0.42
2:E:167:LEU:HA	2:E:168:PRO:HD2	1.45	0.42
1:A:326:VAL:HB	1:A:385:MET:HA	2.01	0.42
1:D:133:THR:HA	3:D:580:SRM:O2B	2.20	0.42
2:B:320:LEU:HD23	2:B:320:LEU:O	2.20	0.42
2:B:353:TYR:HA	2:E:353:TYR:HA	2.01	0.42
3:D:580:SRM:HHA	3:D:580:SRM:CEA	2.49	0.42
1:D:316:PRO:HA	1:D:321:ALA:N	2.35	0.41
2:E:134:THR:HB	4:E:585:SF4:S4	2.60	0.41
2:E:165:HIS:C	2:E:167:LEU:H	2.28	0.41
2:B:173:ILE:HA	2:B:190:ILE:O	2.21	0.41
1:D:129:PHE:HB2	2:E:62:LEU:HD22	2.03	0.41
2:E:53:VAL:HA	2:E:92:PHE:O	2.20	0.41
1:D:128:ASN:HD21	2:E:135:GLN:HE22	1.69	0.41
1:D:132:SER:H	3:D:580:SRM:HCD1	1.86	0.41
1:A:410:GLU:O	1:A:414:ARG:HG2	2.21	0.41
2:B:175:LEU:C	2:B:175:LEU:HD23	2.46	0.41
1:D:79:GLY:HA2	1:D:95:HIS:ND1	2.36	0.41
2:E:57:GLY:HA2	2:E:89:ASN:ND2	2.36	0.41
3:E:570:SRM:HMA2	3:E:570:SRM:HHA	1.79	0.41
1:A:128:ASN:O	1:A:130:HIS:HA	2.20	0.41
2:B:89:ASN:HD21	2:B:130:ASN:HB2	1.86	0.41
1:A:142:ARG:NH1	6:A:466:HOH:O	2.48	0.40
2:B:287:PRO:HG3	2:B:344:LEU:HD13	2.03	0.40
2:E:266:ILE:HB	2:E:286:VAL:HB	2.03	0.40
1:A:394:PHE:HE2	2:E:179:ALA:CB	2.33	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:261:GLU:OE2	2:E:316:LYS:HE3	2.21	0.40
2:E:108:GLN:NE2	2:E:114:PRO:HA	2.37	0.40
1:D:330:PHE:HB2	2:E:366:TRP:CH2	2.56	0.40
2:B:14:TYR:CE2	2:B:16:ARG:HB2	2.57	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	415/418 (99%)	401 (97%)	12 (3%)	2 (0%)	24	29
1	D	415/418 (99%)	403 (97%)	10 (2%)	2 (0%)	24	29
2	B	361/366 (99%)	346 (96%)	15 (4%)	0	100	100
2	E	361/366 (99%)	321 (89%)	32 (9%)	8 (2%)	5	3
All	All	1552/1568 (99%)	1471 (95%)	69 (4%)	12 (1%)	16	18

All (12) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	318	VAL
1	D	318	VAL
2	E	168	PRO
2	E	211	CYS
2	E	37	LYS
2	E	147	ALA
2	E	166	LYS
1	A	416	MET
1	D	416	MET
2	E	318	GLU
2	E	142	THR

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Mol	Chain	Res	Type
2	E	36	VAL

5.3.2 Protein sidechains ⓘ

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	353/354 (100%)	339 (96%)	14 (4%)	28	40
1	D	353/354 (100%)	339 (96%)	14 (4%)	28	40
2	B	314/317 (99%)	300 (96%)	14 (4%)	24	35
2	E	314/317 (99%)	294 (94%)	20 (6%)	16	20
All	All	1334/1342 (99%)	1272 (95%)	62 (5%)	24	34

All (62) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	5	LEU
1	A	56	LYS
1	A	67	ILE
1	A	96	THR
1	A	100	ASN
1	A	126	LEU
1	A	189	LEU
1	A	224	VAL
1	A	247	GLU
1	A	310	LEU
1	A	318	VAL
1	A	399	LYS
1	A	413	LYS
1	A	416	MET
2	B	58	THR
2	B	62	LEU
2	B	82	LEU
2	B	97	GLU
2	B	108	GLN
2	B	177	CYS

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Mol	Chain	Res	Type
2	B	188	SER
2	B	230	LYS
2	B	242	MET
2	B	243	TYR
2	B	268	VAL
2	B	316	LYS
2	B	335	LEU
2	B	349	ARG
1	D	5	LEU
1	D	56	LYS
1	D	96	THR
1	D	100	ASN
1	D	126	LEU
1	D	133	THR
1	D	189	LEU
1	D	224	VAL
1	D	229	ARG
1	D	247	GLU
1	D	310	LEU
1	D	318	VAL
1	D	413	LYS
1	D	416	MET
2	E	41	ILE
2	E	58	THR
2	E	97	GLU
2	E	100	ILE
2	E	104	ILE
2	E	105	ASN
2	E	108	GLN
2	E	142	THR
2	E	157	GLU
2	E	160	GLU
2	E	164	ASP
2	E	186	HIS
2	E	190	ILE
2	E	212	GLU
2	E	242	MET
2	E	243	TYR
2	E	268	VAL
2	E	283	LYS
2	E	335	LEU
2	E	344	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (23) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	93	HIS
1	A	100	ASN
1	A	130	HIS
1	A	200	GLN
2	B	89	ASN
2	B	108	GLN
2	B	135	GLN
2	B	231	ASN
2	B	261	ASN
2	B	313	ASN
1	D	93	HIS
1	D	100	ASN
1	D	130	HIS
1	D	200	GLN
1	D	221	ASN
1	D	293	ASN
2	E	89	ASN
2	E	108	GLN
2	E	135	GLN
2	E	180	ASN
2	E	203	ASN
2	E	246	ASN
2	E	363	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry

13 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
3	SRM	A	580	5	68,70,70	2.21	18 (26%)	86,112,112	2.73	28 (32%)
4	SF4	E	586	2	0,12,12	-	-	-		
4	SF4	D	575	1	0,12,12	-	-	-		
5	NO3	A	590	3	1,3,3	3.17	1 (100%)	0,3,3	-	-
4	SF4	A	575	1	0,12,12	-	-	-		
3	SRM	B	570	1	68,70,70	2.15	14 (20%)	86,112,112	2.99	38 (44%)
4	SF4	B	586	2	0,12,12	-	-	-		
3	SRM	E	570	-	68,70,70	2.25	14 (20%)	86,112,112	2.99	38 (44%)
4	SF4	E	585	2	0,12,12	-	-	-		
3	SRM	D	580	-	68,70,70	2.16	17 (25%)	86,112,112	2.95	29 (33%)
4	SF4	D	576	1,6	0,12,12	-	-	-		
4	SF4	B	585	2	0,12,12	-	-	-		
4	SF4	A	576	1	0,12,12	-	-	-		

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	SRM	A	580	5	2/2/19/23	11/38/126/126	-
4	SF4	E	586	2	-	-	0/6/5/5
4	SF4	D	575	1	-	-	0/6/5/5
4	SF4	A	575	1	-	-	0/6/5/5
3	SRM	B	570	1	1/1/19/23	18/38/126/126	-
4	SF4	B	586	2	-	-	0/6/5/5
3	SRM	E	570	-	1/1/19/23	19/38/126/126	-
4	SF4	E	585	2	-	-	0/6/5/5
3	SRM	D	580	-	2/2/19/23	13/38/126/126	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	SF4	D	576	1,6	-	-	0/6/5/5
4	SF4	B	585	2	-	-	0/6/5/5
4	SF4	A	576	1	-	-	0/6/5/5

All (64) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	E	570	SRM	C4A-NA	-9.50	1.28	1.35
3	B	570	SRM	C4A-NA	-8.92	1.28	1.35
3	E	570	SRM	C3C-C2C	6.76	1.50	1.36
3	D	580	SRM	C3C-C2C	6.44	1.50	1.36
3	B	570	SRM	C3C-C2C	6.30	1.49	1.36
3	A	580	SRM	C3C-C2C	6.02	1.49	1.36
3	A	580	SRM	C3A-C4A	-6.01	1.38	1.51
3	D	580	SRM	C3B-C4B	-5.64	1.39	1.51
3	D	580	SRM	C3A-C4A	-5.42	1.39	1.51
3	E	570	SRM	C4C-NC	-5.40	1.29	1.39
3	B	570	SRM	C4C-NC	-5.20	1.29	1.39
3	A	580	SRM	C3B-C4B	-5.16	1.40	1.51
3	E	570	SRM	C1C-NC	-4.97	1.30	1.39
3	A	580	SRM	FE-NA	4.90	2.10	1.94
3	A	580	SRM	FE-NB	4.85	2.09	1.94
3	D	580	SRM	FE-NA	4.49	2.08	1.94
3	A	580	SRM	C4D-C3D	4.28	1.53	1.44
3	B	570	SRM	C1C-NC	-4.27	1.31	1.39
3	B	570	SRM	C4D-C3D	4.24	1.53	1.44
3	D	580	SRM	FE-NB	4.09	2.07	1.94
3	B	570	SRM	C1D-C2D	4.00	1.52	1.44
3	A	580	SRM	C4A-NA	-3.99	1.32	1.35
3	D	580	SRM	C4D-ND	-3.84	1.32	1.39
3	E	570	SRM	C4D-C3D	3.80	1.52	1.44
3	A	580	SRM	C1D-C2D	3.64	1.51	1.44
3	D	580	SRM	C1D-C2D	3.62	1.51	1.44
3	A	580	SRM	FE-NC	3.62	2.07	1.95
3	D	580	SRM	FE-NC	3.59	2.07	1.95
3	E	570	SRM	C1C-C2C	3.48	1.51	1.45
3	E	570	SRM	C1D-C2D	3.44	1.51	1.44
3	A	580	SRM	C3D-C2D	3.40	1.55	1.40
3	D	580	SRM	C1C-NC	-3.35	1.33	1.39
3	A	580	SRM	C1C-C2C	3.26	1.50	1.45
3	D	580	SRM	C4C-NC	-3.23	1.33	1.39
3	B	570	SRM	C1C-C2C	3.22	1.50	1.45

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	590	NO3	O1-N	3.17	1.39	1.24
3	A	580	SRM	CDD-C3D	3.16	1.55	1.51
3	A	580	SRM	C4C-NC	-3.14	1.33	1.39
3	D	580	SRM	C3D-C2D	3.12	1.54	1.40
3	E	570	SRM	C4C-C3C	3.08	1.50	1.45
3	E	570	SRM	C3D-C2D	3.05	1.53	1.40
3	B	570	SRM	C1D-ND	-3.02	1.33	1.39
3	D	580	SRM	C4D-C3D	2.93	1.50	1.44
3	D	580	SRM	C1D-ND	-2.92	1.34	1.39
3	A	580	SRM	C1C-NC	-2.90	1.34	1.39
3	B	570	SRM	C3D-C2D	2.86	1.52	1.40
3	D	580	SRM	C1C-C2C	2.84	1.50	1.45
3	E	570	SRM	CDD-C3D	2.78	1.55	1.51
3	B	570	SRM	C4C-C3C	2.74	1.50	1.45
3	B	570	SRM	C2B-C3B	-2.74	1.48	1.55
3	E	570	SRM	C1D-ND	-2.74	1.34	1.39
3	D	580	SRM	FE-ND	-2.71	1.86	1.95
3	D	580	SRM	C4C-C3C	2.39	1.49	1.45
3	E	570	SRM	CDC-C2C	2.33	1.54	1.51
3	D	580	SRM	CAB-C3B	-2.33	1.49	1.54
3	A	580	SRM	C4C-C3C	2.24	1.49	1.45
3	B	570	SRM	C4D-ND	-2.22	1.35	1.39
3	B	570	SRM	CDC-C2C	2.21	1.54	1.51
3	E	570	SRM	C2B-C3B	-2.19	1.49	1.55
3	B	570	SRM	CHD-C1D	-2.19	1.34	1.39
3	E	570	SRM	C4D-ND	-2.16	1.35	1.39
3	A	580	SRM	CAA-C3A	-2.08	1.49	1.54
3	A	580	SRM	C4D-ND	-2.08	1.35	1.39
3	A	580	SRM	C1D-ND	-2.01	1.35	1.39

All (133) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	580	SRM	C2A-C3A-C4A	10.29	113.92	100.89
3	A	580	SRM	C2A-C3A-C4A	10.19	113.80	100.89
3	A	580	SRM	CAA-C3A-C4A	10.10	128.81	111.19
3	D	580	SRM	CAA-C3A-C4A	9.29	127.40	111.19
3	D	580	SRM	C2B-C3B-C4B	8.83	112.08	100.89
3	B	570	SRM	CAB-C3B-C4B	8.35	125.75	111.19
3	E	570	SRM	CAB-C3B-C4B	8.17	125.44	111.19
3	E	570	SRM	C3C-C4C-NC	7.56	117.62	110.32
3	D	580	SRM	C4D-C3D-C2D	-7.25	99.20	106.81

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	570	SRM	C2B-C1B-CHB	-7.11	117.16	123.54
3	B	570	SRM	C2B-C3B-C4B	6.92	109.66	100.89
3	E	570	SRM	C4C-C3C-C2C	-6.90	99.13	106.84
3	E	570	SRM	C1D-C2D-C3D	-6.81	99.67	106.81
3	E	570	SRM	C2B-C1B-CHB	-6.75	117.48	123.54
3	E	570	SRM	C2D-C1D-ND	6.66	117.54	110.15
3	B	570	SRM	C1D-C2D-C3D	-6.48	100.02	106.81
3	E	570	SRM	C2A-C1A-CHA	-6.44	117.76	123.54
3	B	570	SRM	C2D-C1D-ND	6.35	117.19	110.15
3	A	580	SRM	C3C-C4C-NC	6.22	116.32	110.32
3	A	580	SRM	C2B-C3B-C4B	6.20	108.75	100.89
3	B	570	SRM	C2A-C1A-CHA	-6.12	118.04	123.54
3	A	580	SRM	CMB-C2B-C3B	6.01	123.15	112.05
3	D	580	SRM	C1D-C2D-C3D	-6.00	100.52	106.81
3	D	580	SRM	CAB-C3B-C4B	5.65	121.05	111.19
3	E	570	SRM	C2B-C3B-C4B	5.64	108.04	100.89
3	B	570	SRM	C4C-C3C-C2C	-5.58	100.61	106.84
3	D	580	SRM	C1A-NA-C4A	5.51	112.15	105.34
3	B	570	SRM	C3C-C4C-NC	5.38	115.51	110.32
3	D	580	SRM	CAD-C2D-C1D	-5.32	114.54	124.94
3	D	580	SRM	CHD-C4C-NC	-5.16	118.84	124.45
3	A	580	SRM	C4C-C3C-C2C	-5.14	101.09	106.84
3	D	580	SRM	C3D-C4D-ND	-5.12	104.47	110.15
3	E	570	SRM	CDA-C2A-C1A	5.05	122.76	107.11
3	D	580	SRM	C4C-C3C-C2C	-4.95	101.30	106.84
3	A	580	SRM	C4D-ND-C1D	4.93	113.86	105.82
3	B	570	SRM	CDA-C2A-C1A	4.91	122.31	107.11
3	E	570	SRM	CAC-C3C-C2C	-4.71	118.18	129.24
3	E	570	SRM	C2C-C1C-NC	4.61	114.77	110.32
3	D	580	SRM	C3C-C4C-NC	4.55	114.72	110.32
3	B	570	SRM	CHD-C4C-C3C	-4.46	117.81	124.86
3	B	570	SRM	CAC-C3C-C2C	-4.40	118.91	129.24
3	B	570	SRM	CBC-CAC-C3C	-4.39	100.38	112.53
3	D	580	SRM	C4D-ND-C1D	4.35	112.91	105.82
3	E	570	SRM	CHC-C1C-C2C	-4.33	118.02	124.86
3	B	570	SRM	CHC-C1C-C2C	-4.33	118.03	124.86
3	B	570	SRM	C3B-C2B-C1B	-4.29	93.64	100.92
3	E	570	SRM	CHD-C4C-C3C	-4.26	118.13	124.86
3	A	580	SRM	C1A-NA-C4A	4.25	110.59	105.34
3	E	570	SRM	C1C-C2C-C3C	-4.24	102.10	106.84
3	B	570	SRM	CMB-C2B-C3B	4.12	119.65	112.05
3	E	570	SRM	C3A-C4A-NA	4.06	118.75	110.83

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	570	SRM	CEC-CDC-C2C	-4.05	103.57	113.76
3	A	580	SRM	CBD-CAD-C2D	4.01	123.61	112.53
3	E	570	SRM	C3B-C2B-C1B	-3.98	94.16	100.92
3	B	570	SRM	C3D-C4D-ND	3.98	114.56	110.15
3	A	580	SRM	C2B-C1B-CHB	-3.96	119.99	123.54
3	B	570	SRM	C4D-C3D-C2D	-3.92	102.70	106.81
3	B	570	SRM	CMA-C2A-CDA	-3.90	104.12	110.74
3	B	570	SRM	CHC-C1C-NC	3.84	128.63	124.45
3	E	570	SRM	CAD-C2D-C1D	-3.82	117.48	124.94
3	E	570	SRM	CAB-C3B-C2B	3.80	124.64	114.19
3	B	570	SRM	C1C-C2C-C3C	-3.78	102.61	106.84
3	B	570	SRM	CBD-CAD-C2D	3.77	122.96	112.53
3	B	570	SRM	C3A-C4A-NA	3.65	117.95	110.83
3	B	570	SRM	CED-CDD-C3D	3.63	122.91	113.76
3	D	580	SRM	CHC-C1C-NC	-3.61	120.52	124.45
3	E	570	SRM	C3D-C4D-ND	3.60	114.15	110.15
3	A	580	SRM	CBB-CAB-C3B	3.55	124.70	114.65
3	A	580	SRM	C3A-C2A-C1A	-3.54	94.91	100.92
3	A	580	SRM	C4D-C3D-C2D	-3.51	103.13	106.81
3	E	570	SRM	C4D-CHA-C1A	-3.47	119.48	125.87
3	D	580	SRM	CAD-C2D-C3D	-3.46	114.54	125.30
3	B	570	SRM	CAB-CBB-CCB	3.41	121.58	112.49
3	A	580	SRM	C2C-C1C-NC	3.35	113.56	110.32
3	E	570	SRM	C4D-C3D-C2D	-3.35	103.30	106.81
3	A	580	SRM	CBA-CAA-C3A	3.34	124.12	114.65
3	E	570	SRM	CBD-CAD-C2D	3.30	121.67	112.53
3	D	580	SRM	C3A-C2A-C1A	-3.22	95.45	100.92
3	E	570	SRM	CBC-CAC-C3C	-3.22	103.64	112.53
3	D	580	SRM	C3B-C2B-C1B	-3.20	95.49	100.92
3	A	580	SRM	CMA-C2A-CDA	3.20	116.17	110.74
3	E	570	SRM	CEC-CDC-C2C	-3.18	105.76	113.76
3	E	570	SRM	CAC-C3C-C4C	-3.09	118.56	124.85
3	A	580	SRM	CHC-C1C-NC	-3.07	121.11	124.45
3	A	580	SRM	C1C-C2C-C3C	-3.00	103.48	106.84
3	B	570	SRM	C4D-CHA-C1A	-2.98	120.38	125.87
3	B	570	SRM	C2C-C1C-NC	2.97	113.19	110.32
3	D	580	SRM	C2D-C1D-ND	-2.91	106.92	110.15
3	E	570	SRM	C3A-C4A-CHB	-2.91	117.13	123.33
3	E	570	SRM	CHD-C1D-C2D	-2.85	119.05	125.30
3	E	570	SRM	CMB-C2B-C3B	2.79	117.20	112.05
3	B	570	SRM	CHA-C4D-C3D	-2.77	119.23	125.30
3	D	580	SRM	C1C-C2C-C3C	-2.76	103.75	106.84

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	580	SRM	CAB-C3B-C2B	-2.71	106.72	114.19
3	E	570	SRM	CED-CDD-C3D	2.69	120.52	113.76
3	B	570	SRM	C3A-C4A-CHB	-2.67	117.64	123.33
3	B	570	SRM	CHD-C1D-C2D	-2.63	119.55	125.30
3	B	570	SRM	CAA-CBA-CCA	2.62	119.49	112.49
3	B	570	SRM	CAD-C2D-C1D	-2.61	119.84	124.94
3	D	580	SRM	CEC-CDC-C2C	-2.60	107.21	113.76
3	B	570	SRM	O2A-CCA-CBA	2.58	122.16	114.00
3	D	580	SRM	C3A-C4A-CHB	2.56	128.77	123.33
3	D	580	SRM	C3A-C4A-NA	-2.55	105.85	110.83
3	E	570	SRM	CAB-CBB-CCB	2.54	119.28	112.49
3	A	580	SRM	CED-CDD-C3D	2.53	120.14	113.76
3	A	580	SRM	C3B-C2B-C1B	-2.52	96.64	100.92
3	E	570	SRM	C1A-NA-C4A	-2.49	102.26	105.34
3	E	570	SRM	CHC-C1C-NC	2.49	127.17	124.45
3	A	580	SRM	C1D-C2D-C3D	-2.48	104.21	106.81
3	D	580	SRM	C2C-C1C-NC	2.43	112.67	110.32
3	E	570	SRM	CAA-CBA-CCA	2.43	118.97	112.49
3	B	570	SRM	C1C-CHC-C4B	-2.42	120.80	126.62
3	E	570	SRM	O2A-CCA-CBA	2.41	121.61	114.00
3	D	580	SRM	C4B-NB-C1B	2.41	108.31	105.34
3	B	570	SRM	CAB-C3B-C2B	2.37	120.71	114.19
3	A	580	SRM	CHD-C4C-NC	-2.29	121.96	124.45
3	E	570	SRM	O4B-CEB-CDB	2.29	121.60	114.35
3	A	580	SRM	CAD-CBD-CCD	-2.27	107.63	113.67
3	D	580	SRM	CBA-CAA-C3A	2.23	120.97	114.65
3	D	580	SRM	CAC-C3C-C4C	2.22	129.36	124.85
3	E	570	SRM	CAD-CBD-CCD	-2.14	108.00	113.67
3	A	580	SRM	O2B-CCB-CBB	2.12	120.69	114.00
3	D	580	SRM	O2D-CCD-CBD	2.11	120.65	114.00
3	B	570	SRM	O2B-CCB-O1B	-2.09	117.96	123.33
3	D	580	SRM	CBB-CAB-C3B	2.08	120.56	114.65
3	E	570	SRM	CHA-C4D-C3D	-2.06	120.78	125.30
3	A	580	SRM	O3B-CEB-CDB	-2.06	117.12	122.95
3	D	580	SRM	CDA-C2A-C3A	2.06	113.80	108.37
3	A	580	SRM	C3A-C4A-CHB	2.05	127.69	123.33
3	B	570	SRM	CAA-C3A-C4A	-2.05	107.62	111.19
3	A	580	SRM	CEC-CDC-C2C	2.02	118.85	113.76
3	B	570	SRM	O1C-CCC-CBC	-2.01	116.72	123.09
3	E	570	SRM	O1A-CCA-CBA	-2.00	116.75	123.09

All (6) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
3	A	580	SRM	NC
3	A	580	SRM	C3A
3	B	570	SRM	NC
3	D	580	SRM	NC
3	D	580	SRM	C3A
3	E	570	SRM	C3B

All (61) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	580	SRM	C4A-C3A-CAA-CBA
3	A	580	SRM	C4D-C3D-CDD-CED
3	B	570	SRM	C4A-C3A-CAA-CBA
3	B	570	SRM	C4B-C3B-CAB-CBB
3	B	570	SRM	C3D-C2D-CAD-CBD
3	B	570	SRM	C4D-C3D-CDD-CED
3	D	580	SRM	C1B-C2B-CDB-CEB
3	D	580	SRM	CMB-C2B-CDB-CEB
3	D	580	SRM	C1D-C2D-CAD-CBD
3	E	570	SRM	C4A-C3A-CAA-CBA
3	E	570	SRM	C4C-C3C-CAC-CBC
3	E	570	SRM	C3D-C2D-CAD-CBD
3	E	570	SRM	C2D-C3D-CDD-CED
3	E	570	SRM	C4D-C3D-CDD-CED
3	B	570	SRM	C2B-C3B-CAB-CBB
3	D	580	SRM	C3C-CAC-CBC-CCC
3	B	570	SRM	C4C-C3C-CAC-CBC
3	D	580	SRM	C2A-C3A-CAA-CBA
3	E	570	SRM	C2B-C3B-CAB-CBB
3	B	570	SRM	C3B-CAB-CBB-CCB
3	E	570	SRM	C3A-CAA-CBA-CCA
3	E	570	SRM	C3B-CAB-CBB-CCB
3	A	580	SRM	C3D-C2D-CAD-CBD
3	E	570	SRM	C4B-C3B-CAB-CBB
3	D	580	SRM	C2D-CAD-CBD-CCD
3	B	570	SRM	C3C-CAC-CBC-CCC
3	B	570	SRM	C3A-CAA-CBA-CCA
3	B	570	SRM	C3D-CDD-CED-O3D
3	B	570	SRM	C3D-CDD-CED-O4D
3	E	570	SRM	C3D-CDD-CED-O3D
3	E	570	SRM	C3D-CDD-CED-O4D
3	A	580	SRM	C3B-CAB-CBB-CCB
3	B	570	SRM	C2D-C3D-CDD-CED

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Mol	Chain	Res	Type	Atoms
3	E	570	SRM	C3C-CAC-CBC-CCC
3	B	570	SRM	C2B-CDB-CEB-O4B
3	E	570	SRM	C2B-CDB-CEB-O4B
3	D	580	SRM	CAC-CBC-CCC-O1C
3	A	580	SRM	CAB-CBB-CCB-O2B
3	A	580	SRM	CAB-CBB-CCB-O1B
3	A	580	SRM	C1A-C2A-CDA-CEA
3	D	580	SRM	CAA-CBA-CCA-O2A
3	A	580	SRM	CAC-CBC-CCC-O2C
3	D	580	SRM	CAC-CBC-CCC-O2C
3	E	570	SRM	C2B-CDB-CEB-O3B
3	A	580	SRM	CAC-CBC-CCC-O1C
3	D	580	SRM	CAA-CBA-CCA-O1A
3	A	580	SRM	CAA-CBA-CCA-O2A
3	B	570	SRM	C2B-CDB-CEB-O3B
3	E	570	SRM	C1B-C2B-CDB-CEB
3	B	570	SRM	CAA-CBA-CCA-O1A
3	A	580	SRM	CAA-CBA-CCA-O1A
3	E	570	SRM	CAC-CBC-CCC-O1C
3	B	570	SRM	CAC-CBC-CCC-O1C
3	D	580	SRM	CAB-CBB-CCB-O2B
3	B	570	SRM	CAA-CBA-CCA-O2A
3	E	570	SRM	CAC-CBC-CCC-O2C
3	B	570	SRM	CAC-CBC-CCC-O2C
3	D	580	SRM	C2D-C3D-CDD-CED
3	E	570	SRM	CAD-CBD-CCD-O2D
3	D	580	SRM	CAB-CBB-CCB-O1B
3	E	570	SRM	CAD-CBD-CCD-O1D

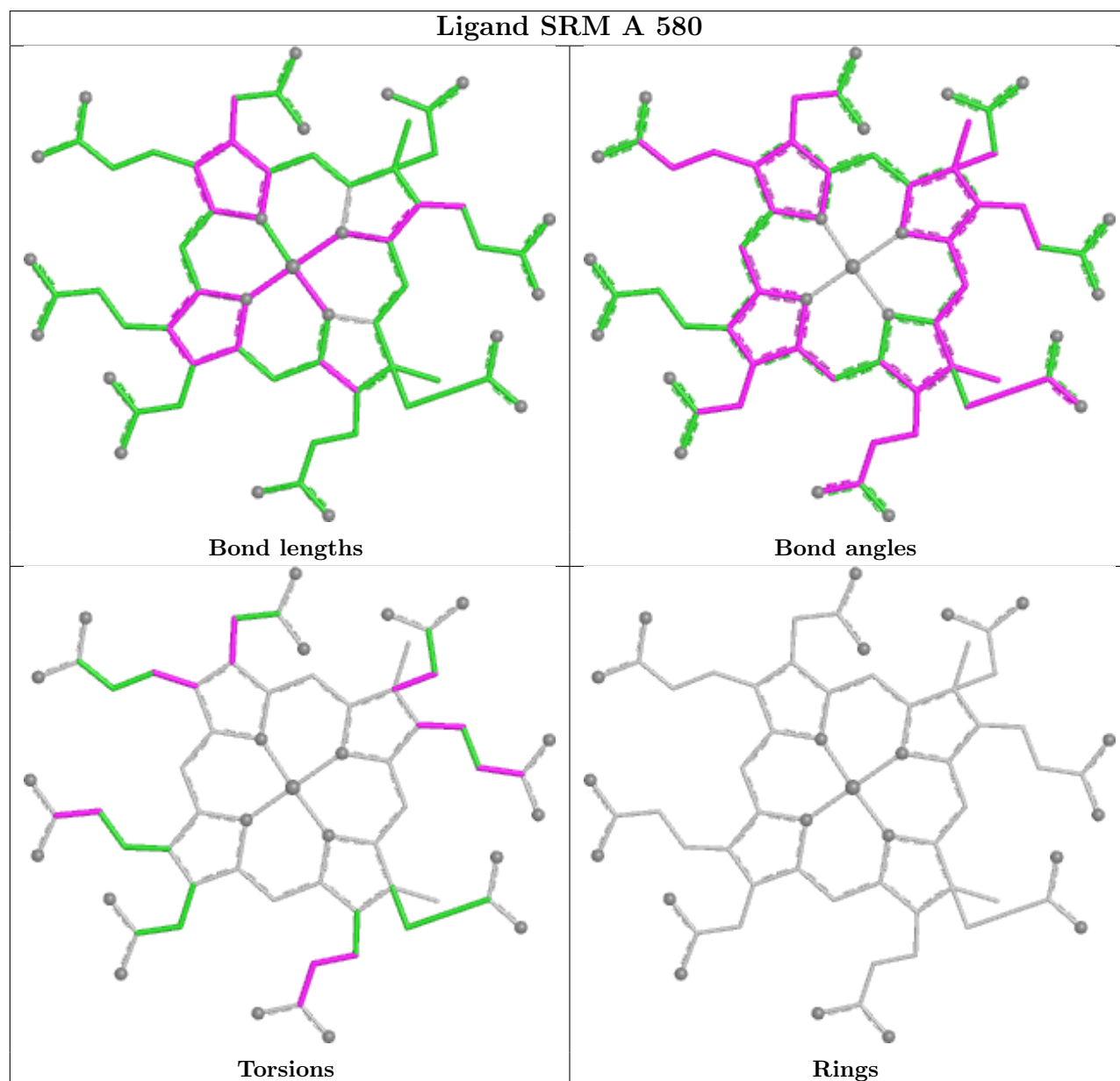
There are no ring outliers.

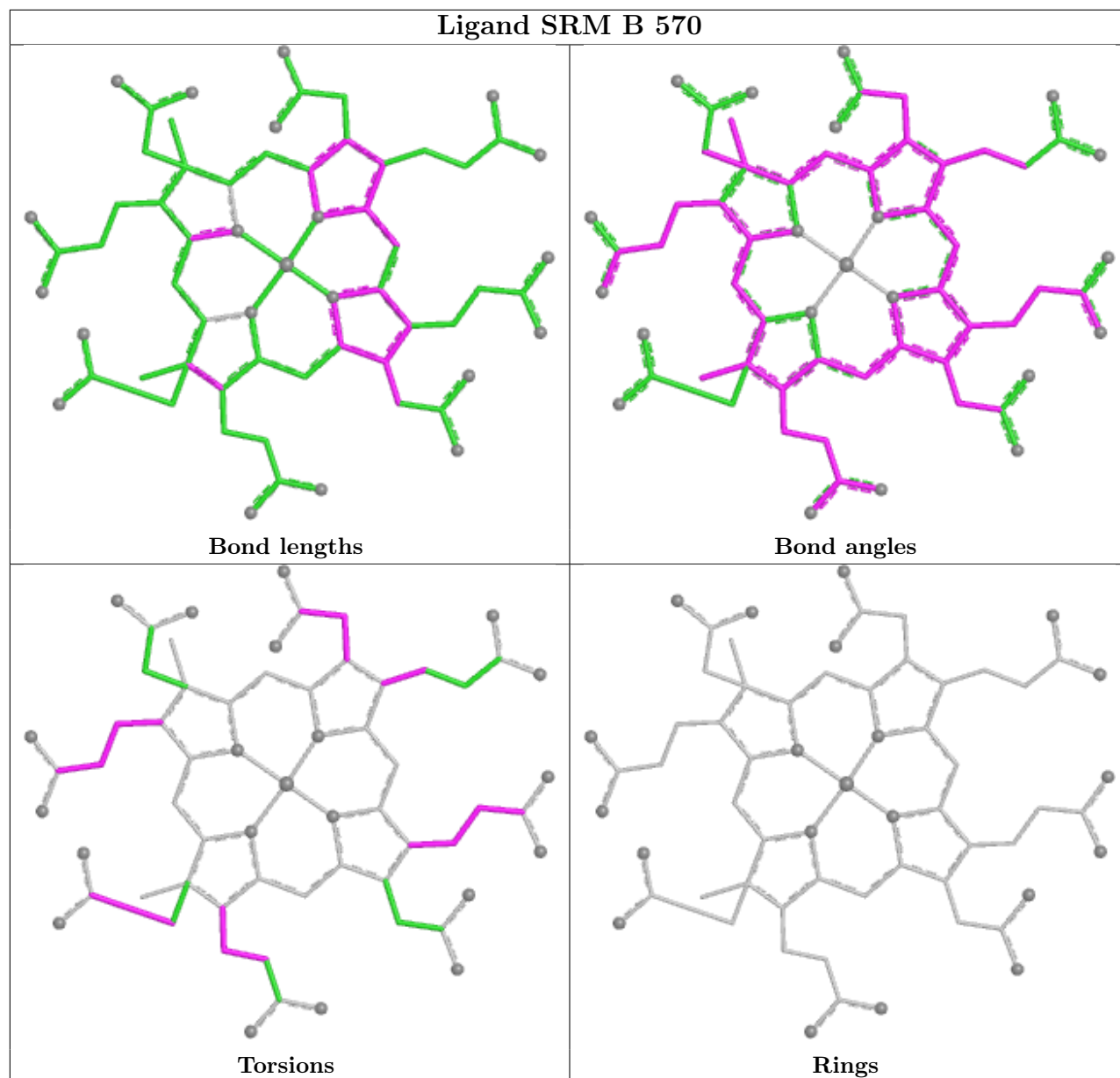
7 monomers are involved in 42 short contacts:

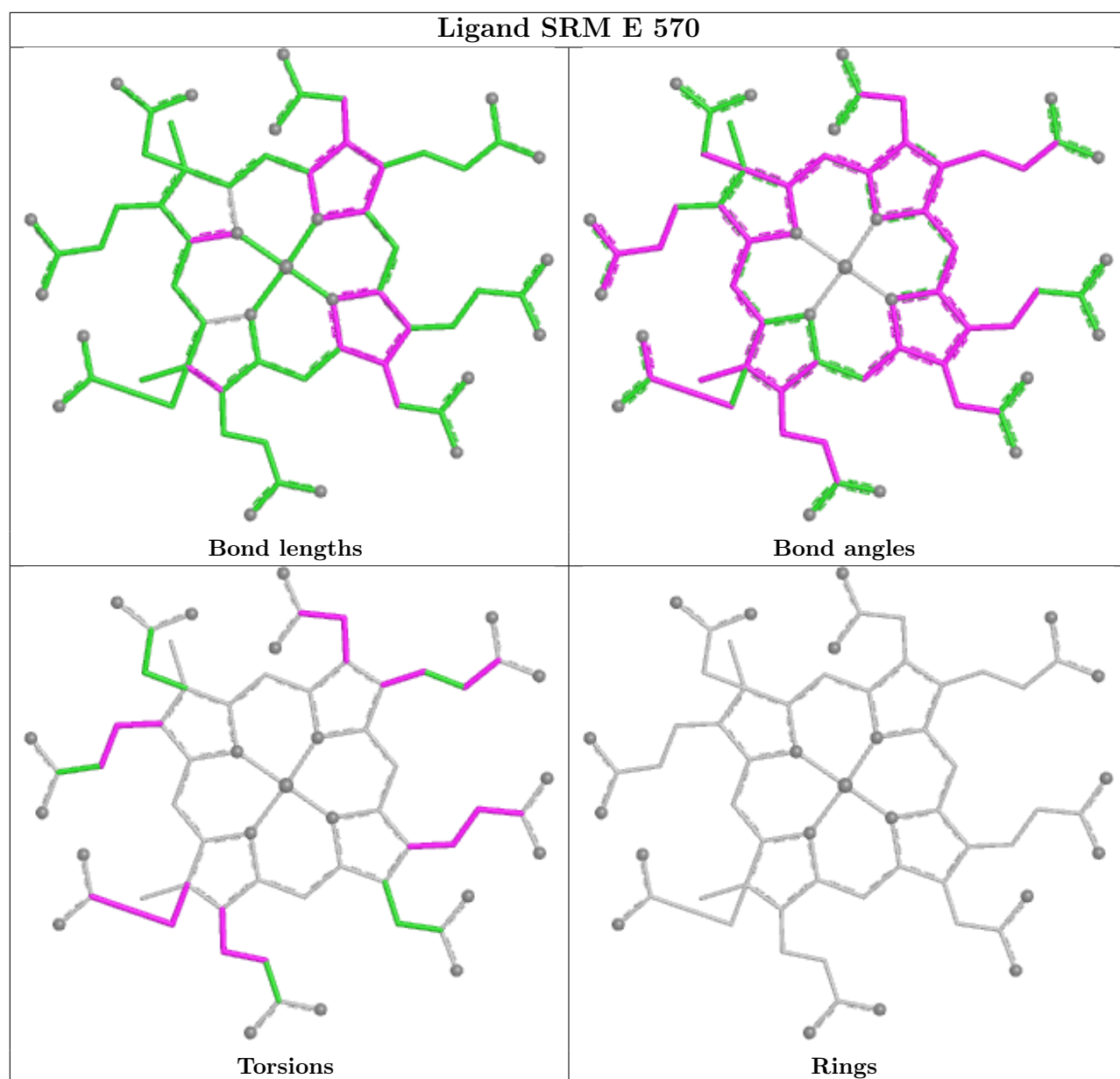
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	580	SRM	6	0
4	D	575	SF4	1	0
3	B	570	SRM	7	0
3	E	570	SRM	8	0
4	E	585	SF4	2	0
3	D	580	SRM	16	0
4	D	576	SF4	2	0

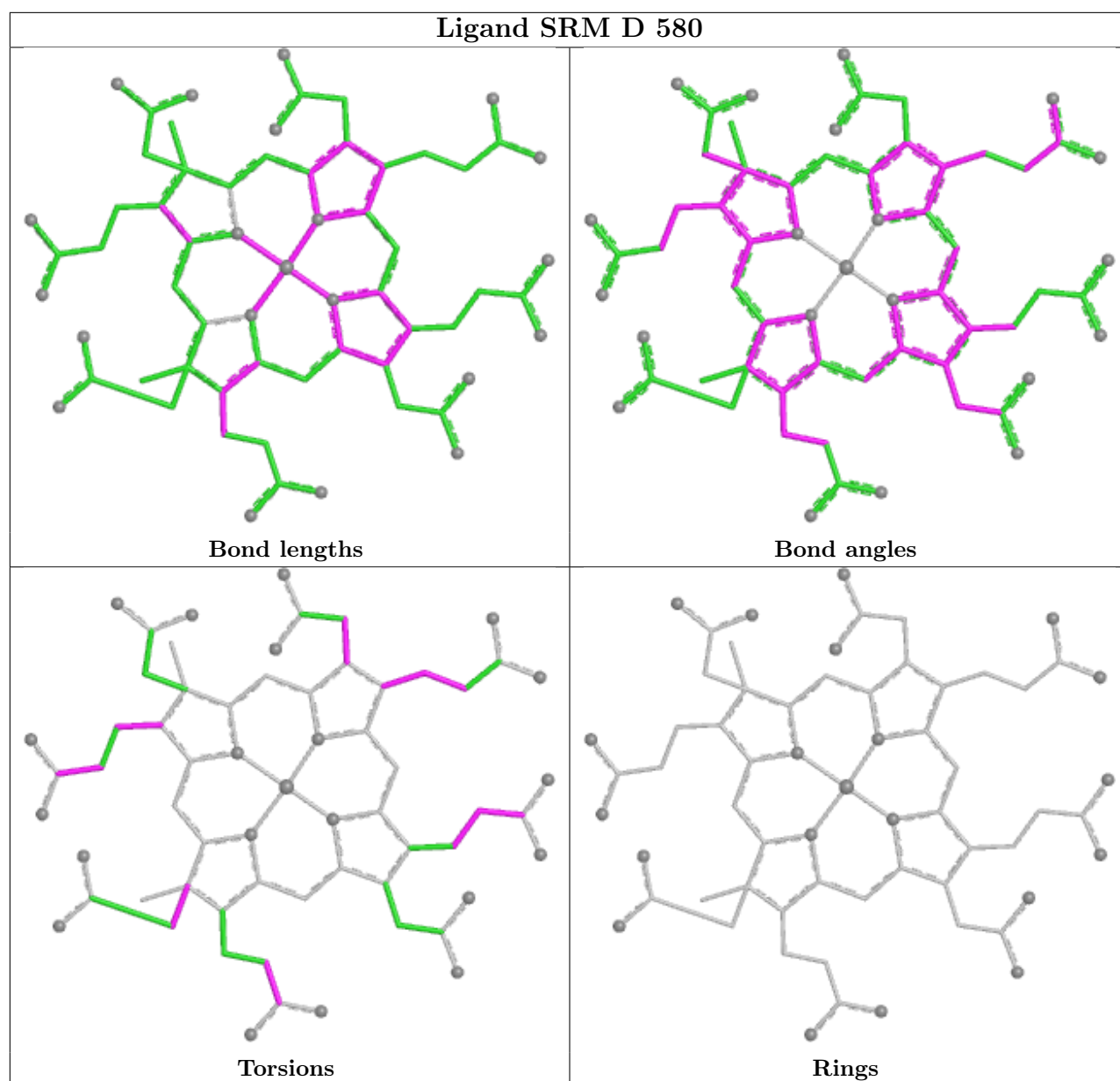
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths,

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 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

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, 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	417/418 (99%)	0.85	30 (7%) 21 22	12, 23, 42, 87	0
1	D	417/418 (99%)	0.73	26 (6%) 26 27	12, 28, 46, 71	0
2	B	363/366 (99%)	0.67	14 (3%) 43 45	10, 19, 30, 66	0
2	E	363/366 (99%)	0.74	24 (6%) 24 25	2, 21, 59, 88	0
All	All	1560/1568 (99%)	0.75	94 (6%) 27 28	2, 22, 48, 88	0

All (94) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	417	TRP	7.9
1	A	415	GLY	5.8
1	D	81	TYR	5.0
1	D	417	TRP	4.4
1	A	407	TYR	4.1
1	A	406	ALA	3.6
2	B	5	GLY	3.5
1	D	67	ILE	3.4
1	D	132	SER	3.4
2	E	5	GLY	3.4
2	E	115	CYS	3.3
1	A	396	PHE	3.3
2	E	256	LEU	3.1
1	A	416	MET	3.1
1	D	219	CYS	3.0
1	A	91	VAL	2.9
1	A	93	HIS	2.9
1	A	25	ALA	2.9
1	D	276	LYS	2.9
1	A	402	LEU	2.9
2	E	213	ILE	2.8

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Mol	Chain	Res	Type	RSRZ
2	B	182	CYS	2.8
2	E	100	ILE	2.8
2	E	200	PRO	2.8
1	A	81	TYR	2.7
1	A	410	GLU	2.7
1	A	270	ALA	2.7
2	E	229	MET	2.7
1	D	262	VAL	2.6
1	D	93	HIS	2.6
1	D	72	GLY	2.6
1	D	31	ALA	2.6
2	E	218	ALA	2.6
1	A	207	MET	2.5
2	B	107	VAL	2.5
1	A	66	GLY	2.5
2	B	70	LEU	2.5
1	D	75	GLY	2.5
2	E	223	GLY	2.5
2	E	183	GLY	2.5
2	E	4	GLU	2.4
1	A	318	VAL	2.4
2	B	4	GLU	2.4
1	D	106	PHE	2.4
2	E	6	VAL	2.4
1	D	413	LYS	2.4
2	B	61	LEU	2.4
1	D	47	LEU	2.4
2	E	126	TYR	2.4
1	D	68	VAL	2.4
2	B	364	PHE	2.3
2	E	77	TYR	2.3
1	A	56	LYS	2.3
1	A	403	LYS	2.3
2	B	229	MET	2.3
1	D	154	GLY	2.3
1	D	244	VAL	2.3
1	D	145	TYR	2.2
1	A	162	ILE	2.2
2	E	219	ALA	2.2
2	E	238	VAL	2.2
2	E	160	GLU	2.2
1	D	298	ALA	2.2

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Mol	Chain	Res	Type	RSRZ
1	D	78	ILE	2.2
2	B	181	MET	2.2
2	B	205	GLU	2.2
1	A	12	GLY	2.2
1	D	66	GLY	2.2
1	A	411	LEU	2.1
1	D	62	TRP	2.1
1	A	38	VAL	2.1
2	E	112	GLY	2.1
2	E	134	THR	2.1
1	A	409	GLU	2.1
2	E	72	ASP	2.1
2	B	108	GLN	2.1
2	E	233	THR	2.1
1	A	111	ALA	2.1
2	E	231	ASN	2.1
2	E	255	PRO	2.1
1	D	415	GLY	2.1
1	A	9	LEU	2.1
2	B	17	ASP	2.1
1	A	404	PRO	2.1
1	A	18	VAL	2.1
1	A	414	ARG	2.1
2	B	230	LYS	2.0
1	D	96	THR	2.0
2	E	182	CYS	2.0
1	D	91	VAL	2.0
1	A	94	PHE	2.0
1	A	86	GLU	2.0
1	D	1	SER	2.0
2	B	69	GLU	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

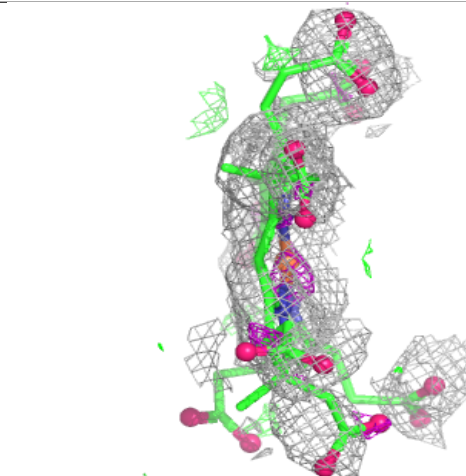
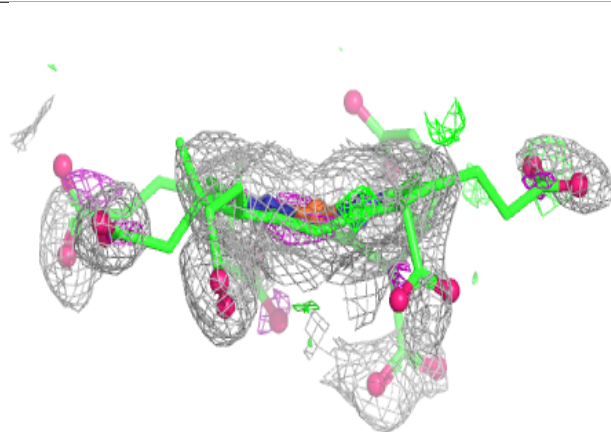
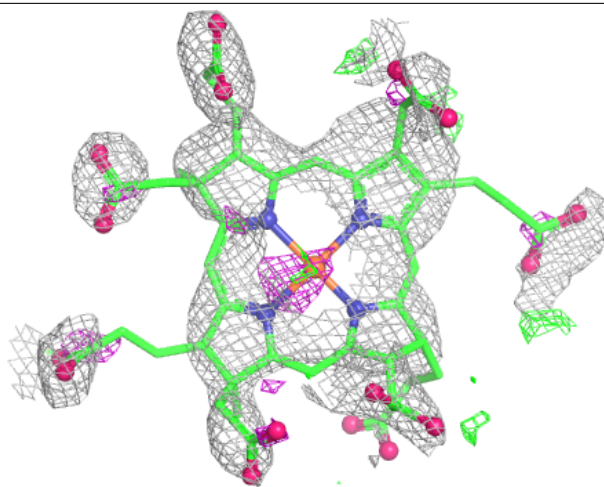
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	SRM	D	580	63/63	0.74	0.17	51,71,81,83	0
4	SF4	E	585	8/8	0.81	0.12	97,104,107,112	0
3	SRM	E	570	63/63	0.83	0.13	15,21,26,30	0
5	NO3	A	590	4/4	0.89	0.16	39,39,43,45	0
4	SF4	A	576	8/8	0.91	0.09	11,11,14,14	0
4	SF4	D	575	8/8	0.93	0.16	15,17,17,18	0
4	SF4	D	576	8/8	0.93	0.12	14,16,17,18	0
3	SRM	A	580	63/63	0.94	0.10	22,30,40,48	0
4	SF4	E	586	8/8	0.95	0.14	38,40,44,46	0
3	SRM	B	570	63/63	0.95	0.08	16,18,24,30	0
4	SF4	B	585	8/8	0.96	0.07	21,24,26,28	0
4	SF4	B	586	8/8	0.97	0.06	16,17,20,21	0
4	SF4	A	575	8/8	0.97	0.05	15,19,23,23	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.

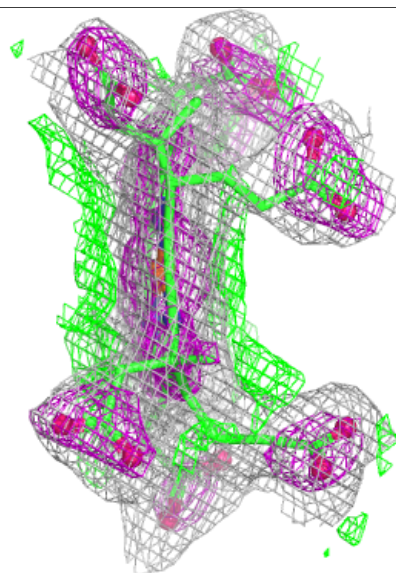
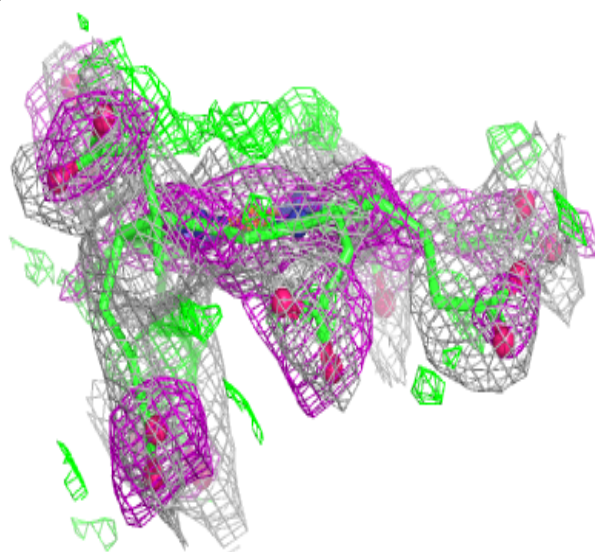
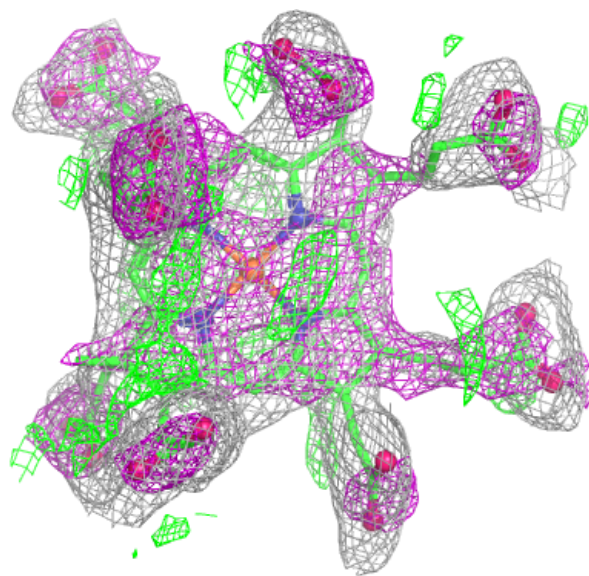
Electron density around SRM D 580:

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



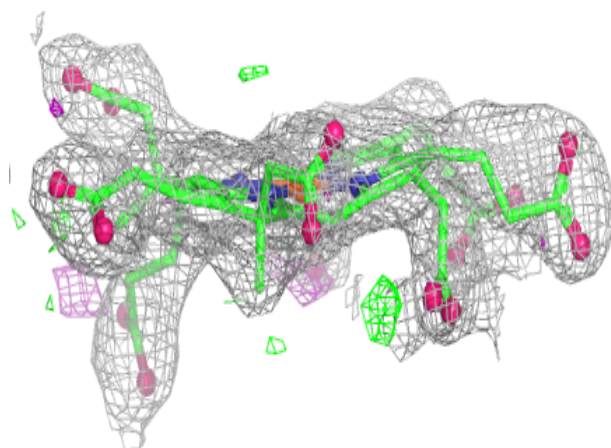
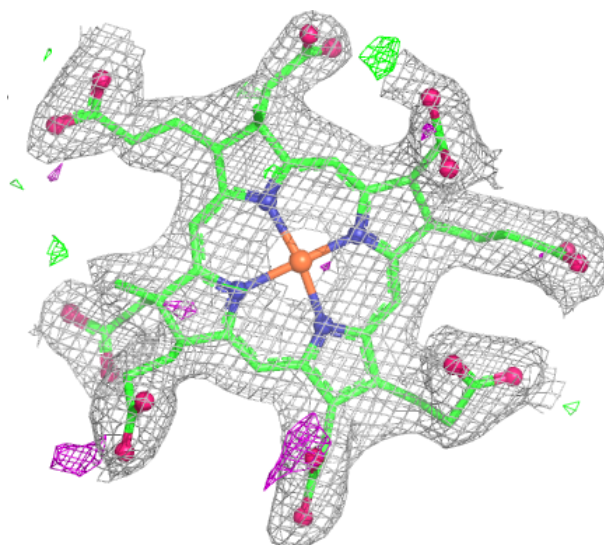
Electron density around SRM E 570:

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



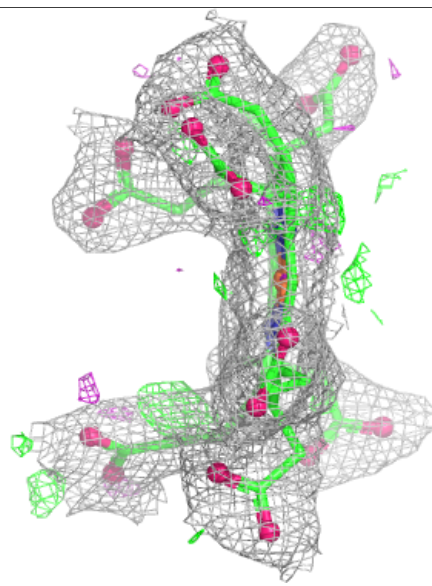
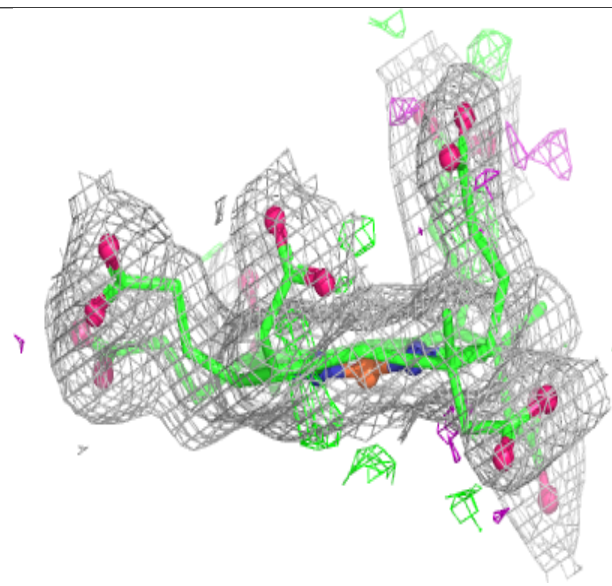
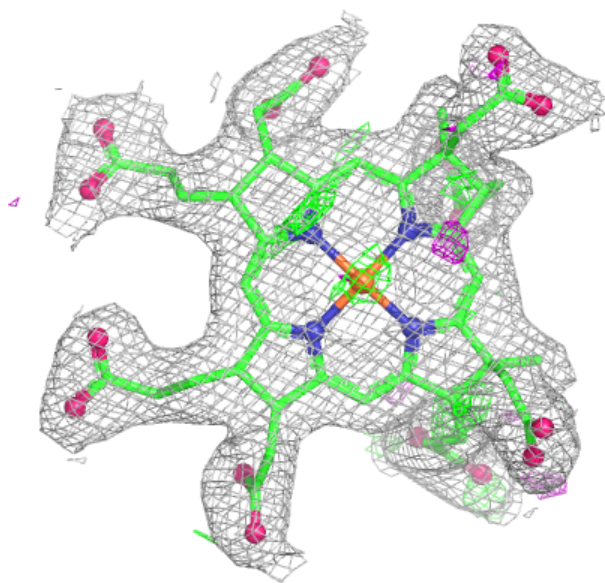
Electron density around SRM A 580:

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



Electron density around SRM B 570:

$2mF_o-DF_c$ (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.