Full wwPDB X-ray Structure Validation Report (i)

Dec 19, 2023 – 01:17 PM EST

PDB ID	:	3MM9
Title	:	Dissimilatory sulfite reductase nitrite complex
Authors	:	Parey, K.; Warkentin, E.; Kroneck, P.M.H.; Ermler, U.
Deposited on	:	2010-04-19
Resolution	:	2.10 Å(reported)

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

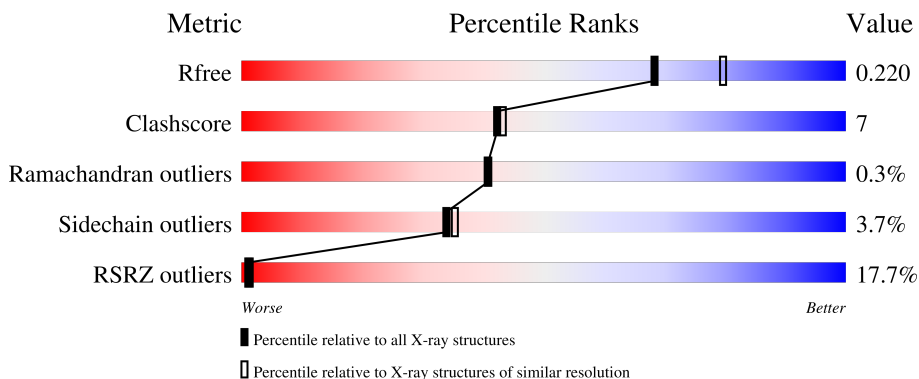|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh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

1   Overall quality at a glance ⓘ

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

The reported resolution of this entry is 2.10 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	Percentile Ranks	Value
Rfree		0.220
Clashscore		7
Ramachandran outliers		0.3%
Sidechain outliers		3.7%
RSRZ outliers		17.7%

Worse   *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	130704	5197 (2.10-2.10)
Clashscore	141614	5710 (2.10-2.10)
Ramachandran outliers	138981	5647 (2.10-2.10)
Sidechain outliers	138945	5648 (2.10-2.10)
RSRZ outliers	127900	5083 (2.10-2.10)

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	418	7% / 89% / 11%
1	D	418	25% / 82% / 17% ·
2	B	366	5% / 85% / 13% ··
2	E	366	33% / 73% / 23% ··

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	-	-	-

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 13261 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
			3330	2134	557	613	26			
1	D	417	Total	C	N	O	S	0	0	0
			3330	2134	557	613	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	1	0
			2907	1865	492	527	23			
2	E	363	Total	C	N	O	S	0	0	0
			2901	1862	491	526	22			

- Molecule 3 is SIROHEME (three-letter code: SRM) (formula: $C_{42}H_{44}FeN_4O_{16}$).
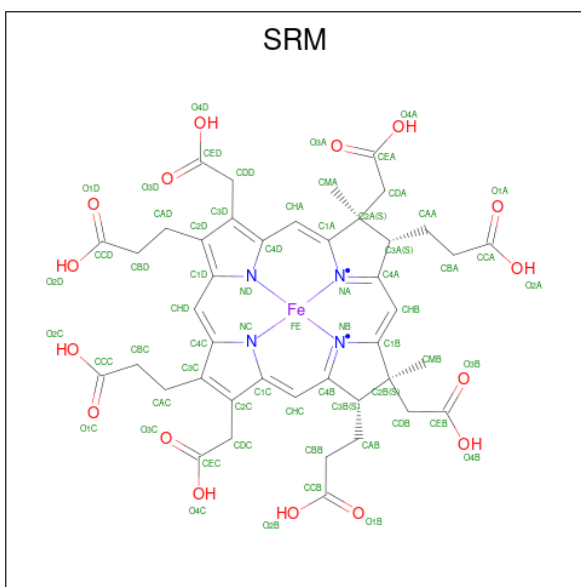
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	Fe	N	O	0	0
			63	42	1	4	16		
3	B	1	Total	C	Fe	N	O	0	0
			63	42	1	4	16		
3	D	1	Total	C	Fe	N	O	0	0
			63	42	1	4	16		
3	E	1	Total	C	Fe	N	O	0	0
			63	42	1	4	16		

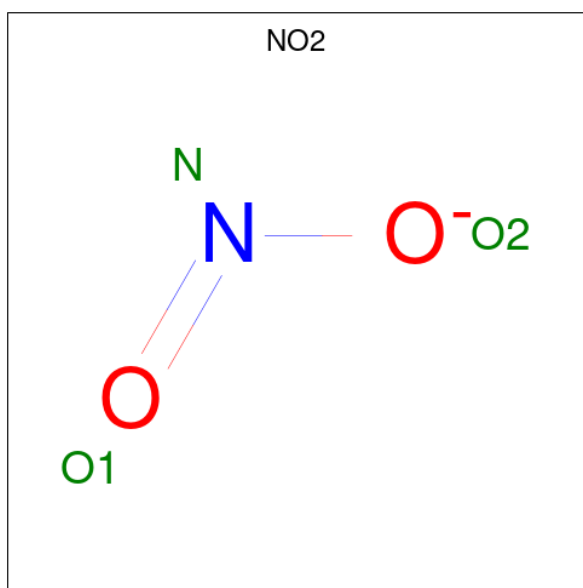- Molecule 4 is IRON/SULFUR CLUSTER (three-letter code: SF4) (formula: Fe_4S_4).
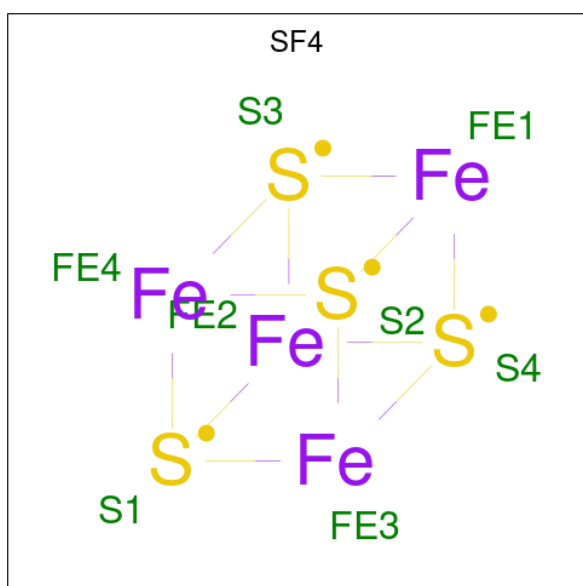
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	Fe	S	0	0
			8	4	4		
4	A	1	Total	Fe	S	0	0
			8	4	4		
4	B	1	Total	Fe	S	0	0
			8	4	4		
4	B	1	Total	Fe	S	0	0
			8	4	4		
4	D	1	Total	Fe	S	0	0
			8	4	4		
4	D	1	Total	Fe	S	0	0
			8	4	4		
4	E	1	Total	Fe	S	0	0
			8	4	4		
4	E	1	Total	Fe	S	0	0
			8	4	4		

- Molecule 5 is NITRITE ION (three-letter code: NO2) (formula: NO_2).

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total 3	N 1	O 2	0	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	199	Total 199	O 199	0	0
6	B	226	Total 226	O 226	0	0
6	D	31	Total 31	O 31	0	0
6	E	18	Total 18	O 18	0	0

3 Residue-property plots ⓘ

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

Chain A:

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

Chain D:

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

Chain B:

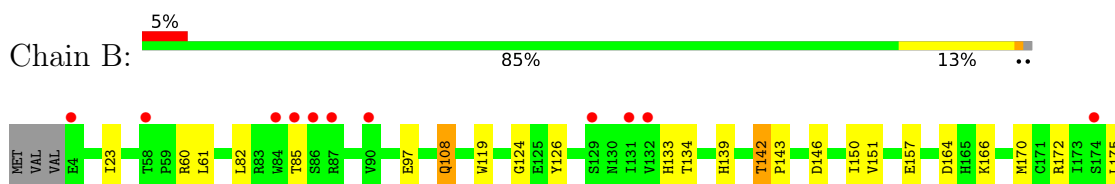A176 C177 M181 C182 V185 H186 A187 S188 R197 C220 P221 D228 M229 K230 K235 M242 Y243 C244 F257 G270 K271 L272 R277 M278 P279 E280 L281 S282 K283 L299 V300 N313 K316 Q342 Y353 S361 W366

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

Chain E:

33%

73%   23%

MET VAL VAL E4 G5 V6 K7 T8 G11 Y14 F15 R16 D17 L18 L19 H20 P21 V22 I23 A24 K25 N26 Y27 G28 K29 W30 H33 E34 V40 I41 K42 R43 E46 S47 G48 D49 V50 I51 Y52 V53 V54 R55 T58 P59 R60 L61 L62 T66 E69 L70 C71 D72

I73 A74 D75 K76 Y77 S78 D79 G80 Y81 L82 R83 W84 T85 S86 R87 N88 N89 F92 F93 V94 T95 D96 E97 S98 K99 I100 D101 D102 L103 I104 N105 E106 V107 Q108 E109 R110 V111 G112 F113 P114 C115 G116 G117 V122 K123 G124 E125 N130 I131 V132 H133 T134 Q135 H139 C140 H141

T142 P143 D146 A147 S148 G149 I150 V151 K152 E157 L158 Y159 D164 H165 C171 R172 I173 S174 L175 A176 C177 N180 M181 C182 G183 A184 V185 H186 A187 S188 V193 P199 P200 I201 P202 N203 D204 E205 A206 I207 R208 K209 T210 C211 E212 I213 P214 S215 T216 V217 A218 A219

L225 K226 P227 D228 M229 K230 N231 K232 T233 I234 K235 V236 D237 M242 Y243 Y248 P252 G253 M254 P255 L256 G263 A264 M267 V268 G269 L272 R277 L281 S282 K283 V284 W288 E292 P293 P294 R295 W296 P297 T298 L299 V300 I306 W310 K316 H317

L320 I321 L338 Y353 W366

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	94.96Å 69.09Å 145.55Å 90.00° 107.46° 90.00°	Depositor
Resolution (Å)	20.00 – 2.10 47.46 – 2.10	Depositor EDS
% Data completeness (in resolution range)	90.7 (20.00-2.10) 90.6 (47.46-2.10)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	0.07	Depositor
$< I/\sigma(I) >$ [1]	3.75 (at 2.10Å)	Xtriage
Refinement program	REFMAC 5.6.0046	Depositor
R, R_{free}	0.181 , 0.219 0.181 , 0.220	Depositor DCC
R_{free} test set	4775 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	34.1	Xtriage
Anisotropy	0.478	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 51.3	EDS
L-test for twinning[2]	$< |L| > = 0.48, < L^2 > = 0.31$	Xtriage
Estimated twinning fraction	0.019 for h,-k,-h-l	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	13261	wwPDB-VP
Average B, all atoms (Å^2)	62.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.58% of the height of the origin peak. No significant pseudotranslation is detected.*

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[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: NO2, SRM, 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	0.80	0/3417	0.74	2/4610 (0.0%)
1	D	0.65	4/3417 (0.1%)	0.63	0/4610
2	B	0.86	0/2990	0.81	4/4066 (0.1%)
2	E	0.69	3/2984 (0.1%)	0.67	1/4058 (0.0%)
All	All	0.75	7/12808 (0.1%)	0.71	7/17344 (0.0%)

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	99	LYS	CD-CE	13.18	1.84	1.51
1	D	23	LYS	CD-CE	11.96	1.81	1.51
1	D	117	ASP	CG-OD2	7.48	1.42	1.25
1	D	117	ASP	CG-OD1	5.71	1.38	1.25
2	E	106	GLU	CG-CD	5.50	1.60	1.51
1	D	113	ARG	NE-CZ	5.32	1.40	1.33
2	E	107	VAL	C-O	5.13	1.33	1.23

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	172	ARG	NE-CZ-NH2	-7.46	116.57	120.30
2	B	108	GLN	CA-CB-CG	5.83	126.23	113.40
1	A	287	ARG	NE-CZ-NH2	-5.63	117.48	120.30
2	B	60	ARG	NE-CZ-NH2	-5.32	117.64	120.30
2	B	197	ARG	NE-CZ-NH1	-5.25	117.67	120.30
1	A	360	ARG	NE-CZ-NH1	5.07	122.84	120.30
2	E	72	ASP	CB-CG-OD2	-5.02	113.78	118.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3330	0	3276	27	0
1	D	3330	0	3276	51	0
2	B	2907	0	2840	37	0
2	E	2901	0	2838	65	0
3	A	63	0	34	6	0
3	B	63	0	34	3	0
3	D	63	0	34	10	0
3	E	63	0	34	12	0
4	A	16	0	0	0	0
4	B	16	0	0	0	0
4	D	16	0	0	1	0
4	E	16	0	0	1	0
5	A	3	0	0	0	0
6	A	199	0	0	1	0
6	B	226	0	0	1	0
6	D	31	0	0	1	0
6	E	18	0	0	6	0
All	All	13261	0	12366	174	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 7.

All (174) 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:23:LYS:CD	1:D:23:LYS:CE	1.81	1.57
2:E:99:LYS:CD	2:E:99:LYS:CE	1.84	1.55
1:D:218:GLY:HA3	6:D:462:HOH:O	1.60	1.01
1:D:25:ALA:HB2	1:D:44:ALA:HB3	1.44	0.96
2:E:230:LYS:HB2	2:E:231:ASN:HB2	1.53	0.89
2:B:181:MET:HG2	2:B:185:VAL:CG2	2.03	0.87
2:E:85:THR:HB	3:E:570:SRM:HAB2	1.56	0.86
3:D:580:SRM:HMB1	3:D:580:SRM:HBB2	1.58	0.85
2:E:134:THR:HB	4:E:585:SF4:S4	2.18	0.84
1:A:94:PHE:O	2:B:139:HIS:HE1	1.61	0.84

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:E:570:SRM:HDD2	3:E:570:SRM:HBD2	1.59	0.84
1:D:128:ASN:HB2	1:D:137:ILE:HB	1.61	0.81
2:B:181:MET:HG2	2:B:185:VAL:HG21	1.61	0.81
4:D:575:SF4:S4	6:E:465:HOH:O	2.38	0.81
1:A:147:GLN:HB3	1:A:148:PRO:HD3	1.66	0.78
2:E:230:LYS:CB	2:E:231:ASN:HB2	2.14	0.77
3:A:580:SRM:O2A	2:B:139:HIS:HD2	1.68	0.75
1:D:235:ILE:HD12	1:D:310:LEU:HD22	1.69	0.74
2:B:85:THR:HB	3:B:570:SRM:HAB1	1.68	0.74
2:E:52:TYR:CE1	2:E:97:GLU:HB3	2.26	0.71
1:D:211:LYS:NZ	3:D:580:SRM:HDD2	2.05	0.70
2:E:99:LYS:CE	2:E:99:LYS:CG	2.69	0.70
2:B:181:MET:HG2	2:B:185:VAL:HG23	1.74	0.68
2:E:125:GLU:HB3	2:E:165:HIS:HB3	1.75	0.67
1:A:235:ILE:HD12	1:A:310:LEU:HD22	1.77	0.66
3:D:580:SRM:HBB2	3:D:580:SRM:CMB	2.26	0.65
2:E:55:ARG:HH22	3:E:570:SRM:HBA2	1.61	0.65
1:D:66:GLY:H	1:D:81:TYR:HE1	1.44	0.64
2:E:140:CYS:HB3	6:E:376:HOH:O	1.98	0.63
1:D:23:LYS:CE	1:D:23:LYS:CG	2.75	0.62
2:E:230:LYS:CA	2:E:231:ASN:HB2	2.29	0.62
2:B:313:ASN:HB3	6:B:490:HOH:O	2.00	0.61
1:D:127:THR:C	1:D:128:ASN:HD22	2.04	0.61
2:E:106:GLU:O	2:E:110:ARG:HG3	2.02	0.60
1:A:339:GLU:OE2	1:A:379:ARG:NH2	2.35	0.60
1:D:129:PHE:HB2	2:E:62:LEU:HD12	1.85	0.59
3:A:580:SRM:O2A	2:B:139:HIS:CD2	2.52	0.59
2:E:146:ASP:O	2:E:150:ILE:HD12	2.02	0.59
2:E:199:PRO:HA	6:E:474:HOH:O	2.03	0.58
1:D:211:LYS:HZ3	3:D:580:SRM:HDD2	1.68	0.58
1:A:127:THR:O	2:B:61:LEU:HD12	2.04	0.57
1:D:128:ASN:OD1	2:E:60:ARG:NH1	2.38	0.57
1:D:57:ASP:HB3	1:D:59:LYS:HG2	1.87	0.56
3:E:570:SRM:HHA	3:E:570:SRM:O4D	2.06	0.56
2:E:124:GLY:HA3	2:E:316:LYS:HD2	1.87	0.56
1:D:45:ARG:HG2	1:D:49:LYS:HE2	1.88	0.56
2:E:108:GLN:HE22	2:E:114:PRO:HA	1.71	0.55
2:E:134:THR:CG2	2:E:182:CYS:HB2	2.36	0.55
2:E:296:TRP:N	2:E:297:PRO:CD	2.69	0.55
1:D:178:PRO:HG3	1:D:187:ASP:HA	1.88	0.55
1:D:253:ALA:HB2	1:D:258:ILE:HD12	1.89	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:41:ILE:HD11	2:E:55:ARG:HH21	1.71	0.55
2:E:267:MET:HG2	2:E:284:VAL:HG22	1.88	0.55
1:A:393:PRO:HG3	2:E:181:MET:HE1	1.89	0.54
2:E:272:LEU:HB2	3:E:570:SRM:CCC	2.37	0.54
2:E:66:THR:O	2:E:70:LEU:HG	2.08	0.54
1:A:186:TYR:CD1	1:A:333:VAL:HG11	2.43	0.54
1:D:99:ILE:HB	1:D:136:ILE:HB	1.89	0.54
1:A:315:ALA:HB1	1:A:316:PRO:HD2	1.90	0.53
2:B:157:GLU:HG3	2:B:300:VAL:HG11	1.89	0.53
1:D:23:LYS:CD	1:D:23:LYS:NZ	2.67	0.53
1:D:14:TRP:O	2:E:152:LYS:NZ	2.35	0.52
1:A:14:TRP:CD2	1:A:15:PRO:HD2	2.45	0.52
1:D:147:GLN:HB3	1:D:148:PRO:HD3	1.92	0.52
1:A:310:LEU:HD12	1:A:326:VAL:HA	1.91	0.52
3:D:580:SRM:HHB	3:D:580:SRM:HBA1	1.92	0.52
2:B:82:LEU:N	2:B:82:LEU:HD23	2.25	0.52
1:D:25:ALA:CB	1:D:44:ALA:HB3	2.30	0.52
2:E:87:ARG:CZ	2:E:172:ARG:HD2	2.40	0.52
1:D:133:THR:H	3:D:580:SRM:HAB2	1.75	0.51
1:A:96:THR:HG23	2:B:139:HIS:NE2	2.25	0.51
2:E:243:TYR:HA	6:E:474:HOH:O	2.09	0.51
1:D:131:GLY:HA3	3:D:580:SRM:HBB1	1.93	0.51
2:E:40:VAL:HG13	2:E:54:VAL:HG22	1.93	0.51
2:E:176:ALA:HB2	2:E:185:VAL:HG21	1.92	0.51
1:A:40:MET:SD	1:A:141:THR:HA	2.52	0.50
2:E:193:VAL:HG21	2:E:267:MET:SD	2.51	0.50
2:E:58:THR:HG22	2:E:113:PHE:CD2	2.47	0.49
2:E:233:THR:OG1	2:E:234:ILE:N	2.45	0.49
2:E:142:THR:N	2:E:143:PRO:HD3	2.27	0.49
1:D:112:LEU:HA	1:D:115:LEU:HD12	1.94	0.49
2:B:181:MET:CG	2:B:185:VAL:HG21	2.38	0.49
2:E:86:SER:OG	3:E:570:SRM:HAB1	2.13	0.49
2:E:134:THR:HG21	2:E:182:CYS:HB2	1.95	0.49
3:A:580:SRM:CBB	3:A:580:SRM:CMB	2.90	0.48
2:B:142:THR:HA	2:B:257:PHE:HZ	1.78	0.48
1:D:55:TYR:CD1	2:E:293:PRO:HB3	2.49	0.48
1:A:330:PHE:HB2	2:B:366:TRP:CH2	2.49	0.48
1:D:399:LYS:HB2	1:D:417:TRP:CZ2	2.48	0.48
1:D:82:SER:HB3	1:D:91:VAL:O	2.14	0.47
1:D:211:LYS:HZ1	3:D:580:SRM:HDD2	1.79	0.47
1:A:99:ILE:HB	1:A:136:ILE:HB	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:142:ARG:HH11	1:D:142:ARG:HG2	1.78	0.47
3:E:570:SRM:HAC2	3:E:570:SRM:HCD1	1.60	0.47
2:E:58:THR:HG22	2:E:113:PHE:CE2	2.51	0.46
2:E:263:GLY:HA3	2:E:288:TRP:NE1	2.30	0.46
1:A:77:VAL:HG13	1:A:96:THR:O	2.16	0.46
1:D:14:TRP:CD2	1:D:15:PRO:HD2	2.50	0.46
2:B:134:THR:OG1	2:B:177:CYS:SG	2.69	0.46
1:D:96:THR:HG23	2:E:139:HIS:CE1	2.50	0.46
2:E:210:THR:OG1	2:E:252:PRO:HG2	2.16	0.46
3:E:570:SRM:HMA3	3:E:570:SRM:O2A	2.15	0.46
1:A:402:LEU:HD12	1:A:417:TRP:HH2	1.80	0.46
1:D:151:GLU:HG2	2:E:6:VAL:HG22	1.96	0.46
2:B:124:GLY:HA3	2:B:316:LYS:HD3	1.98	0.45
1:D:316:PRO:HG3	1:D:321:ALA:HB2	1.98	0.45
2:E:16:ARG:HA	2:E:19:LEU:HD12	1.98	0.45
2:B:119:TRP:HB2	2:B:126:TYR:CD2	2.51	0.45
1:D:288:CYS:O	1:D:289:MET:HB2	2.17	0.45
1:D:59:LYS:HE3	1:D:61:HIS:CE1	2.51	0.45
3:A:580:SRM:C4C	2:B:182[B]:CYS:HA	2.46	0.45
1:D:37:ASP:O	1:D:121:LYS:HG3	2.16	0.45
2:E:34:GLU:O	2:E:42:LYS:HB3	2.16	0.45
1:A:128:ASN:HD22	2:B:61:LEU:HA	1.81	0.45
1:A:315:ALA:HB1	1:A:316:PRO:CD	2.47	0.45
1:D:80:ARG:NH2	3:D:580:SRM:O3A	2.49	0.45
1:D:317:PHE:HE2	2:E:180:ASN:HD22	1.65	0.44
2:E:157:GLU:HG3	2:E:300:VAL:HG11	1.99	0.44
2:E:134:THR:HG22	2:E:182:CYS:HB2	1.97	0.44
2:E:264:ALA:O	2:E:288:TRP:HA	2.18	0.44
2:B:146:ASP:O	2:B:150:ILE:HD12	2.18	0.44
2:B:181:MET:CG	2:B:185:VAL:CG2	2.89	0.44
1:D:80:ARG:HD3	1:D:80:ARG:HA	1.85	0.44
3:D:580:SRM:CMB	3:D:580:SRM:CBB	2.91	0.44
1:A:119:TRP:CH2	1:A:141:THR:HB	2.54	0.43
1:A:393:PRO:CG	2:E:181:MET:HE1	2.48	0.43
3:A:580:SRM:CCA	2:B:139:HIS:HD2	2.31	0.43
1:D:36:LYS:O	1:D:38:VAL:N	2.51	0.43
2:E:33:HIS:HB3	2:E:43:ARG:NH1	2.33	0.43
1:A:94:PHE:O	2:B:139:HIS:CE1	2.53	0.43
2:E:316:LYS:HG2	2:E:317:HIS:CD2	2.53	0.43
2:E:306:ILE:HD11	2:E:338:LEU:HD11	2.01	0.43
2:E:85:THR:CB	3:E:570:SRM:HAB2	2.40	0.43

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Full wwPDB X-ray Structure Validation Report

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:330:PHE:HB2	2:E:366:TRP:CH2	2.53	0.43
3:E:570:SRM:HDD2	3:E:570:SRM:CBD	2.40	0.43
2:B:228:ASP:HB2	2:B:235:LYS:HG3	2.00	0.42
1:D:248:ALA:O	1:D:251:GLU:HB3	2.20	0.42
1:D:129:PHE:HA	1:D:130:HIS:HA	1.73	0.42
2:B:142:THR:N	2:B:143:PRO:CD	2.83	0.42
2:B:175:LEU:C	2:B:175:LEU:HD23	2.40	0.42
1:D:235:ILE:CD1	1:D:310:LEU:HD22	2.46	0.42
3:A:580:SRM:HBB2	3:A:580:SRM:HMB3	2.01	0.42
1:D:310:LEU:HD12	1:D:326:VAL:HA	2.01	0.42
2:E:320:LEU:C	2:E:320:LEU:HD23	2.39	0.42
1:A:96:THR:HG22	1:A:139:LEU:HA	2.02	0.42
2:B:220:CYS:HA	2:B:221:PRO:HD3	1.90	0.42
1:D:186:TYR:CD1	1:D:333:VAL:HG11	2.55	0.42
2:E:164:ASP:HB2	6:E:375:HOH:O	2.20	0.42
2:B:279:PRO:HD2	2:B:361:SER:HB2	2.01	0.42
1:A:85:GLY:O	1:A:89:PRO:HA	2.19	0.41
2:E:59:PRO:HD3	2:E:113:PHE:CZ	2.55	0.41
2:E:140:CYS:CB	6:E:376:HOH:O	2.64	0.41
1:A:179:ALA:O	2:B:23:ILE:HG23	2.19	0.41
2:E:213:ILE:HB	2:E:214:PRO:HD3	2.03	0.41
1:A:8:GLU:OE1	6:A:511:HOH:O	2.20	0.41
2:B:170:MET:CE	3:B:570:SRM:HBD1	2.51	0.41
2:B:133:HIS:CG	2:B:151:VAL:HG21	2.56	0.41
2:B:299:LEU:C	2:B:299:LEU:HD23	2.41	0.41
1:D:139:LEU:HD13	2:E:135:GLN:HE22	1.86	0.41
2:E:171:CYS:HB2	2:E:310:TRP:CH2	2.56	0.41
2:E:292:GLU:O	2:E:293:PRO:C	2.60	0.41
2:B:164:ASP:HB3	2:B:166:LYS:HG3	2.03	0.41
2:B:342:GLN:HG2	1:D:371:ARG:HG3	2.03	0.41
1:D:45:ARG:HG3	1:D:45:ARG:HH11	1.85	0.41
1:D:271:ILE:HD11	1:D:278:LEU:HD21	2.02	0.41
3:E:570:SRM:CHB	3:E:570:SRM:CBA	2.97	0.41
1:A:317:PHE:CZ	2:B:244:CYS:HB2	2.56	0.41
3:B:570:SRM:C1A	3:B:570:SRM:HBA1	2.51	0.41
2:E:106:GLU:HG2	2:E:110:ARG:HD2	2.02	0.40
3:E:570:SRM:HHA	3:E:570:SRM:CED	2.51	0.40
2:E:269:GLY:O	2:E:321:ILE:HB	2.22	0.40
1:A:128:ASN:HB2	1:A:137:ILE:HB	2.03	0.40
2:B:353:TYR:HA	2:E:353:TYR:HA	2.04	0.40
1:D:101:GLN:HA	1:D:102:PRO:HD3	1.96	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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%)	402 (97%)	13 (3%)	0	100	100
1	D	415/418 (99%)	386 (93%)	28 (7%)	1 (0%)	47	49
2	B	362/366 (99%)	347 (96%)	14 (4%)	1 (0%)	41	41
2	E	361/366 (99%)	322 (89%)	37 (10%)	2 (1%)	25	21
All	All	1553/1568 (99%)	1457 (94%)	92 (6%)	4 (0%)	41	41

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	37	ASP
2	E	159	TYR
2	E	231	ASN
2	B	142	THR

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%)	342 (97%)	11 (3%)	40	43
1	D	353/354 (100%)	342 (97%)	11 (3%)	40	43
2	B	315/317 (99%)	305 (97%)	10 (3%)	39	41

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	E	314/317 (99%)	296 (94%)	18 (6%)	20	18
All	All	1335/1342 (100%)	1285 (96%)	50 (4%)	34	35

All (50) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	64	HIS
1	A	68	VAL
1	A	87	GLN
1	A	93	HIS
1	A	100	ASN
1	A	132	SER
1	A	210	TYR
1	A	224	VAL
1	A	310	LEU
1	A	399	LYS
1	A	413	LYS
2	B	97	GLU
2	B	108	GLN
2	B	185	VAL
2	B	188	SER
2	B	230	LYS
2	B	242	MET
2	B	243	TYR
2	B	277	ARG
2	B	282	SER
2	B	283	LYS
1	D	100	ASN
1	D	144	GLU
1	D	210	TYR
1	D	224	VAL
1	D	247	GLU
1	D	276	LYS
1	D	299	LEU
1	D	310	LEU
1	D	339	GLU
1	D	399	LYS
1	D	413	LYS
2	E	17	ASP
2	E	97	GLU
2	E	108	GLN
2	E	109	GLU

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Mol	Chain	Res	Type
2	E	132	VAL
2	E	140	CYS
2	E	148	SER
2	E	164	ASP
2	E	177	CYS
2	E	180	ASN
2	E	230	LYS
2	E	233	THR
2	E	235	LYS
2	E	242	MET
2	E	243	TYR
2	E	268	VAL
2	E	277	ARG
2	E	283	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	50	GLN
1	A	100	ASN
2	B	139	HIS
1	D	50	GLN
1	D	100	ASN
2	E	108	GLN
2	E	135	GLN
2	E	180	ASN

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 monosaccharides in this entry.

5.6 Ligand geometry (i)

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	#$|Z| > 2$
4	SF4	A	576	1	0,12,12	-	-	-		
4	SF4	B	585	2	0,12,12	-	-	-		
4	SF4	D	575	1,6	0,12,12	-	-	-		
4	SF4	B	586	2	0,12,12	-	-	-		
3	SRM	B	570	1	68,70,70	1.96	16 (23%)	81,112,112	3.07	33 (40%)
3	SRM	D	580	-	68,70,70	2.10	14 (20%)	81,112,112	2.78	24 (29%)
5	NO2	A	590	3	1,2,2	4.11	1 (100%)	0,1,1	-	-
4	SF4	A	575	1	0,12,12	-	-	-		
4	SF4	E	585	2	0,12,12	-	-	-		
4	SF4	E	586	2	0,12,12	-	-	-		
4	SF4	D	576	1	0,12,12	-	-	-		
3	SRM	E	570	1	68,70,70	2.19	11 (16%)	81,112,112	3.01	33 (40%)
3	SRM	A	580	2,5	68,70,70	2.04	14 (20%)	81,112,112	2.84	31 (38%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	SF4	A	576	1	-	-	0/6/5/5
4	SF4	B	585	2	-	-	0/6/5/5
4	SF4	D	575	1,6	-	-	0/6/5/5
4	SF4	B	586	2	-	-	0/6/5/5
3	SRM	B	570	1	1/1/19/23	14/38/126/126	-
3	SRM	D	580	-	1/1/19/23	16/38/126/126	-
4	SF4	A	575	1	-	-	0/6/5/5
4	SF4	E	585	2	-	-	0/6/5/5
4	SF4	E	586	2	-	-	0/6/5/5
4	SF4	D	576	1	-	-	0/6/5/5

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PROTEIN DATA BANK

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	SRM	E	570	1	1/1/19/23	15/38/126/126	-
3	SRM	A	580	2,5	1/1/19/23	13/38/126/126	-

All (56) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	E	570	SRM	C4A-NA	-8.74	1.29	1.35
3	D	580	SRM	C3D-C2D	6.87	1.55	1.39
3	E	570	SRM	C3D-C2D	6.85	1.55	1.39
3	E	570	SRM	C3C-C2C	6.28	1.50	1.36
3	A	580	SRM	C3D-C2D	6.18	1.53	1.39
3	A	580	SRM	C3C-C2C	6.02	1.49	1.36
3	D	580	SRM	C3C-C2C	6.00	1.49	1.36
3	A	580	SRM	C3A-C4A	-5.84	1.38	1.51
3	D	580	SRM	C3A-C4A	-5.84	1.38	1.51
3	B	570	SRM	C3C-C2C	5.79	1.49	1.36
3	B	570	SRM	C4A-NA	-5.57	1.31	1.35
3	D	580	SRM	C3B-C4B	-5.56	1.39	1.51
3	E	570	SRM	C4C-NC	-5.20	1.29	1.39
3	B	570	SRM	C3D-C2D	5.15	1.51	1.39
3	E	570	SRM	C1C-NC	-4.96	1.30	1.39
3	B	570	SRM	C4C-NC	-4.71	1.30	1.39
3	A	580	SRM	C3B-C4B	-4.62	1.41	1.51
3	A	580	SRM	C4A-NA	-4.58	1.32	1.35
3	B	570	SRM	C1C-NC	-4.18	1.31	1.39
5	A	590	NO2	O1-N	4.11	1.43	1.22
3	D	580	SRM	C4A-NA	-4.00	1.32	1.35
3	A	580	SRM	CAD-C2D	3.92	1.57	1.52
3	E	570	SRM	C4C-C3C	3.43	1.51	1.45
3	E	570	SRM	CAD-C2D	3.40	1.57	1.52
3	D	580	SRM	CHD-C4C	3.35	1.40	1.35
3	B	570	SRM	C4C-C3C	3.29	1.51	1.45
3	D	580	SRM	FE-NC	3.22	2.08	1.95
3	D	580	SRM	CAD-C2D	3.19	1.56	1.52
3	B	570	SRM	C4B-NB	3.16	1.37	1.35
3	B	570	SRM	C1C-C2C	3.14	1.50	1.45
3	E	570	SRM	CHA-C1A	2.98	1.40	1.35
3	D	580	SRM	C4C-NC	-2.95	1.34	1.39
3	D	580	SRM	C1C-NC	-2.91	1.34	1.39
3	D	580	SRM	C1C-C2C	2.90	1.50	1.45
3	D	580	SRM	C4C-C3C	2.86	1.50	1.45
3	A	580	SRM	C1C-C2C	2.82	1.50	1.45

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	570	SRM	CHA-C1A	2.80	1.40	1.35
3	E	570	SRM	C1C-C2C	2.79	1.50	1.45
3	B	570	SRM	C2B-C3B	-2.75	1.47	1.55
3	A	580	SRM	C4C-NC	-2.65	1.34	1.39
3	B	570	SRM	O4C-CEC	-2.48	1.22	1.30
3	A	580	SRM	C1C-NC	-2.41	1.35	1.39
3	A	580	SRM	C2A-C1A	-2.36	1.49	1.54
3	B	570	SRM	C3B-C4B	-2.30	1.46	1.51
3	D	580	SRM	FE-NB	2.29	2.09	1.97
3	E	570	SRM	C2B-C3B	-2.28	1.49	1.55
3	A	580	SRM	CHA-C1A	2.26	1.39	1.35
3	B	570	SRM	O4B-CEB	-2.24	1.23	1.30
3	D	580	SRM	CAA-C3A	-2.24	1.49	1.54
3	B	570	SRM	CAD-C2D	2.17	1.55	1.52
3	A	580	SRM	C2B-C1B	-2.10	1.49	1.54
3	A	580	SRM	C1D-CHD	-2.05	1.35	1.41
3	B	570	SRM	C2A-C1A	-2.04	1.49	1.54
3	B	570	SRM	O1B-CCB	2.03	1.28	1.22
3	E	570	SRM	CHC-C4B	-2.03	1.33	1.39
3	A	580	SRM	FE-NC	2.00	2.03	1.95

All (121) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	580	SRM	CDD-C3D-C4D	-10.44	111.54	127.36
3	D	580	SRM	C2A-C3A-C4A	9.10	112.55	100.90
3	B	570	SRM	C2B-C3B-C4B	8.78	112.14	100.90
3	E	570	SRM	CAB-C3B-C4B	8.78	126.68	111.19
3	E	570	SRM	C2B-C1B-CHB	-7.84	116.39	123.54
3	B	570	SRM	CBD-CAD-C2D	7.79	125.91	112.62
3	A	580	SRM	CMB-C2B-C3B	7.74	126.39	112.08
3	B	570	SRM	C3D-CDD-CED	7.52	123.21	114.21
3	E	570	SRM	CAC-C3C-C2C	-7.12	114.50	129.51
3	D	580	SRM	CAA-C3A-C4A	6.99	123.51	111.19
3	E	570	SRM	C3C-C4C-NC	6.98	117.12	110.32
3	A	580	SRM	CBD-CAD-C2D	6.72	124.09	112.62
3	E	570	SRM	C4C-C3C-C2C	-6.61	99.22	106.86
3	A	580	SRM	C2A-C3A-C4A	6.30	108.97	100.90
3	D	580	SRM	C1A-NA-C4A	6.05	112.08	105.23
3	A	580	SRM	C3D-CDD-CED	6.02	121.41	114.21
3	A	580	SRM	CAA-C3A-C4A	5.96	121.70	111.19
3	D	580	SRM	C2B-C3B-C4B	5.87	108.41	100.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	B	570	SRM	C3B-C2B-C1B	-5.83	90.92	100.92
3	A	580	SRM	C3C-C4C-NC	5.82	115.98	110.32
3	B	570	SRM	CBC-CAC-C3C	-5.81	96.48	112.63
3	B	570	SRM	C2B-C1B-CHB	-5.72	118.32	123.54
3	B	570	SRM	C3C-C4C-NC	5.69	115.86	110.32
3	A	580	SRM	CDA-C2A-C3A	5.66	123.54	108.39
3	E	570	SRM	CBD-CAD-C2D	5.63	122.23	112.62
3	A	580	SRM	C4C-C3C-C2C	-5.62	100.36	106.86
3	B	570	SRM	C4C-C3C-C2C	-5.61	100.37	106.86
3	E	570	SRM	C2C-C1C-NC	5.60	115.78	110.32
3	E	570	SRM	CHC-C1C-C2C	-5.58	115.89	124.94
3	B	570	SRM	C2A-C1A-CHA	-5.52	118.51	123.54
3	D	580	SRM	CBD-CAD-C2D	5.50	122.01	112.62
3	A	580	SRM	C2B-C3B-C4B	5.48	107.91	100.90
3	E	570	SRM	CDA-C2A-C1A	5.45	124.26	107.12
3	B	570	SRM	CMB-C2B-C3B	5.44	122.14	112.08
3	B	570	SRM	C4D-CHA-C1A	-5.42	119.39	130.12
3	A	580	SRM	C1A-NA-C4A	5.33	111.27	105.23
3	B	570	SRM	CAB-C3B-C4B	5.06	120.12	111.19
3	A	580	SRM	CDD-C3D-C2D	-5.06	117.45	126.49
3	E	570	SRM	C2B-C1B-NB	4.94	119.16	111.21
3	E	570	SRM	C4D-CHA-C1A	-4.92	120.38	130.12
3	D	580	SRM	CDD-C3D-C2D	-4.89	117.76	126.49
3	D	580	SRM	C2A-C1A-CHA	4.62	127.76	123.54
3	A	580	SRM	C2B-C1B-CHB	-4.59	119.35	123.54
3	E	570	SRM	C3D-CDD-CED	4.52	119.62	114.21
3	D	580	SRM	C2C-C1C-NC	4.49	114.69	110.32
3	B	570	SRM	CHC-C1C-C2C	-4.47	117.70	124.94
3	E	570	SRM	C2B-C3B-C4B	4.44	106.59	100.90
3	A	580	SRM	CAB-C3B-C4B	-4.42	103.39	111.19
3	E	570	SRM	C1C-C2C-C3C	-4.36	101.82	106.86
3	D	580	SRM	CBB-CAB-C3B	4.28	127.07	114.73
3	D	580	SRM	C3C-C4C-NC	4.27	114.48	110.32
3	E	570	SRM	C3A-C4A-NA	4.24	119.19	110.85
3	B	570	SRM	CHD-C4C-C3C	-4.22	118.12	124.93
3	B	570	SRM	CEC-CDC-C2C	-4.13	103.08	113.79
3	A	580	SRM	CBB-CAB-C3B	4.12	126.62	114.73
3	D	580	SRM	C1C-C2C-C3C	-4.03	102.20	106.86
3	B	570	SRM	C2B-C1B-NB	4.02	117.68	111.21
3	E	570	SRM	CAB-C3B-C2B	4.02	125.22	114.14
3	E	570	SRM	C2A-C1A-CHA	-3.95	119.94	123.54
3	B	570	SRM	C3A-C4A-NA	3.93	118.57	110.85

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	580	SRM	CAC-C3C-C4C	3.91	132.27	124.89
3	D	580	SRM	CHD-C4C-NC	-3.72	120.41	124.43
3	D	580	SRM	C4C-C3C-C2C	-3.69	102.59	106.86
3	B	570	SRM	C2C-C1C-NC	3.59	113.82	110.32
3	E	570	SRM	CHD-C4C-C3C	-3.57	119.15	124.93
3	E	570	SRM	CHC-C1C-NC	3.57	128.30	124.44
3	A	580	SRM	CAC-CBC-CCC	-3.53	106.00	113.60
3	A	580	SRM	CAA-C3A-C2A	3.50	123.77	114.14
3	D	580	SRM	CMA-C2A-CDA	3.46	116.50	110.80
3	B	570	SRM	CHC-C1C-NC	3.44	128.16	124.44
3	B	570	SRM	CBB-CAB-C3B	3.44	124.64	114.73
3	A	580	SRM	C4D-CHA-C1A	-3.40	123.38	130.12
3	B	570	SRM	C1C-C2C-C3C	-3.31	103.03	106.86
3	D	580	SRM	C4D-CHA-C1A	-3.27	123.65	130.12
3	A	580	SRM	C2B-C1B-NB	3.26	116.46	111.21
3	D	580	SRM	CHC-C1C-NC	-3.22	120.96	124.44
3	A	580	SRM	CAB-C3B-C2B	-3.21	105.28	114.14
3	E	570	SRM	C3A-C4A-CHB	-3.18	116.46	123.32
3	E	570	SRM	CAC-C3C-C4C	-3.17	118.91	124.89
3	E	570	SRM	CDD-C3D-C2D	-3.13	120.91	126.49
3	A	580	SRM	CMA-C2A-C3A	-3.11	106.32	112.08
3	E	570	SRM	CMB-C2B-CDB	3.05	115.83	110.80
3	B	570	SRM	CDD-C3D-C4D	-3.05	122.74	127.36
3	E	570	SRM	C3B-C2B-C1B	-3.03	95.72	100.92
3	D	580	SRM	C3A-C2A-C1A	-3.03	95.73	100.92
3	B	570	SRM	CAC-C3C-C2C	-2.97	123.24	129.51
3	E	570	SRM	CDD-C3D-C4D	-2.90	122.97	127.36
3	B	570	SRM	C2A-C1A-NA	2.87	115.83	111.21
3	E	570	SRM	CAB-CBB-CCB	2.87	120.13	112.51
3	D	580	SRM	C2B-C1B-NB	2.81	115.74	111.21
3	A	580	SRM	O3A-CEA-CDA	-2.81	114.72	122.94
3	D	580	SRM	CMB-C2B-C3B	2.80	117.25	112.08
3	B	570	SRM	O2D-CCD-CBD	2.80	123.02	114.03
3	D	580	SRM	C3A-C4A-CHB	2.75	129.25	123.32
3	B	570	SRM	C1C-CHC-C4B	-2.70	120.11	126.62
3	B	570	SRM	C3B-C4B-NB	-2.67	105.60	110.85
3	B	570	SRM	O1D-CCD-CBD	-2.62	114.66	123.08
3	B	570	SRM	C3A-C4A-CHB	-2.56	117.79	123.32
3	B	570	SRM	O2C-CCC-CBC	2.56	122.25	114.03
3	D	580	SRM	CAC-C3C-C4C	2.52	129.64	124.89
3	A	580	SRM	C3B-C2B-C1B	-2.47	96.69	100.92
3	B	570	SRM	C1A-NA-C4A	-2.43	102.48	105.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	E	570	SRM	O2D-CCD-CBD	2.39	121.70	114.03
3	E	570	SRM	CEC-CDC-C2C	-2.38	107.63	113.79
3	D	580	SRM	C3B-C2B-C1B	-2.36	96.87	100.92
3	E	570	SRM	C2A-C1A-NA	2.35	114.99	111.21
3	D	580	SRM	CAC-CBC-CCC	-2.34	108.57	113.60
3	A	580	SRM	CHC-C1C-NC	-2.33	121.92	124.44
3	A	580	SRM	O3B-CEB-CDB	-2.32	116.16	122.94
3	A	580	SRM	O2C-CCC-CBC	2.26	121.29	114.03
3	B	570	SRM	CMA-C2A-CDA	-2.25	107.10	110.80
3	A	580	SRM	CMA-C2A-CDA	2.24	114.50	110.80
3	E	570	SRM	C1C-CHC-C4B	-2.14	121.47	126.62
3	A	580	SRM	O3D-CED-CDD	-2.13	116.95	123.04
3	A	580	SRM	O2B-CCB-CBB	2.12	120.86	114.03
3	A	580	SRM	O2D-CCD-CBD	2.12	120.86	114.03
3	E	570	SRM	CBC-CAC-C3C	-2.08	106.85	112.63
3	E	570	SRM	C1A-NA-C4A	-2.08	102.88	105.23
3	E	570	SRM	O1D-CCD-CBD	-2.05	116.48	123.08
3	B	570	SRM	CDA-C2A-C1A	2.04	113.54	107.12
3	A	580	SRM	CHD-C4C-C3C	-2.03	121.66	124.93

All (4) chirality outliers are listed below:

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

All (58) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	580	SRM	C2A-C3A-CAA-CBA
3	B	570	SRM	C4B-C3B-CAB-CBB
3	D	580	SRM	C3A-C2A-CDA-CEA
3	D	580	SRM	C1B-C2B-CDB-CEB
3	D	580	SRM	CMB-C2B-CDB-CEB
3	D	580	SRM	C3B-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	C3A-CAA-CBA-CCA

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Mol	Chain	Res	Type	Atoms
3	E	570	SRM	C3B-CAB-CBB-CCB
3	D	580	SRM	C2B-C3B-CAB-CBB
3	B	570	SRM	C4A-C3A-CAA-CBA
3	D	580	SRM	CMA-C2A-CDA-CEA
3	E	570	SRM	C4D-C3D-CDD-CED
3	A	580	SRM	C3B-CAB-CBB-CCB
3	D	580	SRM	C2A-C3A-CAA-CBA
3	E	570	SRM	C2B-C3B-CAB-CBB
3	A	580	SRM	C2A-CDA-CEA-O3A
3	E	570	SRM	C2B-CDB-CEB-O3B
3	B	570	SRM	C4C-C3C-CAC-CBC
3	D	580	SRM	C1A-C2A-CDA-CEA
3	A	580	SRM	C4D-C3D-CDD-CED
3	B	570	SRM	C3C-CAC-CBC-CCC
3	D	580	SRM	C2D-C3D-CDD-CED
3	A	580	SRM	C2A-CDA-CEA-O4A
3	B	570	SRM	C2B-CDB-CEB-O3B
3	E	570	SRM	C2B-CDB-CEB-O4B
3	B	570	SRM	C3D-C2D-CAD-CBD
3	A	580	SRM	C4A-C3A-CAA-CBA
3	E	570	SRM	C2D-CAD-CBD-CCD
3	A	580	SRM	CAB-CBB-CCB-O1B
3	B	570	SRM	CAA-CBA-CCA-O1A
3	A	580	SRM	CAB-CBB-CCB-O2B
3	E	570	SRM	C3C-CAC-CBC-CCC
3	B	570	SRM	CAD-CBD-CCD-O1D
3	D	580	SRM	CAB-CBB-CCB-O2B
3	B	570	SRM	CAA-CBA-CCA-O2A
3	D	580	SRM	CAB-CBB-CCB-O1B
3	D	580	SRM	CAC-CBC-CCC-O1C
3	D	580	SRM	CAA-CBA-CCA-O1A
3	D	580	SRM	CAC-CBC-CCC-O2C
3	D	580	SRM	CAA-CBA-CCA-O2A
3	B	570	SRM	CAD-CBD-CCD-O2D
3	A	580	SRM	CAA-CBA-CCA-O1A
3	E	570	SRM	CAD-CBD-CCD-O1D
3	A	580	SRM	CAA-CBA-CCA-O2A
3	B	570	SRM	C2B-CDB-CEB-O4B
3	A	580	SRM	CAC-CBC-CCC-O1C
3	A	580	SRM	C2B-C3B-CAB-CBB
3	B	570	SRM	CAC-CBC-CCC-O1C
3	A	580	SRM	CAC-CBC-CCC-O2C

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Mol	Chain	Res	Type	Atoms
3	E	570	SRM	CAD-CBD-CCD-O2D
3	B	570	SRM	CAC-CBC-CCC-O2C
3	E	570	SRM	CAC-CBC-CCC-O1C
3	E	570	SRM	CAC-CBC-CCC-O2C
3	B	570	SRM	CAB-CBB-CCB-O1B

There are no ring outliers.
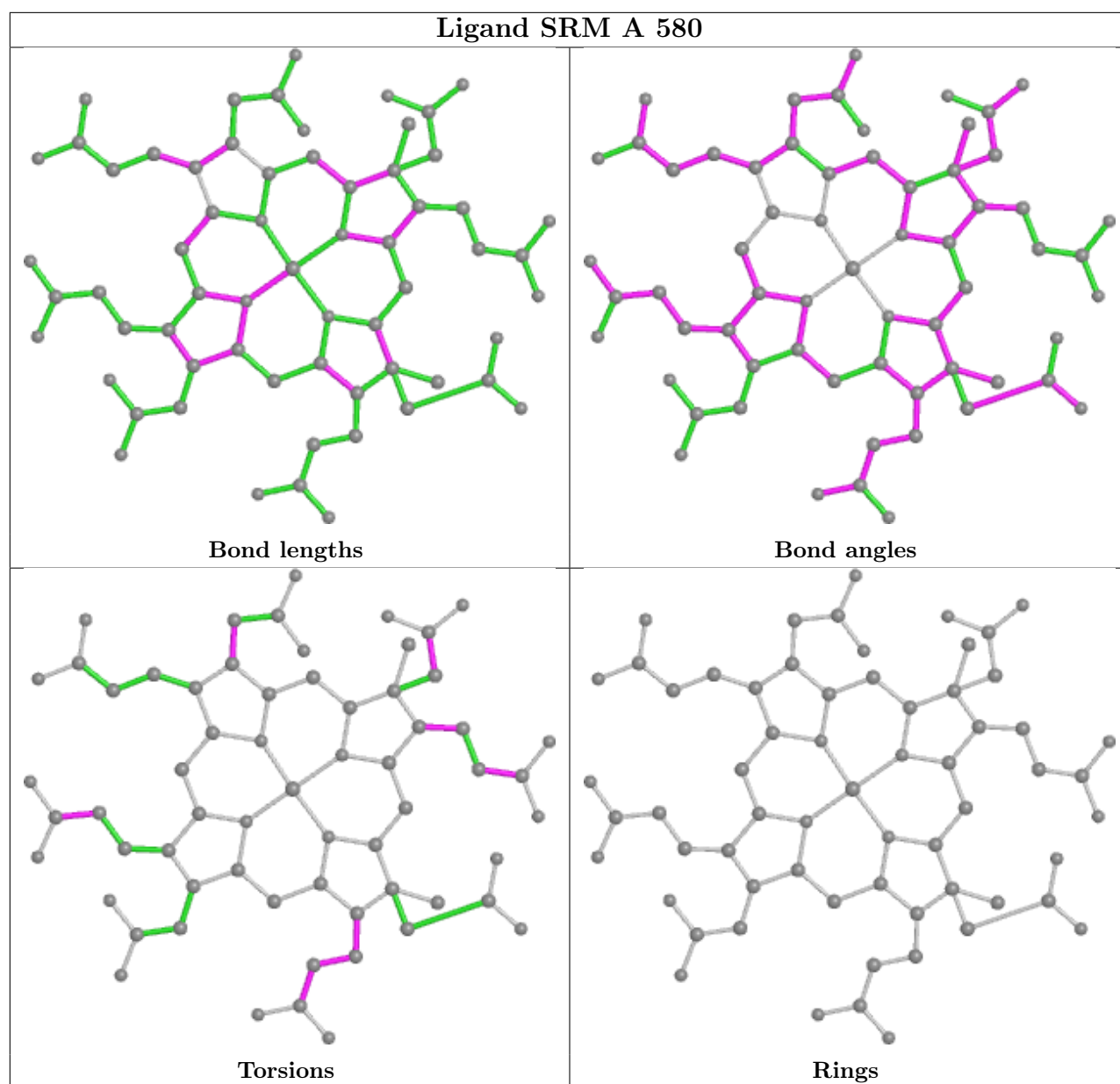
6 monomers are involved in 33 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	D	575	SF4	1	0
3	B	570	SRM	3	0
3	D	580	SRM	10	0
4	E	585	SF4	1	0
3	E	570	SRM	12	0
3	A	580	SRM	6	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 SRM B 570

Bond lengths

Bond angles

Torsions

Rings

Ligand SRM D 580

Bond lengths

Bond angles

Torsions

Rings

Ligand SRM E 570

Bond lengths

Bond angles

Torsions

Rings

Ligand SRM A 580

Bond lengths

Bond angles

Torsions

Rings
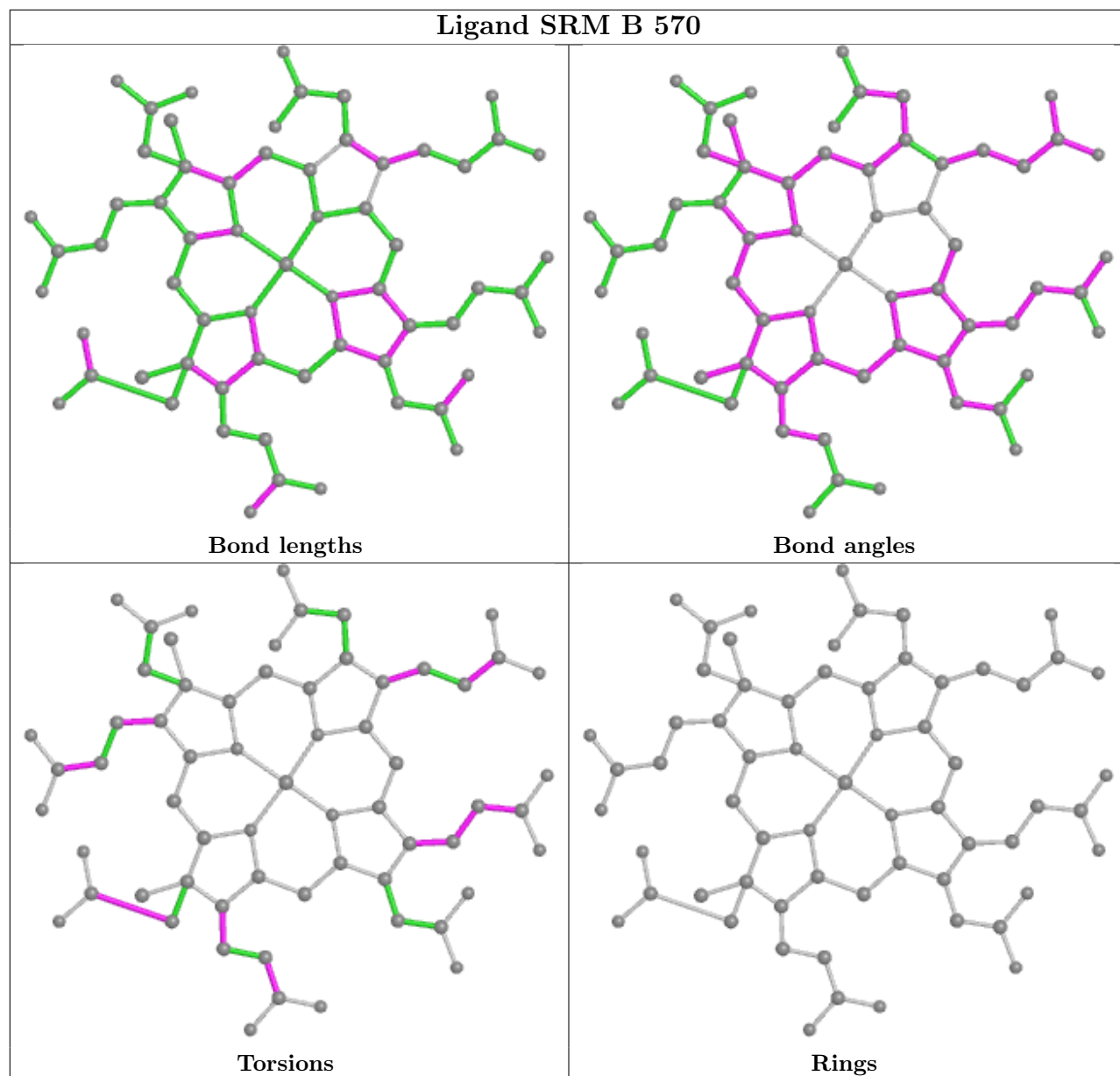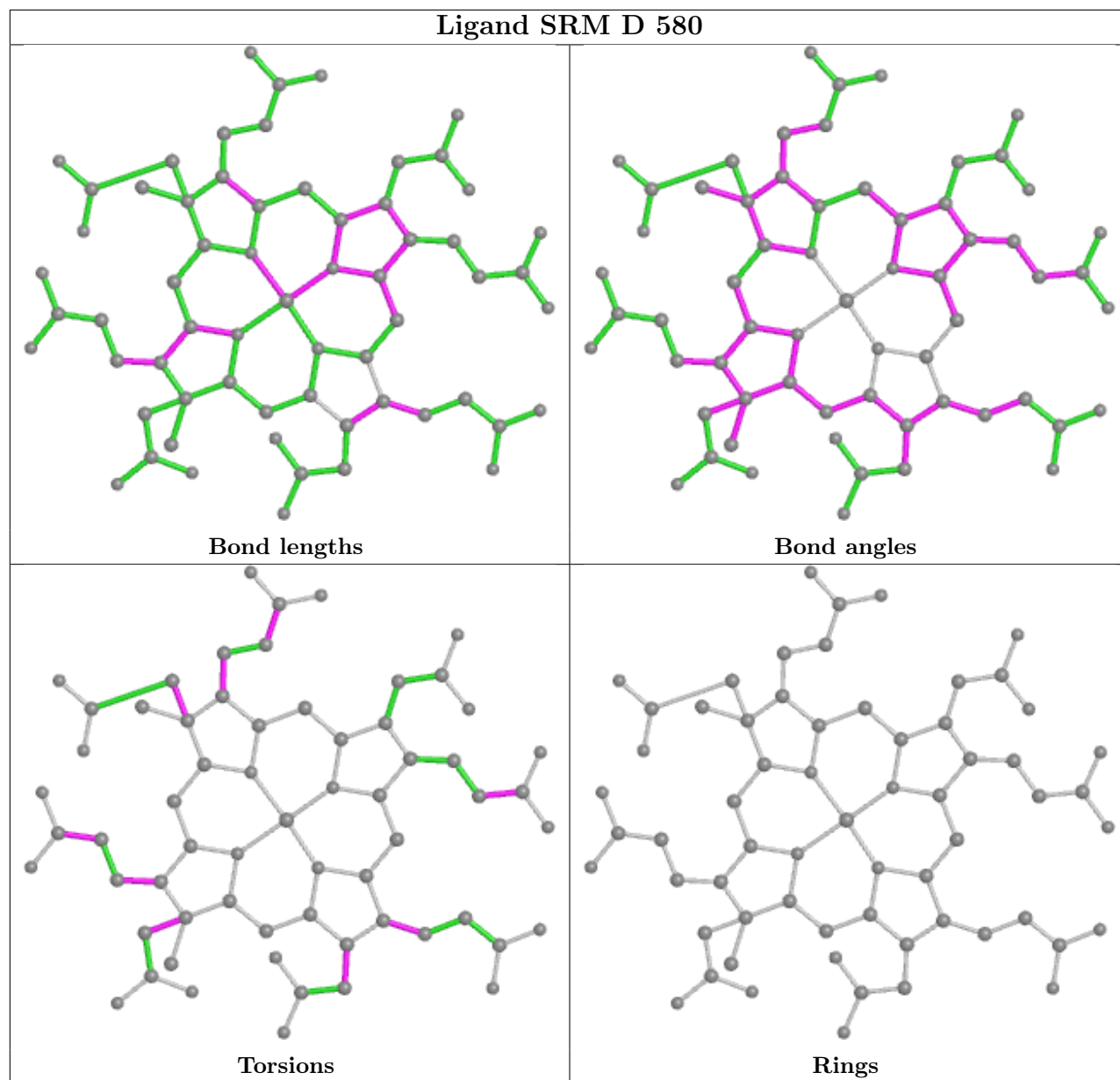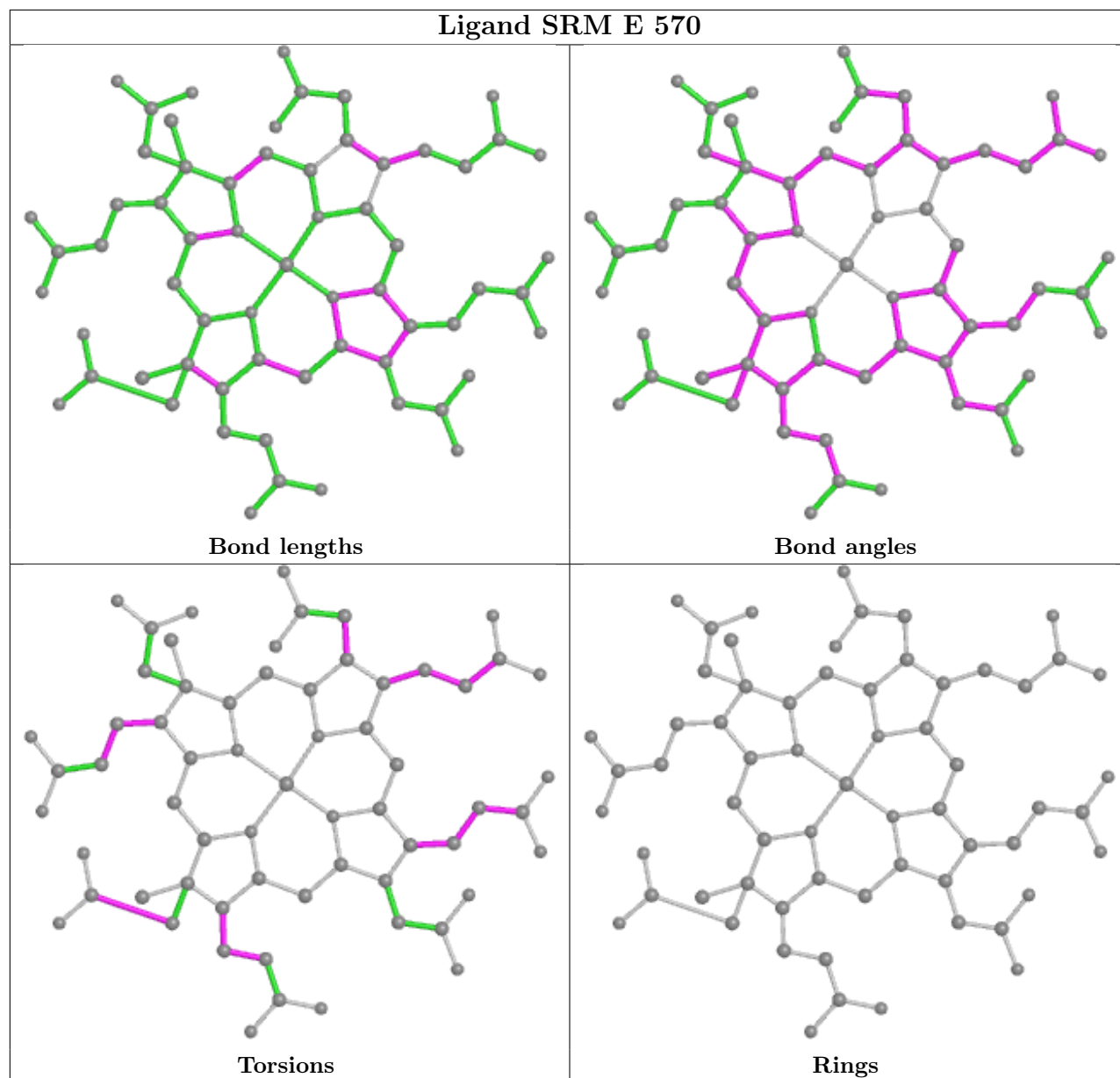
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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%)	0.30	31 (7%)	14	18	21, 34, 73, 133	0
1	D	417/418 (99%)	1.27	105 (25%)	0	0	29, 87, 142, 181	0
2	B	363/366 (99%)	0.14	18 (4%)	28	34	20, 32, 45, 79	0
2	E	363/366 (99%)	1.68	122 (33%)	0	0	34, 91, 137, 178	0
All	All	1560/1568 (99%)	0.85	276 (17%)	1	1	20, 52, 133, 181	0

All (276) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	417	TRP	10.4
2	E	4	GLU	10.4
1	D	33	ALA	9.1
2	E	207	ILE	8.6
2	E	234	ILE	8.1
2	E	184	ALA	7.6
1	D	132	SER	7.5
2	E	77	TYR	7.4
1	D	131	GLY	7.3
2	E	205	GLU	7.0
1	D	1	SER	6.6
2	E	233	THR	6.5
2	E	183	GLY	6.5
1	D	72	GLY	6.4
1	D	5	LEU	6.3
2	E	23	ILE	6.2
1	D	40	MET	6.2
2	E	232	LYS	6.0
2	E	214	PRO	5.8
1	D	130	HIS	5.7
2	E	86	SER	5.7

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Mol	Chain	Res	Type	RSRZ
1	D	129	PHE	5.7
1	A	416	MET	5.6
2	E	88	ASN	5.6
1	A	415	GLY	5.6
1	D	67	ILE	5.6
2	E	272	LEU	5.5
2	E	253	GLY	5.5
2	E	78	SER	5.2
2	E	116	GLY	5.2
1	D	9	LEU	5.1
2	E	21	PRO	5.1
1	A	414	ARG	4.9
2	E	256	LEU	4.9
1	D	225	ALA	4.8
2	E	229	MET	4.8
1	D	228	ALA	4.8
1	A	407	TYR	4.7
1	A	411	LEU	4.7
2	E	100	ILE	4.7
2	E	236	VAL	4.7
2	E	182	CYS	4.7
2	E	87	ARG	4.7
2	E	27	TYR	4.7
1	A	413	LYS	4.6
2	E	204	ASP	4.6
1	D	71	VAL	4.6
2	E	185	VAL	4.5
2	E	217	VAL	4.5
2	E	93	PHE	4.5
2	E	5	GLY	4.5
1	D	224	VAL	4.5
1	D	70	VAL	4.4
2	E	103	LEU	4.4
1	D	154	GLY	4.4
2	E	213	ILE	4.4
2	E	211	CYS	4.4
2	E	132	VAL	4.3
1	D	134	GLY	4.3
2	E	210	THR	4.2
2	E	6	VAL	4.2
2	E	230	LYS	4.2
2	E	133	HIS	4.2

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Mol	Chain	Res	Type	RSRZ
2	E	104	ILE	4.1
2	E	201	ILE	4.1
2	E	208	ARG	4.1
1	D	36	LYS	4.1
2	E	202	PRO	4.1
2	E	227	PRO	4.1
2	E	20	HIS	4.1
1	D	263	VAL	4.1
2	E	85	THR	4.1
2	B	272	LEU	4.1
1	D	254	SER	4.0
2	E	122	VAL	4.0
2	B	4	GLU	4.0
2	E	131	ILE	4.0
2	E	175	LEU	3.9
1	D	28	MET	3.9
1	A	406	ALA	3.9
1	D	115	LEU	3.9
2	E	209	LYS	3.9
2	E	22	VAL	3.9
2	E	216	THR	3.9
1	D	88	ILE	3.9
1	A	408	THR	3.9
2	E	94	VAL	3.8
2	E	71	CYS	3.8
1	D	127	THR	3.8
1	D	207	MET	3.8
2	E	46	GLU	3.8
1	A	224	VAL	3.7
2	E	188	SER	3.7
2	E	231	ASN	3.7
2	E	25	LYS	3.7
2	E	235	LYS	3.7
2	E	225	LEU	3.6
2	E	76	LYS	3.6
1	D	249	VAL	3.6
1	D	229	ARG	3.6
2	E	92	PHE	3.5
1	D	323	ILE	3.5
2	E	111	VAL	3.5
1	D	32	ALA	3.5
1	D	137	ILE	3.5

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Mol	Chain	Res	Type	RSRZ
1	D	157	GLU	3.5
2	E	102	ASP	3.5
1	D	259	GLU	3.5
2	E	215	SER	3.4
1	D	151	GLU	3.4
1	D	244	VAL	3.4
1	D	145	TYR	3.3
2	E	42	LYS	3.3
2	E	123	LYS	3.3
1	D	136	ILE	3.3
1	A	412	LYS	3.3
2	E	219	ALA	3.3
1	D	417	TRP	3.3
1	D	34	GLU	3.3
1	D	64	HIS	3.3
1	D	274	ASP	3.3
1	D	4	PRO	3.3
1	D	298	ALA	3.3
2	E	98	SER	3.2
1	A	409	GLU	3.2
2	E	26	ASN	3.2
2	E	51	ILE	3.2
2	E	298	THR	3.2
2	E	254	MET	3.2
1	D	89	PRO	3.2
2	E	174	SER	3.2
2	E	73	ILE	3.2
2	E	173	ILE	3.2
1	D	275	GLY	3.2
1	D	105	TRP	3.2
1	D	2	GLU	3.1
1	D	74	GLY	3.1
1	D	117	ASP	3.1
1	D	86	GLU	3.1
1	A	410	GLU	3.1
2	E	294	PRO	3.1
1	D	49	LYS	3.1
1	D	31	ALA	3.1
1	A	323	ILE	3.1
2	E	95	THR	3.0
1	D	81	TYR	3.0
1	D	69	SER	3.0

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Mol	Chain	Res	Type	RSRZ
1	D	47	LEU	3.0
2	E	62	LEU	3.0
1	D	48	LEU	3.0
1	D	273	TRP	3.0
2	E	206	ALA	3.0
1	D	276	LYS	3.0
2	B	229	MET	3.0
1	D	257	ASP	2.9
1	A	276	LYS	2.9
2	E	252	PRO	2.9
2	E	8	THR	2.9
2	E	134	THR	2.9
2	E	96	ASP	2.9
1	D	35	GLY	2.9
2	E	24	ALA	2.9
2	B	182[A]	CYS	2.9
1	D	333	VAL	2.9
1	D	21	ILE	2.9
1	D	45	ARG	2.9
1	D	332	GLU	2.9
2	E	186	HIS	2.8
2	E	248	TYR	2.8
2	E	47	SER	2.8
2	E	7	LYS	2.8
1	D	227	LYS	2.8
1	D	54	SER	2.8
1	D	226	SER	2.8
1	D	144	GLU	2.8
2	E	99	LYS	2.8
2	B	281	LEU	2.8
2	E	61	LEU	2.8
2	E	84	TRP	2.7
1	D	146	LEU	2.7
2	E	82	LEU	2.7
1	A	250	LYS	2.7
2	B	90	VAL	2.7
1	D	160	PHE	2.7
1	D	7	ASP	2.7
2	B	131	ILE	2.7
1	D	56	LYS	2.7
2	E	89	ASN	2.7
1	D	272	LYS	2.6

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Mol	Chain	Res	Type	RSRZ
2	B	132	VAL	2.6
2	E	203	ASN	2.6
2	B	86	SER	2.6
2	E	52	TYR	2.6
1	D	223	CYS	2.6
2	E	69	GLU	2.6
1	D	30	LYS	2.6
2	B	230	LYS	2.6
2	E	81	TYR	2.6
1	D	8	GLU	2.6
1	D	313	GLY	2.6
1	A	405	SER	2.6
1	D	110	LYS	2.6
1	D	111	ALA	2.6
1	A	277	GLU	2.5
1	A	105	TRP	2.5
2	E	228	ASP	2.5
1	D	58	LYS	2.5
2	E	30	TRP	2.5
1	D	222	ASP	2.5
1	A	399	LYS	2.5
1	A	274	ASP	2.5
1	D	83	ASP	2.5
1	D	251	GLU	2.5
1	D	258	ILE	2.5
1	A	129	PHE	2.5
2	E	226	LYS	2.5
1	A	228	ALA	2.5
1	A	398	GLU	2.4
1	A	225	ALA	2.4
1	A	35	GLY	2.4
1	D	24	THR	2.4
1	D	260	ASN	2.4
2	E	28	GLY	2.4
2	E	58	THR	2.4
2	E	237	ASP	2.3
1	D	26	GLU	2.3
1	A	229	ARG	2.3
2	E	15	PHE	2.3
1	D	315	ALA	2.3
2	E	79	ASP	2.3
2	E	187	ALA	2.3

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Mol	Chain	Res	Type	RSRZ
1	D	138	PHE	2.3
2	E	49	ASP	2.3
1	D	53	ILE	2.3
1	D	73	TYR	2.3
1	A	315	ALA	2.3
1	D	133	THR	2.3
2	E	130	ASN	2.2
1	A	223	CYS	2.2
2	E	14	TYR	2.2
1	D	178	PRO	2.2
1	D	206	PRO	2.2
2	E	107	VAL	2.2
2	E	164	ASP	2.2
1	D	338	ASP	2.2
1	A	279	THR	2.2
2	B	129	SER	2.2
2	E	17	ASP	2.2
2	E	117	GLY	2.2
2	E	255	PRO	2.2
1	D	18	VAL	2.1
1	D	38	VAL	2.1
1	D	279	THR	2.1
2	E	135	GLN	2.1
1	D	112	LEU	2.1
2	B	187	ALA	2.1
1	A	403	LYS	2.1
2	B	58	THR	2.1
2	B	85	THR	2.1
1	D	304	GLU	2.1
1	D	43	GLY	2.1
1	D	128	ASN	2.1
2	B	84	TRP	2.1
2	B	174	SER	2.1
2	E	281	LEU	2.1
1	D	94	PHE	2.1
1	D	255	TRP	2.1
2	B	270	GLY	2.1
2	E	19	LEU	2.0
2	E	110	ARG	2.0
2	E	148	SER	2.0
2	E	59	PRO	2.0
2	E	74	ALA	2.0

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Mol	Chain	Res	Type	RSRZ
2	E	11	GLY	2.0
1	D	107	TYR	2.0
2	B	87	ARG	2.0

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

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

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

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	0.89	0.25	71,95,121,130	0
3	SRM	E	570	63/63	0.91	0.21	61,78,91,100	0
4	SF4	B	585	8/8	0.92	0.13	24,28,32,33	8
4	SF4	E	585	8/8	0.92	0.09	83,86,90,91	8
5	NO2	A	590	3/3	0.95	0.27	30,30,33,34	0
3	SRM	A	580	63/63	0.96	0.16	22,30,43,56	0
4	SF4	D	576	8/8	0.96	0.04	54,57,60,60	0
4	SF4	E	586	8/8	0.97	0.07	69,73,76,76	0
3	SRM	B	570	63/63	0.97	0.20	19,24,29,31	0
4	SF4	A	576	8/8	0.98	0.08	33,35,36,37	0
4	SF4	A	575	8/8	0.98	0.11	24,26,27,29	0
4	SF4	B	586	8/8	0.98	0.06	30,31,32,33	0
4	SF4	D	575	8/8	0.98	0.06	75,77,82,85	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.
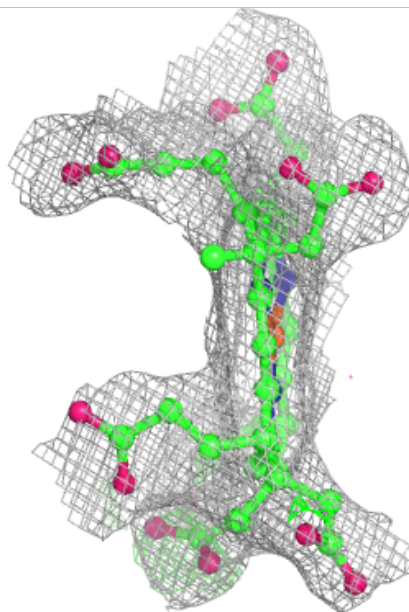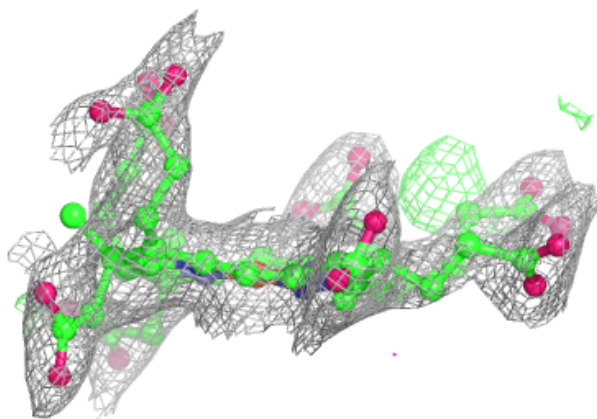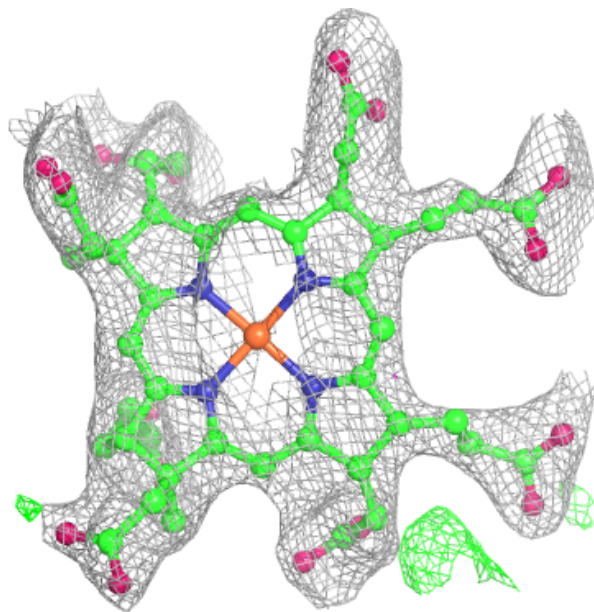
Electron density around SRM D 580:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
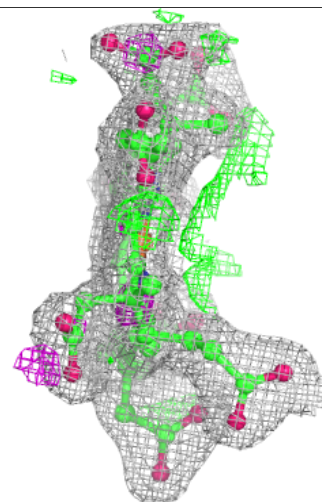$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
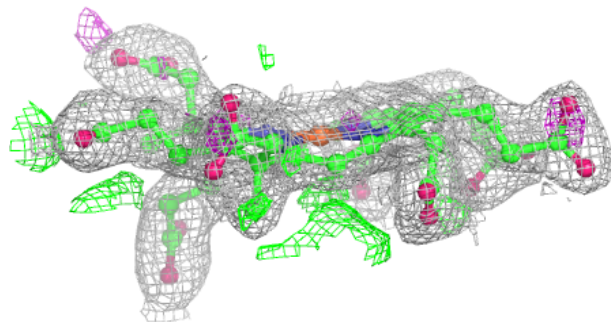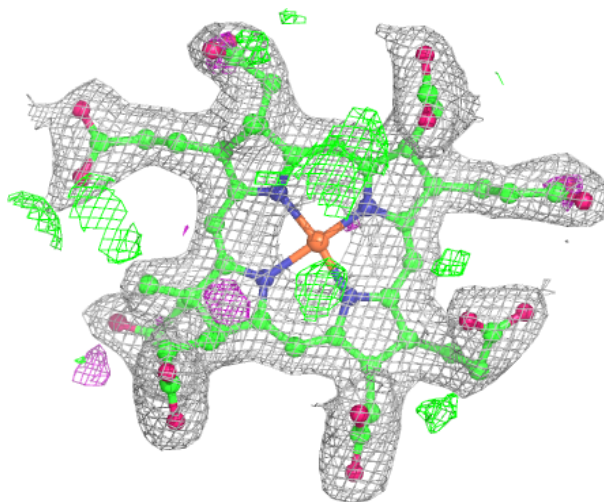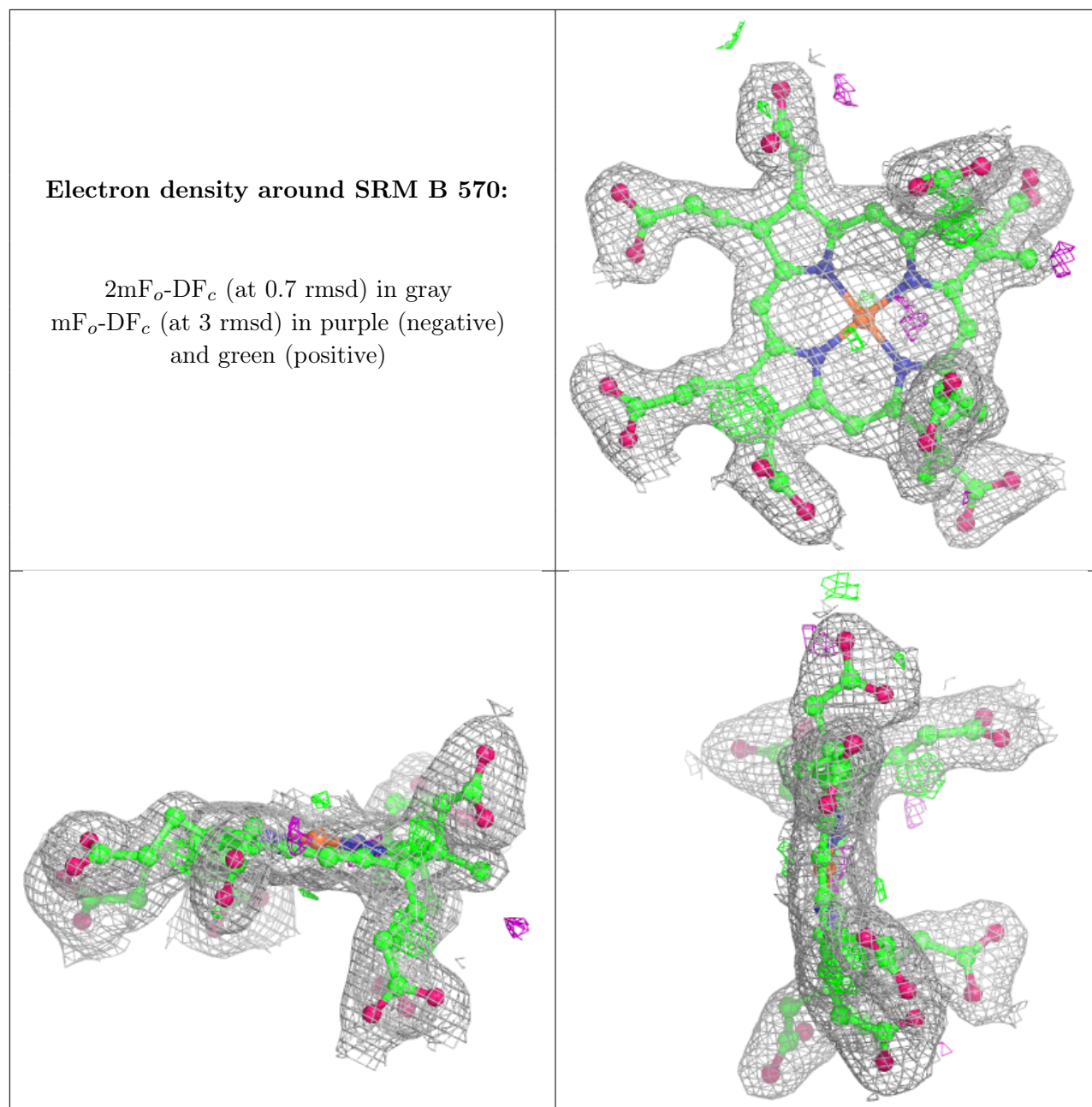and green (positive)
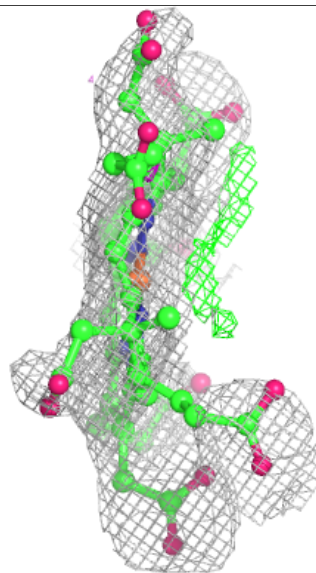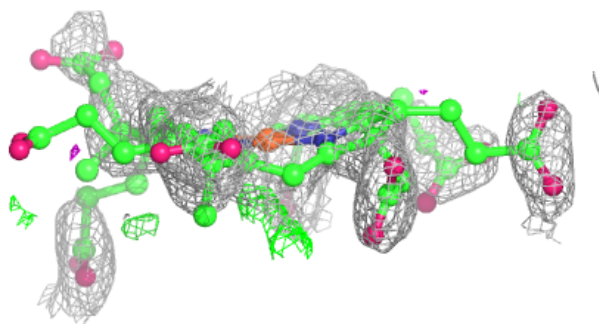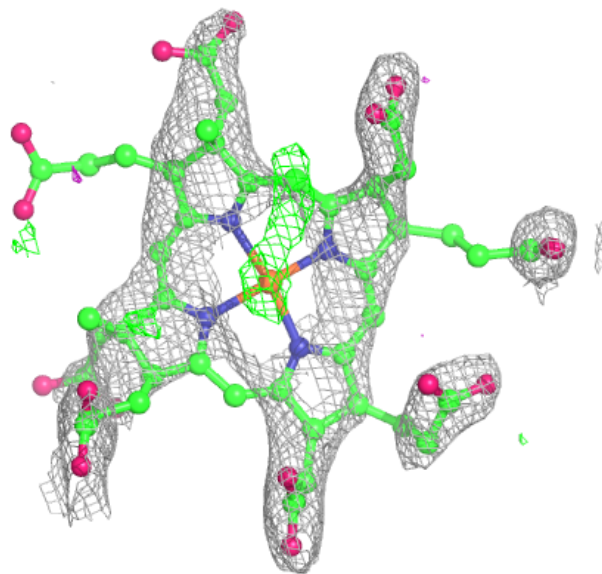
Electron density around SRM E 570:

$2mF_o$-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:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.