Full wwPDB X-ray Structure Validation Report ⓘ

Oct 17, 2021 – 07:19 AM EDT

PDB ID	:	1KBY
Title	:	Structure of Photosynthetic Reaction Center with bacteriochlorophyll-bacteri opheophytin heterodimer
Authors	:	Camara-Artigas, A.; Magee, C.; Goetsch, A.; Allen, J.P.
Deposited on	:	2001-11-07
Resolution	:	2.50 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 following versions of software and data (see references ⓘ) were used in the production of this report:

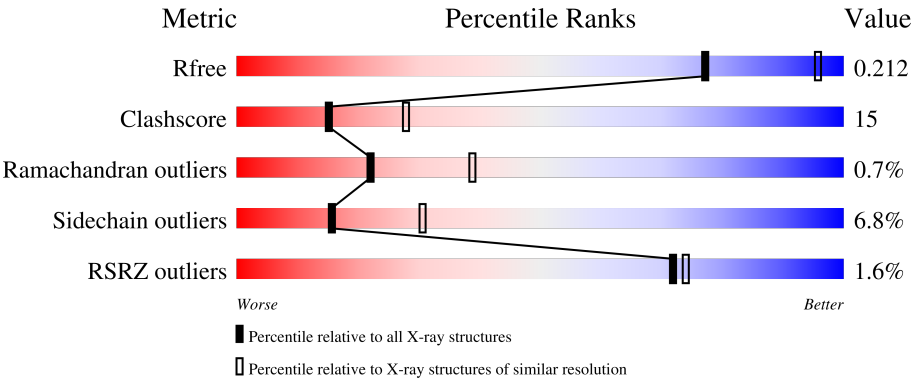
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.23.2
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.23.2

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.50 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

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	L	281	2% 77% 22%
2	M	307	64% 31%
3	H	260	64% 22% 5% 9%

2 Entry composition (i)

There are 11 unique types of molecules in this entry. The entry contains 7220 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 PHOTOSYNTHETIC REACTION CENTER PROTEIN L CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	L	281	Total	C	N	O	S	0	0	0
			2232	1507	355	362	8			

- Molecule 2 is a protein called PHOTOSYNTHETIC REACTION CENTER PROTEIN M CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	M	302	Total	C	N	O	S	0	0	0
			2406	1607	392	397	10			

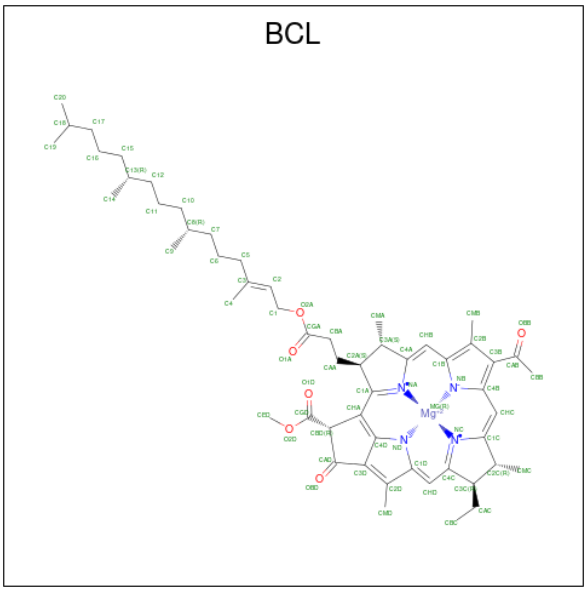
There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
M	202	LEU	HIS	engineered mutation	UNP P02953

- Molecule 3 is a protein called PHOTOSYNTHETIC REACTION CENTER PROTEIN H CHAIN.

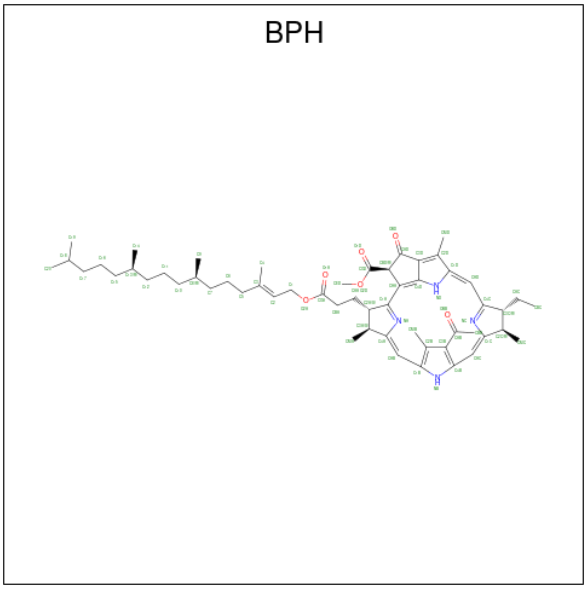
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	H	236	Total	C	N	O	S	0	0	0
			1794	1148	305	332	9			

- Molecule 4 is BACTERIOCHLOROPHYLL A (three-letter code: BCL) (formula: $C_{55}H_{74}MgN_4O_6$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	L	1	Total	C	Mg	N	O	0	0
			66	55	1	4	6		
4	L	1	Total	C	Mg	N	O	0	0
			66	55	1	4	6		
4	L	1	Total	C	Mg	N	O	0	0
			66	55	1	4	6		

- Molecule 5 is BACTERIOPHEOPHYTIN A (three-letter code: BPH) (formula: $C_{55}H_{76}N_4O_6$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	L	1	Total	C	N	O	0	0
			65	55	4	6		

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	L	1	Total C N O 65 55 4 6	0	0
5	M	1	Total C N O 65 55 4 6	0	0

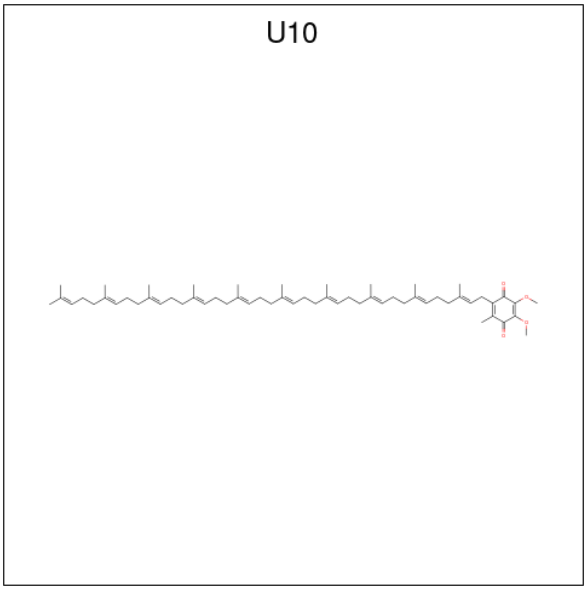
- Molecule 6 is FE (III) ION (three-letter code: FE) (formula: Fe).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	M	1	Total Fe 1 1	0	0

- Molecule 7 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

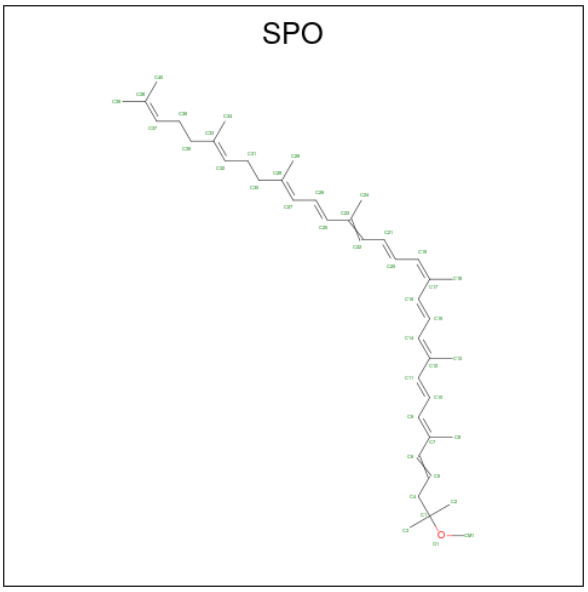
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	M	1	Total Cl 1 1	0	0

- Molecule 8 is UBIQUINONE-10 (three-letter code: U10) (formula: $C_{59}H_{90}O_4$).



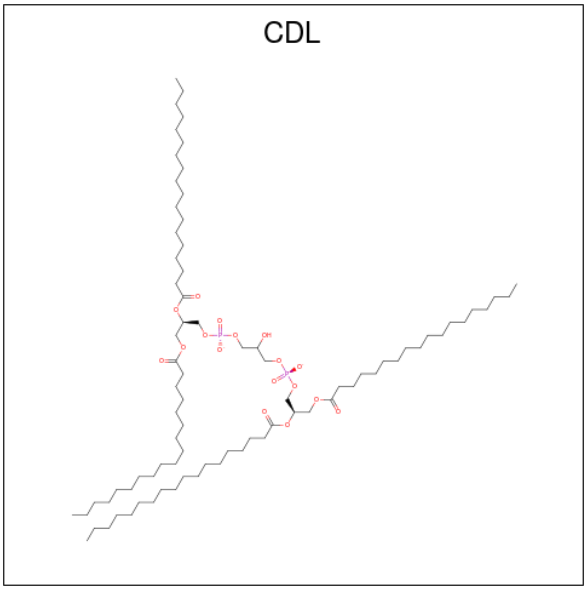
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	M	1	Total C O 48 44 4	0	0

- Molecule 9 is SPHEROIDENE (three-letter code: SPO) (formula: $C_{41}H_{60}O$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
9	M	1	42	41	1	0	0

- Molecule 10 is CARDIOLIPIN (three-letter code: CDL) (formula: $C_{81}H_{156}O_{17}P_2$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	O	P		
10	M	1	81	62	17	2	0	0

- Molecule 11 is water.

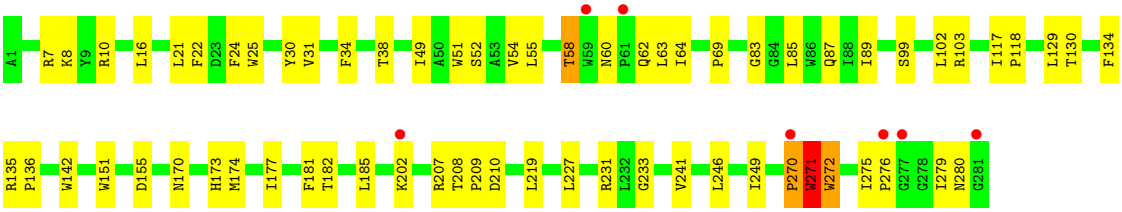
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
11	L	74	Total O 74 74	0	0
11	M	71	Total O 71 71	0	0
11	H	77	Total O 77 77	0	0

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

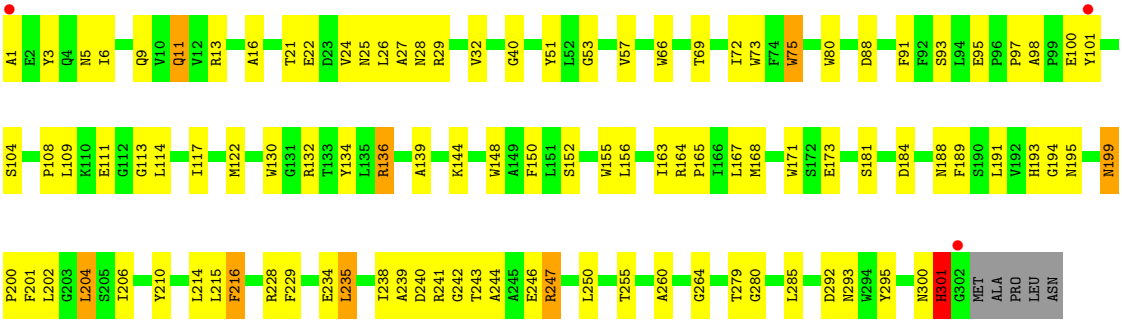
• Molecule 1: PHOTOSYNTHETIC REACTION CENTER PROTEIN L CHAIN

Chain L:



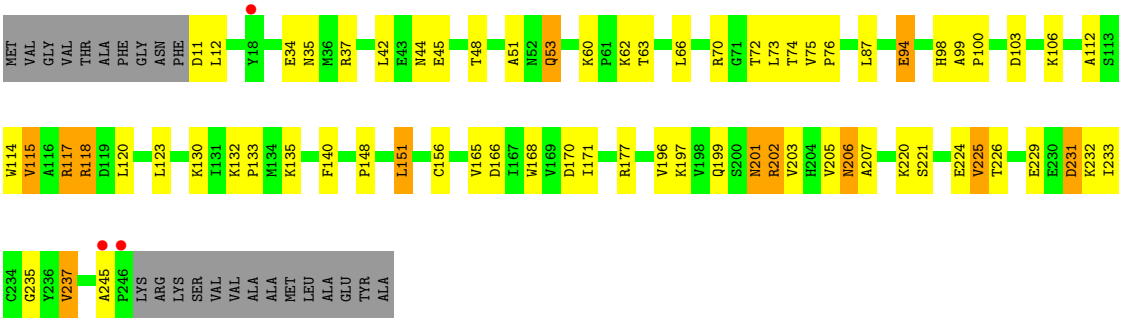
• Molecule 2: PHOTOSYNTHETIC REACTION CENTER PROTEIN M CHAIN

Chain M:



• Molecule 3: PHOTOSYNTHETIC REACTION CENTER PROTEIN H CHAIN

Chain H:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α, β, γ	142.31Å 142.31Å 187.59Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	27.07 – 2.50 27.07 – 2.56	Depositor EDS
% Data completeness (in resolution range)	81.4 (27.07-2.50) 83.8 (27.07-2.56)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	0.12	Depositor
$< I/\sigma(I) >$ [1]	1.62 (at 2.57Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.195 , 0.224 0.196 , 0.212	Depositor DCC
R_{free} test set	6034 reflections (10.13%)	wwPDB-VP
Wilson B-factor (Å^2)	46.9	Xtriage
Anisotropy	0.124	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 73.9	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.021 for -h,-k,l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	7220	wwPDB-VP
Average B, all atoms (Å^2)	46.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.78% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: BPH, FE, CL, SPO, U10, CDL, BCL

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	L	0.43	0/2320	0.61	0/3175
2	M	0.43	0/2497	0.60	0/3409
3	H	0.39	0/1842	0.66	0/2509
All	All	0.42	0/6659	0.62	0/9093

There are no bond length outliers.

There are no bond angle outliers.

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	L	2232	0	2187	60	0
2	M	2406	0	2325	78	0
3	H	1794	0	1792	64	0
4	L	198	0	222	16	0
5	L	130	0	152	17	0
5	M	65	0	76	9	0
6	M	1	0	0	0	0
7	M	1	0	0	0	0
8	M	48	0	63	3	0
9	M	42	0	60	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
10	M	81	0	106	1	0
11	H	77	0	0	1	0
11	L	74	0	0	2	0
11	M	71	0	0	3	0
All	All	7220	0	6983	210	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 15.

All (210) 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:L:272:TRP:HA	1:L:275:ILE:HD13	1.42	1.00
5:M:852:BPH:HAA2	5:M:852:BPH:HBD	1.47	0.96
2:M:21:THR:HG23	2:M:26:LEU:HD11	1.45	0.95
1:L:34:PHE:O	1:L:38:THR:HG23	1.74	0.88
4:L:850:BCL:H93	5:M:852:BPH:H203	1.56	0.87
2:M:108:PRO:HG2	2:M:111:GLU:HB2	1.57	0.86
1:L:38:THR:HG22	1:L:99:SER:HB2	1.56	0.85
5:M:852:BPH:HAA2	5:M:852:BPH:CBD	2.02	0.83
2:M:202:LEU:O	2:M:206:ILE:HG12	1.79	0.81
1:L:58:THR:HG21	1:L:63:LEU:HD23	1.64	0.79
3:H:70:ARG:HH21	3:H:120:LEU:HB3	1.49	0.78
1:L:271:TRP:CD1	1:L:271:TRP:N	2.49	0.77
1:L:38:THR:HG22	1:L:99:SER:CB	2.15	0.76
1:L:271:TRP:H	1:L:271:TRP:HD1	1.30	0.75
2:M:75:TRP:HD1	2:M:80:TRP:HA	1.52	0.74
1:L:181:PHE:CD2	5:L:854:BPH:HBB1	2.23	0.74
3:H:45:GLU:HG3	3:H:94:GLU:HG2	1.71	0.73
2:M:240:ASP:O	3:H:117:ARG:NH1	2.21	0.71
5:L:855:BPH:HBB2	2:M:210:TYR:HB3	1.73	0.70
3:H:70:ARG:NH2	3:H:120:LEU:HB3	2.07	0.70
4:L:850:BCL:H11	5:L:854:BPH:HBB2	1.74	0.69
2:M:72:ILE:HD12	2:M:73:TRP:N	2.08	0.68
3:H:201:ASN:H	3:H:201:ASN:HD22	1.41	0.68
2:M:16:ALA:HB1	2:M:32:VAL:HG11	1.76	0.67
2:M:97:PRO:HG2	2:M:171:TRP:HB2	1.76	0.67
2:M:242:GLY:HA2	3:H:117:ARG:HD2	1.75	0.66
2:M:144:LYS:N	2:M:144:LYS:HD2	2.11	0.66
3:H:148:PRO:HA	3:H:151:LEU:HD22	1.77	0.66
1:L:69:PRO:HG2	1:L:142:TRP:HB2	1.77	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:L:51:TRP:O	1:L:54:VAL:HG22	1.96	0.65
1:L:7:ARG:NH1	3:H:98:HIS:CD2	2.65	0.64
2:M:199:ASN:C	2:M:199:ASN:HD22	2.00	0.64
2:M:11:GLN:OE1	2:M:40:GLY:HA3	1.96	0.64
1:L:7:ARG:HH12	3:H:98:HIS:CD2	2.16	0.63
4:L:850:BCL:HMB2	5:L:854:BPH:HMB3	1.81	0.63
2:M:243:THR:O	2:M:247:ARG:HG2	1.99	0.63
1:L:117:ILE:HB	1:L:118:PRO:HD3	1.81	0.63
3:H:70:ARG:HH12	3:H:123:LEU:HD11	1.63	0.62
2:M:241:ARG:HD3	2:M:246:GLU:HG2	1.80	0.62
1:L:275:ILE:HD12	1:L:275:ILE:H	1.65	0.62
2:M:66:TRP:CD1	2:M:122:MET:HB2	2.34	0.62
2:M:168:MET:HG3	2:M:173:GLU:HG2	1.82	0.62
1:L:275:ILE:HD12	1:L:275:ILE:N	2.15	0.61
2:M:93:SER:HB2	2:M:181:SER:OG	2.00	0.61
2:M:75:TRP:CD1	2:M:80:TRP:HA	2.35	0.61
3:H:156:CYS:HB3	3:H:206:ASN:O	2.00	0.61
2:M:242:GLY:CA	3:H:117:ARG:HD2	2.30	0.61
3:H:148:PRO:O	3:H:151:LEU:HB2	2.00	0.61
2:M:164:ARG:HH12	2:M:173:GLU:HG3	1.66	0.61
2:M:199:ASN:ND2	2:M:201:PHE:H	1.99	0.60
3:H:70:ARG:NH1	3:H:123:LEU:HD11	2.17	0.60
3:H:37:ARG:NH2	3:H:60:LYS:O	2.35	0.60
1:L:135:ARG:HB3	1:L:136:PRO:HD3	1.85	0.59
1:L:241:VAL:HG21	5:L:855:BPH:HAC2	1.83	0.59
1:L:246:LEU:O	1:L:249:ILE:HG22	2.02	0.59
1:L:275:ILE:H	1:L:275:ILE:CD1	2.15	0.58
2:M:113:GLY:O	2:M:117:ILE:HD13	2.03	0.58
1:L:60:ASN:O	1:L:64:ILE:HG13	2.03	0.58
2:M:164:ARG:NH1	2:M:173:GLU:HG3	2.19	0.58
11:M:1152:HOH:O	3:H:118:ARG:HD3	2.03	0.58
1:L:30:TYR:O	1:L:103:ARG:NH1	2.37	0.57
3:H:130:LYS:HE3	3:H:170:ASP:OD2	2.04	0.57
4:L:850:BCL:CBB	4:L:850:BCL:HHC	2.34	0.57
2:M:101:TYR:O	2:M:104:SER:HB3	2.05	0.57
1:L:181:PHE:HB3	5:L:854:BPH:CBB	2.35	0.57
1:L:208:THR:HB	1:L:209:PRO:HD2	1.86	0.56
2:M:204:LEU:CB	2:M:279:THR:HG21	2.36	0.56
2:M:199:ASN:HD22	2:M:200:PRO:N	2.04	0.55
2:M:136:ARG:NE	2:M:136:ARG:HA	2.21	0.55
1:L:52:SER:HB2	1:L:85:LEU:HD13	1.89	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:L:181:PHE:HB3	5:L:854:BPH:HBB2	1.88	0.55
1:L:103:ARG:HG3	11:L:1016:HOH:O	2.07	0.55
5:L:854:BPH:H4C2	5:M:852:BPH:H141	1.88	0.55
3:H:202:ARG:HG2	3:H:203:VAL:N	2.21	0.55
4:L:850:BCL:HHC	4:L:850:BCL:HBB3	1.90	0.54
3:H:133:PRO:HG3	3:H:168:TRP:CZ2	2.42	0.54
3:H:226:THR:OG1	3:H:229:GLU:HG3	2.08	0.53
3:H:103:ASP:HB3	3:H:106:LYS:HB2	1.91	0.53
1:L:22:PHE:O	1:L:31:VAL:O	2.27	0.53
2:M:22:GLU:HB3	2:M:139:ALA:O	2.08	0.53
1:L:54:VAL:HG23	1:L:55:LEU:N	2.25	0.52
2:M:204:LEU:HB3	2:M:279:THR:HG21	1.91	0.52
3:H:201:ASN:HD22	3:H:201:ASN:N	2.03	0.52
3:H:45:GLU:CG	3:H:94:GLU:HG2	2.37	0.52
2:M:152:SER:O	2:M:155:TRP:HB3	2.10	0.52
3:H:135:LYS:HE2	3:H:166:ASP:OD2	2.10	0.52
1:L:22:PHE:HA	1:L:24:PHE:CE2	2.45	0.52
1:L:174:MET:HB3	4:L:850:BCL:O1D	2.09	0.52
3:H:221:SER:HB3	3:H:224:GLU:HG2	1.92	0.52
2:M:53:GLY:O	2:M:57:VAL:HG23	2.11	0.51
2:M:1:ALA:HB3	3:H:197:LYS:NZ	2.25	0.51
2:M:163:ILE:O	2:M:167:LEU:HG	2.10	0.51
3:H:42:LEU:N	3:H:53:GLN:OE1	2.43	0.51
1:L:177:ILE:HG12	4:L:851:BCL:HMB3	1.93	0.51
1:L:182:THR:OG1	4:L:850:BCL:H42	2.10	0.51
5:L:855:BPH:HHC	5:L:855:BPH:HBB3	1.92	0.50
3:H:133:PRO:HG3	3:H:168:TRP:CE2	2.46	0.50
3:H:233:ILE:O	3:H:237:VAL:HG13	2.11	0.50
2:M:134:TYR:CE2	2:M:144:LYS:HG2	2.47	0.50
2:M:3:TYR:CZ	2:M:5:ASN:HA	2.47	0.50
3:H:207:ALA:HB1	3:H:237:VAL:O	2.11	0.50
2:M:130:TRP:HD1	2:M:150:PHE:CD2	2.30	0.49
4:L:853:BCL:HAA2	4:L:853:BCL:HBD	1.95	0.48
11:M:1055:HOH:O	3:H:34:GLU:HG3	2.13	0.48
1:L:103:ARG:NH2	2:M:255:THR:O	2.46	0.48
3:H:201:ASN:H	3:H:201:ASN:ND2	2.07	0.48
1:L:246:LEU:C	1:L:246:LEU:HD13	2.33	0.48
2:M:24:VAL:HG11	2:M:29:ARG:NH1	2.28	0.48
2:M:13:ARG:O	3:H:140:PHE:HA	2.14	0.48
2:M:25:ASN:OD1	2:M:27:ALA:HB3	2.13	0.48
1:L:280:ASN:ND2	2:M:88:ASP:OD1	2.46	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:M:194:GLY:O	2:M:195:ASN:HB3	2.12	0.47
1:L:83:GLY:O	1:L:87:GLN:HG3	2.15	0.47
2:M:239:ALA:O	3:H:73:LEU:HD22	2.14	0.47
3:H:11:ASP:HB2	11:H:1139:HOH:O	2.14	0.47
3:H:70:ARG:NH1	3:H:123:LEU:CD1	2.77	0.47
4:L:851:BCL:HAA2	4:L:853:BCL:HBC1	1.96	0.47
1:L:275:ILE:N	1:L:275:ILE:CD1	2.76	0.47
3:H:44:ASN:ND2	3:H:48:THR:HG22	2.30	0.47
1:L:58:THR:HG21	1:L:63:LEU:CD2	2.41	0.47
1:L:231:ARG:HD2	2:M:6:ILE:O	2.15	0.47
2:M:164:ARG:HB3	2:M:165:PRO:HD3	1.96	0.47
2:M:97:PRO:CG	2:M:171:TRP:HB2	2.43	0.46
1:L:219:LEU:HD12	2:M:132:ARG:NH1	2.30	0.46
2:M:228:ARG:HG3	2:M:229:PHE:CE1	2.50	0.46
2:M:293:ASN:OD1	2:M:295:TYR:HB3	2.16	0.46
2:M:1:ALA:HB3	3:H:197:LYS:HZ3	1.79	0.46
8:M:857:U10:H222	8:M:857:U10:H201	1.66	0.46
3:H:63:THR:HA	3:H:73:LEU:O	2.16	0.46
3:H:168:TRP:CZ3	3:H:225:VAL:HG22	2.50	0.46
3:H:196:VAL:HG12	3:H:205:VAL:HG22	1.97	0.46
4:L:853:BCL:H193	5:L:855:BPH:H111	1.96	0.46
3:H:201:ASN:N	3:H:201:ASN:ND2	2.63	0.46
1:L:22:PHE:HA	1:L:24:PHE:HE2	1.81	0.45
2:M:72:ILE:HD12	2:M:72:ILE:C	2.36	0.45
3:H:34:GLU:OE2	3:H:37:ARG:NH1	2.49	0.45
4:L:851:BCL:CAA	4:L:853:BCL:HBC1	2.46	0.45
2:M:109:LEU:HD12	2:M:109:LEU:N	2.32	0.45
1:L:38:THR:HG22	1:L:99:SER:HB3	1.97	0.45
1:L:85:LEU:O	1:L:89:ILE:HG13	2.17	0.45
2:M:204:LEU:HB2	2:M:279:THR:HG21	1.98	0.45
3:H:34:GLU:O	3:H:37:ARG:HG3	2.17	0.45
3:H:199:GLN:OE1	3:H:202:ARG:HD2	2.17	0.45
1:L:173:HIS:CE1	1:L:177:ILE:HD11	2.52	0.45
3:H:132:LYS:HD2	3:H:171:ILE:CD1	2.46	0.45
2:M:28:ASN:HB2	2:M:51:TYR:CE2	2.52	0.44
2:M:264:GLY:HA3	3:H:35:ASN:OD1	2.17	0.44
11:M:1077:HOH:O	3:H:70:ARG:HD3	2.17	0.44
1:L:130:THR:HA	1:L:134:PHE:HB2	2.00	0.44
2:M:101:TYR:CD1	2:M:101:TYR:N	2.85	0.44
3:H:115:VAL:HG13	3:H:231:ASP:OD2	2.18	0.44
2:M:229:PHE:HB2	2:M:244:ALA:HB2	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:L:170:ASN:HB3	1:L:173:HIS:CB	2.48	0.44
2:M:75:TRP:HZ3	9:M:859:SPO:O1	2.01	0.44
3:H:99:ALA:HA	3:H:100:PRO:HD3	1.85	0.44
1:L:270:PRO:HB2	1:L:271:TRP:HD1	1.83	0.43
5:L:855:BPH:HHB	5:L:855:BPH:HMB1	1.80	0.43
2:M:189:PHE:O	2:M:193:HIS:HD2	2.01	0.43
1:L:34:PHE:HB2	11:L:1016:HOH:O	2.18	0.43
2:M:184:ASP:O	2:M:188:ASN:HB2	2.18	0.43
1:L:60:ASN:HB3	1:L:63:LEU:HB2	2.00	0.43
3:H:75:VAL:HA	3:H:76:PRO:C	2.38	0.43
5:L:854:BPH:HMB1	5:L:854:BPH:HHB	1.78	0.43
2:M:11:GLN:HE21	2:M:11:GLN:HB2	1.66	0.43
8:M:857:U10:H271	8:M:857:U10:H251	1.71	0.43
3:H:165:VAL:O	3:H:166:ASP:HB2	2.17	0.43
1:L:8:LYS:HA	3:H:87:LEU:HD11	2.01	0.42
3:H:45:GLU:HG3	3:H:94:GLU:CG	2.44	0.42
4:L:851:BCL:HAA2	4:L:851:BCL:HBD	2.01	0.42
2:M:109:LEU:HA	2:M:113:GLY:HA3	2.01	0.42
2:M:199:ASN:C	2:M:199:ASN:ND2	2.71	0.42
1:L:227:LEU:O	1:L:231:ARG:HG3	2.19	0.42
3:H:148:PRO:HA	3:H:151:LEU:CD2	2.46	0.42
2:M:206:ILE:HG23	5:M:852:BPH:HMB2	2.01	0.42
2:M:234:GLU:O	2:M:238:ILE:HG13	2.20	0.42
1:L:202:LYS:H	1:L:202:LYS:HG3	1.54	0.42
1:L:279:ILE:HG21	2:M:91:PHE:HB3	2.01	0.42
5:L:854:BPH:HBB3	5:L:854:BPH:HHC	2.02	0.42
1:L:62:GLN:NE2	1:L:151:TRP:HE1	2.18	0.42
1:L:170:ASN:HB3	1:L:173:HIS:HB3	2.02	0.42
3:H:45:GLU:CD	3:H:94:GLU:HG2	2.40	0.42
3:H:112:ALA:HA	3:H:235:GLY:O	2.20	0.42
5:L:854:BPH:H7C2	5:M:852:BPH:H192	2.01	0.41
3:H:114:TRP:CZ2	3:H:232:LYS:HE2	2.54	0.41
3:H:44:ASN:HD22	3:H:48:THR:HG22	1.84	0.41
1:L:272:TRP:HA	1:L:275:ILE:CD1	2.30	0.41
2:M:235:LEU:HD12	2:M:235:LEU:HA	1.82	0.41
2:M:260:ALA:HB1	3:H:35:ASN:OD1	2.20	0.41
2:M:280:GLY:O	5:M:852:BPH:HED3	2.20	0.41
3:H:62:LYS:O	3:H:74:THR:HA	2.20	0.41
4:L:851:BCL:H122	5:L:855:BPH:H3A	2.03	0.41
2:M:148:TRP:CD2	10:M:5000:CDL:H511	2.56	0.41
2:M:98:ALA:HB1	2:M:100:GLU:OE1	2.20	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:M:199:ASN:HD22	2:M:201:PHE:H	1.68	0.41
2:M:242:GLY:O	2:M:246:GLU:HG3	2.20	0.41
3:H:66:LEU:N	3:H:66:LEU:HD23	2.36	0.41
1:L:233:GLY:HA3	2:M:216:PHE:CE1	2.55	0.41
5:L:854:BPH:H8	5:M:852:BPH:H191	2.03	0.41
3:H:118:ARG:HB3	3:H:120:LEU:HD23	2.02	0.41
1:L:10:ARG:NH2	1:L:25:TRP:HB2	2.36	0.41
2:M:300:ASN:O	2:M:301:HIS:C	2.59	0.41
3:H:132:LYS:HD2	3:H:171:ILE:HD11	2.03	0.41
4:L:850:BCL:HBB3	4:L:850:BCL:CHC	2.48	0.41
8:M:857:U10:H71	8:M:857:U10:H1M1	1.87	0.41
2:M:73:TRP:CE3	2:M:114:LEU:HD12	2.56	0.40
5:M:852:BPH:HBC2	5:M:852:BPH:H2C	1.95	0.40
4:L:850:BCL:H2	5:L:854:BPH:HMB2	2.03	0.40
2:M:69:THR:O	2:M:72:ILE:HG13	2.21	0.40
1:L:49:ILE:HG13	1:L:89:ILE:HD13	2.03	0.40
1:L:275:ILE:HA	1:L:276:PRO:HD3	1.96	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	L	279/281 (99%)	262 (94%)	15 (5%)	2 (1%)	22	39
2	M	300/307 (98%)	286 (95%)	13 (4%)	1 (0%)	41	61
3	H	234/260 (90%)	222 (95%)	9 (4%)	3 (1%)	12	21
All	All	813/848 (96%)	770 (95%)	37 (5%)	6 (1%)	22	39

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	M	301	HIS
3	H	220	LYS
3	H	51	ALA
1	L	270	PRO
1	L	271	TRP
3	H	245	ALA

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	L	220/220 (100%)	209 (95%)	11 (5%)	24 46
2	M	236/240 (98%)	218 (92%)	18 (8%)	13 25
3	H	191/208 (92%)	176 (92%)	15 (8%)	12 24
All	All	647/668 (97%)	603 (93%)	44 (7%)	16 30

All (44) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	L	16	LEU
1	L	21	LEU
1	L	58	THR
1	L	102	LEU
1	L	129	LEU
1	L	155	ASP
1	L	185	LEU
1	L	207	ARG
1	L	210	ASP
1	L	271	TRP
1	L	272	TRP
2	M	9	GLN
2	M	11	GLN
2	M	75	TRP
2	M	95	GLU
2	M	136	ARG
2	M	156	LEU

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Mol	Chain	Res	Type
2	M	191	LEU
2	M	199	ASN
2	M	204	LEU
2	M	214	LEU
2	M	215	LEU
2	M	216	PHE
2	M	235	LEU
2	M	247	ARG
2	M	250	LEU
2	M	285	LEU
2	M	292	ASP
2	M	301	HIS
3	H	12	LEU
3	H	53	GLN
3	H	72	THR
3	H	94	GLU
3	H	115	VAL
3	H	117	ARG
3	H	118	ARG
3	H	151	LEU
3	H	177	ARG
3	H	201	ASN
3	H	202	ARG
3	H	206	ASN
3	H	225	VAL
3	H	231	ASP
3	H	237	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	L	62	GLN
1	L	159	ASN
1	L	264	GLN
2	M	11	GLN
2	M	28	ASN
2	M	193	HIS
2	M	199	ASN
2	M	299	GLN
3	H	44	ASN
3	H	98	HIS
3	H	201	ASN

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Mol	Chain	Res	Type
3	H	206	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 11 ligands modelled in this entry, 2 are monoatomic - leaving 9 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
4	BCL	L	851	-	58,74,74	1.66	8 (13%)	69,115,115	1.82	12 (17%)
5	BPH	L	854	-	64,70,70	1.46	11 (17%)	76,101,101	1.82	16 (21%)
4	BCL	L	853	-	58,74,74	1.69	9 (15%)	69,115,115	2.10	19 (27%)
8	U10	M	857	-	48,48,63	2.46	13 (27%)	58,61,79	2.09	21 (36%)
5	BPH	M	852	-	64,70,70	1.69	12 (18%)	76,101,101	2.53	27 (35%)
5	BPH	L	855	-	64,70,70	1.42	12 (18%)	76,101,101	1.87	20 (26%)
4	BCL	L	850	-	58,74,74	2.60	11 (18%)	69,115,115	4.58	17 (24%)
10	CDL	M	5000	-	80,80,99	0.73	1 (1%)	86,92,111	0.94	5 (5%)
9	SPO	M	859	-	40,41,41	3.62	26 (65%)	47,50,50	2.72	14 (29%)

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	BCL	L	851	-	-	5/37/137/137	-
5	BPH	L	854	-	-	10/54/105/105	0/5/6/6
4	BCL	L	853	-	-	6/37/137/137	-
8	U10	M	857	-	-	15/45/69/87	0/1/1/1
5	BPH	M	852	-	-	9/54/105/105	0/5/6/6
5	BPH	L	855	-	-	9/54/105/105	0/5/6/6
4	BCL	L	850	-	-	5/37/137/137	-
10	CDL	M	5000	-	-	34/91/91/110	-
9	SPO	M	859	-	-	12/47/47/47	-

All (103) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	L	850	BCL	C1B-NB	-12.22	1.24	1.35
8	M	857	U10	C6-C1	10.26	1.54	1.35
4	L	850	BCL	C3B-C2B	9.97	1.57	1.39
9	M	859	SPO	C15-C16	9.32	1.58	1.34
9	M	859	SPO	C10-C11	7.26	1.53	1.34
9	M	859	SPO	C6-C5	7.23	1.50	1.32
4	L	850	BCL	C3D-C2D	6.74	1.51	1.39
4	L	851	BCL	C3D-C2D	6.22	1.50	1.39
9	M	859	SPO	C21-C20	5.76	1.51	1.36
9	M	859	SPO	C27-C28	5.61	1.40	1.34
4	L	853	BCL	C3D-C2D	5.44	1.49	1.39
4	L	853	BCL	C3B-C2B	5.28	1.48	1.39
8	M	857	U10	C7-C8	-5.26	1.43	1.50
4	L	851	BCL	C3B-C2B	5.19	1.48	1.39
5	L	854	BPH	C3D-C2D	5.02	1.48	1.39
9	M	859	SPO	C26-C25	5.00	1.47	1.34
5	L	855	BPH	C3D-C2D	4.98	1.48	1.39
9	M	859	SPO	C13-C12	4.57	1.60	1.50
8	M	857	U10	C4-C3	4.44	1.54	1.36
9	M	859	SPO	C14-C12	4.40	1.41	1.35
5	M	852	BPH	CHA-C1A	4.34	1.47	1.38
4	L	853	BCL	C2-C3	4.30	1.43	1.33
8	M	857	U10	C7-C6	4.26	1.58	1.51
4	L	850	BCL	C3B-CAB	4.25	1.60	1.49
5	M	852	BPH	C2-C3	4.21	1.43	1.33

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	M	859	SPO	O1-CM1	4.11	1.56	1.43
5	M	852	BPH	C3D-CAD	-4.08	1.39	1.47
5	M	852	BPH	CMB-C2B	4.01	1.59	1.50
9	M	859	SPO	C15-C14	3.91	1.55	1.43
4	L	850	BCL	C2-C3	3.91	1.42	1.33
4	L	851	BCL	C4B-NB	3.77	1.38	1.35
8	M	857	U10	C6-C5	3.77	1.57	1.46
5	M	852	BPH	C3B-C2B	3.76	1.49	1.39
5	M	852	BPH	O2A-CGA	-3.74	1.22	1.33
5	L	855	BPH	CMB-C2B	3.69	1.58	1.50
9	M	859	SPO	C19-C17	3.63	1.40	1.35
9	M	859	SPO	C35-C33	3.61	1.58	1.51
5	M	852	BPH	C3B-CAB	3.51	1.57	1.46
5	L	854	BPH	CMB-C2B	3.48	1.58	1.50
9	M	859	SPO	C37-C38	3.34	1.42	1.32
9	M	859	SPO	C32-C33	3.32	1.40	1.33
5	L	854	BPH	C2-C3	3.31	1.40	1.33
9	M	859	SPO	C22-C23	3.31	1.40	1.35
4	L	853	BCL	C3C-C4C	-3.27	1.47	1.51
9	M	859	SPO	C4-C5	-3.24	1.45	1.50
9	M	859	SPO	C10-C9	3.24	1.53	1.43
9	M	859	SPO	C11-C12	-3.18	1.39	1.45
5	M	852	BPH	C3D-C2D	3.17	1.45	1.39
4	L	853	BCL	C4B-NB	3.16	1.38	1.35
8	M	857	U10	C33-C34	3.15	1.40	1.33
9	M	859	SPO	O1-C1	3.09	1.58	1.41
4	L	853	BCL	CMB-C2B	3.05	1.58	1.51
4	L	851	BCL	C2-C3	3.01	1.40	1.33
9	M	859	SPO	C8-C7	3.01	1.57	1.50
8	M	857	U10	C28-C29	2.97	1.40	1.33
9	M	859	SPO	C31-C32	-2.96	1.40	1.50
4	L	851	BCL	CMB-C2B	2.95	1.57	1.51
4	L	853	BCL	C3B-CAB	2.90	1.56	1.49
8	M	857	U10	C23-C24	2.86	1.39	1.33
8	M	857	U10	C18-C19	2.81	1.39	1.33
8	M	857	U10	C13-C14	2.81	1.39	1.33
4	L	850	BCL	OBD-CAD	2.76	1.26	1.22
5	L	855	BPH	C3B-C2B	2.74	1.46	1.39
4	L	851	BCL	C3B-CAB	2.74	1.56	1.49
5	L	854	BPH	C1B-C2B	-2.67	1.40	1.45
5	L	855	BPH	C3D-CAD	-2.67	1.41	1.47
8	M	857	U10	C38-C39	2.64	1.39	1.32

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	M	5000	CDL	CB3-CB4	2.59	1.58	1.50
9	M	859	SPO	C9-C7	2.59	1.39	1.35
8	M	857	U10	O4-C4	2.57	1.43	1.36
5	L	854	BPH	C3B-C2B	2.56	1.46	1.39
5	L	855	BPH	C2-C3	2.54	1.39	1.33
5	L	854	BPH	CMD-C2D	2.54	1.56	1.51
5	M	852	BPH	O2A-C1	-2.53	1.39	1.46
9	M	859	SPO	C24-C23	2.52	1.56	1.50
5	L	855	BPH	C3A-C2A	-2.50	1.47	1.54
9	M	859	SPO	C29-C28	2.50	1.57	1.50
5	L	855	BPH	C3B-CAB	2.49	1.54	1.46
5	M	852	BPH	CBB-CAB	2.47	1.55	1.50
5	L	855	BPH	C1B-C2B	-2.46	1.40	1.45
5	L	854	BPH	C3D-CAD	-2.42	1.42	1.47
4	L	853	BCL	OBD-CAD	2.41	1.25	1.22
5	L	855	BPH	O2A-CGA	-2.38	1.26	1.33
4	L	850	BCL	C4B-NB	-2.36	1.33	1.35
5	L	855	BPH	CMD-C2D	2.35	1.56	1.51
4	L	850	BCL	CMB-C2B	2.32	1.56	1.51
8	M	857	U10	C36-C34	2.30	1.56	1.51
4	L	850	BCL	C3A-C2A	-2.28	1.48	1.54
5	M	852	BPH	CMD-C2D	2.27	1.56	1.51
9	M	859	SPO	C25-C23	-2.26	1.41	1.45
4	L	850	BCL	C4B-CHC	2.25	1.47	1.41
4	L	850	BCL	O2D-CGD	-2.22	1.27	1.33
5	L	855	BPH	CHA-C1A	2.20	1.42	1.38
4	L	851	BCL	CBB-CAB	2.19	1.56	1.49
5	M	852	BPH	C4-C3	2.18	1.56	1.50
4	L	853	BCL	C3A-C2A	-2.16	1.48	1.54
9	M	859	SPO	C6-C7	-2.11	1.41	1.45
5	L	854	BPH	C3A-C2A	-2.08	1.48	1.54
4	L	851	BCL	O2A-CGA	-2.04	1.27	1.33
5	L	854	BPH	O2D-CGD	-2.04	1.28	1.33
5	L	854	BPH	C5-C3	2.03	1.55	1.51
5	L	854	BPH	CHA-C1A	2.02	1.42	1.38
5	L	855	BPH	C4-C3	2.01	1.55	1.50

All (151) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	L	850	BCL	OBB-CAB-C3B	24.21	162.96	119.99
4	L	850	BCL	OBB-CAB-CBB	-18.68	78.14	120.17

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	L	850	BCL	CBB-CAB-C3B	-11.96	84.83	120.34
9	M	859	SPO	C25-C23-C22	-11.15	101.83	118.94
4	L	850	BCL	C4B-C3B-CAB	9.69	145.84	127.13
4	L	850	BCL	CMB-C2B-C1B	-8.66	115.16	128.46
5	M	852	BPH	CBA-CAA-C2A	7.41	135.73	113.86
5	M	852	BPH	CAA-C2A-C1A	-7.24	93.62	112.33
4	L	853	BCL	CMB-C2B-C1B	-6.62	118.29	128.46
4	L	851	BCL	CMB-C2B-C1B	-6.57	118.37	128.46
4	L	853	BCL	CAA-C2A-C1A	-6.30	91.32	111.97
8	M	857	U10	C7-C6-C5	6.16	125.89	118.48
9	M	859	SPO	C18-C17-C19	-6.09	114.39	122.92
5	L	854	BPH	C1-O2A-CGA	6.04	132.29	116.44
5	M	852	BPH	C4-C3-C5	5.80	125.03	115.27
4	L	850	BCL	C4D-C3D-CAD	-5.67	105.31	108.47
4	L	851	BCL	C4D-C3D-CAD	-5.58	105.36	108.47
5	L	855	BPH	C1-O2A-CGA	5.55	131.01	116.44
5	L	855	BPH	C4-C3-C5	5.49	124.50	115.27
5	M	852	BPH	C5-C3-C2	-5.48	110.02	121.12
5	M	852	BPH	C1-O2A-CGA	5.47	130.79	116.44
4	L	853	BCL	C4D-C3D-CAD	-5.40	105.46	108.47
9	M	859	SPO	C20-C21-C22	-5.39	112.44	123.47
5	M	852	BPH	C1-C2-C3	5.05	134.77	126.04
4	L	853	BCL	CMB-C2B-C3B	5.03	134.10	124.68
5	L	854	BPH	C4D-C3D-CAD	-5.02	104.69	107.87
4	L	851	BCL	CMB-C2B-C3B	4.95	133.94	124.68
5	M	852	BPH	CAA-CBA-CGA	4.90	127.57	113.25
5	L	855	BPH	C4D-C3D-CAD	-4.80	104.83	107.87
5	M	852	BPH	C7-C6-C5	-4.79	100.34	113.36
8	M	857	U10	C15-C14-C16	4.72	123.20	115.27
9	M	859	SPO	C24-C23-C22	-4.56	116.53	122.92
4	L	850	BCL	CAA-C2A-C1A	-4.55	97.06	111.97
5	L	854	BPH	CHD-C4C-NC	-4.52	119.83	125.20
5	M	852	BPH	C6-C5-C3	4.46	125.14	113.45
8	M	857	U10	C15-C14-C13	-4.24	112.80	123.68
8	M	857	U10	C10-C9-C8	-4.17	112.98	123.68
4	L	850	BCL	C4A-NA-C1A	4.17	108.58	106.71
5	M	852	BPH	CMB-C2B-C1B	-4.16	118.65	125.06
9	M	859	SPO	C8-C7-C9	4.07	128.62	122.92
5	L	855	BPH	C5-C3-C2	-4.03	112.96	121.12
5	L	854	BPH	O2A-C1-C2	-4.00	98.13	108.64
9	M	859	SPO	C11-C12-C14	-3.99	112.82	118.94
4	L	851	BCL	OBD-CAD-C3D	-3.94	121.43	127.98

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	M	852	BPH	CHD-C4C-NC	-3.93	120.53	125.20
4	L	853	BCL	CED-O2D-CGD	3.93	124.83	115.94
4	L	850	BCL	C4B-CHC-C1C	3.91	137.85	130.12
4	L	851	BCL	CED-O2D-CGD	3.90	124.75	115.94
9	M	859	SPO	C15-C14-C12	-3.87	121.78	127.31
4	L	853	BCL	OBD-CAD-C3D	-3.79	121.69	127.98
5	L	855	BPH	CHD-C4C-NC	-3.74	120.75	125.20
5	L	855	BPH	C6-C5-C3	3.73	123.22	113.45
4	L	853	BCL	C4A-NA-C1A	3.64	108.34	106.71
4	L	850	BCL	CED-O2D-CGD	3.63	124.14	115.94
5	L	854	BPH	O2D-CGD-CBD	3.61	117.69	111.27
10	M	5000	CDL	OB8-CB6-CB4	3.60	118.92	108.43
4	L	851	BCL	C2A-C3A-C4A	3.58	107.65	101.87
4	L	850	BCL	OBD-CAD-C3D	-3.54	122.11	127.98
4	L	853	BCL	CBA-CAA-C2A	3.51	124.24	113.86
5	L	854	BPH	CMB-C2B-C1B	-3.51	119.65	125.06
5	L	855	BPH	CMB-C2B-C1B	-3.48	119.70	125.06
5	L	855	BPH	CHC-C4B-NB	-3.48	117.66	124.93
5	M	852	BPH	CAA-C2A-C3A	3.46	122.26	112.78
8	M	857	U10	C35-C34-C33	-3.44	114.84	123.68
5	L	854	BPH	C4-C3-C5	3.43	121.04	115.27
5	M	852	BPH	C4D-C3D-CAD	-3.33	105.76	107.87
9	M	859	SPO	C15-C16-C17	-3.30	117.15	126.42
5	M	852	BPH	CED-O2D-CGD	3.19	123.16	115.94
8	M	857	U10	C11-C9-C8	3.18	127.55	121.12
5	L	855	BPH	O2D-CGD-CBD	3.17	116.90	111.27
5	M	852	BPH	CMB-C2B-C3B	3.16	134.89	127.61
5	L	855	BPH	O1D-CGD-CBD	-3.11	118.13	124.48
5	L	854	BPH	O1D-CGD-CBD	-3.10	118.14	124.48
5	L	854	BPH	CHC-C4B-NB	-3.09	118.47	124.93
4	L	850	BCL	C2A-C3A-C4A	3.07	106.83	101.87
5	L	854	BPH	CHC-C1C-NC	-3.06	121.56	125.20
5	M	852	BPH	C2A-C1A-NA	3.05	115.37	111.86
8	M	857	U10	C25-C24-C26	3.05	120.40	115.27
8	M	857	U10	C25-C24-C23	-3.04	115.87	123.68
4	L	850	BCL	C2A-C1A-CHA	2.99	129.09	123.86
8	M	857	U10	C7-C8-C9	2.99	131.77	126.79
9	M	859	SPO	C2-C1-C4	-2.98	106.28	110.86
4	L	853	BCL	CAC-C3C-C2C	-2.97	106.83	114.26
5	L	854	BPH	C3D-CAD-CBD	2.94	111.48	107.61
4	L	853	BCL	C2A-C3A-C4A	2.94	106.62	101.87
5	L	855	BPH	CED-O2D-CGD	2.94	122.58	115.94

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	L	854	BPH	CBB-CAB-C3B	-2.90	114.23	120.43
9	M	859	SPO	C16-C17-C19	2.89	123.38	118.94
5	M	852	BPH	CHC-C4B-NB	-2.86	118.95	124.93
4	L	853	BCL	O2A-CGA-CBA	2.79	120.66	111.91
5	L	854	BPH	CMB-C2B-C3B	2.78	134.01	127.61
8	M	857	U10	C20-C19-C18	-2.77	116.57	123.68
8	M	857	U10	C30-C29-C31	2.76	119.92	115.27
5	M	852	BPH	C3D-CAD-CBD	2.73	111.21	107.61
4	L	853	BCL	O2D-CGD-CBD	2.71	116.08	111.27
4	L	851	BCL	CHA-C1A-NA	-2.70	120.22	126.40
4	L	850	BCL	C6-C5-C3	2.69	120.52	113.45
5	M	852	BPH	CHC-C1C-NC	-2.69	122.01	125.20
4	L	850	BCL	CBA-CAA-C2A	2.65	121.68	113.86
9	M	859	SPO	C18-C17-C16	2.63	122.23	118.08
8	M	857	U10	O5-C5-C4	-2.63	115.35	120.93
5	L	855	BPH	CMB-C2B-C3B	2.61	133.62	127.61
8	M	857	U10	C35-C34-C36	2.60	119.64	115.27
8	M	857	U10	C4M-O4-C4	2.59	125.64	116.47
4	L	853	BCL	C4B-CHC-C1C	2.58	135.23	130.12
5	M	852	BPH	O2A-C1-C2	-2.56	101.91	108.64
5	L	854	BPH	CED-O2D-CGD	2.55	121.71	115.94
4	L	851	BCL	C4B-CHC-C1C	2.54	135.15	130.12
4	L	851	BCL	C2A-C1A-CHA	2.53	128.29	123.86
9	M	859	SPO	C13-C12-C11	2.53	122.07	118.08
4	L	850	BCL	O2A-CGA-CBA	2.53	119.84	111.91
5	L	855	BPH	O2A-C1-C2	-2.52	102.00	108.64
4	L	850	BCL	CHA-C1A-NA	-2.51	120.65	126.40
5	L	855	BPH	C3D-CAD-CBD	2.50	110.89	107.61
4	L	853	BCL	O1D-CGD-CBD	-2.50	119.38	124.48
8	M	857	U10	C10-C9-C11	2.49	119.47	115.27
5	M	852	BPH	C1C-NC-C4C	-2.49	108.35	110.54
5	M	852	BPH	C3A-C4A-CHB	2.45	126.06	121.83
10	M	5000	CDL	OB6-CB5-C51	2.31	116.48	111.50
9	M	859	SPO	C9-C10-C11	-2.29	116.07	123.22
4	L	851	BCL	C3D-CAD-CBD	2.28	110.60	107.61
10	M	5000	CDL	CB6-CB4-CB3	-2.27	106.41	111.79
8	M	857	U10	C21-C19-C18	2.26	125.69	121.12
4	L	853	BCL	C2C-C3C-C4C	2.26	104.72	101.34
10	M	5000	CDL	CB4-OB6-CB5	2.25	123.33	117.79
4	L	853	BCL	CHA-C1A-NA	-2.25	121.25	126.40
9	M	859	SPO	C8-C7-C6	-2.23	114.56	118.08
4	L	851	BCL	C4A-NA-C1A	2.23	107.71	106.71

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	L	854	BPH	C1C-NC-C4C	-2.22	108.59	110.54
5	L	855	BPH	CHC-C1C-NC	-2.21	122.57	125.20
5	M	852	BPH	C6-C7-C8	2.21	123.06	115.92
4	L	853	BCL	C2A-C1A-CHA	2.19	127.68	123.86
5	L	854	BPH	C2A-C3A-C4A	2.18	105.64	101.34
8	M	857	U10	C36-C34-C33	2.17	125.52	121.12
8	M	857	U10	C31-C32-C33	-2.17	104.75	111.88
4	L	851	BCL	CBC-CAC-C3C	2.16	118.28	113.47
5	L	855	BPH	CAC-C3C-C2C	-2.15	108.89	114.26
5	M	852	BPH	C2A-C3A-C4A	2.14	105.57	101.34
5	L	855	BPH	C1C-NC-C4C	-2.14	108.66	110.54
8	M	857	U10	C11-C12-C13	2.13	118.88	111.88
5	M	852	BPH	O1D-CGD-CBD	-2.13	120.13	124.48
5	L	855	BPH	CBB-CAB-C3B	-2.13	115.89	120.43
8	M	857	U10	C1M-C1-C6	-2.12	120.94	124.40
8	M	857	U10	C1-C6-C5	-2.10	117.61	119.58
4	L	853	BCL	C6-C5-C3	2.09	118.94	113.45
5	M	852	BPH	O2D-CGD-CBD	2.08	114.96	111.27
10	M	5000	CDL	C52-C51-CB5	2.05	121.09	113.62
5	L	855	BPH	C2A-C3A-C4A	2.05	105.39	101.34
4	L	853	BCL	CAA-C2A-C3A	-2.05	107.17	112.78
5	M	852	BPH	C11-C12-C13	2.02	122.45	115.92
5	L	855	BPH	OBD-CAD-C3D	-2.01	124.65	127.98

There are no chirality outliers.

All (105) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	L	851	BCL	C2C-C3C-CAC-CBC
4	L	851	BCL	C4C-C3C-CAC-CBC
5	L	854	BPH	C4C-C3C-CAC-CBC
5	L	854	BPH	C2C-C3C-CAC-CBC
5	L	854	BPH	C4B-C3B-CAB-CBB
5	L	854	BPH	C4B-C3B-CAB-OBB
5	L	855	BPH	C4C-C3C-CAC-CBC
8	M	857	U10	C1-C6-C7-C8
8	M	857	U10	C5-C6-C7-C8
8	M	857	U10	C18-C19-C21-C22
8	M	857	U10	C20-C19-C21-C22
8	M	857	U10	C19-C21-C22-C23
9	M	859	SPO	C1-C4-C5-C6
9	M	859	SPO	C4-C5-C6-C7

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Mol	Chain	Res	Type	Atoms
9	M	859	SPO	C21-C22-C23-C24
9	M	859	SPO	C33-C35-C36-C37
9	M	859	SPO	C36-C37-C38-C40
10	M	5000	CDL	CA3-OA5-PA1-OA2
10	M	5000	CDL	CA3-OA5-PA1-OA3
10	M	5000	CDL	CA3-OA5-PA1-OA4
9	M	859	SPO	C36-C37-C38-C39
5	M	852	BPH	C3-C5-C6-C7
5	L	855	BPH	C3-C5-C6-C7
5	L	854	BPH	C4-C3-C5-C6
5	L	855	BPH	C4-C3-C5-C6
5	M	852	BPH	C4-C3-C5-C6
8	M	857	U10	C15-C14-C16-C17
8	M	857	U10	C25-C24-C26-C27
5	L	854	BPH	C2-C3-C5-C6
5	L	855	BPH	C2-C3-C5-C6
5	M	852	BPH	C2-C3-C5-C6
8	M	857	U10	C13-C14-C16-C17
8	M	857	U10	C23-C24-C26-C27
5	L	855	BPH	C6-C7-C8-C9
9	M	859	SPO	C24-C23-C25-C26
5	M	852	BPH	C8-C10-C11-C12
10	M	5000	CDL	CB7-C71-C72-C73
5	L	854	BPH	C11-C10-C8-C7
9	M	859	SPO	C20-C21-C22-C23
8	M	857	U10	C24-C26-C27-C28
8	M	857	U10	C29-C31-C32-C33
4	L	850	BCL	C5-C6-C7-C8
10	M	5000	CDL	C51-C52-C53-C54
10	M	5000	CDL	C11-CA5-OA6-CA4
10	M	5000	CDL	C17-C18-C19-C20
10	M	5000	CDL	OA7-CA5-OA6-CA4
10	M	5000	CDL	C39-C40-C41-C42
10	M	5000	CDL	C52-C53-C54-C55
4	L	853	BCL	C14-C13-C15-C16
10	M	5000	CDL	CA5-C11-C12-C13
10	M	5000	CDL	C11-C12-C13-C14
4	L	850	BCL	C2A-CAA-CBA-CGA
4	L	851	BCL	C2A-CAA-CBA-CGA
10	M	5000	CDL	C36-C37-C38-C39
8	M	857	U10	C9-C11-C12-C13
10	M	5000	CDL	C79-C80-C81-C82

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Mol	Chain	Res	Type	Atoms
4	L	853	BCL	C5-C6-C7-C8
4	L	853	BCL	C12-C13-C15-C16
9	M	859	SPO	C34-C33-C35-C36
5	L	854	BPH	C11-C10-C8-C9
10	M	5000	CDL	C76-C77-C78-C79
5	L	855	BPH	C2C-C3C-CAC-CBC
10	M	5000	CDL	CA3-CA4-CA6-OA8
10	M	5000	CDL	C54-C55-C56-C57
10	M	5000	CDL	C55-C56-C57-C58
10	M	5000	CDL	C21-C22-C23-C24
5	L	855	BPH	C6-C7-C8-C10
9	M	859	SPO	C32-C33-C35-C36
5	M	852	BPH	C11-C10-C8-C9
10	M	5000	CDL	C38-C39-C40-C41
10	M	5000	CDL	OA5-CA3-CA4-CA6
5	L	855	BPH	C8-C10-C11-C12
10	M	5000	CDL	OA5-CA3-CA4-OA6
5	M	852	BPH	C11-C10-C8-C7
4	L	851	BCL	CAD-CBD-CGD-O2D
5	L	854	BPH	CAD-CBD-CGD-O2D
10	M	5000	CDL	C34-C35-C36-C37
10	M	5000	CDL	C33-C34-C35-C36
8	M	857	U10	C12-C11-C9-C10
10	M	5000	CDL	CB2-OB2-PB2-OB4
5	M	852	BPH	C2C-C3C-CAC-CBC
4	L	850	BCL	C15-C16-C17-C18
10	M	5000	CDL	C40-C41-C42-C43
9	M	859	SPO	C18-C17-C19-C20
5	L	854	BPH	C2A-CAA-CBA-CGA
8	M	857	U10	C5-C4-O4-C4M
10	M	5000	CDL	C78-C79-C80-C81
9	M	859	SPO	C16-C17-C19-C20
4	L	851	BCL	C5-C6-C7-C8
4	L	853	BCL	C2A-CAA-CBA-CGA
8	M	857	U10	C12-C11-C9-C8
10	M	5000	CDL	C73-C74-C75-C76
5	M	852	BPH	C6-C7-C8-C9
10	M	5000	CDL	C52-C51-CB5-OB6
4	L	850	BCL	C4-C3-C5-C6
4	L	850	BCL	C2-C3-C5-C6
5	M	852	BPH	O2A-C1-C2-C3
4	L	853	BCL	CHA-CBD-CGD-O2D

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Mol	Chain	Res	Type	Atoms
5	L	855	BPH	CHA-CBD-CGD-O1D
10	M	5000	CDL	CB2-OB2-PB2-OB5
10	M	5000	CDL	CA7-C31-C32-C33
10	M	5000	CDL	C52-C51-CB5-OB7
10	M	5000	CDL	C32-C31-CA7-OA8
10	M	5000	CDL	C72-C71-CB7-OB8
4	L	853	BCL	C15-C16-C17-C18

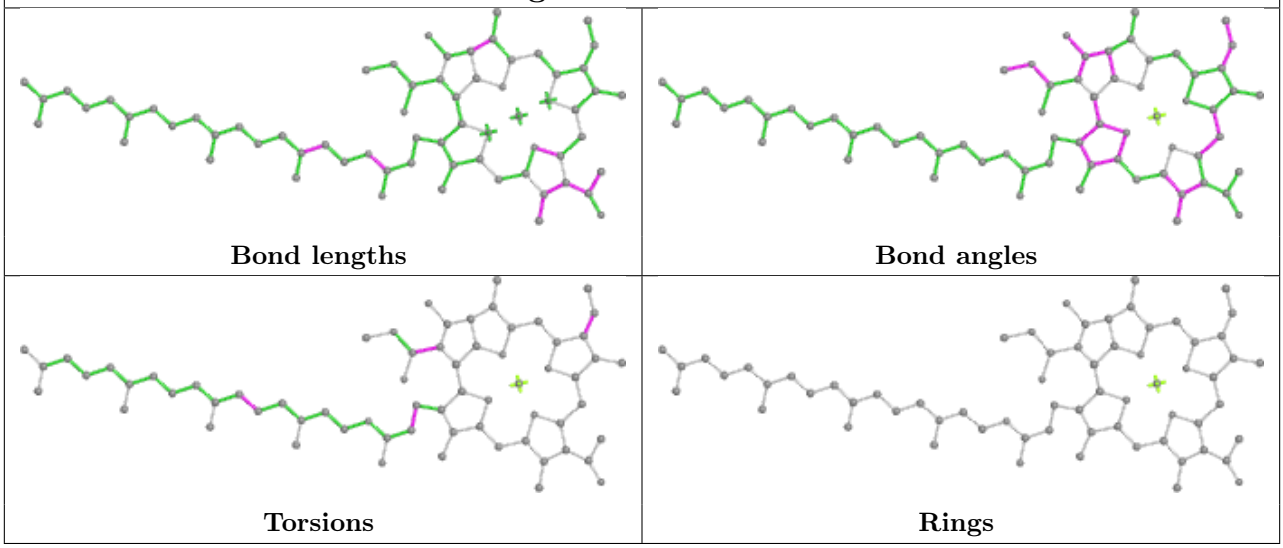
There are no ring outliers.

9 monomers are involved in 38 short contacts:

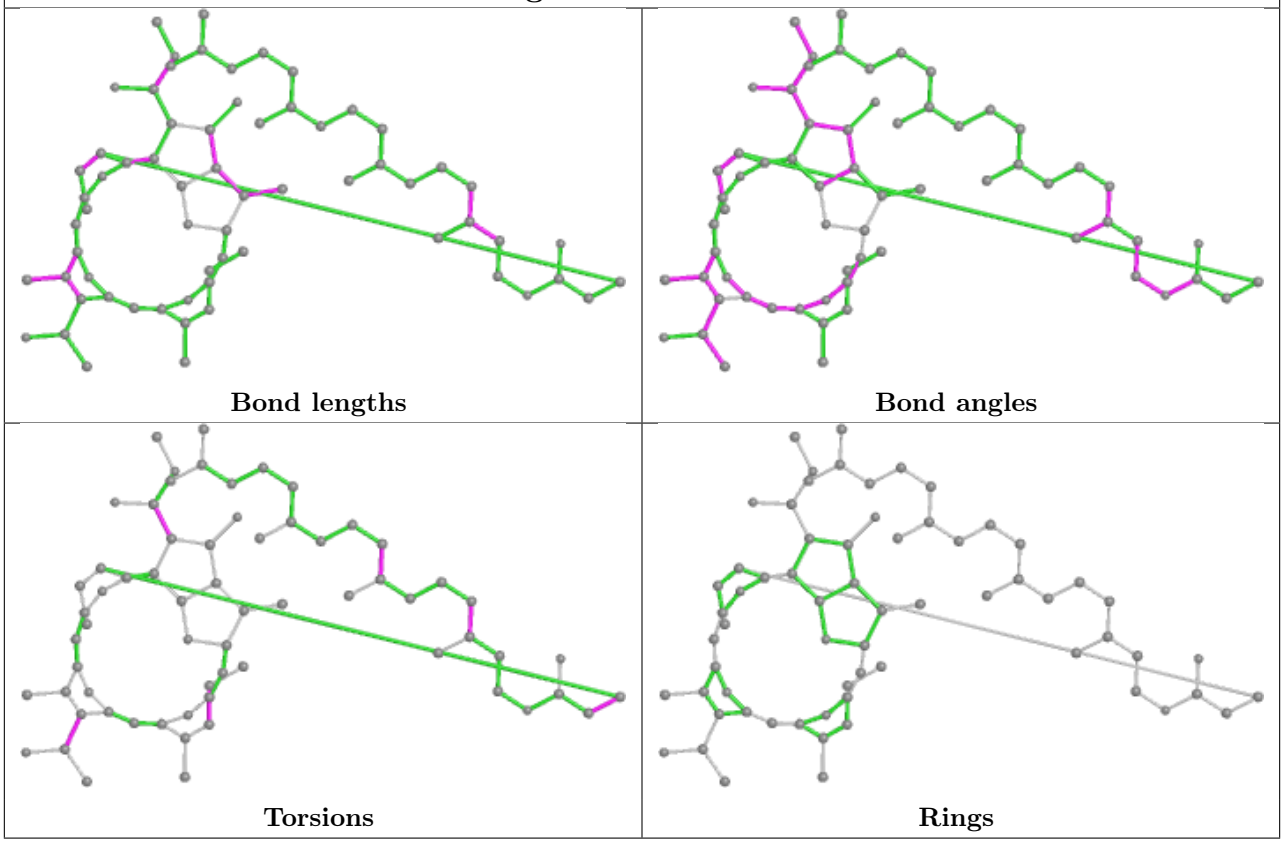
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	L	851	BCL	5	0
5	L	854	BPH	11	0
4	L	853	BCL	4	0
8	M	857	U10	3	0
5	M	852	BPH	9	0
5	L	855	BPH	6	0
4	L	850	BCL	9	0
10	M	5000	CDL	1	0
9	M	859	SPO	1	0

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

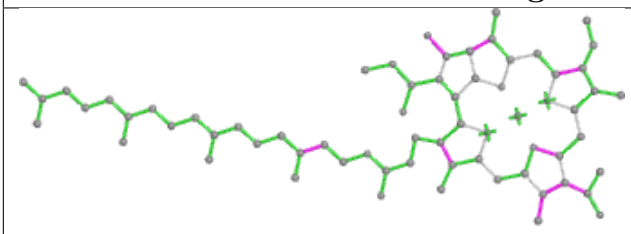
Ligand BCL L 851



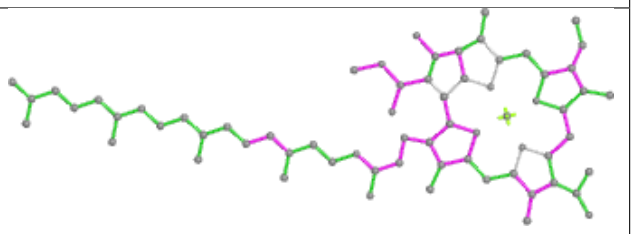
Ligand BPH L 854



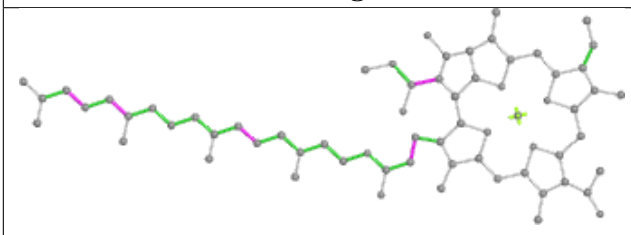
Ligand BCL L 853



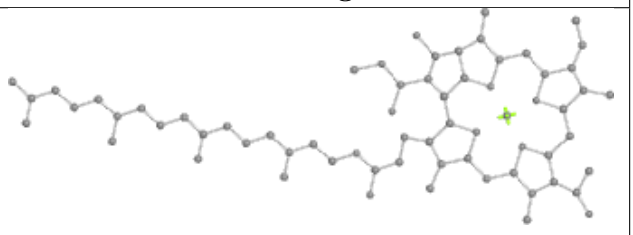
Bond lengths



Bond angles

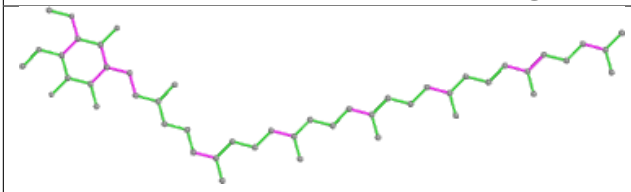


Torsions

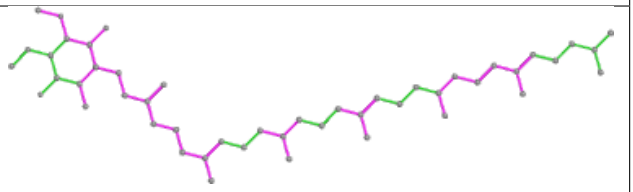


Rings

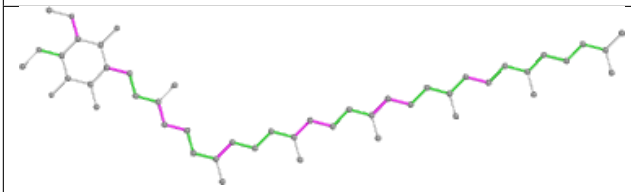
Ligand U10 M 857



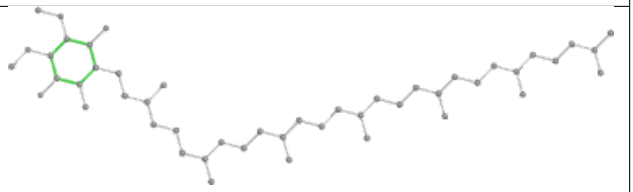
Bond lengths



Bond angles

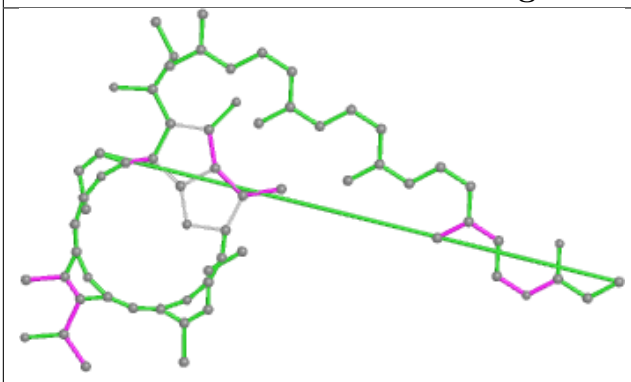


Torsions

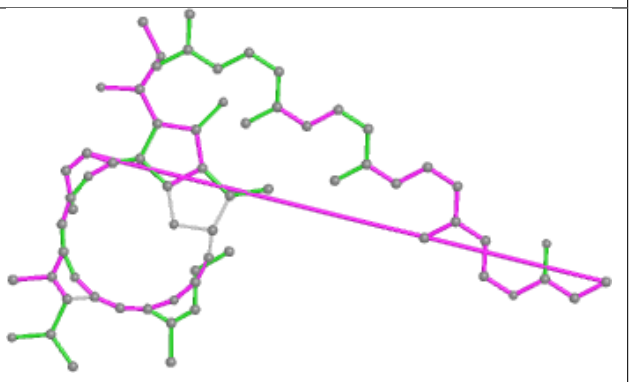


Rings

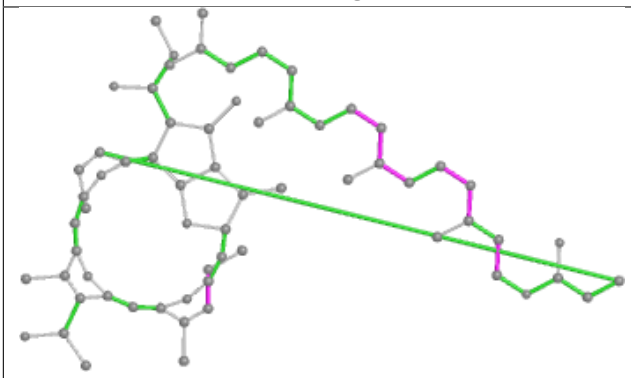
Ligand BPH M 852



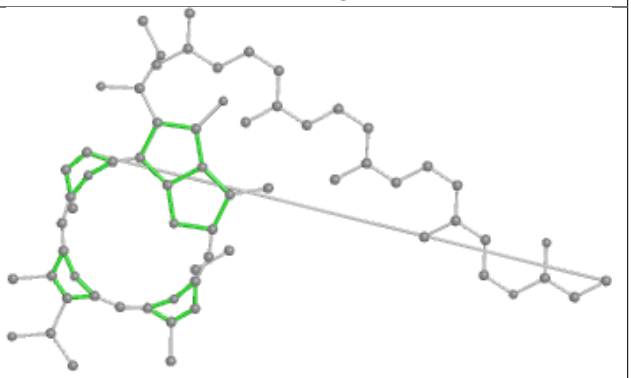
Bond lengths



Bond angles

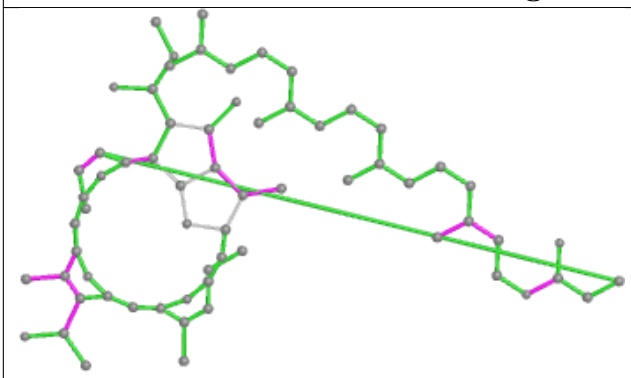


Torsions

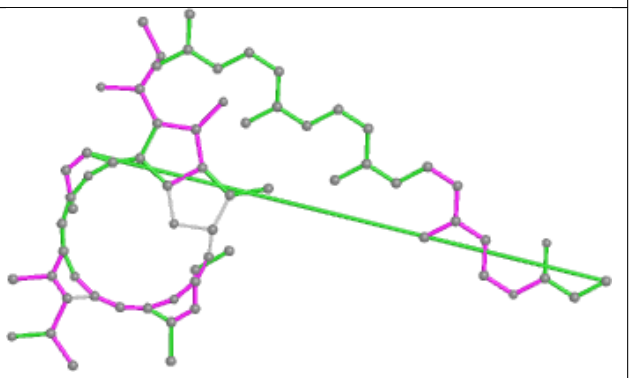


Rings

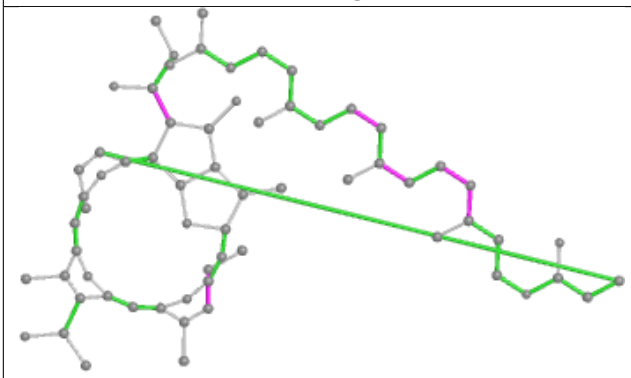
Ligand BPH L 855



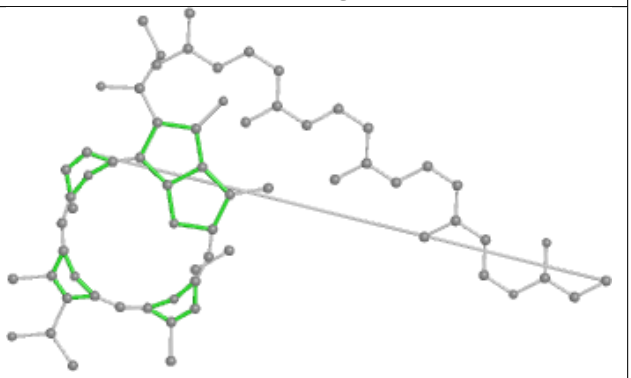
Bond lengths



Bond angles

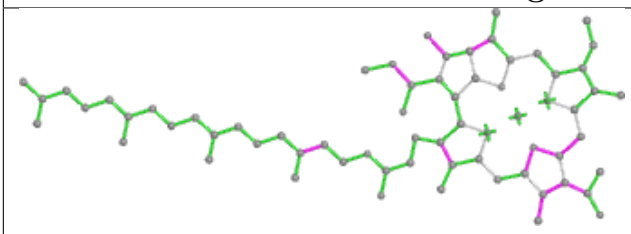


Torsions

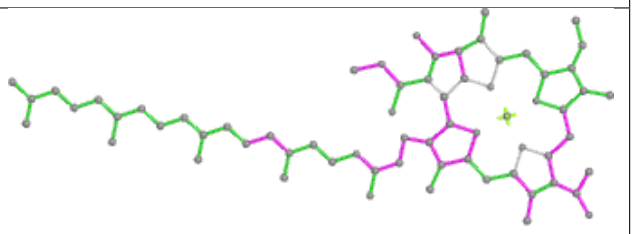


Rings

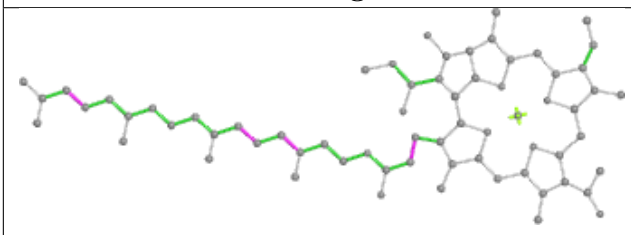
Ligand BCL L 850



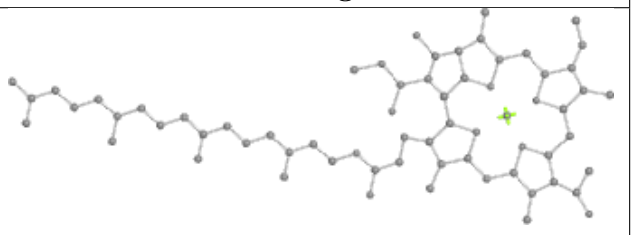
Bond lengths



Bond angles

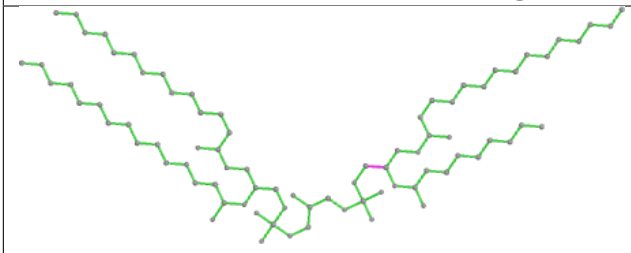


Torsions

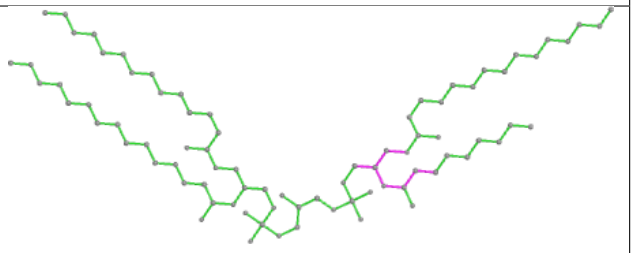


Rings

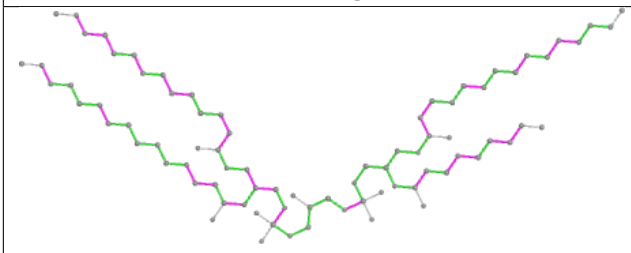
Ligand CDL M 5000



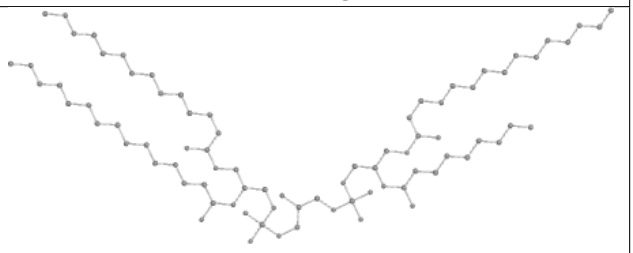
Bond lengths



Bond angles

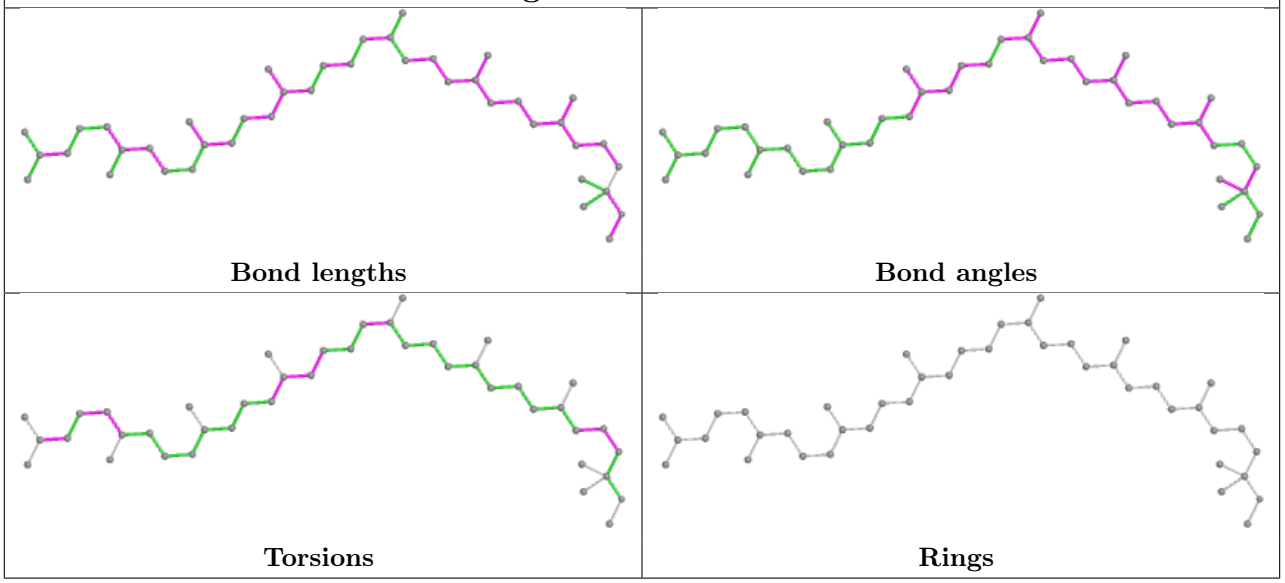


Torsions



Rings

Ligand SPO M 859



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	L	281/281 (100%)	-0.58	7 (2%)	57	61	24, 39, 73, 82	0
2	M	302/307 (98%)	-0.56	3 (0%)	82	84	23, 45, 74, 89	0
3	H	236/260 (90%)	-0.58	3 (1%)	77	79	28, 45, 65, 85	0
All	All	819/848 (96%)	-0.57	13 (1%)	72	74	23, 44, 72, 89	0

All (13) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	M	1	ALA	5.6
1	L	59	TRP	4.7
3	H	245	ALA	3.6
1	L	277	GLY	3.3
1	L	276	PRO	3.0
3	H	246	PRO	2.7
2	M	302	GLY	2.6
2	M	101	TYR	2.5
1	L	61	PRO	2.5
1	L	202	LYS	2.4
1	L	281	GLY	2.4
3	H	18	TYR	2.4
1	L	270	PRO	2.2

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

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

6.3 Carbohydrates

There are no monosaccharides in this entry.

6.4 Ligands (i)

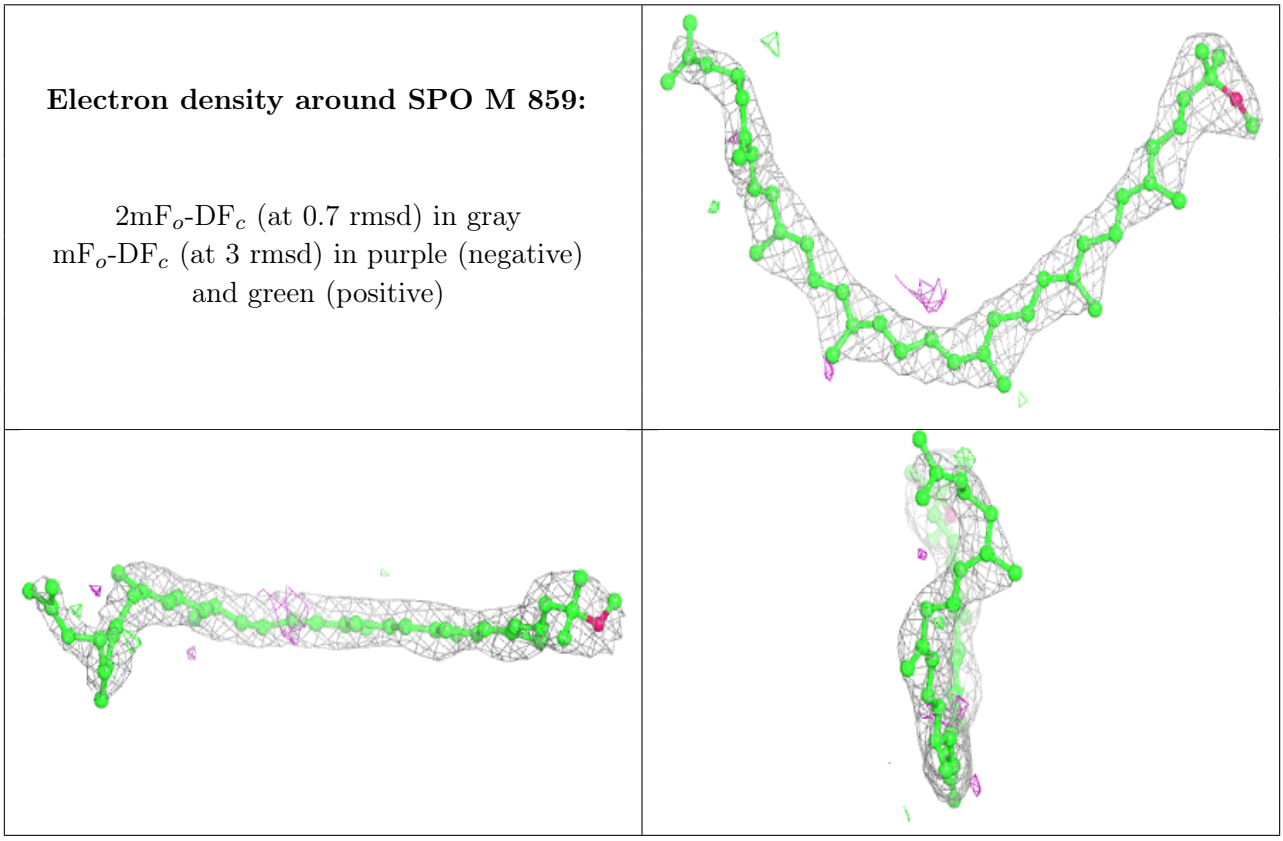
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
7	CL	M	6000	1/1	0.72	0.35	100,100,100,100	0
9	SPO	M	859	42/42	0.86	0.24	47,62,74,75	0
5	BPH	L	854	65/65	0.87	0.19	39,44,95,98	0
4	BCL	L	850	66/66	0.89	0.23	35,46,96,98	0
10	CDL	M	5000	81/100	0.90	0.21	59,76,86,90	0
5	BPH	M	852	65/65	0.94	0.18	33,37,66,76	0
8	U10	M	857	48/63	0.94	0.16	41,51,69,70	0
5	BPH	L	855	65/65	0.95	0.14	26,35,46,53	0
4	BCL	L	853	66/66	0.95	0.14	24,30,60,66	0
4	BCL	L	851	66/66	0.96	0.17	30,37,47,60	0
6	FE	M	856	1/1	0.99	0.08	28,28,28,28	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.

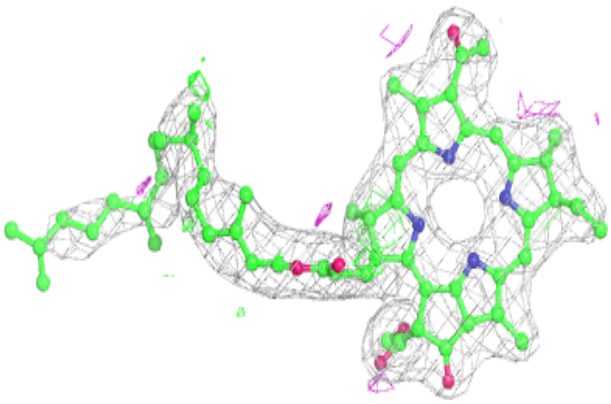
Electron density around SPO M 859:

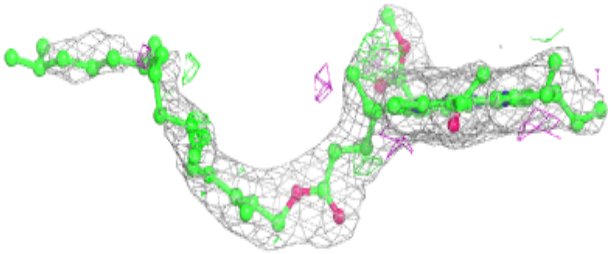
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

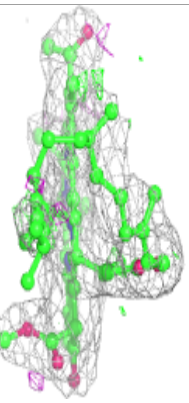


Electron density around BPH L 854:

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

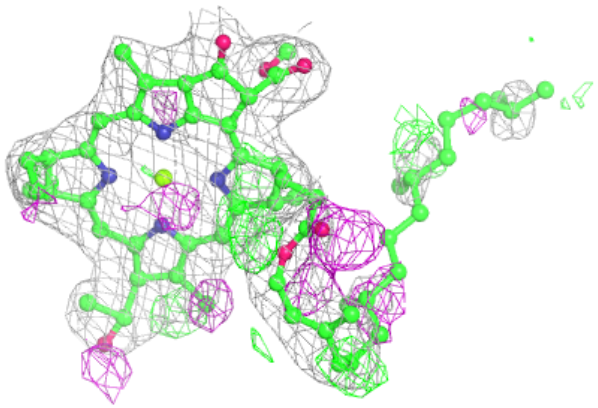


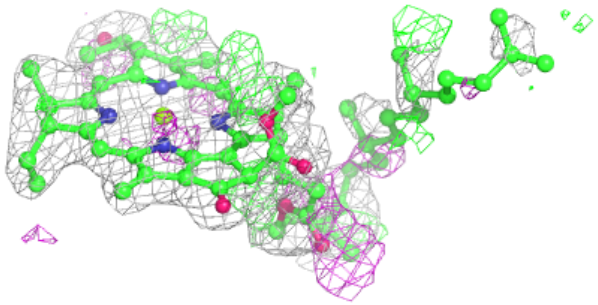


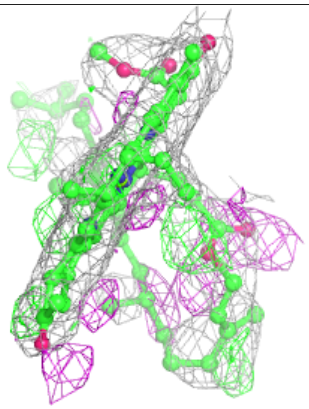


Electron density around BCL L 850:

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

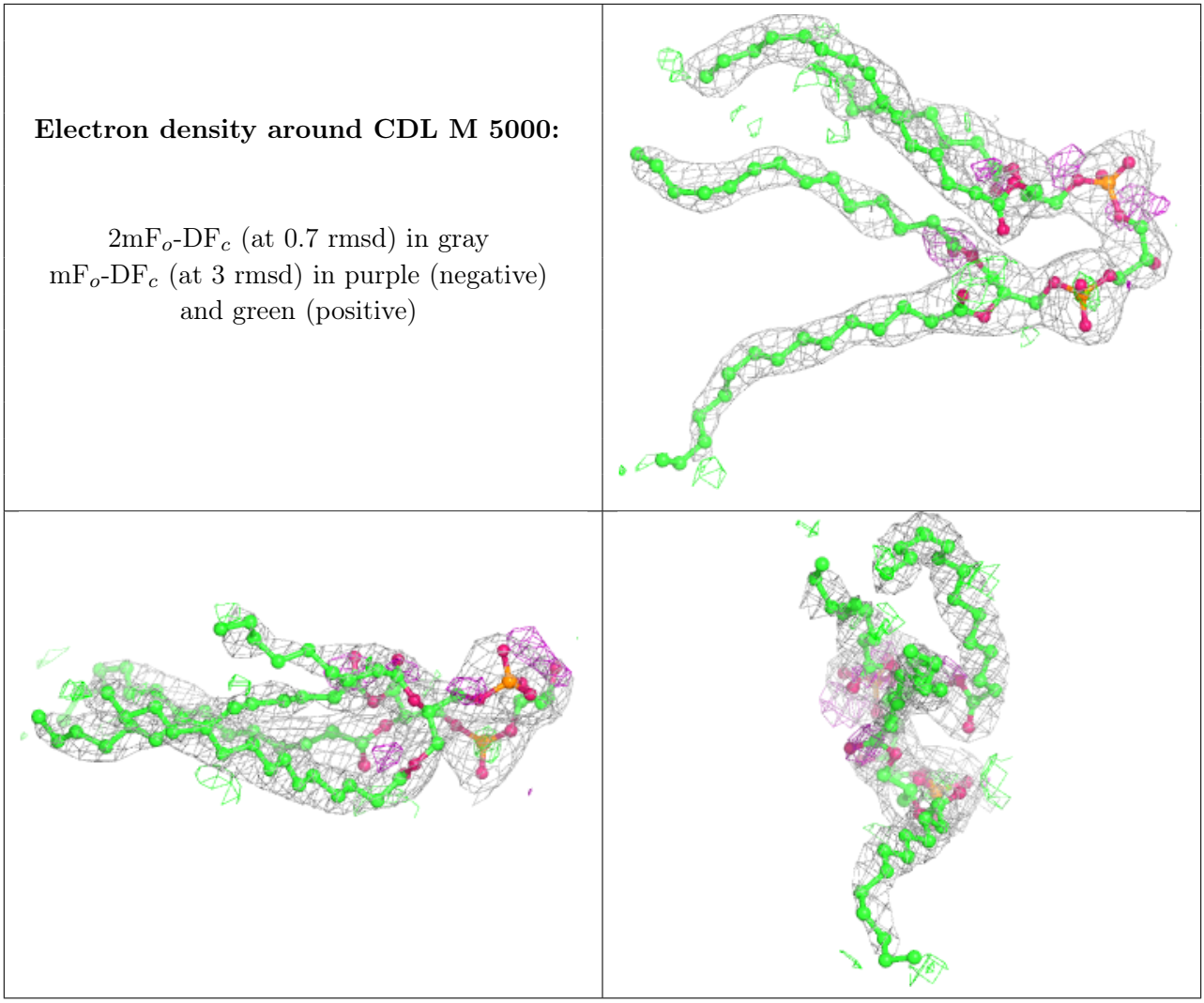






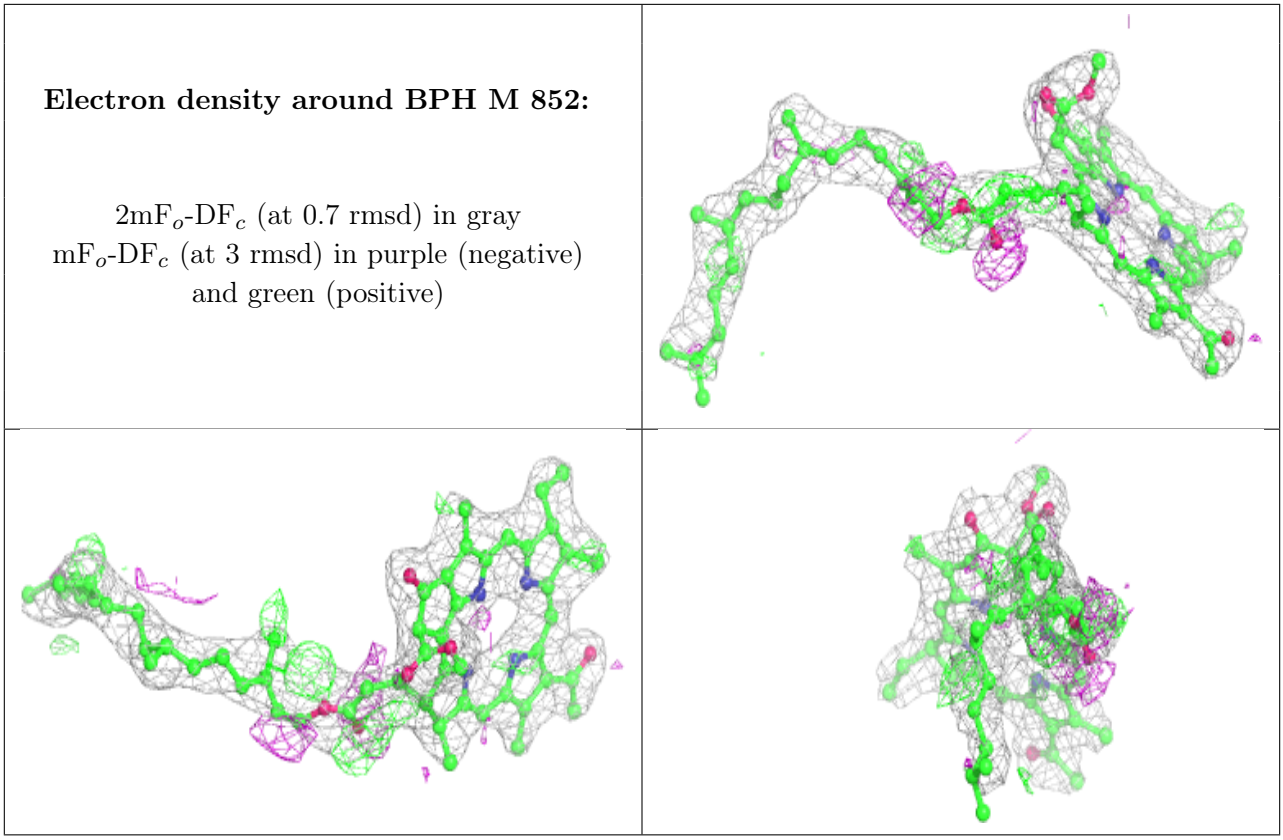
Electron density around CDL M 5000:

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



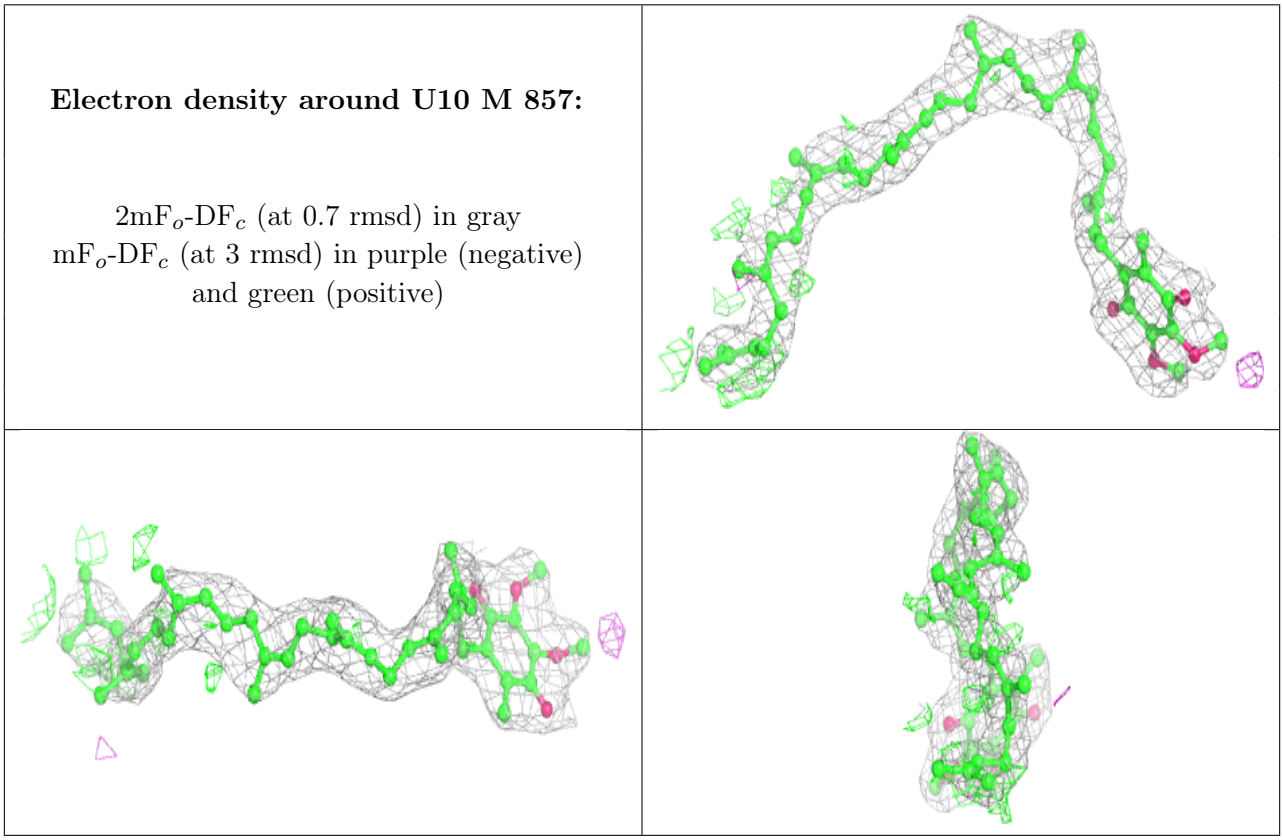
Electron density around BPH M 852:

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



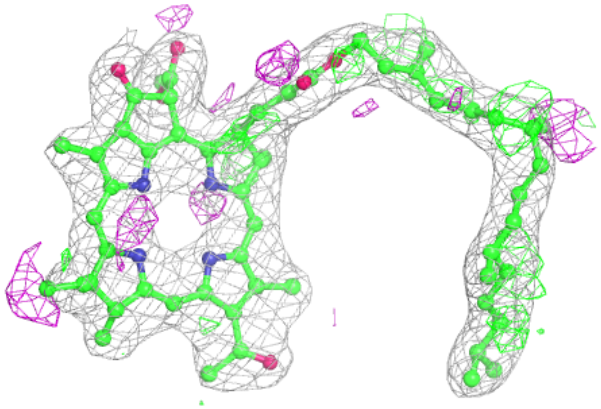
Electron density around U10 M 857:

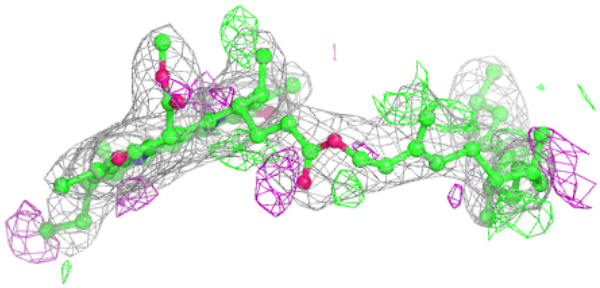
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

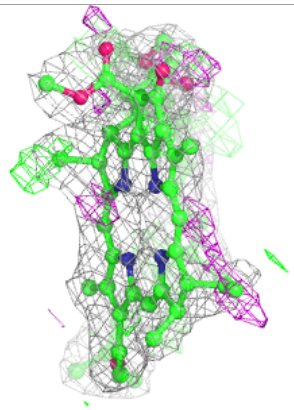


Electron density around BPH L 855:

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

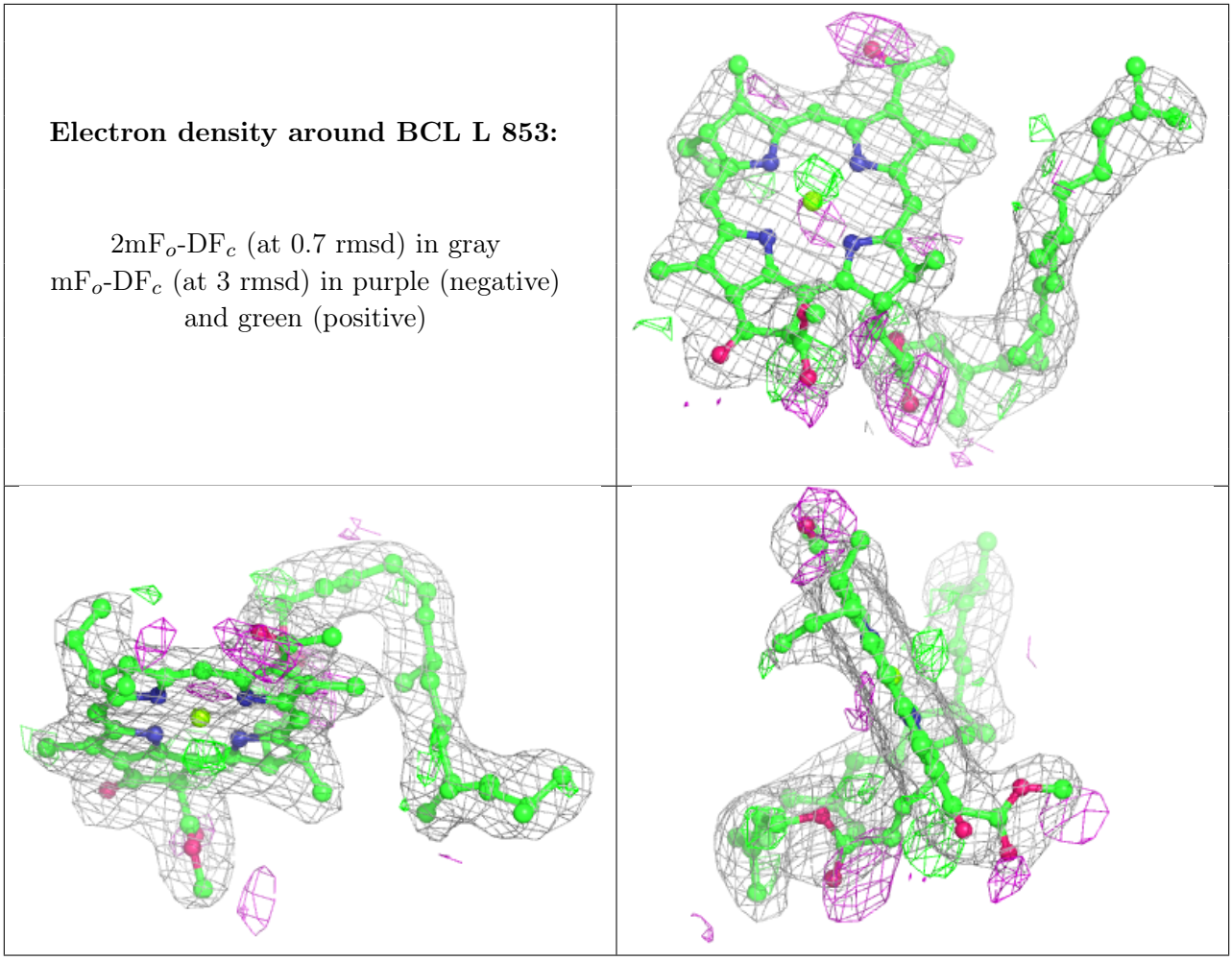






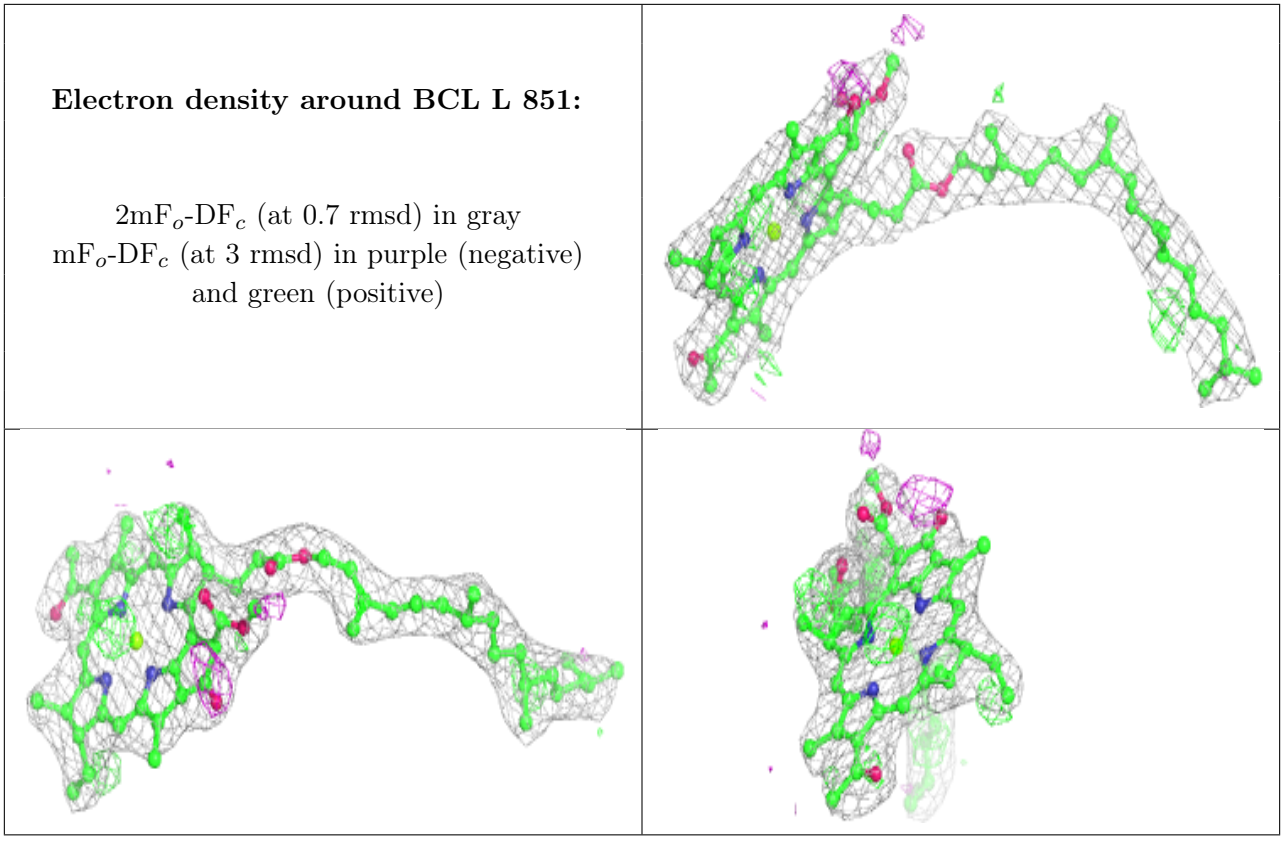
Electron density around BCL L 853:

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



Electron density around BCL L 851:

$2mF_o$-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.