



Full wwPDB X-ray Structure Validation Report ⓘ

Jul 31, 2023 – 04:14 pm BST

PDB ID : 8B1K
Title : DtpB-Nb132-NV
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Deposited on : 2022-09-09
Resolution : 2.80 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467
Mogul : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.34
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) : 2.34

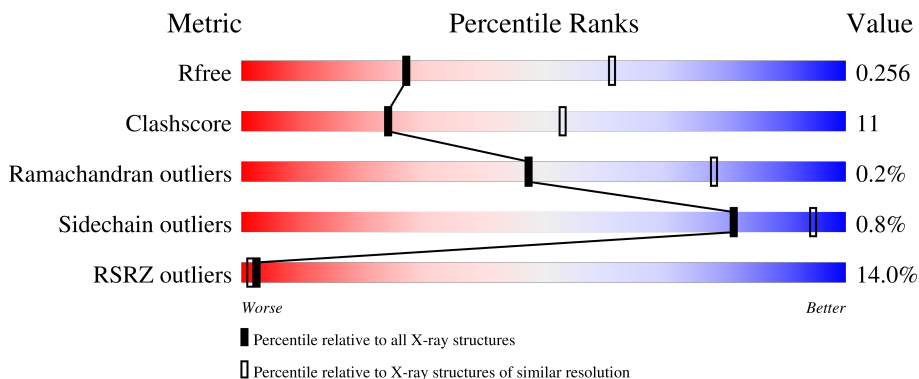
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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	3140 (2.80-2.80)
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)
RSRZ outliers	127900	3078 (2.80-2.80)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	489	 15% 73% 19% • 8%
2	B	127	 8% 80% 20%
3	C	2	 100%

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
10	D10	A	812	-	-	-	X
11	HEX	A	814	-	-	-	X
5	OCT	A	802	-	-	-	X
7	1PE	A	804	-	-	-	X
7	1PE	A	811	-	-	-	X
8	D12	A	809	-	-	-	X

2 Entry composition [i](#)

There are 12 unique types of molecules in this entry. The entry contains 4789 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 Dipeptide and tripeptide permease B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	451	3480	2349	531	573	27	4	0	0

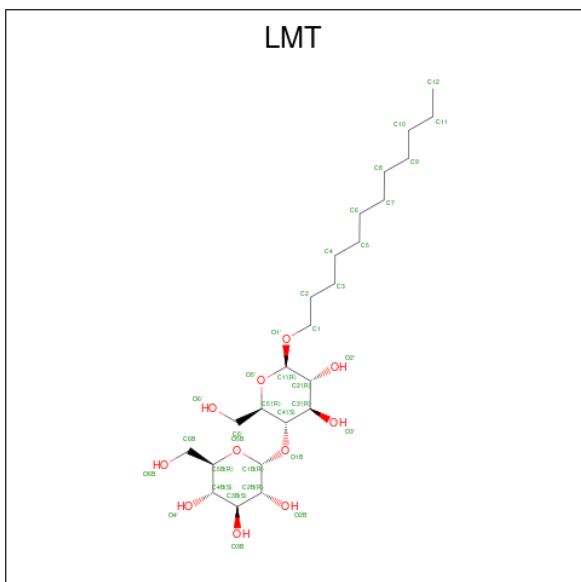
- Molecule 2 is a protein called Nanobody 132.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	127	976	613	178	181	4	5	1	0

- Molecule 3 is a protein called ASN-VAL.

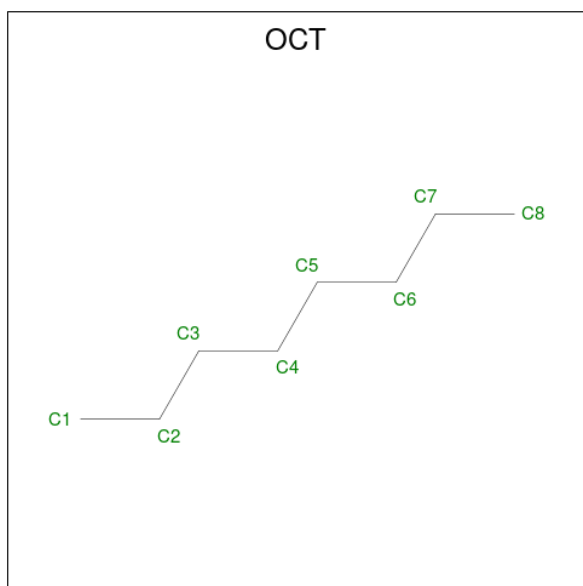
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	C	2	16	9	3	4	0	0	0

- Molecule 4 is DODECYL-BETA-D-MALTOSE (three-letter code: LMT) (formula: $C_{24}H_{46}O_{11}$) (labeled as "Ligand of Interest" by depositor).



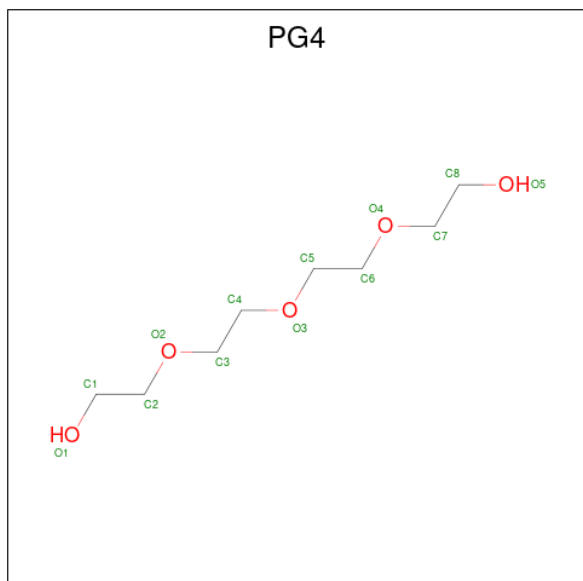
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			35	24	11		

- Molecule 5 is N-OCTANE (three-letter code: OCT) (formula: C_8H_{18}) (labeled as "Ligand of Interest" by depositor).



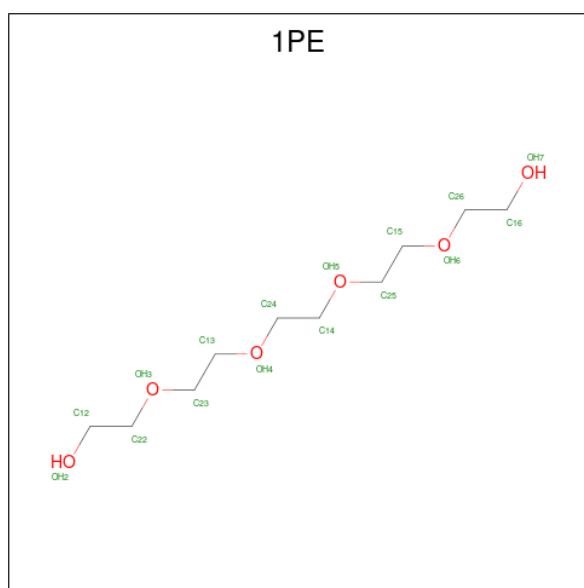
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	C	0	0
			8	8		

- Molecule 6 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula: $C_8H_{18}O_5$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			13	8	5		
6	A	1	Total	C	O	0	0
			13	8	5		
6	A	1	Total	C	O	0	0
			13	8	5		
6	A	1	Total	C	O	0	0
			13	8	5		

- Molecule 7 is PENTAETHYLENE GLYCOL (three-letter code: 1PE) (formula: C₁₀H₂₂O₆) (labeled as "Ligand of Interest" by depositor).



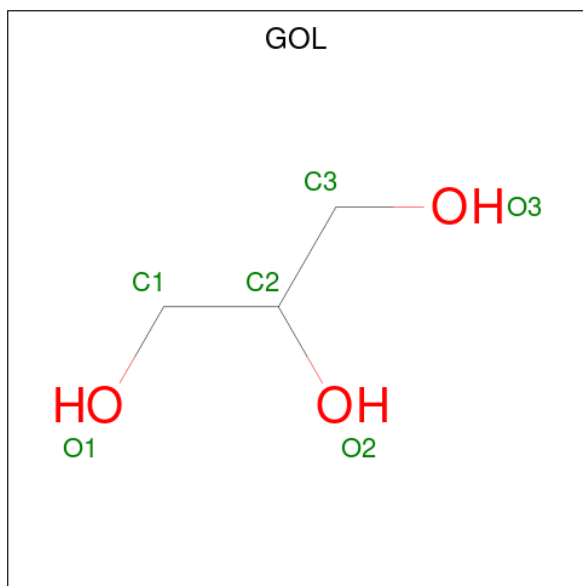
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total	C	O	0	0
			16	10	6		
7	A	1	Total	C	O	0	0
			16	10	6		

- Molecule 8 is DODECANE (three-letter code: D12) (formula: C₁₂H₂₆) (labeled as "Ligand of Interest" by depositor).



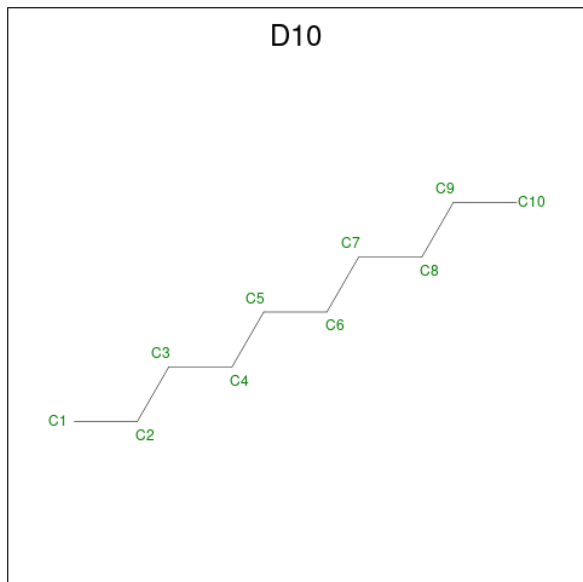
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	1	Total C 12 12	0	0

- Molecule 9 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$) (labeled as "Ligand of Interest" by depositor).



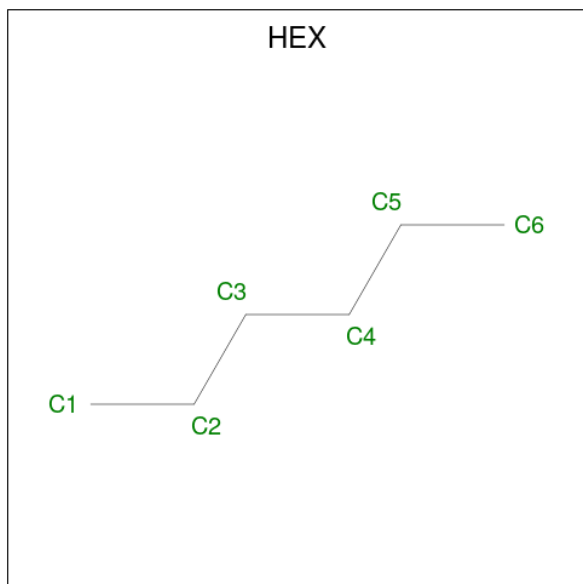
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	A	1	Total C O 6 3 3	0	0
9	A	1	Total C O 6 3 3	0	0

- Molecule 10 is DECANE (three-letter code: D10) (formula: $C_{10}H_{22}$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	A	1	Total C 10 10	0	0

- Molecule 11 is HEXANE (three-letter code: HEX) (formula: C_6H_{14}) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
11	A	1	Total C 6 6	0	0

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
11	A	1	Total C 6 6	0	0

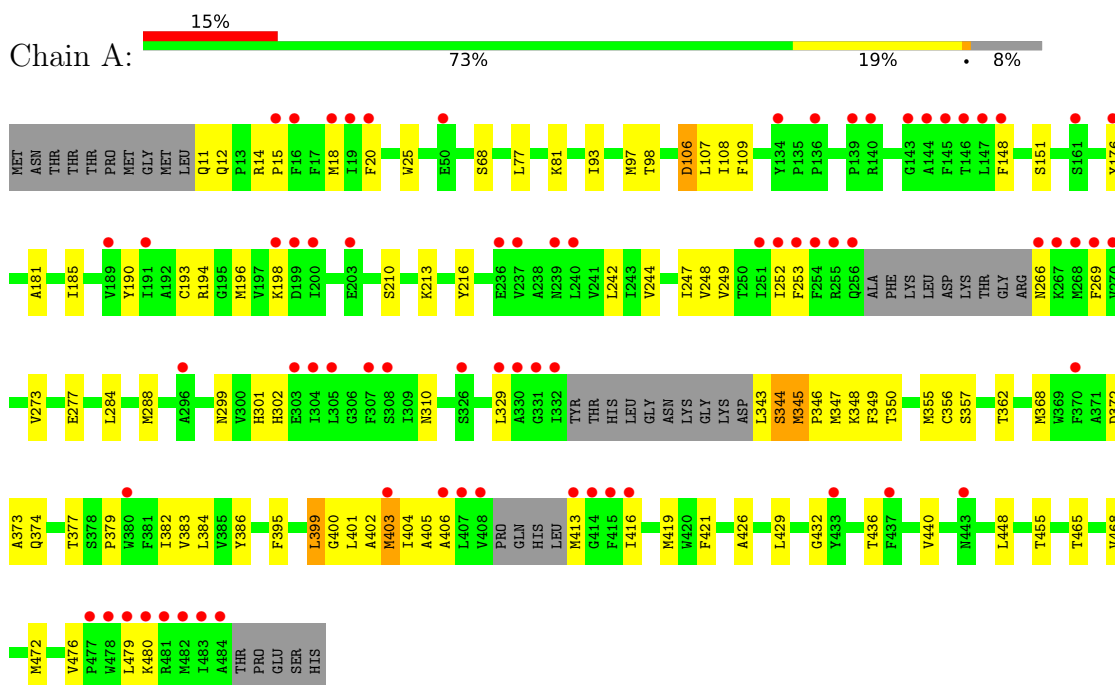
- Molecule 12 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
12	A	72	Total O 72 72	0	0
12	B	57	Total O 57 57	0	0
12	C	2	Total O 2 2	0	0

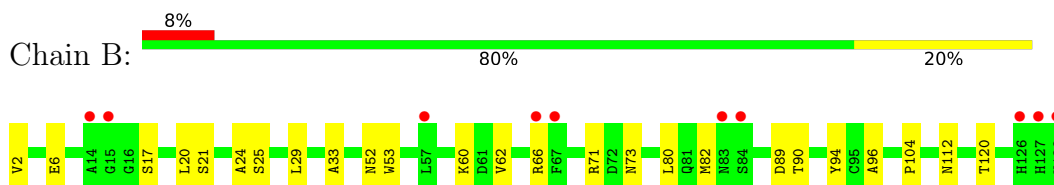
3 Residue-property plots [i](#)

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: Dipeptide and tripeptide permease B



- Molecule 2: Nanobody 132



- Molecule 3: ASN-VAL



There are no outlier residues recorded for this chain.

4 Data and refinement statistics

Property	Value	Source
Space group	P 2 21 21	Depositor
Cell constants a, b, c, α , β , γ	54.14Å 124.92Å 165.77Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	54.14 – 2.80 54.14 – 2.80	Depositor EDS
% Data completeness (in resolution range)	99.8 (54.14-2.80) 87.1 (54.14-2.80)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	0.61 (at 2.81Å)	Xtrriage
Refinement program	PHENIX 1.19.2_4158	Depositor
R, R_{free}	0.226 , 0.250 0.232 , 0.256	Depositor DCC
R_{free} test set	1384 reflections (4.85%)	wwPDB-VP
Wilson B-factor (Å ²)	62.8	Xtrriage
Anisotropy	0.211	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.28 , 52.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.79	EDS
Total number of atoms	4789	wwPDB-VP
Average B, all atoms (Å ²)	82.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.04% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: PG4, OCT, D10, D12, GOL, 1PE, HEX, LMT

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	0.58	1/3572 (0.0%)	0.81	6/4859 (0.1%)
2	B	0.52	0/1004	0.80	0/1361
3	C	0.56	0/15	1.28	0/18
All	All	0.57	1/4591 (0.0%)	0.81	6/6238 (0.1%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	345	MET	CB-CG	-7.58	1.27	1.51

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	345	MET	CG-SD-CE	-12.47	80.25	100.20
1	A	399	LEU	CA-CB-CG	8.58	135.03	115.30
1	A	403	MET	CG-SD-CE	6.62	110.79	100.20
1	A	355	MET	CG-SD-CE	5.55	109.08	100.20
1	A	345	MET	CB-CG-SD	-5.42	96.15	112.40
1	A	355	MET	CA-CB-CG	5.08	121.94	113.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3480	0	3605	89	0
2	B	976	0	939	15	0
3	C	16	0	17	0	0
4	A	35	0	46	2	0
5	A	8	0	18	0	0
6	A	65	0	90	2	0
7	A	32	0	44	0	0
8	A	12	0	26	0	0
9	A	12	0	16	0	0
10	A	10	0	22	2	0
11	A	12	0	28	0	0
12	A	72	0	0	3	0
12	B	57	0	0	1	0
12	C	2	0	0	0	0
All	All	4789	0	4851	104	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 11.

All (104) 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:A:249:VAL:HG12	1:A:419:MET:CE	1.51	1.38
1:A:249:VAL:CG1	1:A:419:MET:CE	2.27	1.13
1:A:249:VAL:CG1	1:A:419:MET:HE3	1.86	1.05
1:A:249:VAL:HG12	1:A:419:MET:HE2	0.97	0.94
1:A:348:LYS:HD2	1:A:399:LEU:HD21	1.51	0.92
2:B:90:THR:HG23	2:B:120:THR:HA	1.53	0.88
1:A:368:MET:HG3	1:A:455:THR:HG21	1.53	0.88
1:A:249:VAL:CG1	1:A:419:MET:HE2	1.93	0.87
1:A:403:MET:HG2	1:A:406:ALA:CB	2.08	0.83
1:A:301:HIS:NE2	1:A:372:ASP:OD2	2.11	0.80
1:A:350:THR:HA	1:A:472:MET:HE2	1.63	0.80
1:A:346:PRO:HG3	1:A:479:LEU:HD22	1.66	0.77
1:A:403:MET:HG2	1:A:406:ALA:HB2	1.66	0.76
1:A:345:MET:HB2	1:A:346:PRO:HD3	1.66	0.76
1:A:253:PHE:HB2	1:A:419:MET:HE1	1.70	0.72
1:A:368:MET:HG3	1:A:455:THR:CG2	2.23	0.68
1:A:401:LEU:HA	1:A:404:ILE:HB	1.77	0.66
1:A:194:ARG:HE	1:A:198:LYS:HZ1	1.47	0.63
1:A:266:ASN:OD1	1:A:269:PHE:CE2	2.52	0.63
1:A:216:TYR:HB3	6:A:807:PG4:H42	1.81	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:14:ARG:HB3	1:A:196:MET:HE2	1.82	0.62
1:A:266:ASN:HA	1:A:269:PHE:HD2	1.65	0.62
1:A:346:PRO:CG	1:A:479:LEU:HD22	2.29	0.61
1:A:249:VAL:HG13	1:A:419:MET:HE3	1.77	0.61
2:B:66:ARG:NH2	2:B:89:ASP:OD2	2.34	0.61
1:A:194:ARG:NH2	1:A:198:LYS:HZ1	1.99	0.60
1:A:194:ARG:NE	1:A:198:LYS:HZ1	1.99	0.60
1:A:181:ALA:O	1:A:185:ILE:HG23	2.02	0.60
1:A:273:VAL:O	1:A:277:GLU:HG3	2.03	0.59
1:A:288:MET:HG2	1:A:386:TYR:CE1	2.37	0.59
1:A:194:ARG:HH21	1:A:198:LYS:HZ1	1.50	0.58
1:A:284:LEU:HD12	1:A:356:CYS:HB3	1.85	0.58
2:B:60:LYS:HD3	2:B:62:VAL:HG22	1.86	0.58
1:A:194:ARG:HE	1:A:198:LYS:NZ	2.00	0.58
1:A:468:VAL:O	1:A:472:MET:HG3	2.04	0.58
1:A:403:MET:HG2	1:A:406:ALA:HB3	1.84	0.57
1:A:14:ARG:HB3	1:A:196:MET:CE	2.33	0.57
2:B:33:ALA:HA	2:B:52:ASN:HA	1.87	0.56
1:A:302:HIS:HD2	12:B:217:HOH:O	1.89	0.55
1:A:344:SER:O	1:A:348:LYS:HE2	2.07	0.55
1:A:344:SER:OG	1:A:345:MET:N	2.41	0.54
2:B:2:VAL:HA	2:B:112:ASN:ND2	2.21	0.54
1:A:400:GLY:O	1:A:404:ILE:HG12	2.08	0.53
1:A:248:VAL:O	1:A:252:ILE:HG23	2.09	0.53
1:A:346:PRO:HB3	1:A:479:LEU:HD13	1.91	0.53
2:B:71:ARG:HD3	2:B:73:ASN:OD1	2.09	0.52
1:A:266:ASN:HA	1:A:269:PHE:CD2	2.44	0.52
2:B:20:LEU:HD12	2:B:80:LEU:HD23	1.92	0.52
1:A:350:THR:HA	1:A:472:MET:CE	2.36	0.51
1:A:194:ARG:CZ	1:A:198:LYS:HZ1	2.24	0.50
2:B:6:GLU:OE2	2:B:94:TYR:HA	2.11	0.50
1:A:93:ILE:HG22	1:A:97:MET:HE2	1.93	0.50
1:A:18:MET:HG3	1:A:193:CYS:HB2	1.94	0.50
1:A:20:PHE:CE2	1:A:151:SER:HB2	2.47	0.50
1:A:81:LYS:HB3	1:A:190:TYR:OH	2.11	0.49
2:B:24:ALA:HB2	2:B:29:LEU:HD13	1.94	0.48
1:A:429:LEU:HD12	12:A:931:HOH:O	2.14	0.48
1:A:11:GLN:HG3	1:A:12:GLN:HG2	1.97	0.47
1:A:402:ALA:O	1:A:405:ALA:HB3	2.14	0.47
1:A:198:LYS:HA	1:A:198:LYS:HD3	1.62	0.47
1:A:210:SER:OG	1:A:213:LYS:HG2	2.14	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:413:MET:O	1:A:416:ILE:N	2.48	0.47
1:A:98:THR:HG22	1:A:176:TYR:CD2	2.50	0.47
2:B:62:VAL:O	2:B:66:ARG:NH1	2.48	0.46
1:A:242:LEU:HD23	1:A:426:ALA:HA	1.97	0.46
1:A:25:TRP:CE3	1:A:185:ILE:HD11	2.51	0.45
1:A:213:LYS:HD3	6:A:807:PG4:H12	1.98	0.45
1:A:329:LEU:HD21	1:A:395:PHE:CE1	2.52	0.45
1:A:343:LEU:HA	1:A:347:MET:HB3	1.98	0.45
1:A:347:MET:HE1	1:A:476:VAL:HG21	1.98	0.45
1:A:299:ASN:O	1:A:377:THR:HG22	2.16	0.45
1:A:379:PRO:O	1:A:382:ILE:HG22	2.15	0.45
4:A:801:LMT:H12	4:A:801:LMT:H41	1.58	0.45
1:A:432:GLY:O	1:A:436:THR:HG23	2.16	0.45
2:B:96:ALA:HA	2:B:112:ASN:O	2.17	0.45
1:A:266:ASN:OD1	1:A:269:PHE:HE2	1.97	0.45
1:A:357:SER:HB2	1:A:465:THR:HG22	1.99	0.45
2:B:2:VAL:HA	2:B:112:ASN:HD22	1.82	0.44
1:A:194:ARG:HH21	1:A:198:LYS:NZ	2.15	0.44
1:A:14:ARG:N	1:A:15:PRO:HD2	2.32	0.43
2:B:6:GLU:HA	2:B:21:SER:O	2.17	0.43
1:A:401:LEU:HD12	1:A:404:ILE:HB	2.00	0.43
1:A:25:TRP:CZ3	1:A:185:ILE:HD11	2.54	0.43
1:A:107:LEU:HD13	10:A:812:D10:H72	2.00	0.43
1:A:362:THR:HG21	1:A:384:LEU:HD23	2.01	0.43
1:A:148:PHE:O	1:A:151:SER:HB3	2.17	0.43
1:A:244:VAL:HA	1:A:247:ILE:HG13	2.00	0.43
1:A:20:PHE:CD2	1:A:151:SER:HB2	2.54	0.42
1:A:247:ILE:HD12	1:A:248:VAL:N	2.33	0.42
1:A:68:SER:HB3	1:A:421:PHE:CD2	2.55	0.42
1:A:288:MET:HG2	1:A:386:TYR:HE1	1.81	0.42
1:A:379:PRO:O	1:A:383:VAL:HG23	2.19	0.42
1:A:344:SER:OG	12:A:902:HOH:O	2.21	0.42
1:A:310:ASN:HD22	4:A:801:LMT:H6'1	1.85	0.42
1:A:106:ASP:HB2	10:A:812:D10:H41	2.02	0.41
1:A:345:MET:CB	1:A:346:PRO:HD3	2.42	0.41
1:A:440:VAL:O	12:A:901:HOH:O	2.21	0.41
1:A:374:GLN:OE1	2:B:104:PRO:HB2	2.20	0.41
1:A:77:LEU:HD22	1:A:213:LYS:HD2	2.03	0.41
1:A:193:CYS:HB3	1:A:196:MET:SD	2.60	0.41
2:B:17:SER:HA	2:B:82:MET:O	2.20	0.41
1:A:343:LEU:N	1:A:480:LYS:HZ3	2.18	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:108:ILE:HG23	1:A:109:PHE:N	2.37	0.40
1:A:373:ALA:O	1:A:448:LEU:HD11	2.21	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	443/489 (91%)	434 (98%)	9 (2%)	0	100	100
2	B	126/127 (99%)	123 (98%)	2 (2%)	1 (1%)	19	49
All	All	569/616 (92%)	557 (98%)	11 (2%)	1 (0%)	47	78

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	25	SER

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	368/401 (92%)	365 (99%)	3 (1%)	81	94
2	B	102/101 (101%)	101 (99%)	1 (1%)	76	93
3	C	2/2 (100%)	2 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
All	All	472/504 (94%)	468 (99%)	4 (1%)	81	94

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	106	ASP
1	A	344	SER
1	A	349	PHE
2	B	53	TRP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	389	GLN
2	B	106	GLN
2	B	112	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](#)

15 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$
6	PG4	A	807	-	12,12,12	0.55	0	11,11,11	0.60	0
11	HEX	A	815	-	5,5,5	0.48	0	4,4,4	0.27	0
7	1PE	A	804	-	15,15,15	0.56	0	14,14,14	0.64	0
6	PG4	A	808	-	12,12,12	0.53	0	11,11,11	0.60	0
11	HEX	A	814	-	5,5,5	0.43	0	4,4,4	0.48	0
6	PG4	A	806	-	12,12,12	0.56	0	11,11,11	0.61	0
4	LMT	A	801	-	36,36,36	1.33	5 (13%)	47,47,47	1.71	13 (27%)
6	PG4	A	805	-	12,12,12	0.61	0	11,11,11	0.83	0
8	D12	A	809	-	11,11,11	0.52	0	10,10,10	0.56	0
7	1PE	A	811	-	15,15,15	0.52	0	14,14,14	0.39	0
5	OCT	A	802	-	7,7,7	0.56	0	6,6,6	0.35	0
9	GOL	A	810	-	5,5,5	1.15	0	5,5,5	0.79	0
9	GOL	A	813	-	5,5,5	0.89	0	5,5,5	1.01	0
10	D10	A	812	-	9,9,9	0.49	0	8,8,8	0.46	0
6	PG4	A	803	-	12,12,12	0.55	0	11,11,11	0.40	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	PG4	A	807	-	-	4/10/10/10	-
11	HEX	A	815	-	-	0/3/3/3	-
7	1PE	A	804	-	-	5/13/13/13	-
6	PG4	A	808	-	-	4/10/10/10	-
11	HEX	A	814	-	-	0/3/3/3	-
6	PG4	A	806	-	-	6/10/10/10	-
4	LMT	A	801	-	-	17/21/61/61	0/2/2/2
6	PG4	A	805	-	-	5/10/10/10	-
8	D12	A	809	-	-	3/9/9/9	-
7	1PE	A	811	-	-	6/13/13/13	-
5	OCT	A	802	-	-	2/5/5/5	-
9	GOL	A	810	-	-	2/4/4/4	-
9	GOL	A	813	-	-	0/4/4/4	-
10	D10	A	812	-	-	1/7/7/7	-
6	PG4	A	803	-	-	4/10/10/10	-

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	801	LMT	O5'-C1'	3.86	1.51	1.41
4	A	801	LMT	O5B-C1B	3.73	1.51	1.41
4	A	801	LMT	O3'-C3'	2.11	1.47	1.43
4	A	801	LMT	O1B-C4'	2.06	1.49	1.43
4	A	801	LMT	O5'-C5'	2.01	1.49	1.44

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	801	LMT	C1'-C2'-C3'	4.18	118.69	110.00
4	A	801	LMT	C3'-C4'-C5'	3.49	118.94	110.93
4	A	801	LMT	O5'-C1'-C2'	3.08	116.87	110.35
4	A	801	LMT	O3B-C3B-C2B	2.99	117.26	110.35
4	A	801	LMT	O5'-C5'-C4'	2.85	115.75	109.75
4	A	801	LMT	O4'-C4B-C3B	-2.81	103.84	110.35
4	A	801	LMT	O1B-C4'-C3'	2.63	114.28	107.28
4	A	801	LMT	C2'-C3'-C4'	2.62	115.66	109.68
4	A	801	LMT	C1-O1'-C1'	2.55	118.07	113.84
4	A	801	LMT	C1B-O1B-C4'	2.48	124.10	117.96
4	A	801	LMT	O5B-C5B-C4B	2.45	114.15	109.69
4	A	801	LMT	C1B-O5B-C5B	2.26	118.12	113.69
4	A	801	LMT	O1'-C1'-C2'	2.24	111.80	108.30

There are no chirality outliers.

All (59) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	801	LMT	C2'-C1'-O1'-C1
4	A	801	LMT	O5B-C5B-C6B-O6B
4	A	801	LMT	C4B-C5B-C6B-O6B
6	A	803	PG4	O3-C5-C6-O4
6	A	806	PG4	O2-C3-C4-O3
6	A	807	PG4	O3-C5-C6-O4
7	A	811	1PE	OH5-C14-C24-OH4
4	A	801	LMT	O5'-C1'-O1'-C1
6	A	806	PG4	O3-C5-C6-O4
4	A	801	LMT	C4'-C5'-C6'-O6'
4	A	801	LMT	O5'-C5'-C6'-O6'
4	A	801	LMT	C3-C4-C5-C6
7	A	811	1PE	OH4-C13-C23-OH3
4	A	801	LMT	C3'-C4'-O1B-C1B

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Mol	Chain	Res	Type	Atoms
4	A	801	LMT	C7-C8-C9-C10
4	A	801	LMT	C5-C6-C7-C8
7	A	811	1PE	OH6-C15-C25-OH5
5	A	802	OCT	C4-C5-C6-C7
6	A	805	PG4	O3-C5-C6-O4
4	A	801	LMT	C6-C7-C8-C9
4	A	801	LMT	C1-C2-C3-C4
7	A	804	1PE	OH7-C16-C26-OH6
5	A	802	OCT	C3-C4-C5-C6
8	A	809	D12	C9-C10-C11-C12
4	A	801	LMT	C11-C10-C9-C8
8	A	809	D12	C3-C4-C5-C6
6	A	805	PG4	O4-C7-C8-O5
6	A	807	PG4	C8-C7-O4-C6
4	A	801	LMT	C4-C5-C6-C7
4	A	801	LMT	C5'-C4'-O1B-C1B
7	A	811	1PE	C25-C15-OH6-C26
9	A	810	GOL	O2-C2-C3-O3
6	A	806	PG4	C1-C2-O2-C3
6	A	805	PG4	C3-C4-O3-C5
6	A	806	PG4	C4-C3-O2-C2
7	A	804	1PE	OH2-C12-C22-OH3
6	A	803	PG4	C1-C2-O2-C3
6	A	808	PG4	O2-C3-C4-O3
6	A	808	PG4	O3-C5-C6-O4
6	A	806	PG4	C6-C5-O3-C4
6	A	803	PG4	O2-C3-C4-O3
6	A	806	PG4	C5-C6-O4-C7
6	A	803	PG4	C4-C3-O2-C2
4	A	801	LMT	C2B-C1B-O1B-C4'
4	A	801	LMT	O5B-C1B-O1B-C4'
7	A	811	1PE	C12-C22-OH3-C23
6	A	805	PG4	O2-C3-C4-O3
6	A	808	PG4	C6-C5-O3-C4
6	A	808	PG4	C3-C4-O3-C5
7	A	804	1PE	OH4-C13-C23-OH3
8	A	809	D12	C1-C2-C3-C4
6	A	807	PG4	O2-C3-C4-O3
7	A	804	1PE	OH6-C15-C25-OH5
9	A	810	GOL	C1-C2-C3-O3
10	A	812	D10	C5-C6-C7-C8
7	A	811	1PE	C15-C25-OH5-C14

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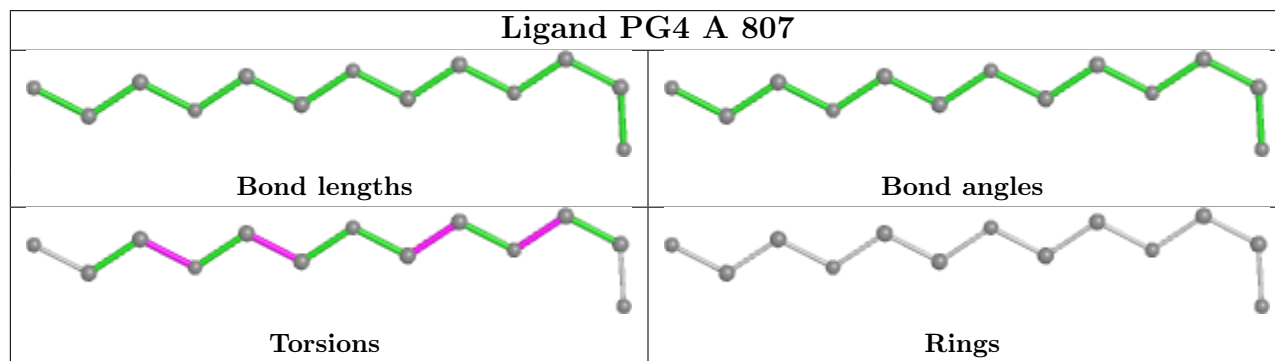
Mol	Chain	Res	Type	Atoms
6	A	805	PG4	C5-C6-O4-C7
6	A	807	PG4	C1-C2-O2-C3
7	A	804	1PE	OH5-C14-C24-OH4

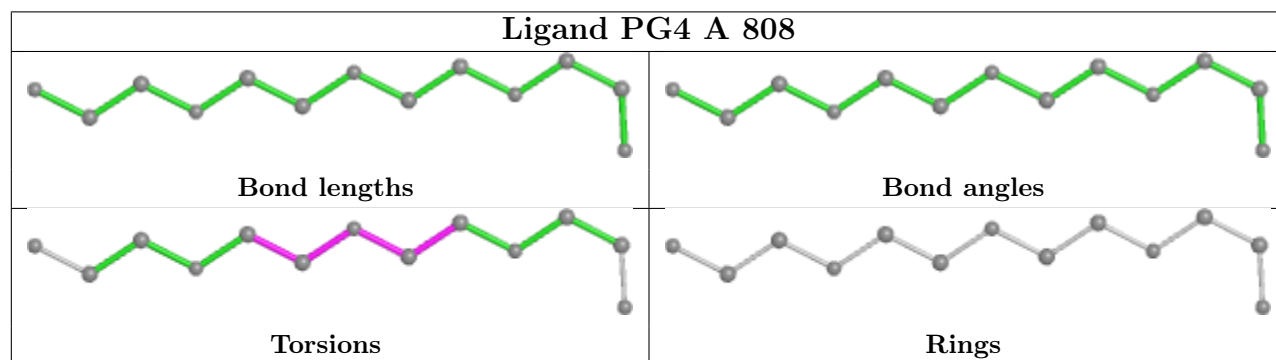
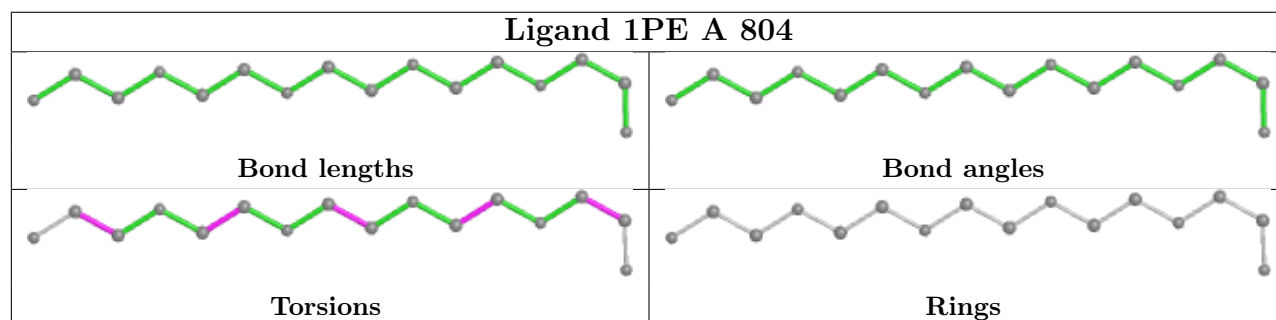
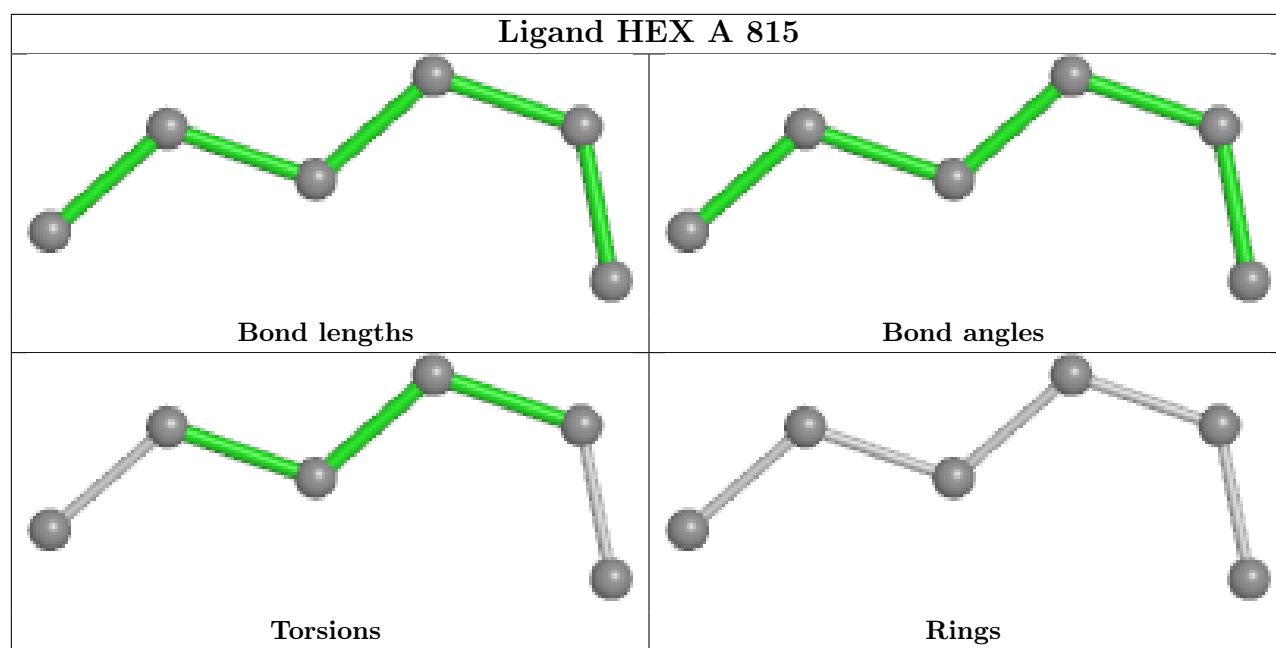
There are no ring outliers.

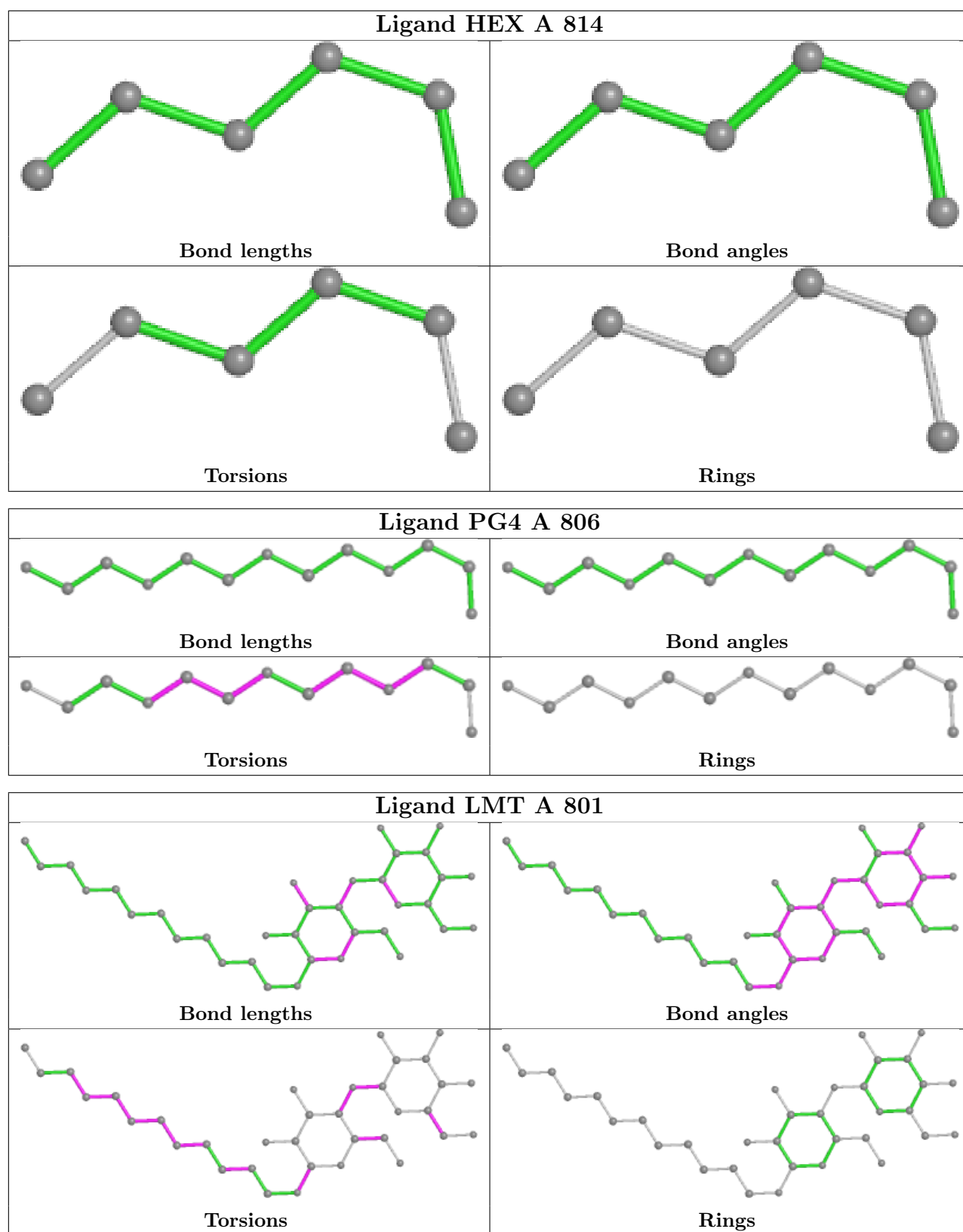
3 monomers are involved in 6 short contacts:

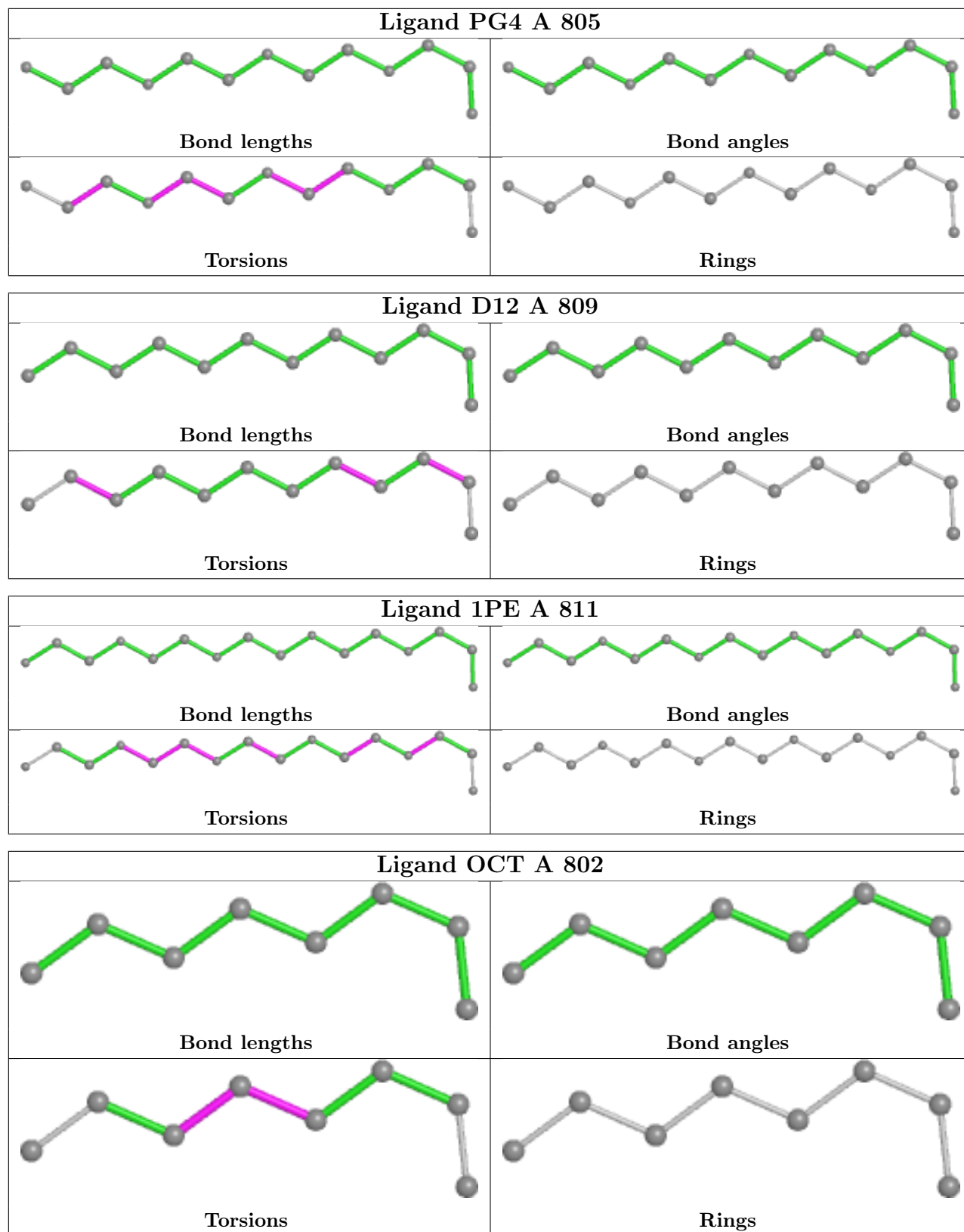
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	807	PG4	2	0
4	A	801	LMT	2	0
10	A	812	D10	2	0

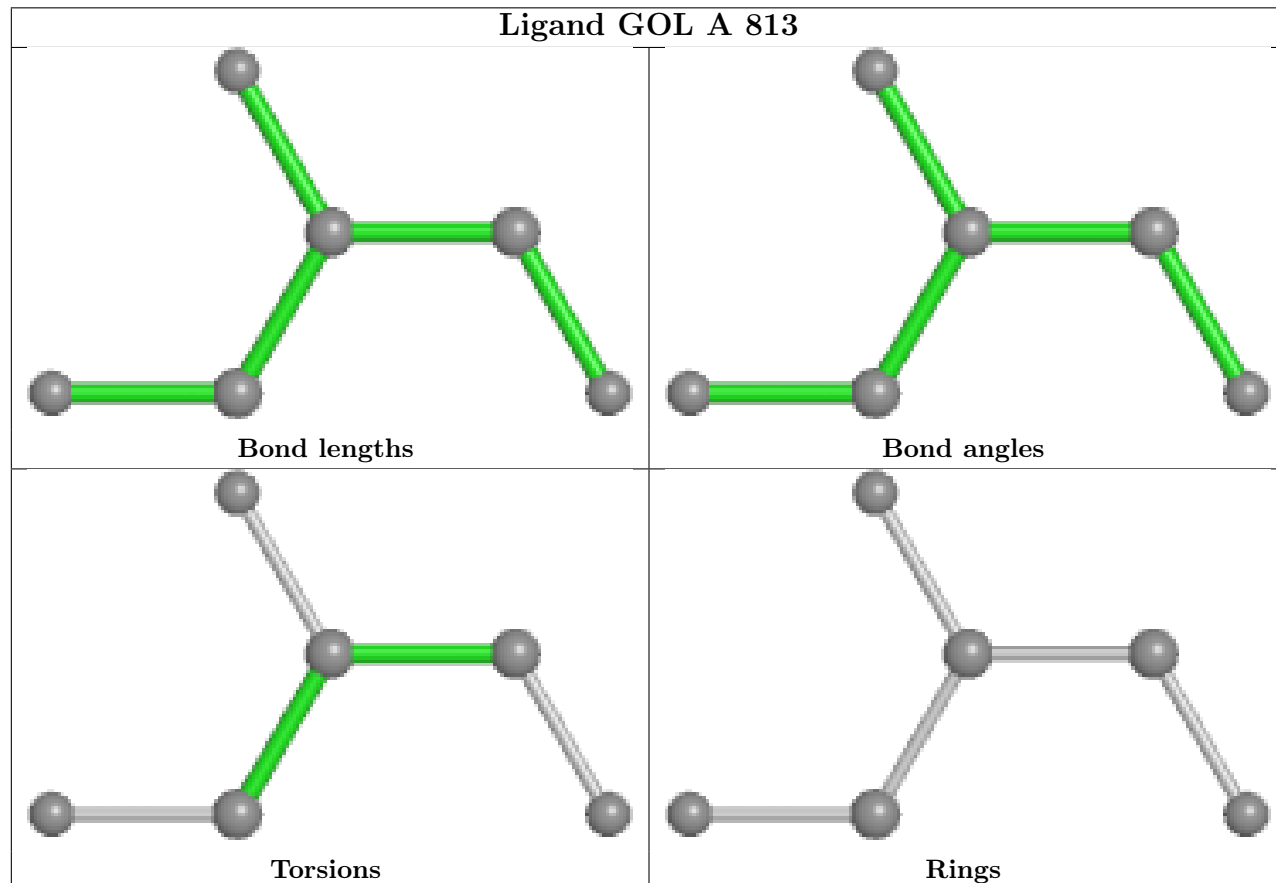
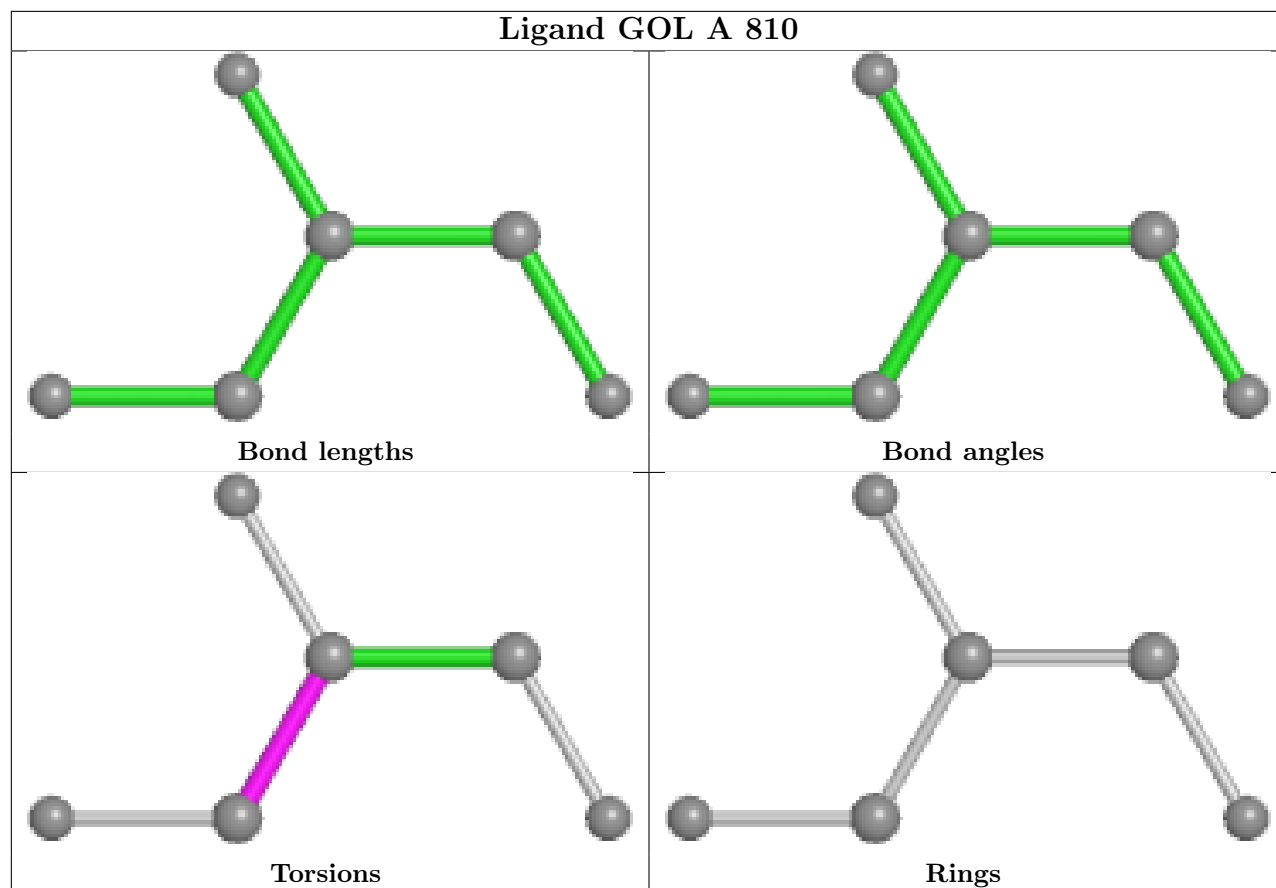
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

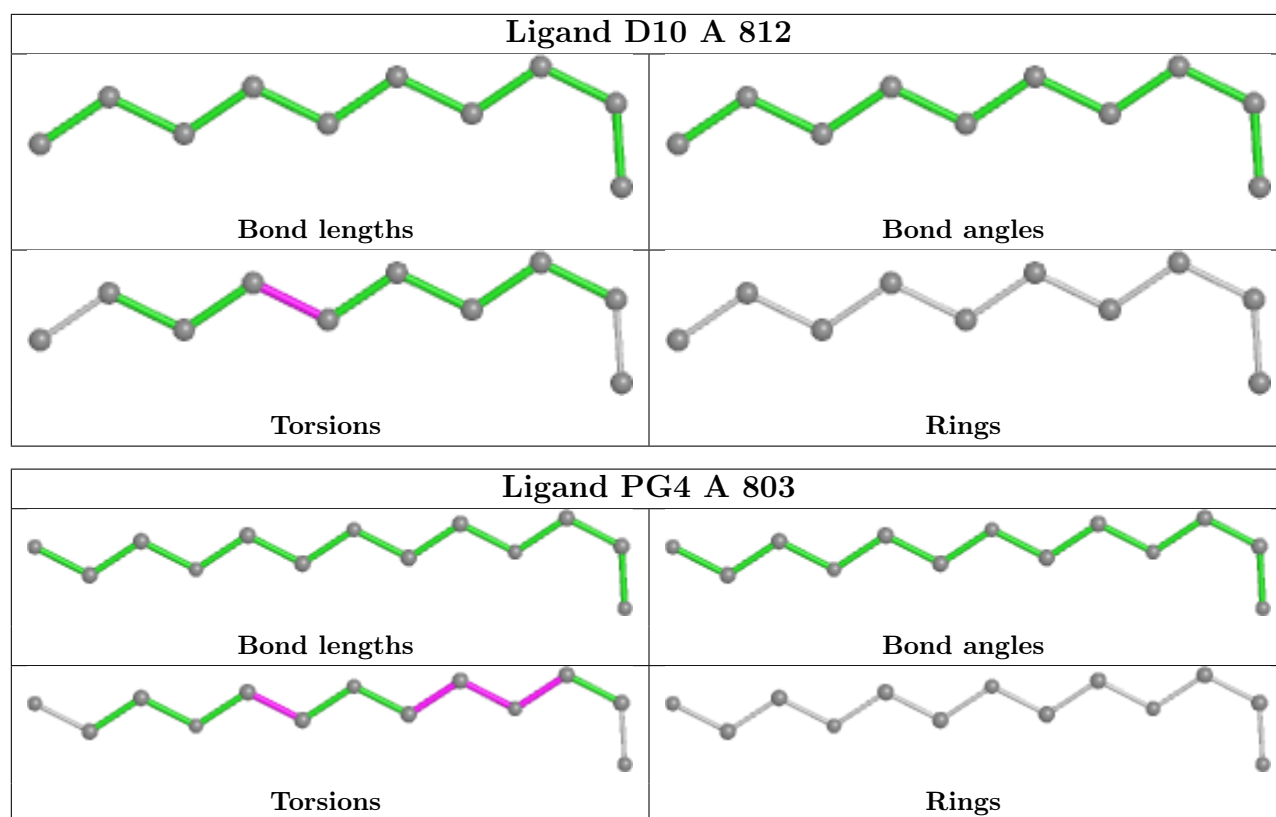












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	451/489 (92%)	0.76	71 (15%) 2 1	59, 75, 122, 148	1 (0%)
2	B	127/127 (100%)	0.24	10 (7%) 12 7	62, 77, 108, 120	1 (0%)
3	C	2/2 (100%)	1.32	0 100 100	70, 70, 70, 77	0
All	All	580/618 (93%)	0.65	81 (13%) 2 1	59, 76, 119, 148	2 (0%)

All (81) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	307	PHE	10.7
1	A	413	MET	9.8
1	A	305	LEU	8.9
1	A	236	GLU	8.8
1	A	484	ALA	7.6
1	A	144	ALA	7.3
1	A	478	TRP	6.9
1	A	480	LYS	6.5
1	A	268	MET	6.2
1	A	408	VAL	6.0
1	A	479	LEU	5.9
1	A	199	ASP	5.3
1	A	253	PHE	5.0
1	A	267	LYS	5.0
1	A	251	ILE	4.9
1	A	329	LEU	4.8
1	A	406	ALA	4.7
1	A	255	ARG	4.7
1	A	148	PHE	4.7
1	A	143	GLY	4.5
1	A	403	MET	4.4
1	A	330	ALA	4.4
1	A	254	PHE	4.4

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Mol	Chain	Res	Type	RSRZ
1	A	483	ILE	4.4
1	A	414	GLY	4.4
1	A	256	GLN	4.3
1	A	407	LEU	4.3
2	B	83	ASN	4.2
1	A	140	ARG	4.1
1	A	240	LEU	4.1
1	A	266	ASN	3.9
1	A	304	ILE	3.8
1	A	415	PHE	3.8
1	A	15	PRO	3.8
1	A	147	LEU	3.7
1	A	139	PRO	3.7
1	A	482	MET	3.6
1	A	416	ILE	3.6
1	A	332	ILE	3.6
1	A	269	PHE	3.5
1	A	308	SER	3.4
1	A	198	LYS	3.4
1	A	50	GLU	3.4
1	A	481	ARG	3.2
1	A	433	TYR	3.2
1	A	477	PRO	3.1
1	A	19	ILE	3.0
1	A	237	VAL	3.0
1	A	437	PHE	3.0
1	A	16	PHE	3.0
2	B	14	ALA	2.9
1	A	191	ILE	2.8
1	A	134	TYR	2.8
1	A	331	GLY	2.7
1	A	18	MET	2.7
1	A	270	VAL	2.6
2	B	66	ARG	2.5
2	B	84	SER	2.5
1	A	370	PHE	2.4
1	A	326	SER	2.4
2	B	57	LEU	2.4
1	A	161	SER	2.3
1	A	20	PHE	2.3
1	A	136	PRO	2.3
1	A	145	PHE	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	303	GLU	2.2
2	B	127	HIS	2.2
2	B	15	GLY	2.1
1	A	189	VAL	2.1
2	B	128	HIS	2.1
1	A	380	TRP	2.1
1	A	146	THR	2.0
1	A	203	GLU	2.0
1	A	239	ASN	2.0
2	B	126	HIS	2.0
1	A	176	TYR	2.0
1	A	296	ALA	2.0
1	A	443	ASN	2.0
1	A	200	ILE	2.0
2	B	67	PHE	2.0
1	A	252	ILE	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [i](#)

There are no 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, 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.

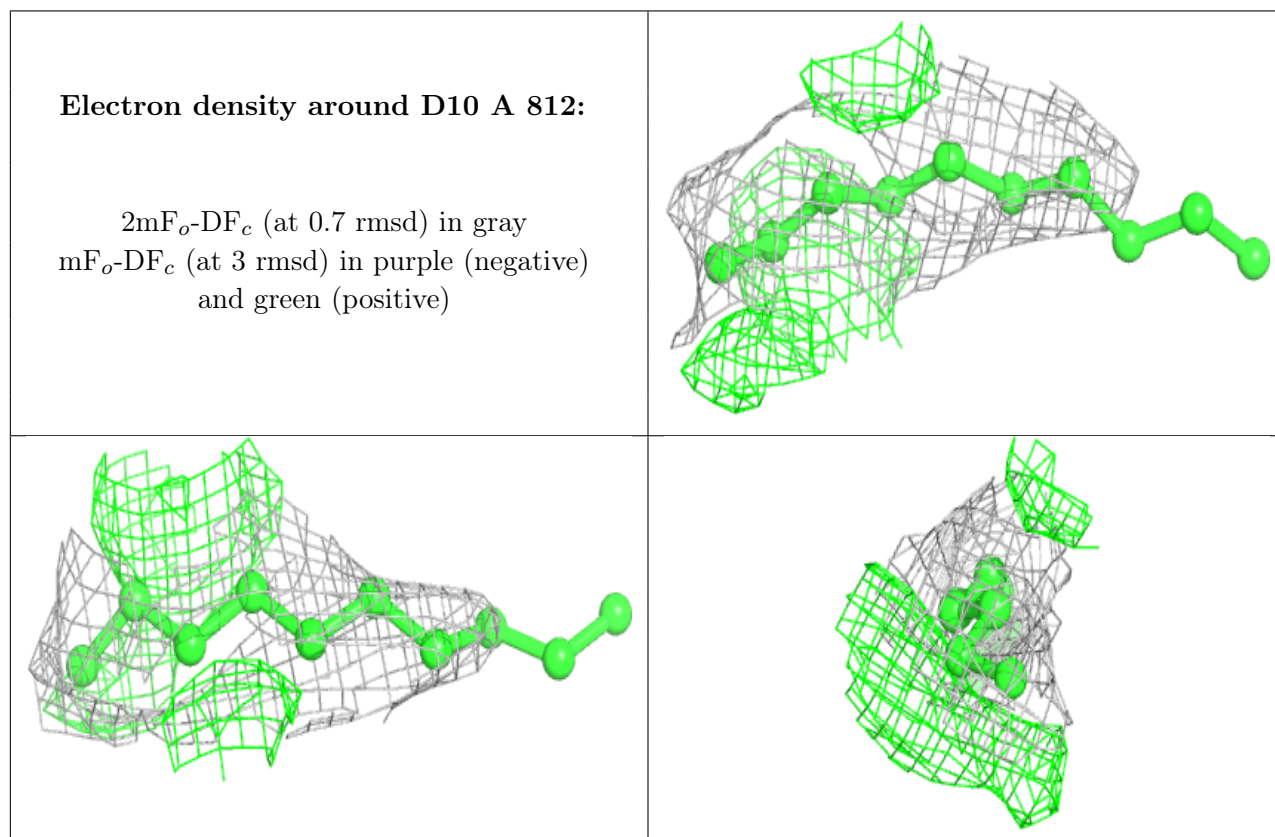
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
10	D10	A	812	10/10	0.39	0.61	83,92,98,99	0
8	D12	A	809	12/12	0.46	0.51	73,90,94,96	0
6	PG4	A	806	13/13	0.56	0.27	89,97,110,111	0
5	OCT	A	802	8/8	0.63	0.49	63,77,80,83	0
9	GOL	A	810	6/6	0.67	0.25	100,106,115,115	0
7	1PE	A	811	16/16	0.68	0.72	91,98,104,106	0
6	PG4	A	808	13/13	0.69	0.30	83,91,103,104	0

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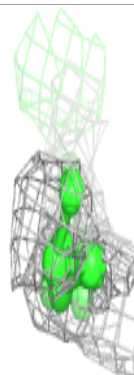
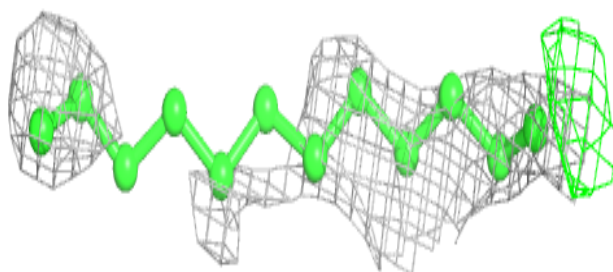
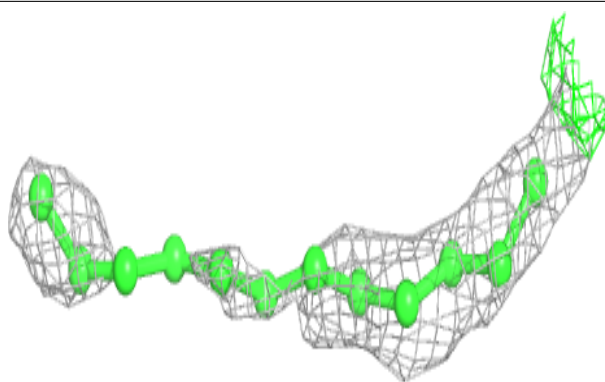
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
11	HEX	A	814	6/6	0.71	0.53	79,85,94,95	0
11	HEX	A	815	6/6	0.71	0.35	67,78,79,84	0
7	1PE	A	804	16/16	0.72	0.72	65,88,109,110	0
6	PG4	A	805	13/13	0.73	0.31	85,98,113,115	0
9	GOL	A	813	6/6	0.79	0.28	90,92,97,98	0
4	LMT	A	801	35/35	0.83	0.63	67,90,112,119	0
6	PG4	A	807	13/13	0.84	0.22	82,91,99,101	0
6	PG4	A	803	13/13	0.91	0.20	78,90,106,107	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.

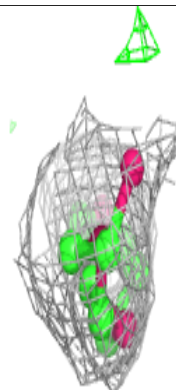
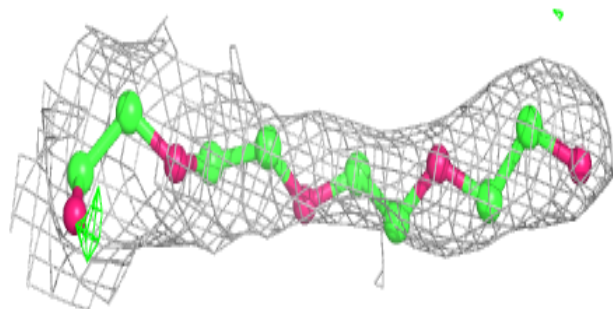
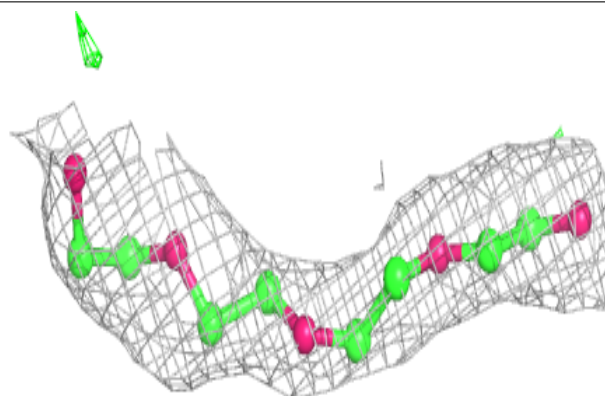


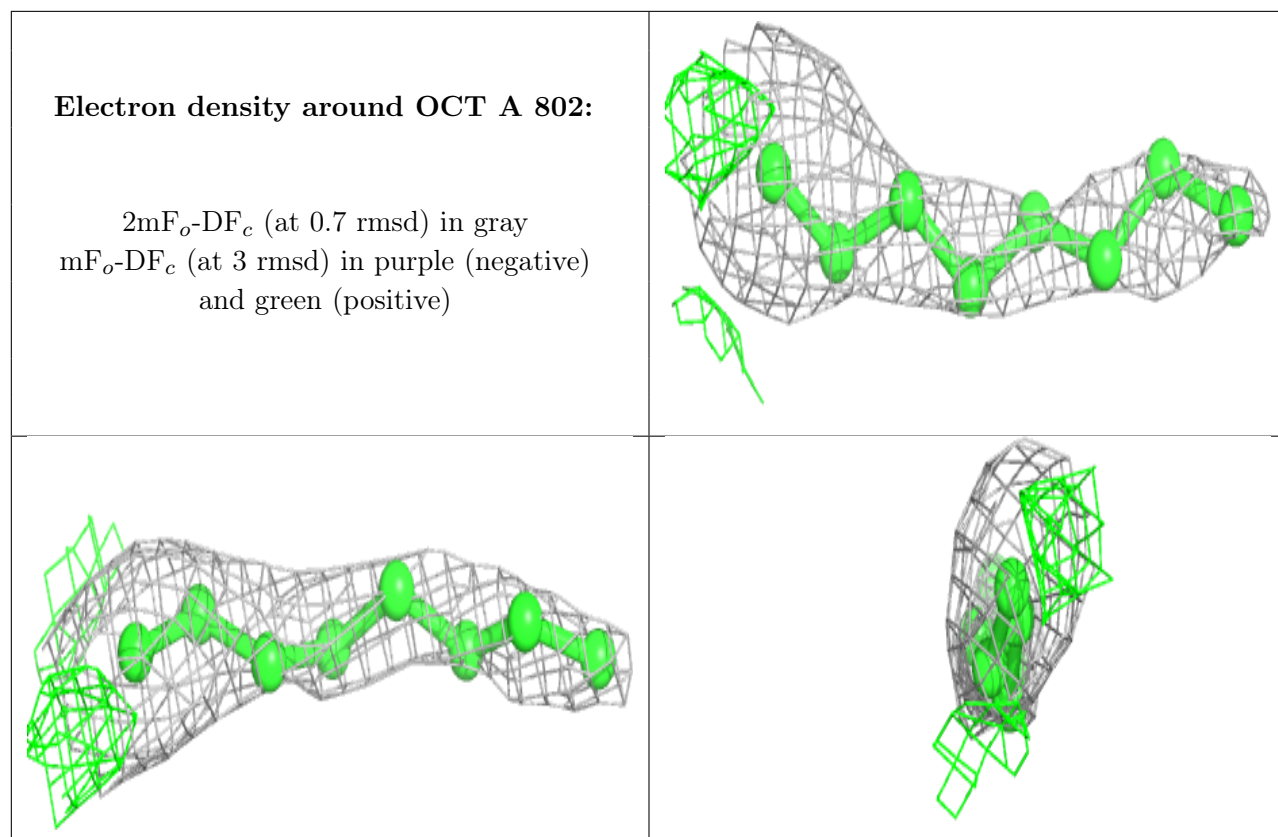
Electron density around D12 A 809:

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

**Electron density around PG4 A 806:**

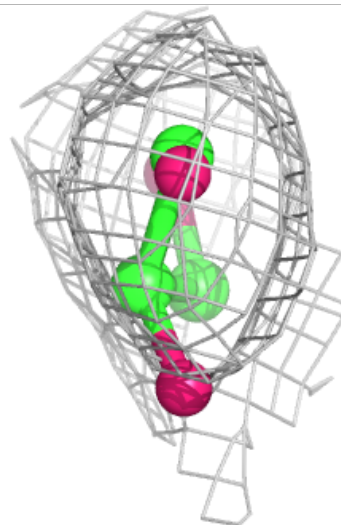
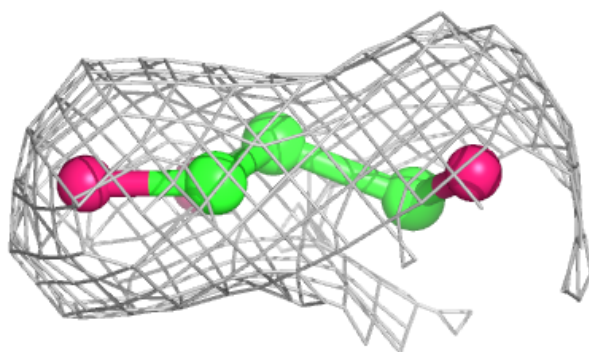
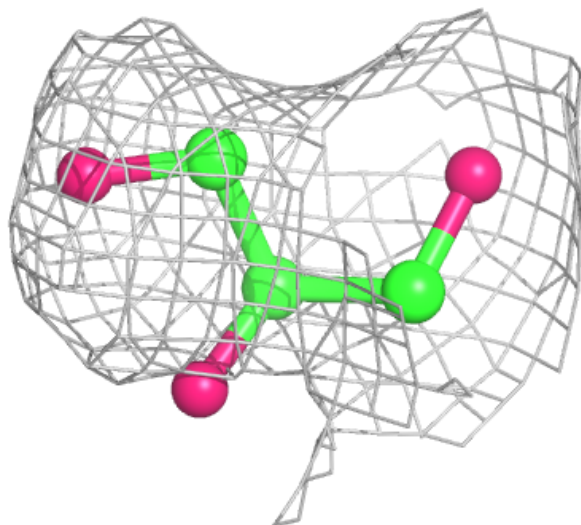
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





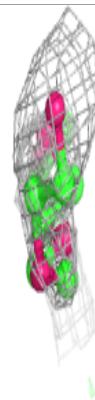
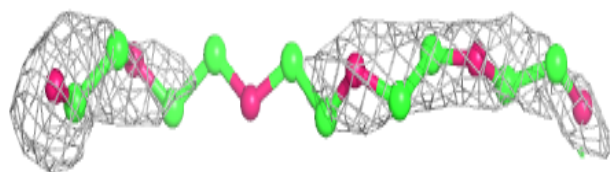
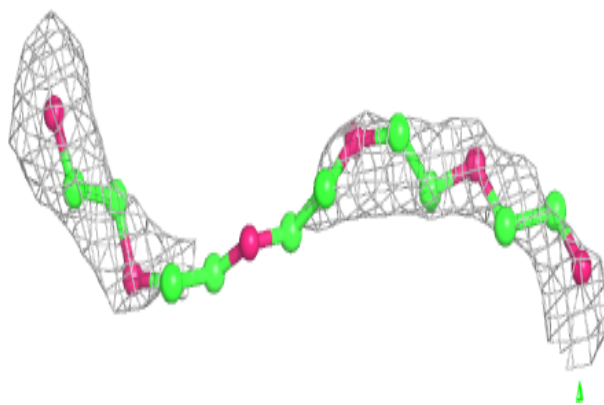
Electron density around GOL A 810:

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

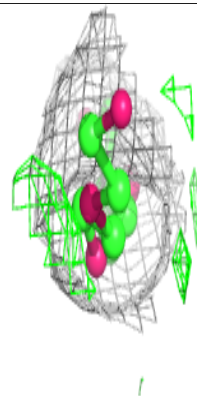
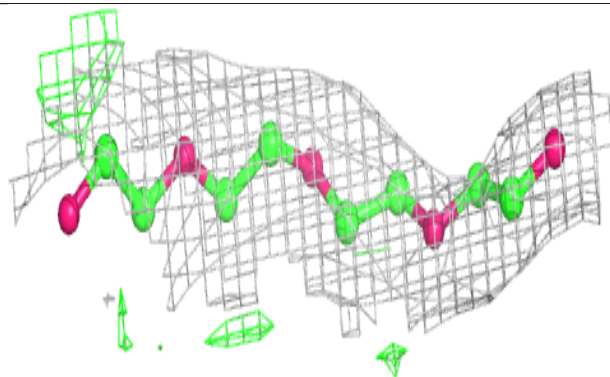
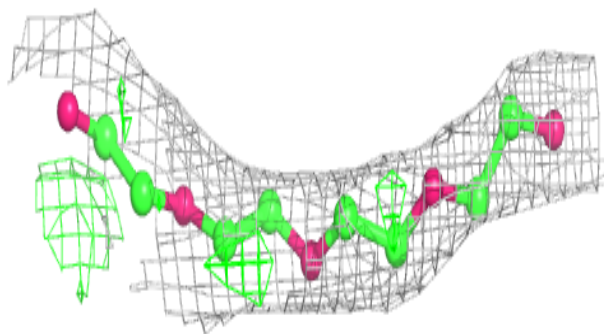


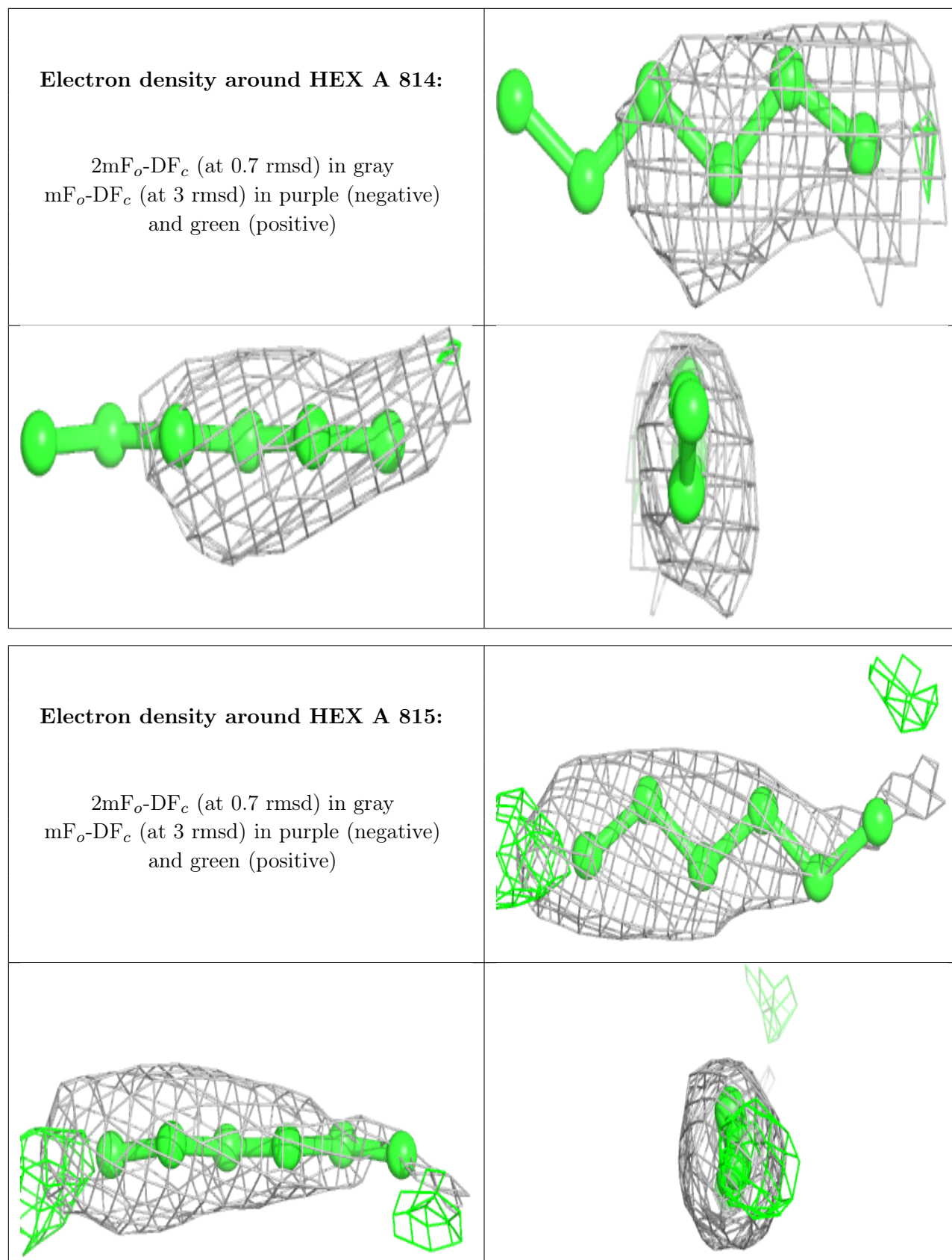
Electron density around 1PE A 811:

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

**Electron density around PG4 A 808:**

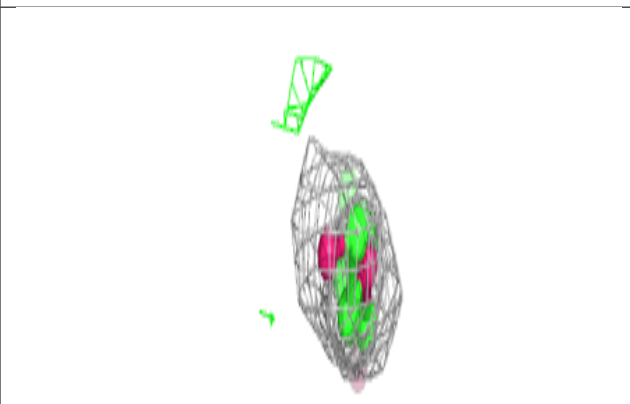
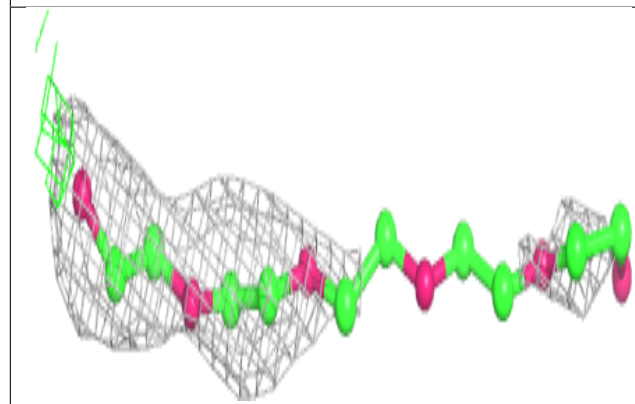
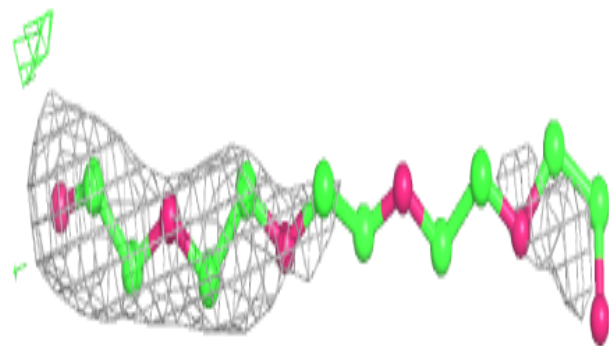
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



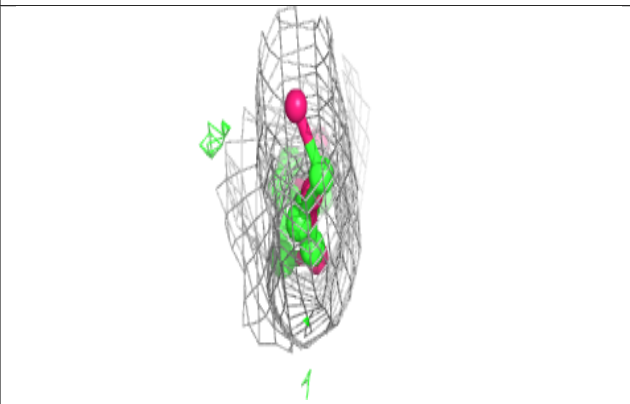
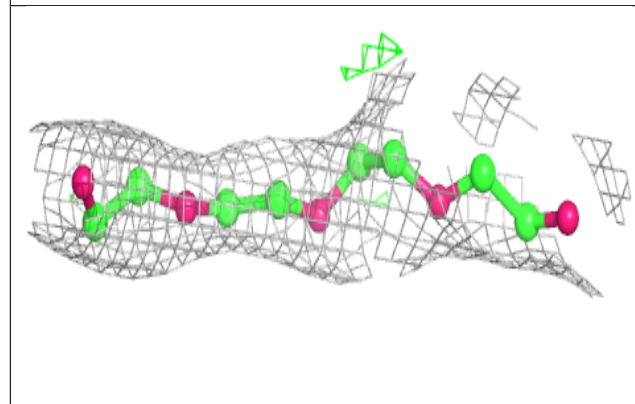
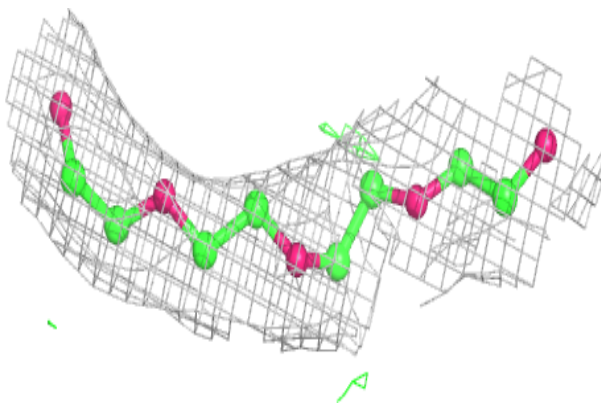


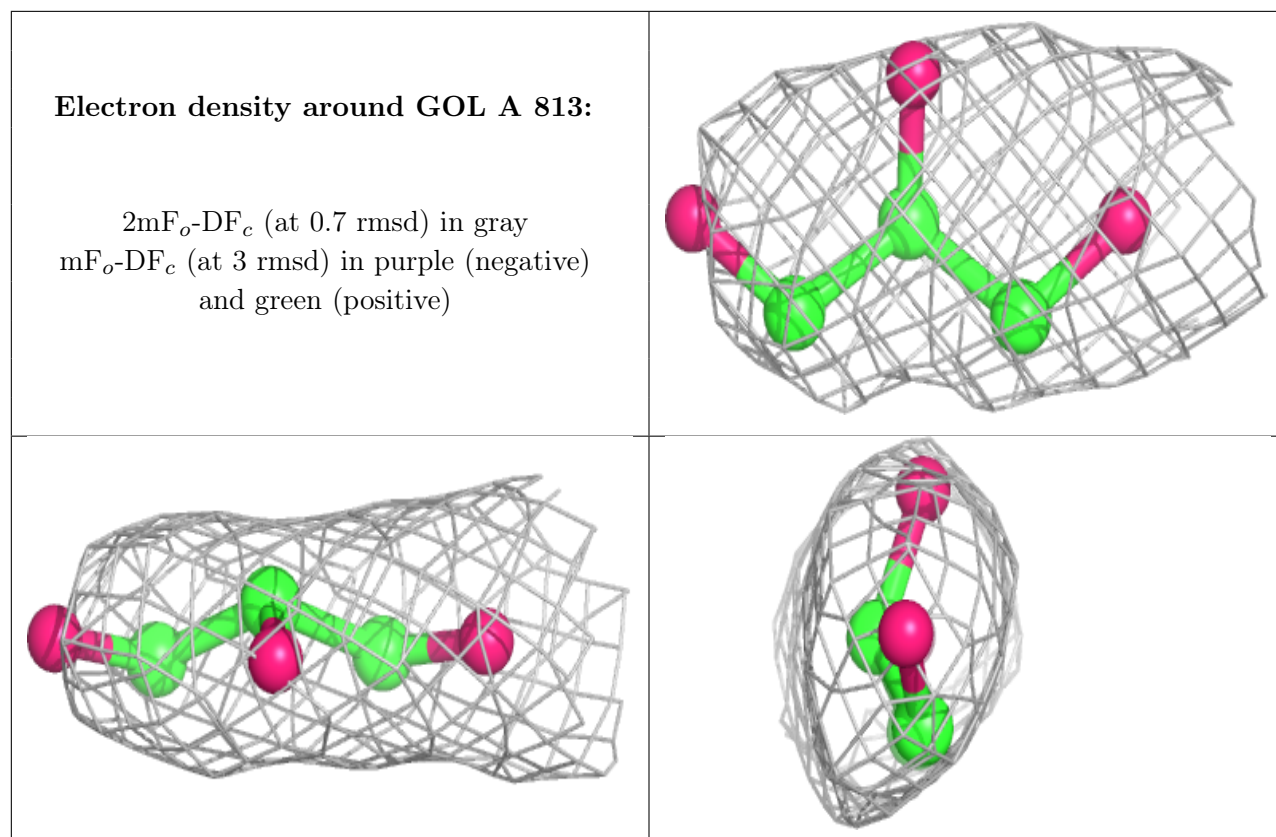
Electron density around 1PE A 804:

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

**Electron density around PG4 A 805:**

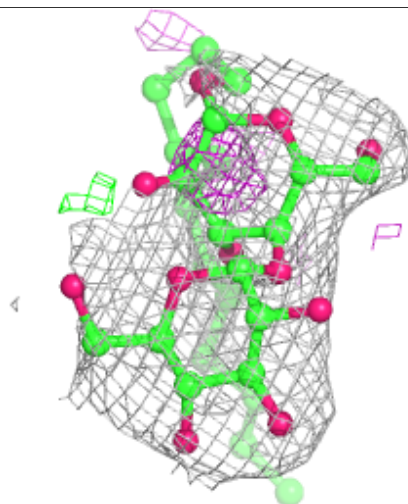
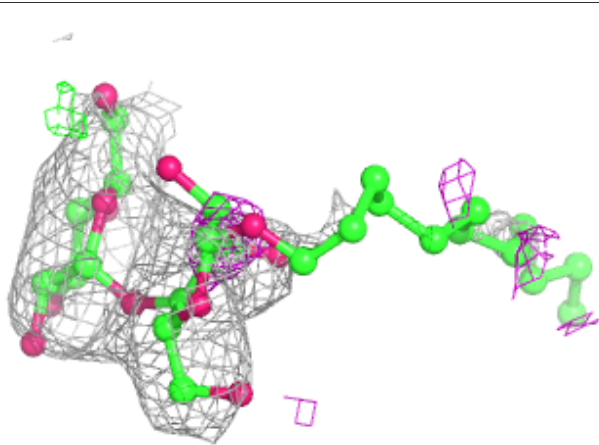
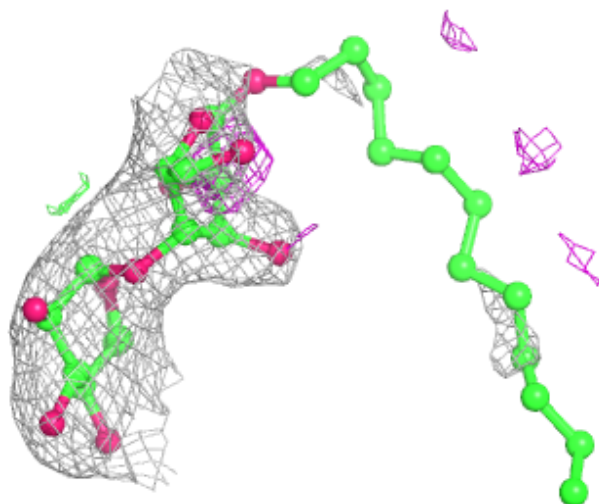
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





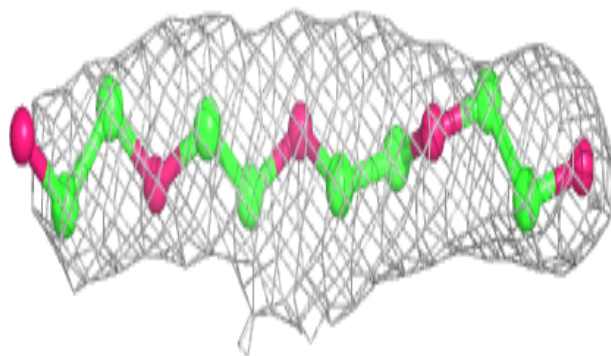
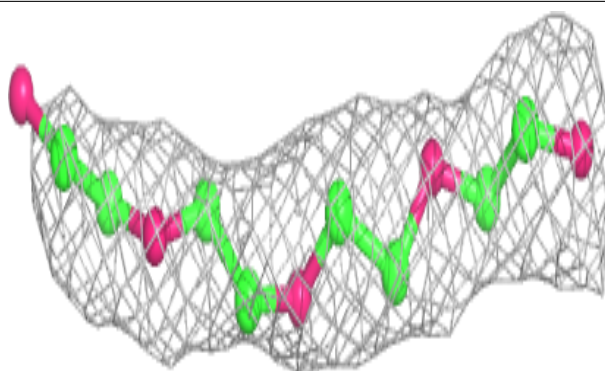
Electron density around LMT A 801:

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

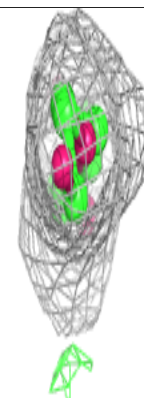
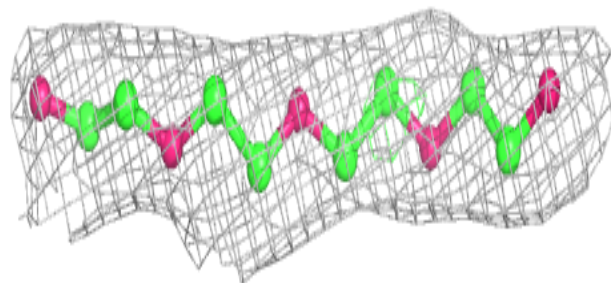
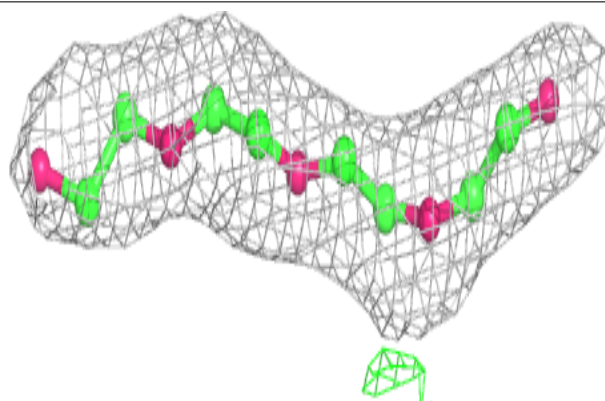


Electron density around PG4 A 807:

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

**Electron density around PG4 A 803:**

$2mF_o-DF_c$ (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.