



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 15, 2026 – 02:23 PM UTC

PDB ID : 7R5Y / pdb_00007r5y
Title : Crystal Structure of Prevotella sp. CAG:617 Multiple Inositol Polyphosphate Phosphatase, complex with myo-inositol hexakisulfate
Authors : Acquistapace, I.M.; Brearley, C.A.; Hemmings, A.M.
Deposited on : 2022-02-12
Resolution : 1.97 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

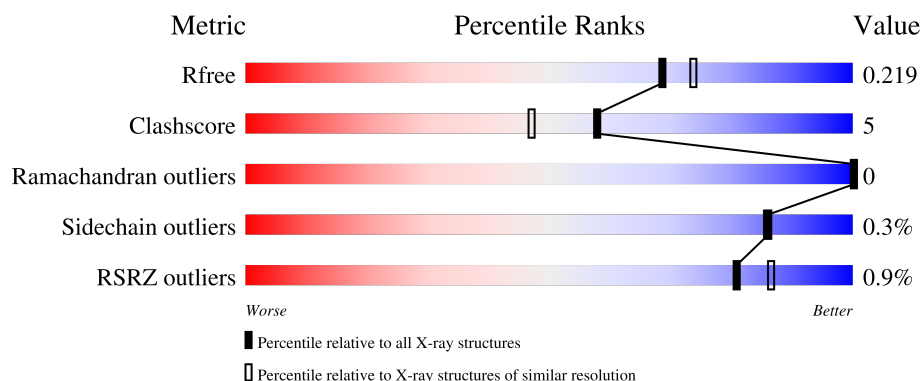
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.97 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	1506 (1.98-1.98)
Clashscore	190562	1534 (1.98-1.98)
Ramachandran outliers	187476	1518 (1.98-1.98)
Sidechain outliers	187428	1518 (1.98-1.98)
RSRZ outliers	180081	1506 (1.98-1.98)

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	416	89% 9% •
1	B	416	89% 9% •
1	C	416	88% 10% •
1	D	416	87% 12% •
1	E	416	92% 7% •

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Mol	Chain	Length	Quality of chain
1	F	416	 A horizontal bar chart showing the quality of chain F. The bar is divided into three segments: a small red segment at the beginning labeled '2%', a large green segment in the middle labeled '87%', and a small yellow segment at the end labeled '12%'.

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 22088 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 Histidine acid phosphatase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	409	Total	C	N	O	S	0	1	0
			3297	2091	566	622	18			
1	B	407	Total	C	N	O	S	0	1	0
			3290	2088	565	620	17			
1	C	408	Total	C	N	O	S	0	1	0
			3293	2089	565	621	18			
1	D	413	Total	C	N	O	S	0	2	0
			3345	2118	577	632	18			
1	E	414	Total	C	N	O	S	0	0	0
			3331	2111	573	629	18			
1	F	414	Total	C	N	O	S	0	0	0
			3330	2110	573	629	18			

There are 18 discrepancies between the modelled and reference sequences:

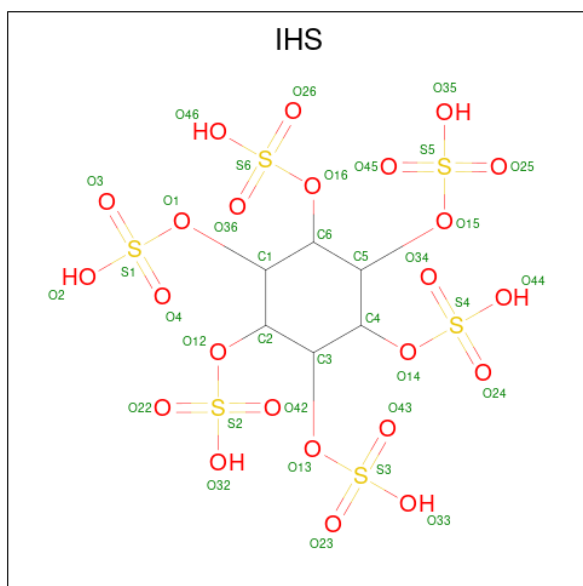
Chain	Residue	Modelled	Actual	Comment	Reference
A	18	GLY	-	expression tag	UNP R7PD89
A	19	PRO	-	expression tag	UNP R7PD89
A	20	MET	-	expression tag	UNP R7PD89
B	18	GLY	-	expression tag	UNP R7PD89
B	19	PRO	-	expression tag	UNP R7PD89
B	20	MET	-	expression tag	UNP R7PD89
C	18	GLY	-	expression tag	UNP R7PD89
C	19	PRO	-	expression tag	UNP R7PD89
C	20	MET	-	expression tag	UNP R7PD89
D	18	GLY	-	expression tag	UNP R7PD89
D	19	PRO	-	expression tag	UNP R7PD89
D	20	MET	-	expression tag	UNP R7PD89
E	18	GLY	-	expression tag	UNP R7PD89
E	19	PRO	-	expression tag	UNP R7PD89
E	20	MET	-	expression tag	UNP R7PD89
F	18	GLY	-	expression tag	UNP R7PD89
F	19	PRO	-	expression tag	UNP R7PD89

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Chain	Residue	Modelled	Actual	Comment	Reference
F	20	MET	-	expression tag	UNP R7PD89

- Molecule 2 is D-MYO-INOSITOL-HEXASULPHATE (CCD ID: IHS) (formula: $C_6H_{12}O_{24}S_6$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	O	S	0	0
			36	6	24	6		
2	B	1	Total	C	O	S	0	0
			36	6	24	6		
2	C	1	Total	C	O	S	0	0
			36	6	24	6		
2	D	1	Total	C	O	S	0	0
			36	6	24	6		
2	E	1	Total	C	O	S	0	0
			36	6	24	6		
2	F	1	Total	C	O	S	0	0
			36	6	24	6		

- Molecule 3 is SULFATE ION (CCD ID: SO4) (formula: O_4S).



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

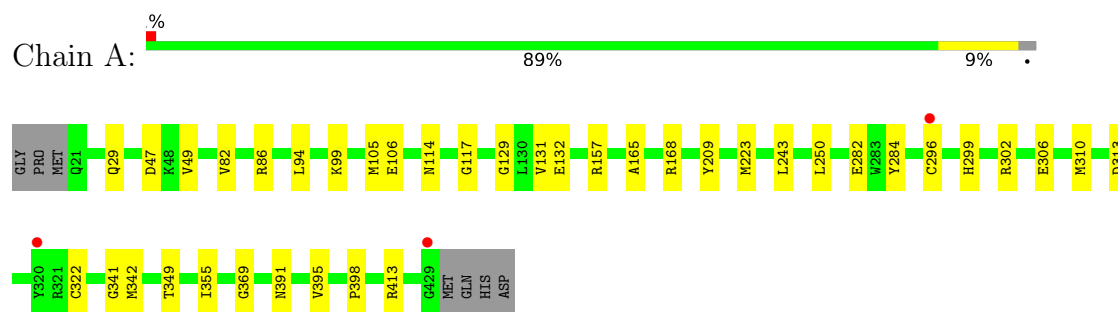
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	346	Total	O	0	0
			346	346		
4	B	329	Total	O	0	0
			329	329		
4	C	312	Total	O	0	0
			312	312		
4	D	343	Total	O	0	0
			343	343		
4	E	370	Total	O	0	0
			370	370		
4	F	281	Total	O	0	0
			281	281		

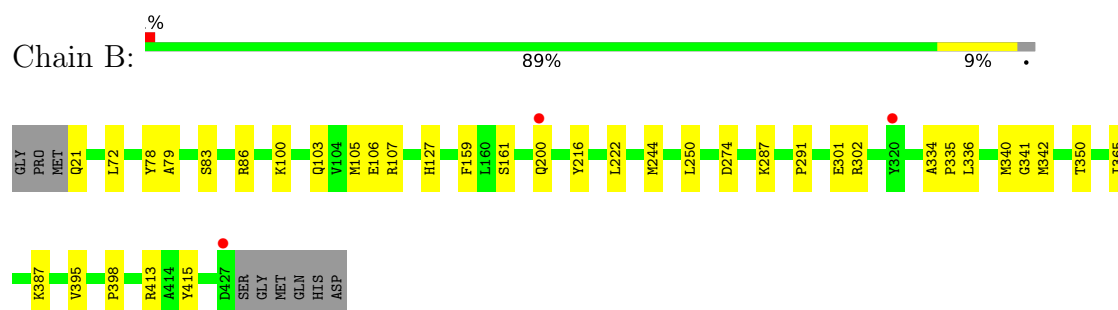
3 Residue-property plots [i](#)

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.

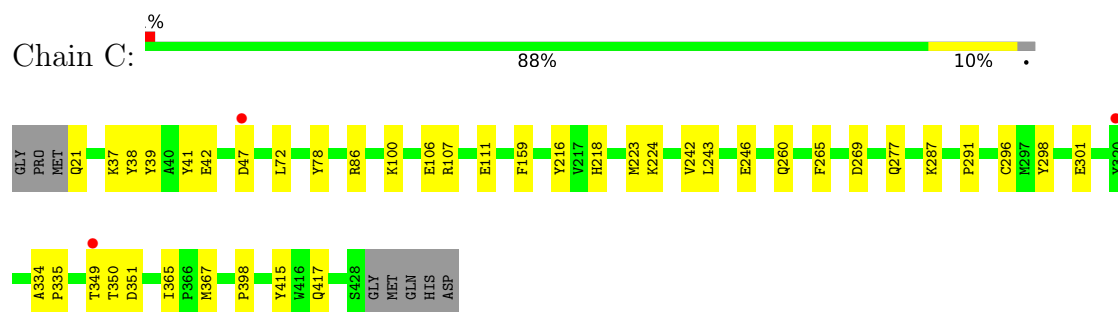
- Molecule 1: Histidine acid phosphatase



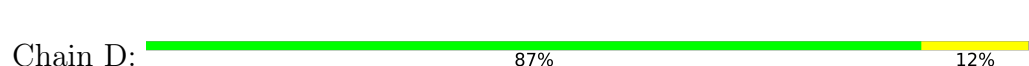
- Molecule 1: Histidine acid phosphatase

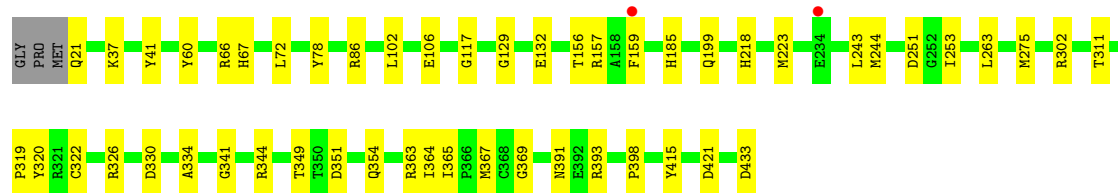


- Molecule 1: Histidine acid phosphatase

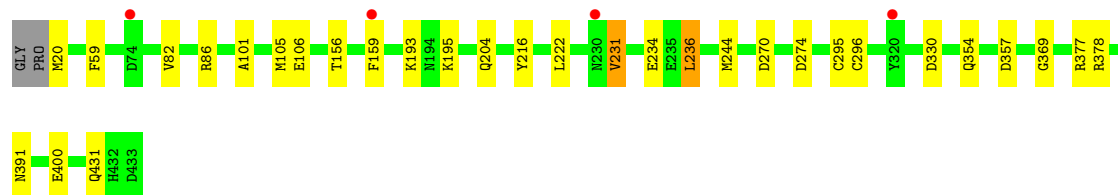
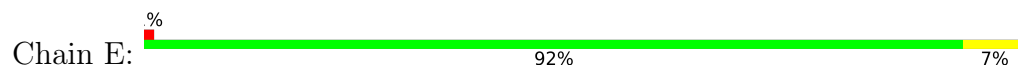


- Molecule 1: Histidine acid phosphatase

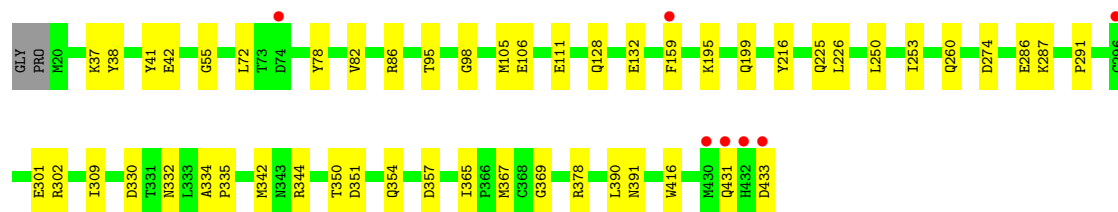
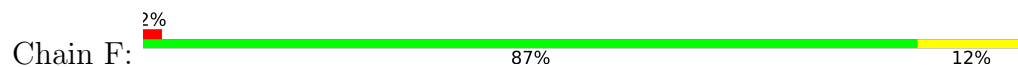




- Molecule 1: Histidine acid phosphatase



- Molecule 1: Histidine acid phosphatase



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	145.14Å 263.63Å 85.03Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	73.37 – 1.97 73.37 – 1.97	Depositor EDS
% Data completeness (in resolution range)	99.9 (73.37-1.97) 100.0 (73.37-1.97)	Depositor EDS
R_{merge}	0.16	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.56 (at 1.97Å)	Xtriage
Refinement program	PHENIX 1.19.2_4158	Depositor
R, R_{free}	0.152 , 0.220 0.151 , 0.219	Depositor DCC
R_{free} test set	11681 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å ²)	31.8	Xtriage
Anisotropy	0.494	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 58.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	22088	wwPDB-VP
Average B, all atoms (Å ²)	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.77% 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: SO4, IHS

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	0.30	0/3376	0.49	0/4577
1	B	0.30	0/3369	0.49	0/4568
1	C	0.30	0/3372	0.48	0/4572
1	D	0.30	0/3425	0.50	0/4642
1	E	0.31	0/3411	0.49	0/4624
1	F	0.30	0/3410	0.48	0/4622
All	All	0.30	0/20363	0.49	0/27605

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 [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	3297	0	3200	22	0
1	B	3290	0	3195	24	0
1	C	3293	0	3197	30	0
1	D	3345	0	3239	42	0
1	E	3331	0	3226	25	0
1	F	3330	0	3225	39	0
2	A	36	0	9	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	36	0	9	0	0
2	C	36	0	9	0	0
2	D	36	0	9	2	0
2	E	36	0	9	1	0
2	F	36	0	10	2	0
3	A	5	0	0	0	0
4	A	346	0	0	3	0
4	B	329	0	0	7	0
4	C	312	0	0	7	1
4	D	343	0	0	8	3
4	E	370	0	0	6	1
4	F	281	0	0	2	1
All	All	22088	0	19337	179	3

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 5.

All (179) 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:C:111:GLU:OE2	1:C:260:GLN:NE2	1.98	0.96
1:D:199:GLN:OE1	4:D:601:HOH:O	1.83	0.96
1:E:296:CYS:SG	4:E:687:HOH:O	2.23	0.94
1:F:342:MET:HE1	1:F:390:LEU:HB2	1.52	0.90
1:A:322:CYS:SG	4:A:879:HOH:O	2.31	0.88
1:E:378:ARG:NH1	4:E:602:HOH:O	2.12	0.82
1:D:322:CYS:SG	4:D:906:HOH:O	2.39	0.80
1:D:21:GLN:N	4:D:603:HOH:O	2.15	0.80
1:C:269:ASP:O	4:C:601:HOH:O	1.99	0.79
1:F:354:GLN:NE2	1:F:357:ASP:OD2	2.16	0.79
1:F:95:THR:HG21	1:F:225:GLN:O	1.84	0.78
1:C:21:GLN:N	4:C:602:HOH:O	2.15	0.78
1:D:421:ASP:OD2	4:D:602:HOH:O	2.02	0.76
1:C:296[B]:CYS:SG	4:C:804:HOH:O	2.43	0.75
1:F:128:GLN:O	1:F:132:GLU:HG2	1.88	0.73
1:D:311:THR:HG21	1:D:326:ARG:HH22	1.55	0.72
1:D:349:THR:HG22	1:D:351:ASP:H	1.55	0.71
1:E:106:GLU:OE2	4:E:601:HOH:O	2.10	0.70
1:D:185:HIS:ND1	4:D:604:HOH:O	2.23	0.70
1:C:349:THR:HG22	1:C:351:ASP:H	1.56	0.69
1:B:287:LYS:HD2	1:B:335:PRO:HG3	1.75	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:330:ASP:OD2	2:E:501:IHS:O35	2.11	0.68
1:B:413:ARG:NH1	4:B:601:HOH:O	1.99	0.67
1:F:291:PRO:HG2	1:F:350:THR:HG23	1.76	0.67
1:E:20:MET:N	4:E:606:HOH:O	2.29	0.65
1:E:231:VAL:HG11	1:E:236:LEU:HD13	1.78	0.64
1:C:291:PRO:HG2	1:C:350:THR:HG23	1.81	0.63
1:F:42:GLU:OE2	4:F:602:HOH:O	2.15	0.63
1:F:302:ARG:HH22	1:F:433:ASP:CG	2.07	0.62
1:C:260:GLN:OE1	4:C:603:HOH:O	2.16	0.61
1:C:301:GLU:HG2	1:C:335:PRO:HB2	1.81	0.61
1:C:224:LYS:N	1:C:224:LYS:HD3	2.14	0.61
1:B:342:MET:HG2	1:B:395:VAL:HG21	1.81	0.61
1:A:302:ARG:NH2	4:A:608:HOH:O	2.33	0.60
1:C:39:TYR:OH	1:C:42:GLU:HG3	2.00	0.60
1:F:95:THR:HG23	1:F:98:GLY:H	1.65	0.60
1:D:330[A]:ASP:OD2	2:D:501:IHS:O35	2.20	0.60
1:A:306:GLU:O	1:A:310:MET:HG2	2.01	0.60
1:A:313:ASP:OD2	1:A:413:ARG:NH1	2.35	0.60
1:F:301:GLU:HG2	1:F:335:PRO:HB2	1.84	0.59
1:B:301:GLU:HG2	1:B:335:PRO:HB2	1.82	0.59
1:D:311:THR:HG21	1:D:326:ARG:NH2	2.16	0.59
1:D:330[B]:ASP:CG	1:D:365:ILE:HB	2.28	0.58
1:F:72:LEU:HG	1:F:253:ILE:HG12	1.85	0.58
1:D:364:ILE:HG22	1:D:365:ILE:HG23	1.84	0.58
1:D:344:ARG:NH1	4:D:607:HOH:O	2.28	0.58
1:C:291:PRO:HG2	1:C:350:THR:CG2	2.35	0.57
1:D:72:LEU:HG	1:D:253:ILE:HG12	1.86	0.56
1:A:86:ARG:HD3	1:A:106:GLU:OE2	2.04	0.56
1:F:344:ARG:HD3	4:F:858:HOH:O	2.06	0.56
1:E:204:GLN:NE2	1:E:204:GLN:H	2.04	0.56
1:F:95:THR:CG2	1:F:98:GLY:H	2.19	0.56
1:D:341:GLY:O	1:D:398:PRO:HD3	2.06	0.55
1:C:86:ARG:HD3	1:C:106:GLU:OE2	2.06	0.55
1:D:66:ARG:HD2	1:D:330[B]:ASP:OD1	2.07	0.55
1:F:111:GLU:OE2	1:F:260:GLN:NE2	2.39	0.55
1:D:244:MET:HE2	1:D:275:MET:SD	2.47	0.54
1:B:86:ARG:HD2	1:B:106:GLU:OE2	2.08	0.53
1:D:302:ARG:HH22	1:D:433:ASP:CG	2.16	0.53
1:F:342:MET:CE	1:F:390:LEU:HB2	2.30	0.53
1:C:107:ARG:NH2	4:C:612:HOH:O	2.40	0.53
1:D:330[B]:ASP:OD2	1:D:365:ILE:HB	2.08	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:86:ARG:HD3	1:D:106:GLU:OE2	2.09	0.53
1:D:351:ASP:HB3	1:D:354:GLN:HB3	1.91	0.53
1:D:349:THR:HG22	1:D:351:ASP:N	2.23	0.52
1:D:223:MET:HE1	1:D:243:LEU:HD23	1.92	0.52
1:E:86:ARG:HD3	1:E:106:GLU:OE2	2.10	0.52
1:C:349:THR:HG22	1:C:351:ASP:N	2.24	0.51
1:F:291:PRO:HG2	1:F:350:THR:CG2	2.39	0.51
1:C:398:PRO:HG2	1:C:415:TYR:CZ	2.45	0.51
1:A:105:MET:HG2	1:A:250:LEU:HD13	1.93	0.51
1:B:398:PRO:HG2	1:B:415:TYR:CZ	2.46	0.51
1:F:302:ARG:NH2	1:F:433:ASP:OD2	2.42	0.51
1:B:103:GLN:HG2	1:B:107:ARG:HH11	1.75	0.50
1:C:223:MET:HE1	1:C:243:LEU:HD23	1.91	0.50
1:F:55:GLY:C	1:F:378:ARG:HG3	2.37	0.50
1:D:334:ALA:HB2	1:D:365:ILE:HG21	1.94	0.50
1:C:334:ALA:HB2	1:C:365:ILE:HG21	1.94	0.50
1:C:218:HIS:HD2	4:C:820:HOH:O	1.93	0.49
1:A:82:VAL:O	1:A:86:ARG:HG3	2.12	0.49
1:C:100:LYS:HD3	1:C:265:PHE:CE2	2.48	0.49
1:F:86:ARG:HD3	1:F:106:GLU:OE2	2.11	0.49
1:F:351:ASP:HB3	1:F:354:GLN:HB2	1.94	0.49
1:F:286:GLU:C	1:F:287:LYS:HG2	2.38	0.49
1:D:398:PRO:HG2	1:D:415:TYR:CZ	2.48	0.49
1:A:296[A]:CYS:HB3	1:A:299:HIS:CD2	2.48	0.48
1:B:336:LEU:HD11	1:B:340:MET:HE3	1.93	0.48
1:B:334:ALA:HB2	1:B:365:ILE:HG21	1.96	0.48
1:F:330:ASP:OD2	2:F:501:IHS:O35	2.31	0.48
1:E:431:GLN:HG2	4:E:751:HOH:O	2.13	0.48
1:A:342:MET:HG2	1:A:395:VAL:HG21	1.95	0.48
1:B:72:LEU:HB2	1:B:78:TYR:CE2	2.49	0.47
1:D:72:LEU:HB2	1:D:78:TYR:CE2	2.49	0.47
1:C:242:VAL:O	1:C:246:GLU:HG3	2.14	0.47
1:B:341:GLY:O	1:B:398:PRO:HD3	2.14	0.47
1:D:363:ARG:CZ	1:D:393[B]:ARG:HH12	2.26	0.47
1:B:222:LEU:CD2	1:B:244:MET:HG3	2.45	0.47
1:A:114:ASN:ND2	4:A:603:HOH:O	2.27	0.47
1:B:291:PRO:HG2	1:B:350:THR:CG2	2.45	0.47
1:D:37:LYS:HD2	2:D:501:IHS:O45	2.14	0.47
1:E:59:PHE:CD1	1:E:377:ARG:HB2	2.50	0.47
1:A:349:THR:HG23	1:A:355:ILE:HD13	1.97	0.47
1:F:41:TYR:HB2	1:F:367:MET:O	2.16	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:41:TYR:HB2	1:D:367:MET:O	2.15	0.46
1:A:129:GLY:HA2	1:A:132:GLU:HG2	1.97	0.46
1:B:291:PRO:HG2	1:B:350:THR:HG23	1.97	0.46
1:C:37:LYS:HE3	1:C:38:TYR:CZ	2.50	0.46
1:A:284:TYR:CD2	1:A:355:ILE:HD12	2.49	0.46
1:B:100:LYS:HG3	4:B:739:HOH:O	2.15	0.46
1:A:341:GLY:O	1:A:398:PRO:HD3	2.16	0.46
1:C:159:PHE:CE2	1:D:159:PHE:HB2	2.50	0.46
1:D:129:GLY:HA2	1:D:132:GLU:HG2	1.98	0.46
1:C:398:PRO:HG2	1:C:415:TYR:CE2	2.51	0.45
1:D:251:ASP:HB2	1:D:263:LEU:HB2	1.97	0.45
1:A:223:MET:HE1	1:A:243:LEU:HD23	1.99	0.45
1:A:369:GLY:HA2	1:A:391:ASN:OD1	2.17	0.45
1:B:159:PHE:CE2	1:F:159:PHE:HB2	2.52	0.45
1:E:204:GLN:H	1:E:204:GLN:CD	2.25	0.45
1:F:55:GLY:O	1:F:378:ARG:HG3	2.16	0.45
1:A:209:TYR:OH	1:A:282:GLU:HG3	2.18	0.44
1:D:218:HIS:HD2	4:D:667:HOH:O	2.00	0.44
1:E:156:THR:HG22	1:E:159:PHE:CZ	2.52	0.44
1:E:234:GLU:CD	1:E:234:GLU:N	2.76	0.44
1:E:101:ALA:O	1:E:105:MET:HG3	2.17	0.44
1:B:105:MET:HG2	1:B:250:LEU:HD13	2.00	0.44
1:C:72:LEU:HB2	1:C:78:TYR:CE2	2.53	0.44
1:F:342:MET:HB3	1:F:342:MET:HE3	1.72	0.44
1:E:82:VAL:O	1:E:86:ARG:HG3	2.18	0.44
1:F:37:LYS:HD2	2:F:501:IHS:O45	2.18	0.44
1:E:222:LEU:CD2	1:E:244:MET:HG3	2.48	0.43
1:F:332:ASN:C	1:F:335:PRO:HD2	2.43	0.43
1:B:387:LYS:NZ	4:B:610:HOH:O	2.51	0.43
1:C:298:TYR:HA	1:C:335:PRO:HB3	2.00	0.43
1:F:342:MET:HE1	1:F:390:LEU:CB	2.35	0.43
1:F:369:GLY:HA2	1:F:391:ASN:OD1	2.18	0.43
1:A:117:GLY:O	1:A:157:ARG:HD3	2.19	0.43
1:E:295:CYS:HB2	4:E:687:HOH:O	2.18	0.43
1:F:309:ILE:HD11	1:F:416:TRP:HB3	2.00	0.43
1:F:95:THR:HG22	1:F:226:LEU:O	2.18	0.43
1:A:29:GLN:HE22	1:E:270:ASP:CG	2.27	0.43
1:D:319:PRO:HG2	1:D:320:TYR:CE2	2.54	0.43
1:E:354:GLN:O	1:E:357:ASP:HB2	2.19	0.43
1:F:334:ALA:HB2	1:F:365:ILE:HG21	2.01	0.43
1:B:200:GLN:HG3	4:B:791:HOH:O	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:302:ARG:NH2	4:B:616:HOH:O	2.51	0.42
4:B:617:HOH:O	1:C:417:GLN:HG3	2.19	0.42
1:C:287:LYS:HD2	1:C:335:PRO:HG3	2.01	0.42
1:A:131:VAL:HG11	1:A:165:ALA:HB1	2.00	0.42
1:D:369:GLY:HA2	1:D:391:ASN:OD1	2.20	0.42
1:E:400:GLU:H	1:E:400:GLU:CD	2.26	0.42
1:E:193:LYS:NZ	1:E:195:LYS:HE2	2.34	0.42
1:F:195:LYS:O	1:F:199:GLN:HG3	2.20	0.42
1:A:94:LEU:HD23	1:A:99:LYS:HG2	2.02	0.42
1:D:319:PRO:HG2	1:D:320:TYR:CD2	2.54	0.42
1:F:253:ILE:H	1:F:253:ILE:HG13	1.73	0.42
1:D:66:ARG:NH1	1:D:330[B]:ASP:OD2	2.53	0.42
1:F:216:TYR:O	1:F:274:ASP:HB3	2.20	0.42
1:B:21:GLN:N	4:B:621:HOH:O	2.54	0.41
1:E:216:TYR:O	1:E:274:ASP:HB3	2.19	0.41
1:D:60:TYR:OH	1:D:311:THR:HG23	2.21	0.41
1:E:231:VAL:CG1	1:E:236:LEU:HD13	2.47	0.41
1:C:100:LYS:HG2	4:C:752:HOH:O	2.21	0.41
1:E:193:LYS:HZ2	1:E:195:LYS:HE2	1.85	0.41
1:F:37:LYS:HE3	1:F:38:TYR:CZ	2.55	0.41
1:C:41:TYR:HB2	1:C:367:MET:O	2.20	0.41
1:B:127:HIS:CD2	1:B:161:SER:HB3	2.56	0.41
1:C:216:TYR:CE1	1:C:277:GLN:HB3	2.56	0.41
1:D:156:THR:HG22	1:D:159:PHE:CZ	2.56	0.41
1:F:82:VAL:O	1:F:86:ARG:HG3	2.21	0.41
1:E:369:GLY:HA2	1:E:391:ASN:OD1	2.21	0.41
1:A:168:ARG:HA	1:A:168:ARG:HD2	1.93	0.40
1:F:105:MET:HG2	1:F:250:LEU:HD13	2.02	0.40
1:B:79:ALA:O	1:B:83:SER:HB3	2.20	0.40
1:F:72:LEU:HB2	1:F:78:TYR:CE2	2.57	0.40
1:B:216:TYR:O	1:B:274:ASP:HB3	2.21	0.40
1:D:86:ARG:NH2	4:D:632:HOH:O	2.55	0.40
1:D:117:GLY:O	1:D:157:ARG:HD3	2.22	0.40
1:D:66:ARG:HG2	1:D:67:HIS:N	2.37	0.40
1:D:102:LEU:O	1:D:106:GLU:HG2	2.22	0.40

All (3) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:765:HOH:O	4:F:648:HOH:O[4_554]	1.99	0.21

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:634:HOH:O	4:E:626:HOH:O[2_556]	2.02	0.18
4:C:880:HOH:O	4:D:821:HOH:O[1_554]	2.15	0.05

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	408/416 (98%)	400 (98%)	8 (2%)	0	100	100
1	B	406/416 (98%)	397 (98%)	9 (2%)	0	100	100
1	C	407/416 (98%)	397 (98%)	10 (2%)	0	100	100
1	D	413/416 (99%)	403 (98%)	10 (2%)	0	100	100
1	E	412/416 (99%)	400 (97%)	12 (3%)	0	100	100
1	F	412/416 (99%)	399 (97%)	13 (3%)	0	100	100
All	All	2458/2496 (98%)	2396 (98%)	62 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	346/351 (99%)	344 (99%)	2 (1%)	78	76
1	B	345/351 (98%)	345 (100%)	0	100	100
1	C	346/351 (99%)	345 (100%)	1 (0%)	86	86

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	D	351/351 (100%)	351 (100%)	0	100	100
1	E	349/351 (99%)	347 (99%)	2 (1%)	78	76
1	F	349/351 (99%)	348 (100%)	1 (0%)	86	86
All	All	2086/2106 (99%)	2080 (100%)	6 (0%)	86	86

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	47	ASP
1	A	49	VAL
1	C	47	ASP
1	E	231	VAL
1	E	236	LEU
1	F	431	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (35) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	103	GLN
1	A	180	GLN
1	A	354	GLN
1	B	103	GLN
1	B	218	HIS
1	B	299	HIS
1	B	372	GLN
1	C	185	HIS
1	C	199	GLN
1	C	218	HIS
1	C	279	ASN
1	C	299	HIS
1	C	417	GLN
1	D	21	GLN
1	D	185	HIS
1	D	218	HIS
1	D	230	ASN
1	D	260	GLN
1	D	277	GLN
1	D	353	GLN
1	D	354	GLN
1	D	417	GLN

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Mol	Chain	Res	Type
1	E	180	GLN
1	E	204	GLN
1	E	299	HIS
1	E	354	GLN
1	E	431	GLN
1	F	29	GLN
1	F	185	HIS
1	F	218	HIS
1	F	277	GLN
1	F	353	GLN
1	F	354	GLN
1	F	431	GLN
1	F	432	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

7 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	$\# Z > 2$
2	IHS	C	501	-	36,36,36	0.80	1 (2%)	48,60,60	0.85	1 (2%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	IHS	D	501	-	36,36,36	0.79	1 (2%)	48,60,60	0.94	3 (6%)
2	IHS	E	501	-	36,36,36	0.80	1 (2%)	48,60,60	0.90	2 (4%)
3	SO4	A	502	-	4,4,4	0.21	0	6,6,6	0.08	0
2	IHS	B	501	-	36,36,36	0.80	1 (2%)	48,60,60	0.91	2 (4%)
2	IHS	F	501	-	36,36,36	0.66	0	48,60,60	0.75	1 (2%)
2	IHS	A	501	-	36,36,36	0.77	0	48,60,60	0.95	1 (2%)

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
2	IHS	C	501	-	-	7/30/54/54	0/1/1/1
2	IHS	D	501	-	-	3/30/54/54	0/1/1/1
2	IHS	E	501	-	-	3/30/54/54	0/1/1/1
2	IHS	B	501	-	-	6/30/54/54	0/1/1/1
2	IHS	F	501	-	-	7/30/54/54	0/1/1/1
2	IHS	A	501	-	-	6/30/54/54	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	501	IHS	O36-S6	2.41	1.55	1.45
2	D	501	IHS	O36-S6	2.39	1.55	1.45
2	C	501	IHS	O36-S6	2.38	1.55	1.45
2	E	501	IHS	O36-S6	2.32	1.55	1.45

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	501	IHS	O46-S6-O26	3.21	119.79	108.56
2	A	501	IHS	O46-S6-O26	3.16	119.60	108.56
2	B	501	IHS	O46-S6-O26	3.13	119.51	108.56
2	D	501	IHS	O46-S6-O26	3.12	119.47	108.56
2	C	501	IHS	O46-S6-O26	2.44	117.09	108.56
2	D	501	IHS	O43-S3-O23	2.34	121.27	112.24
2	B	501	IHS	O43-S3-O23	2.33	121.22	112.24
2	F	501	IHS	O45-S5-O25	2.29	121.08	112.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	501	IHS	O45-S5-O25	2.16	120.58	112.24
2	E	501	IHS	O43-S3-O23	2.05	120.15	112.24

There are no chirality outliers.

All (32) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	IHS	C5-O15-S5-O25
2	A	501	IHS	C5-O15-S5-O35
2	E	501	IHS	C2-O12-S2-O22
2	E	501	IHS	C2-O12-S2-O32
2	F	501	IHS	C5-O15-S5-O25
2	A	501	IHS	C5-O15-S5-O45
2	B	501	IHS	C5-O15-S5-O25
2	B	501	IHS	C5-O15-S5-O45
2	C	501	IHS	C2-O12-S2-O42
2	C	501	IHS	C5-O15-S5-O25
2	C	501	IHS	C5-O15-S5-O45
2	E	501	IHS	C2-O12-S2-O42
2	F	501	IHS	C2-O12-S2-O42
2	B	501	IHS	C5-O15-S5-O35
2	C	501	IHS	C2-O12-S2-O32
2	C	501	IHS	C5-O15-S5-O35
2	D	501	IHS	C2-O12-S2-O32
2	D	501	IHS	C2-O12-S2-O42
2	F	501	IHS	C2-O12-S2-O32
2	F	501	IHS	C5-O15-S5-O35
2	B	501	IHS	C2-O12-S2-O22
2	C	501	IHS	C2-O12-S2-O22
2	D	501	IHS	C2-O12-S2-O22
2	F	501	IHS	C2-O12-S2-O22
2	A	501	IHS	C2-O12-S2-O32
2	B	501	IHS	C2-O12-S2-O32
2	B	501	IHS	C2-O12-S2-O42
2	A	501	IHS	C2-O12-S2-O42
2	F	501	IHS	C5-O15-S5-O45
2	C	501	IHS	C2-C3-O13-S3
2	F	501	IHS	C2-C3-O13-S3
2	A	501	IHS	C2-O12-S2-O22

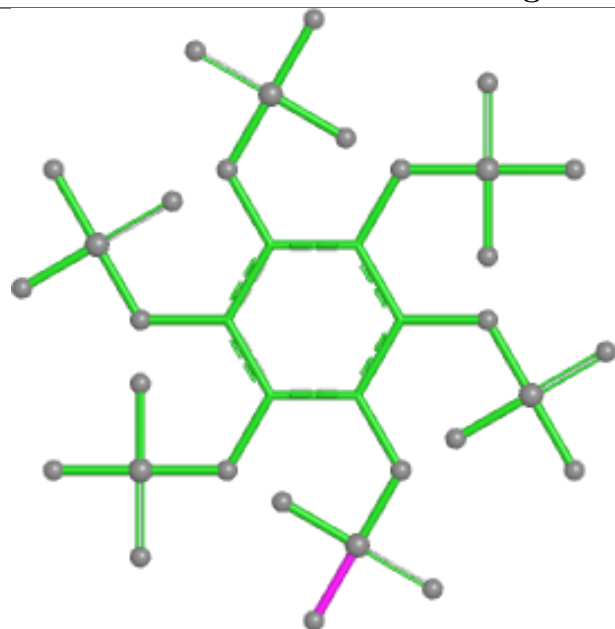
There are no ring outliers.

3 monomers are involved in 5 short contacts:

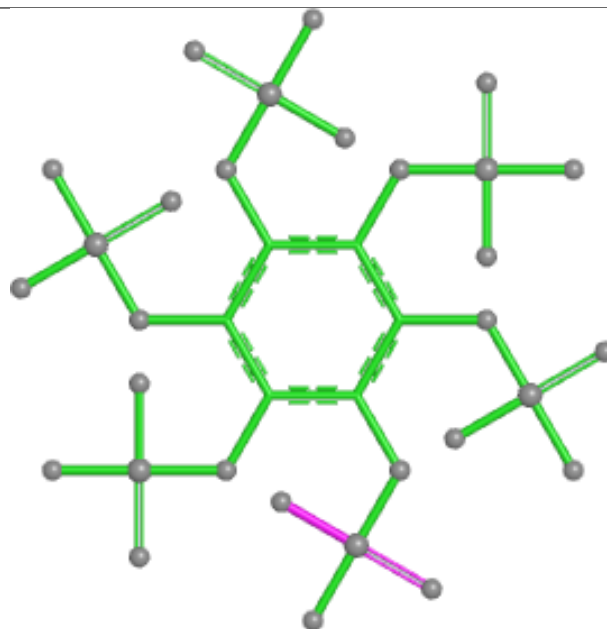
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	501	IHS	2	0
2	E	501	IHS	1	0
2	F	501	IHS	2	0

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.

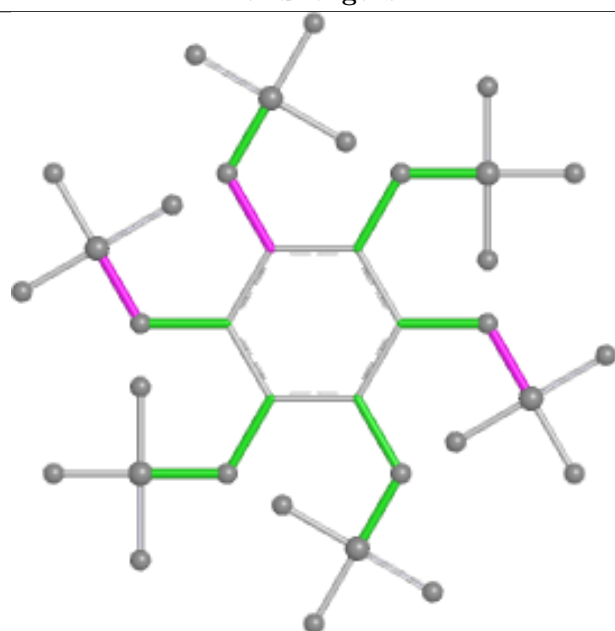
Ligand IHS C 501



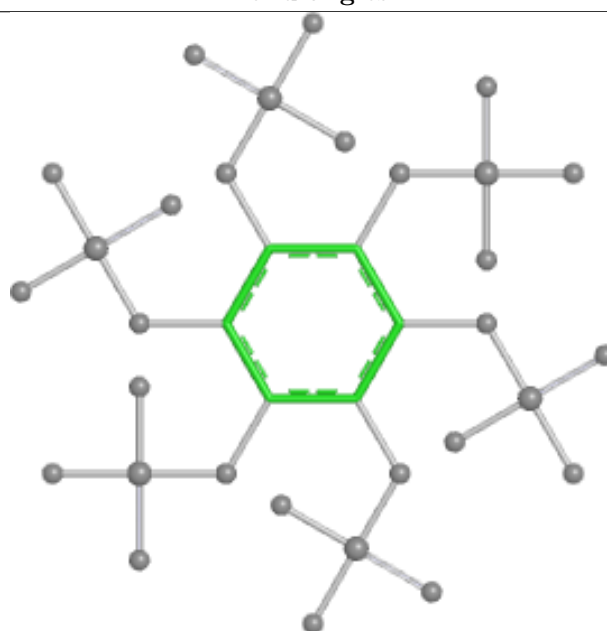
Bond lengths



Bond angles

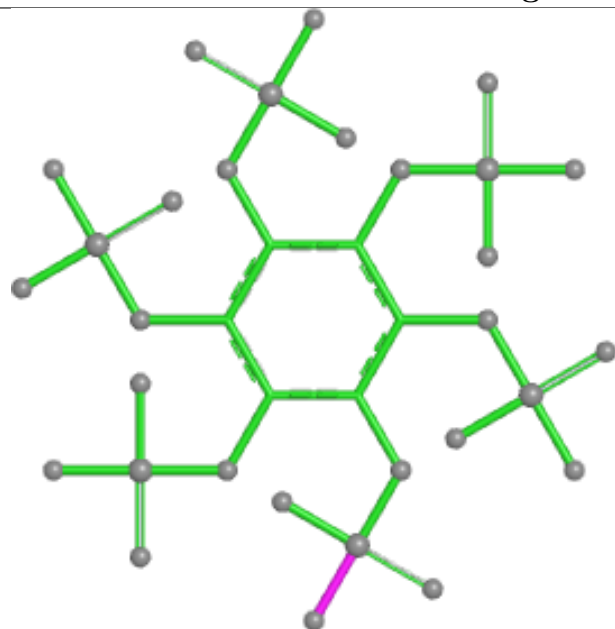


Torsions

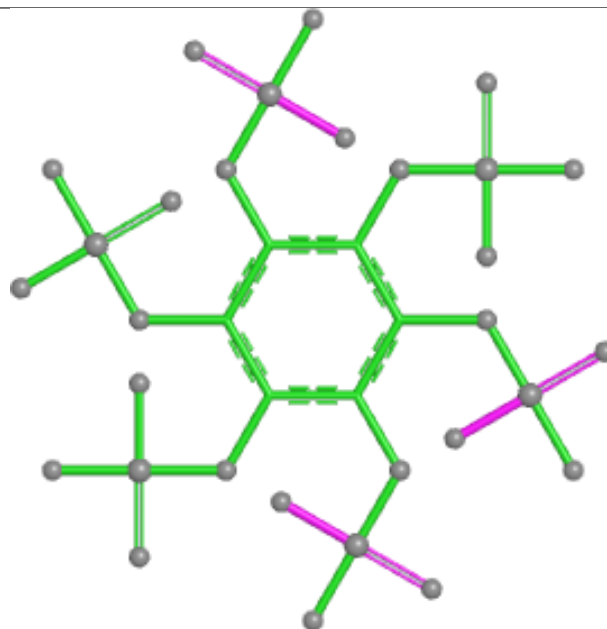


Rings

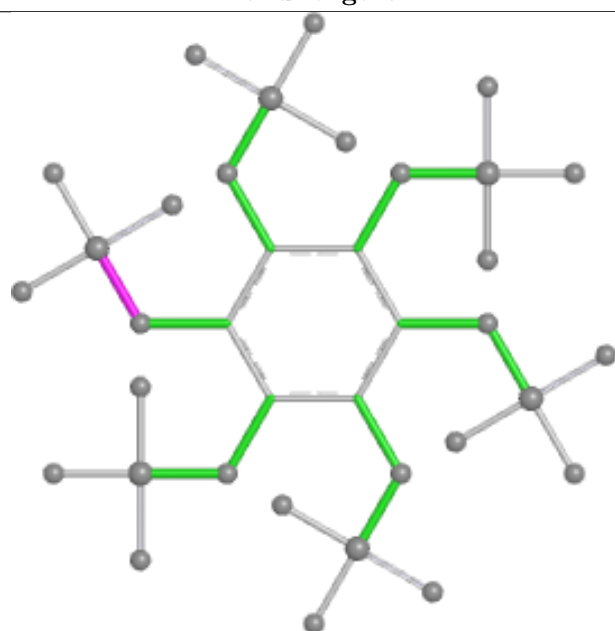
Ligand IHS D 501



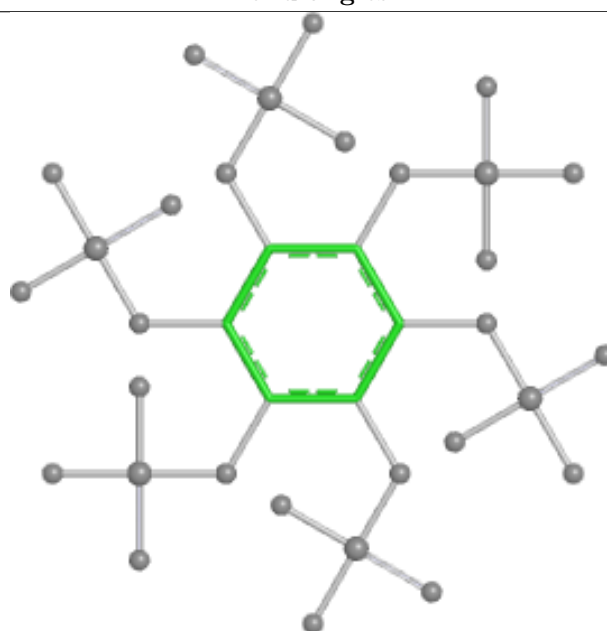
Bond lengths



Bond angles

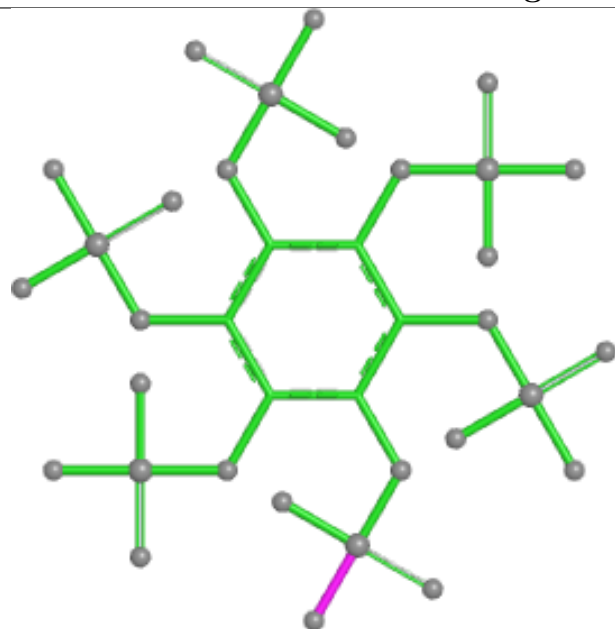


Torsions

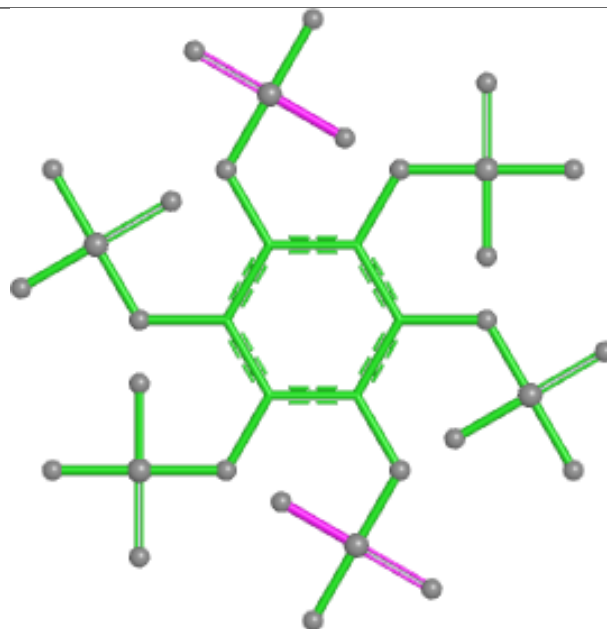


Rings

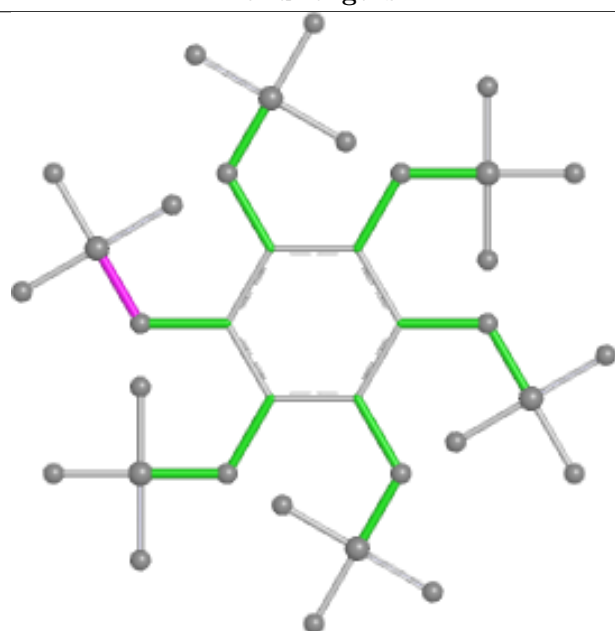
Ligand IHS E 501



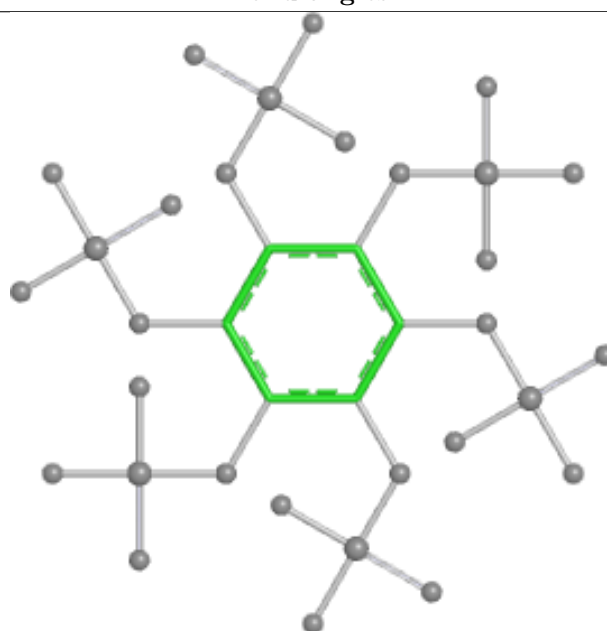
Bond lengths



Bond angles

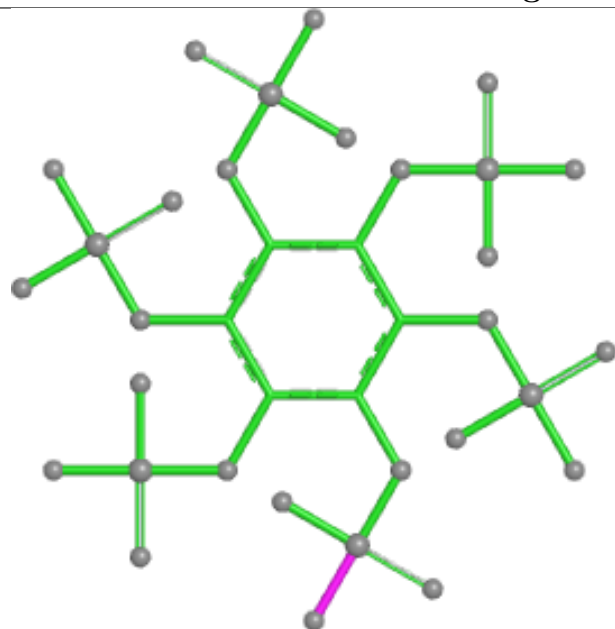


Torsions

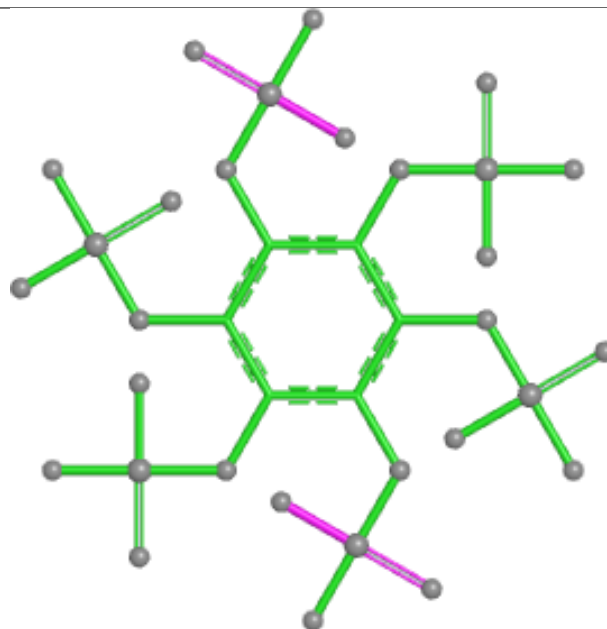


Rings

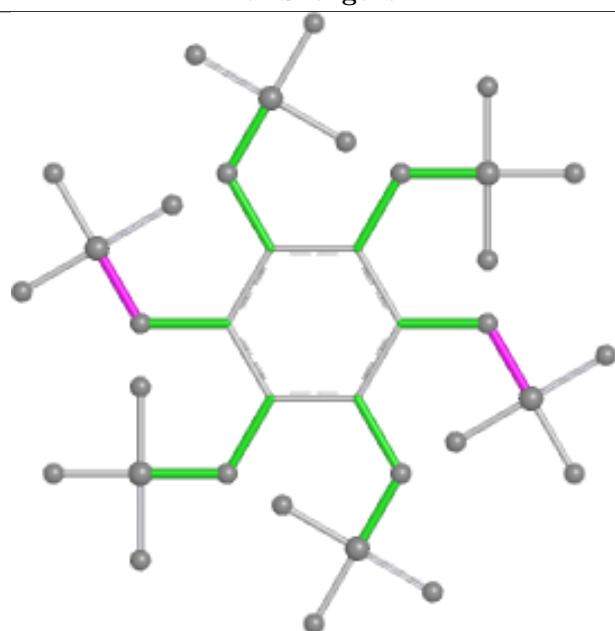
Ligand IHS B 501



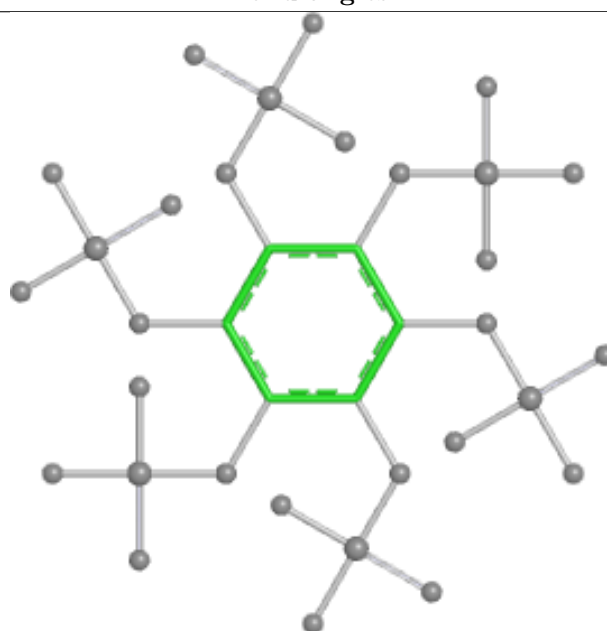
Bond lengths



Bond angles

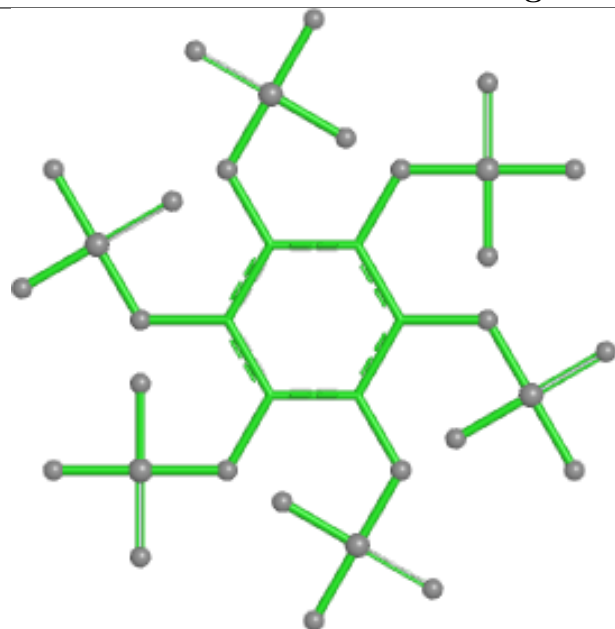


Torsions

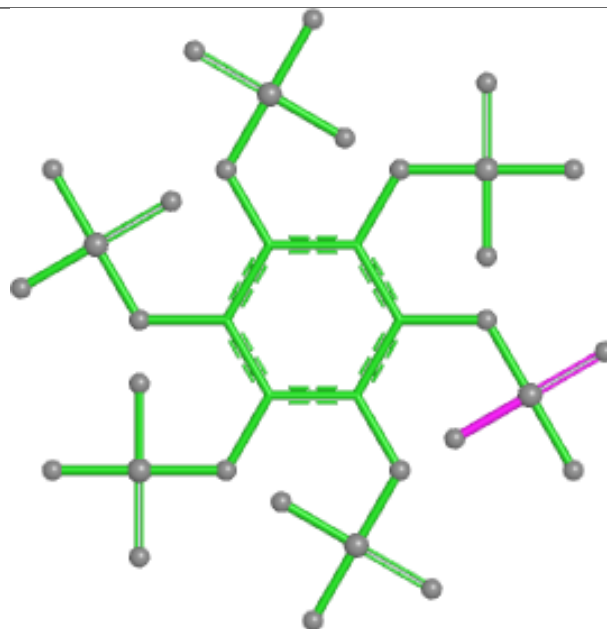


Rings

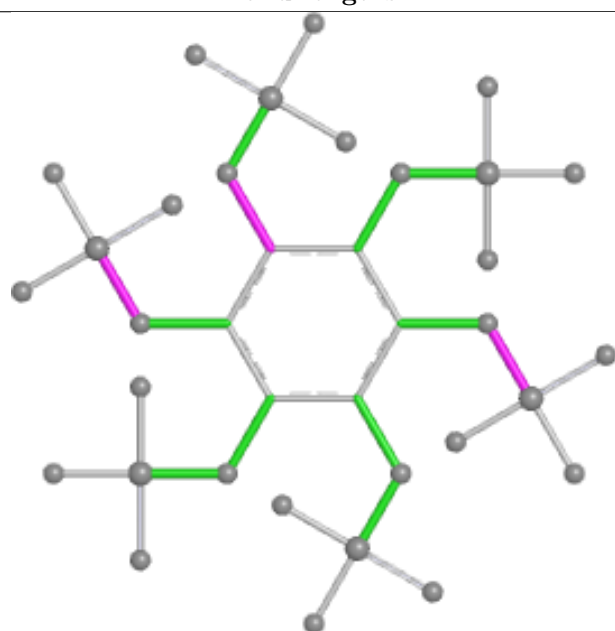
Ligand IHS F 501



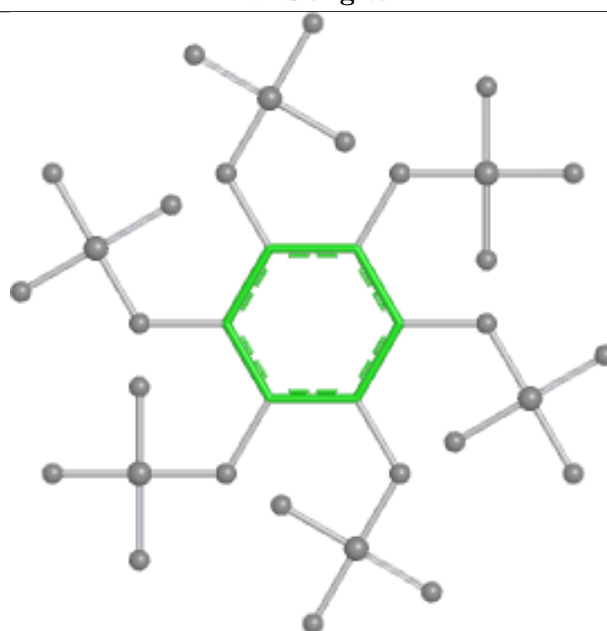
Bond lengths



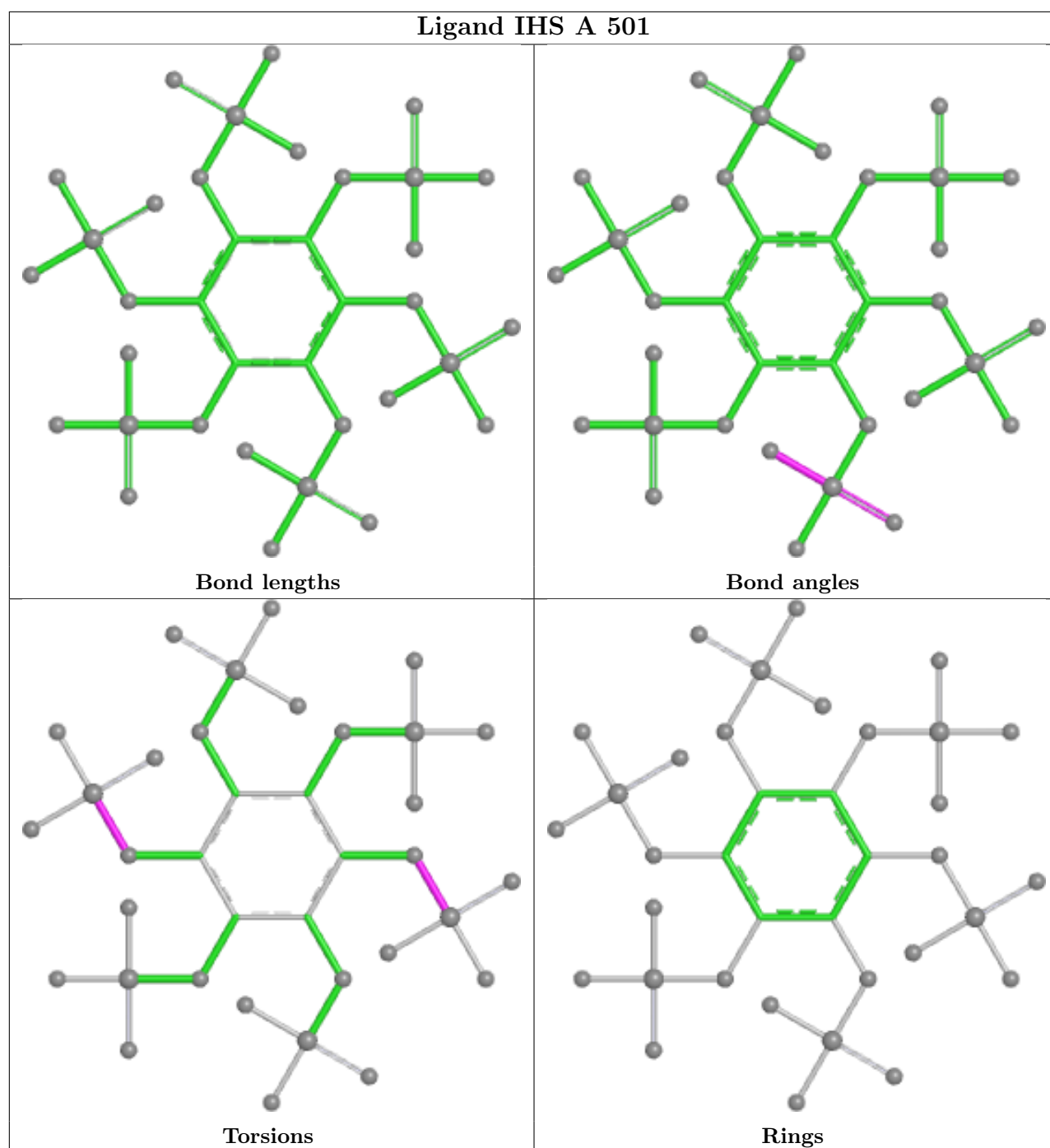
Bond angles



Torsions



Rings



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(Å²)	Q<0.9	
1	A	409/416 (98%)	-0.36	3 (0%)	84	89	23, 35, 57, 80	1 (0%)
1	B	407/416 (97%)	-0.38	3 (0%)	84	89	18, 34, 58, 75	1 (0%)
1	C	408/416 (98%)	-0.19	3 (0%)	84	89	24, 38, 58, 73	1 (0%)
1	D	413/416 (99%)	-0.33	2 (0%)	87	91	14, 36, 61, 79	2 (0%)
1	E	414/416 (99%)	-0.37	4 (0%)	79	86	22, 34, 58, 74	0
1	F	414/416 (99%)	-0.07	7 (1%)	69	78	24, 40, 62, 93	0
All	All	2465/2496 (98%)	-0.28	22 (0%)	81	86	14, 36, 59, 93	5 (0%)

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	433	ASP	4.3
1	F	432	HIS	4.0
1	F	430	MET	3.9
1	C	47	ASP	3.1
1	B	427	ASP	2.9
1	A	320	TYR	2.7
1	F	159	PHE	2.7
1	A	429	GLY	2.6
1	F	431	GLN	2.6
1	E	159	PHE	2.6
1	B	200	GLN	2.6
1	E	74	ASP	2.6
1	B	320	TYR	2.4
1	D	159	PHE	2.4
1	F	74	ASP	2.4
1	C	349	THR	2.3
1	A	296[A]	CYS	2.3
1	E	230	ASN	2.2
1	E	320	TYR	2.2

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Mol	Chain	Res	Type	RSRZ
1	F	296	CYS	2.2
1	C	320	TYR	2.1
1	D	234	GLU	2.0

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

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

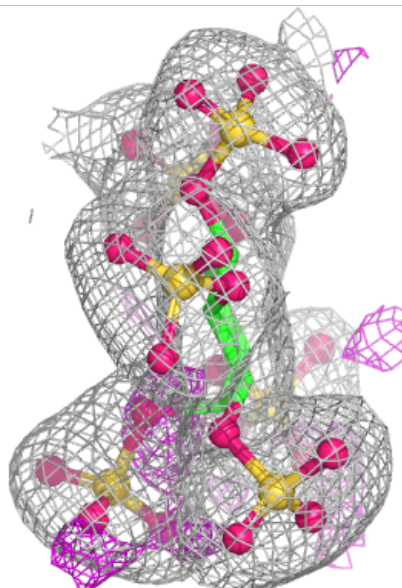
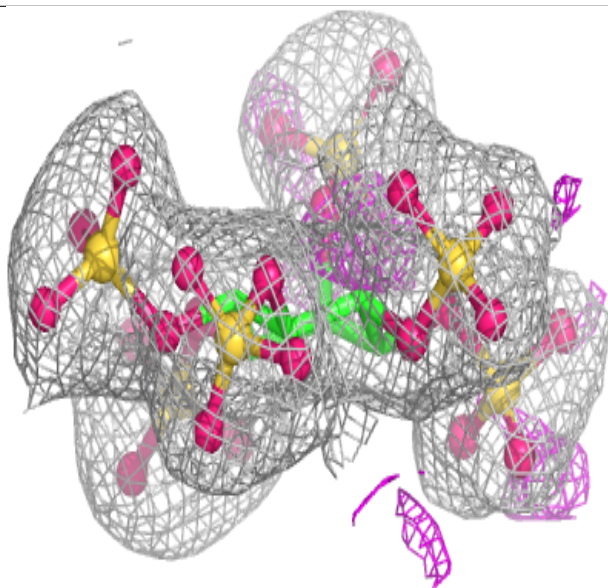
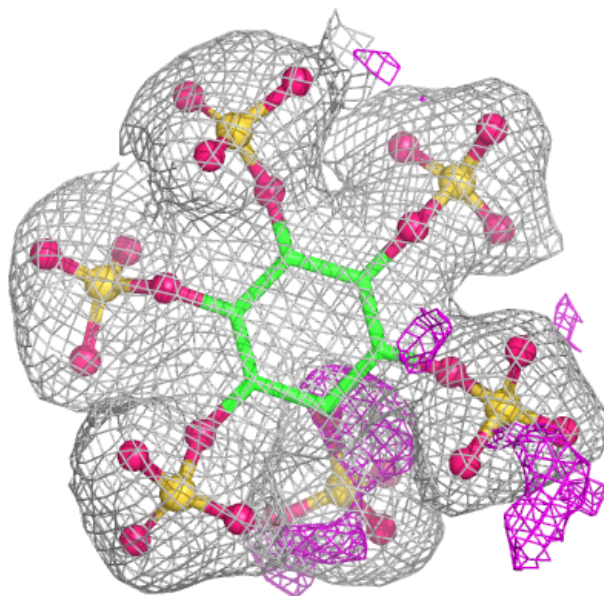
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	SO4	A	502	5/5	0.78	0.23	158,160,163,168	0
2	IHS	F	501	36/36	0.97	0.06	29,46,59,64	0
2	IHS	A	501	36/36	0.97	0.06	31,42,55,60	0
2	IHS	D	501	36/36	0.98	0.05	25,39,50,55	0
2	IHS	E	501	36/36	0.98	0.05	25,39,56,73	0
2	IHS	B	501	36/36	0.98	0.06	27,39,56,64	0
2	IHS	C	501	36/36	0.98	0.05	25,44,61,63	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.

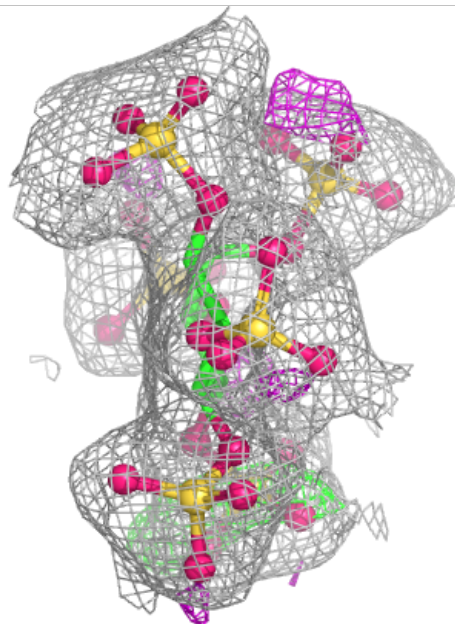
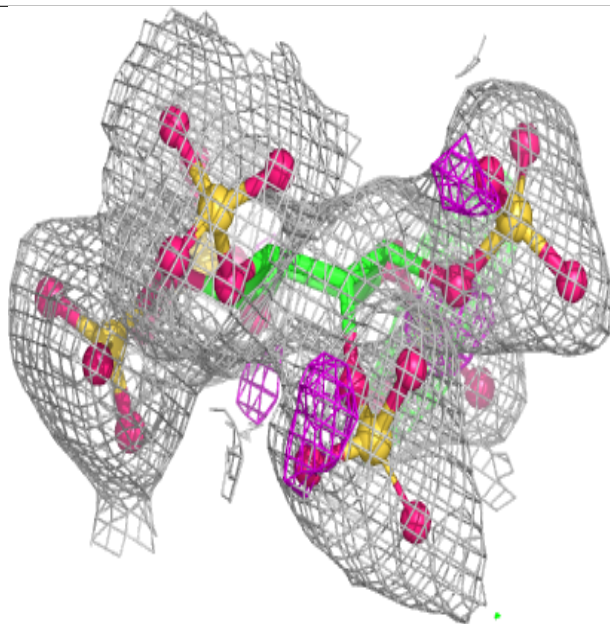
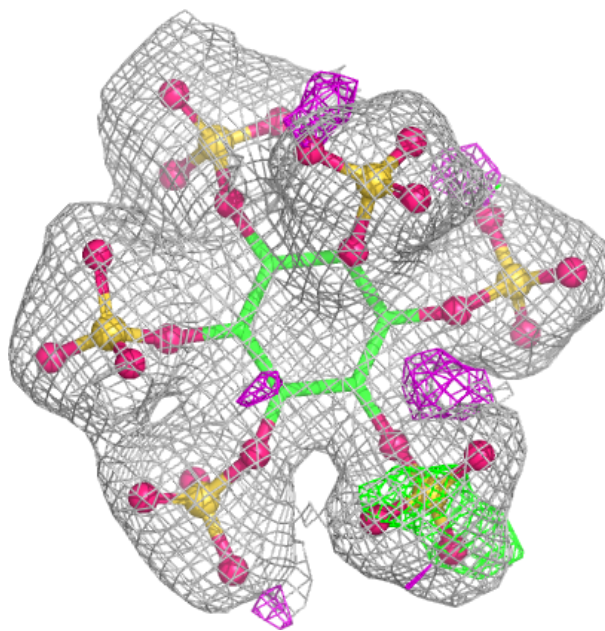
Electron density around IHS F 501:

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



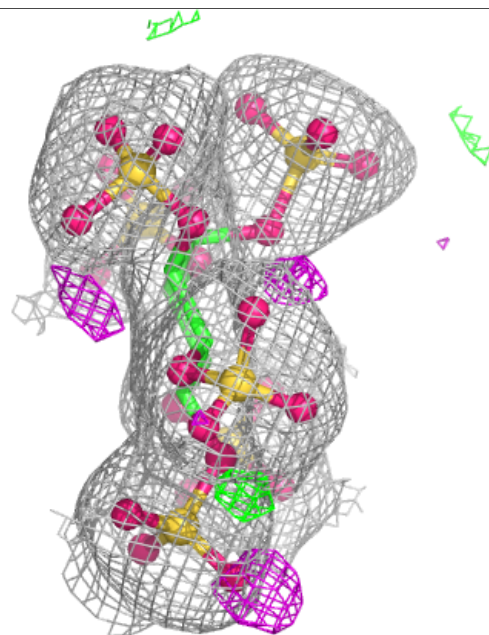
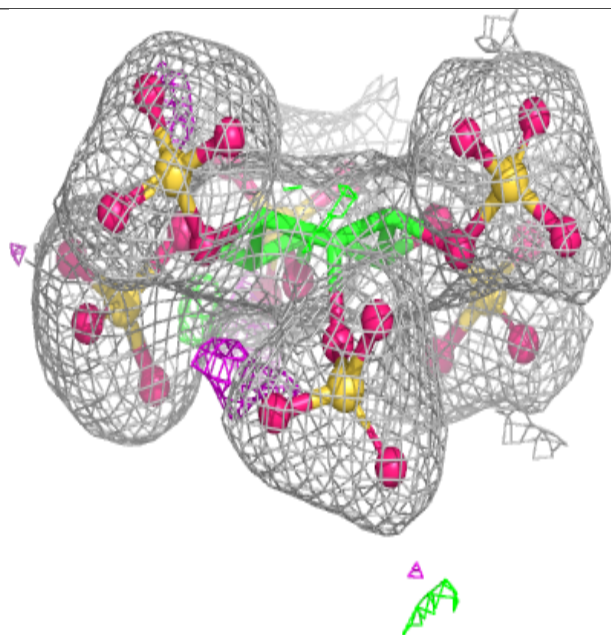
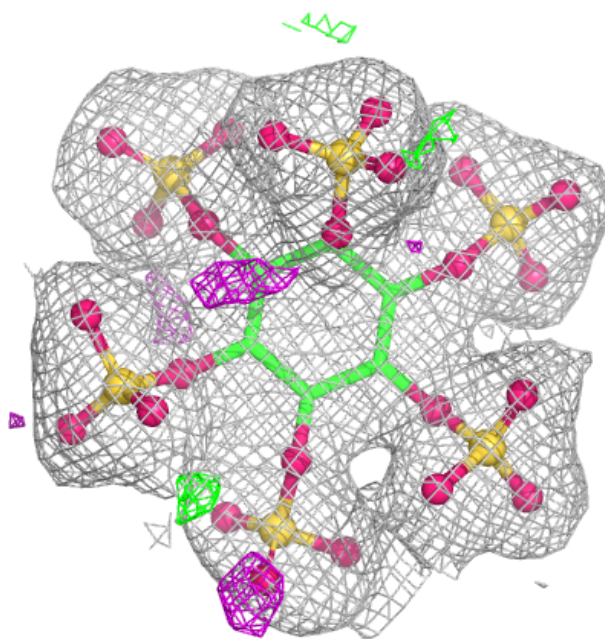
Electron density around IHS A 501:

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



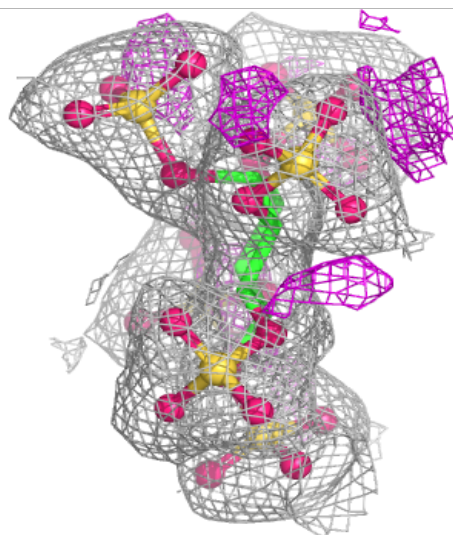
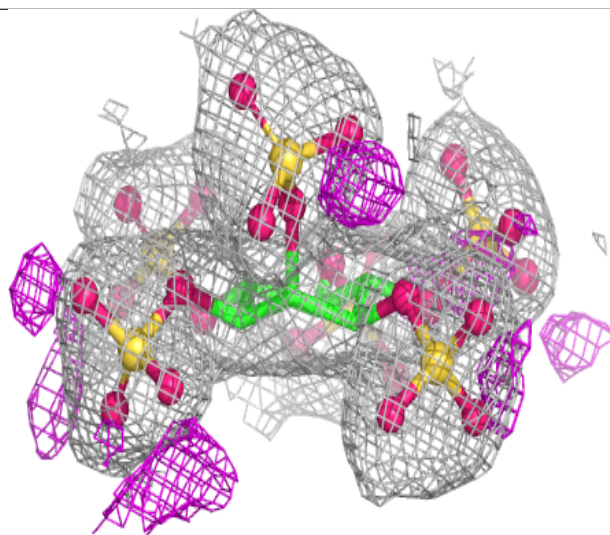
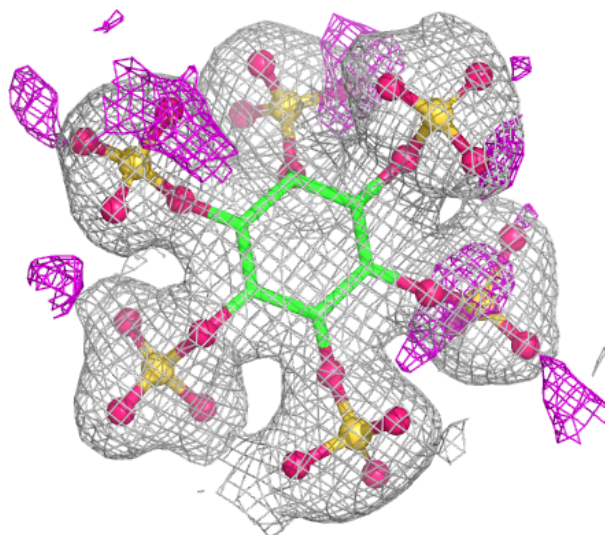
Electron density around IHS D 501:

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



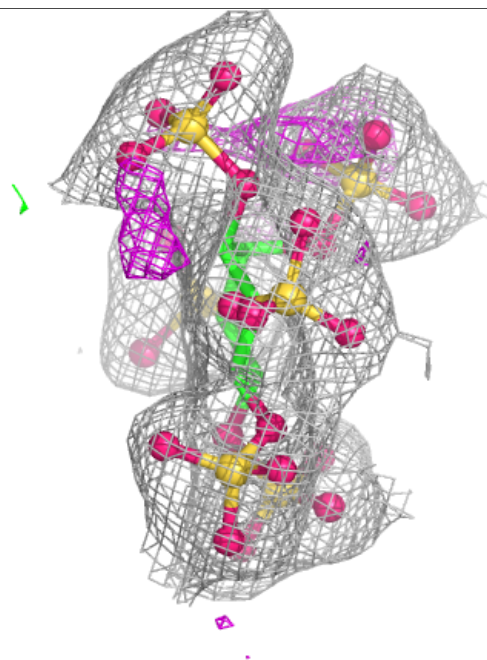
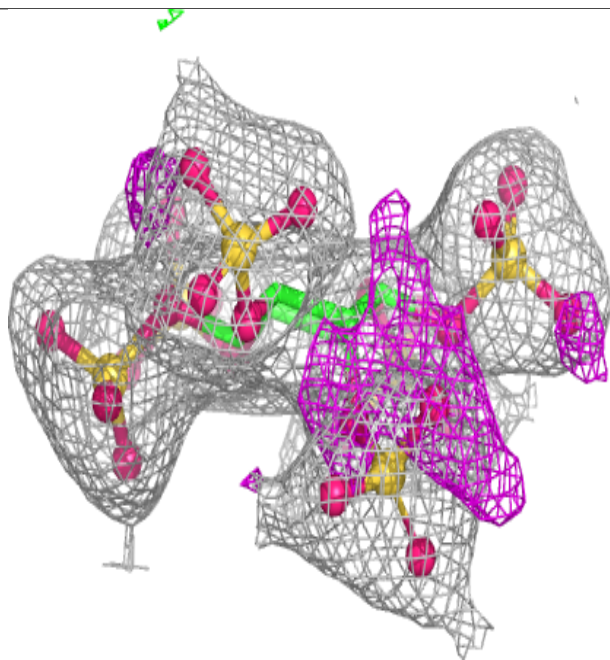
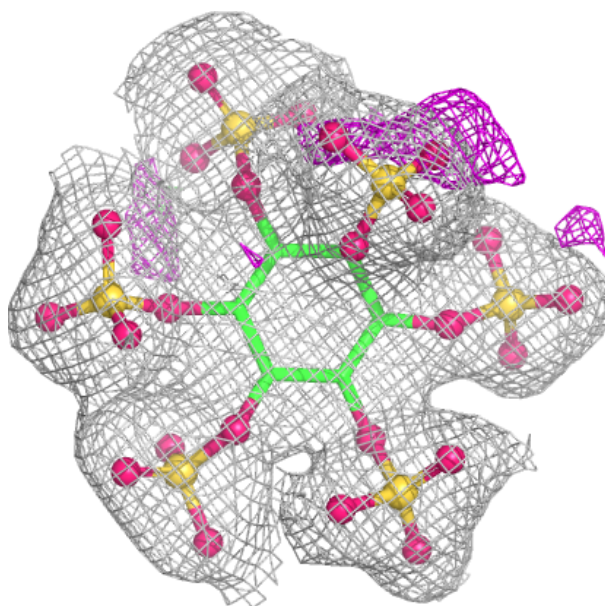
Electron density around IHS E 501:

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



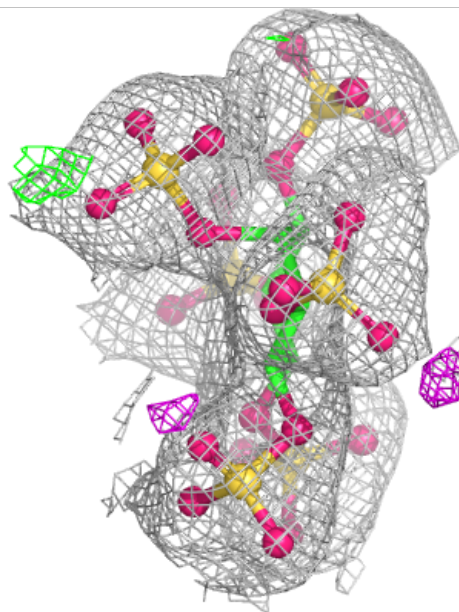
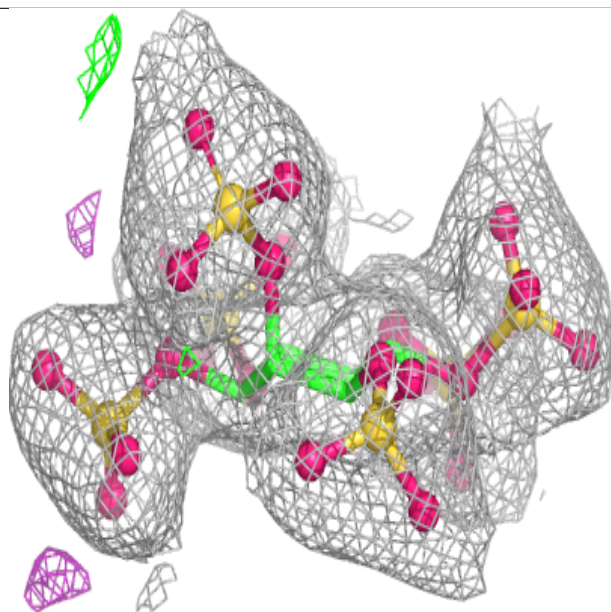
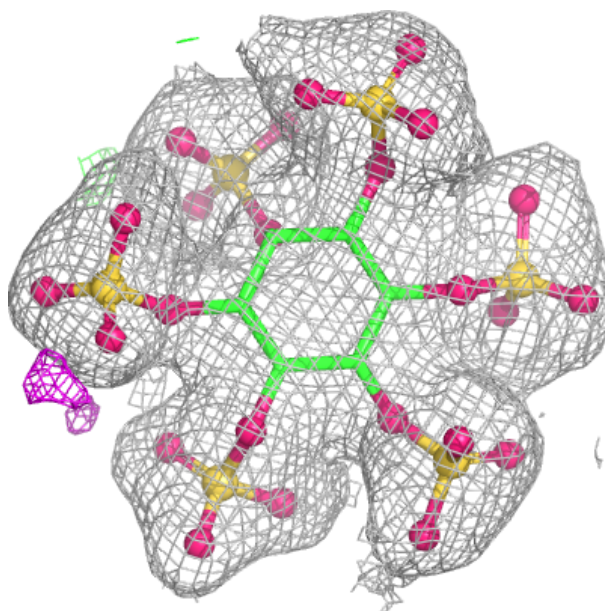
Electron density around IHS B 501:

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



Electron density around IHS C 501:

$2mF_o-DF_c$ (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.