



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 6, 2022 – 07:06 PM EDT

PDB ID : 5SKN
Title : Crystal Structure of human phosphodiesterase 10 in complex with N-[3-[3-[2-(2-fluorophenyl)pyrazol-3-yl]-4-oxopyridazin-1-yl]phenyl]acetamide
Authors : Joseph, C.; Benz, J.; Flohr, A.; Koerner, M.; Rudolph, M.G.
Deposited on : 2022-02-01
Resolution : 1.90 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 : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.31.2
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) : 2.31.2

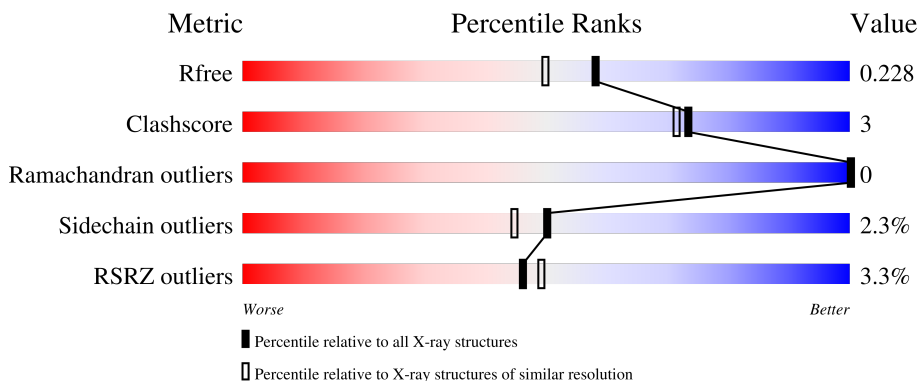
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.90 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	6207 (1.90-1.90)
Clashscore	141614	6847 (1.90-1.90)
Ramachandran outliers	138981	6760 (1.90-1.90)
Sidechain outliers	138945	6760 (1.90-1.90)
RSRZ outliers	127900	6082 (1.90-1.90)

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	343	
1	B	343	
1	C	343	
1	D	343	

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 11102 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 cAMP and cAMP-inhibited cGMP 3',5'-cyclic phosphodiesterase 10A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	313	2552	1631	435	462	24	0	2	0
1	B	315	2559	1635	437	463	24	0	1	0
1	C	313	2549	1629	435	461	24	0	1	0
1	D	310	2536	1623	433	456	24	0	3	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	447	GLY	-	expression tag	UNP Q9Y233
A	448	SER	-	expression tag	UNP Q9Y233
B	447	GLY	-	expression tag	UNP Q9Y233
B	448	SER	-	expression tag	UNP Q9Y233
C	447	GLY	-	expression tag	UNP Q9Y233
C	448	SER	-	expression tag	UNP Q9Y233
D	447	GLY	-	expression tag	UNP Q9Y233
D	448	SER	-	expression tag	UNP Q9Y233

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total 1	Zn 1	0	0
2	B	1	Total 1	Zn 1	0	0
2	C	1	Total 1	Zn 1	0	0
2	D	1	Total 1	Zn 1	0	0

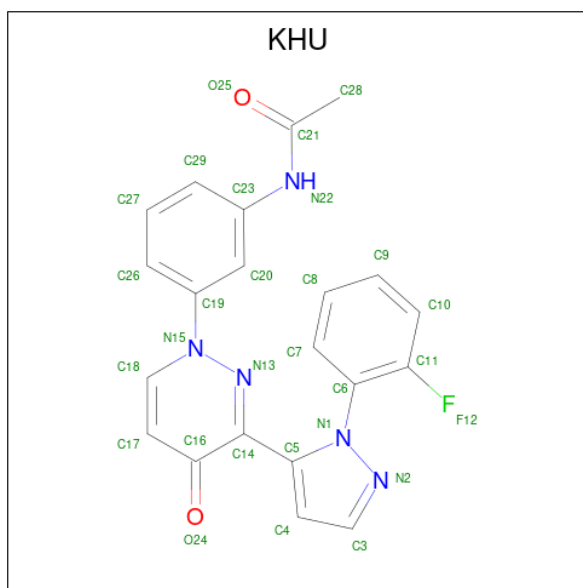
- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total Mg 1 1	0	0
3	B	1	Total Mg 1 1	0	0
3	C	1	Total Mg 1 1	0	0
3	D	1	Total Mg 1 1	0	0

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total Cl 1 1	0	0
4	C	1	Total Cl 1 1	0	0

- Molecule 5 is N-(3-{3-[1-(2-fluorophenyl)-1H-pyrazol-5-yl]-4-oxopyridazin-1(4H)-yl}phenyl)acetamide (three-letter code: KHU) (formula: C₂₁H₁₆FN₅O₂) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C F N O 29 21 1 5 2	0	0
5	B	1	Total C F N O 58 42 2 10 4	0	1

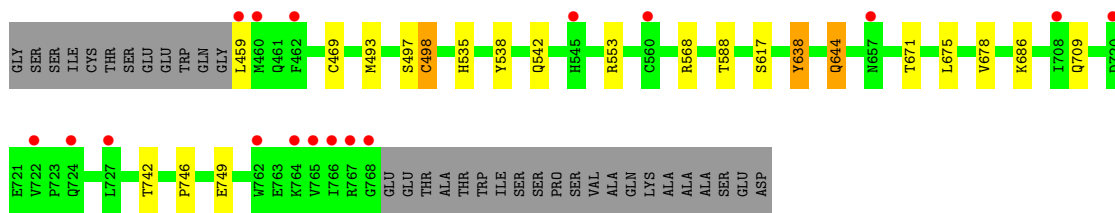
Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	C	1	Total	C	F	N	O	0	1
			58	42	2	10	4		
5	D	1	Total	C	F	N	O	0	0
			29	21	1	5	2		

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	186	Total	O	0	0
			186	186		
6	B	197	Total	O	0	0
			197	197		
6	C	208	Total	O	0	0
			208	208		
6	D	131	Total	O	0	0
			131	131		



4 Data and refinement statistics i

Property	Value	Source
Space group	H 3	Depositor
Cell constants a, b, c, α , β , γ	135.48Å 135.48Å 235.36Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	35.03 – 1.90 35.00 – 1.90	Depositor EDS
% Data completeness (in resolution range)	90.7 (35.03-1.90) 90.7 (35.00-1.90)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	0.82 (at 1.89Å)	Xtrriage
Refinement program	REFMAC 5.8.0258	Depositor
R, R_{free}	0.191 , 0.222 0.198 , 0.228	Depositor DCC
R_{free} test set	6223 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	27.1	Xtrriage
Anisotropy	0.069	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 46.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.025 for h,-h-k,-l	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	11102	wwPDB-VP
Average B, all atoms (Å ²)	37.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.39% 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: CL, CME, ZN, KHU, MG

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	0.64	0/2609	0.68	0/3529
1	B	0.64	0/2613	0.70	0/3535
1	C	0.64	0/2603	0.69	0/3521
1	D	0.67	0/2596	0.68	0/3512
All	All	0.65	0/10421	0.69	0/14097

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	2552	0	2529	15	0
1	B	2559	0	2528	16	0
1	C	2549	0	2524	17	0
1	D	2536	0	2524	13	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	1	0	0	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	A	1	0	0	0	0
4	C	1	0	0	0	0
5	A	29	0	0	1	0
5	B	58	0	0	2	0
5	C	58	0	0	3	0
5	D	29	0	0	1	0
6	A	186	0	0	2	0
6	B	197	0	0	2	0
6	C	208	0	0	4	0
6	D	131	0	0	4	0
All	All	11102	0	10105	66	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 3.

All (66) 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)
5:C:804[B]:KHU:C20	5:C:804[B]:KHU:C28	2.60	0.78
1:C:553:ARG:NH1	6:C:901:HOH:O	2.26	0.69
5:B:803[A]:KHU:C20	5:B:803[A]:KHU:C28	2.71	0.68
1:D:469:CYS:SG	6:D:1021:HOH:O	2.52	0.67
5:D:803:KHU:C20	5:D:803:KHU:C28	2.73	0.66
5:B:803[B]:KHU:C28	5:B:803[B]:KHU:C29	2.71	0.65
1:A:461:GLN:HE22	1:A:500:THR:HG21	1.63	0.64
1:A:461:GLN:HE22	1:A:500:THR:CG2	2.13	0.62
1:A:461:GLN:NE2	1:A:461:GLN:HA	2.17	0.59
1:B:470:LYS:HE2	1:D:746:PRO:HG3	1.84	0.59
1:B:767:ARG:NH2	1:B:769:GLU:OE1	2.37	0.57
5:C:804[A]:KHU:C20	5:C:804[A]:KHU:C28	2.81	0.57
1:A:461:GLN:NE2	1:A:500:THR:HG21	2.24	0.52
1:C:493:MET:O	1:C:497:SER:HB2	2.11	0.51
1:B:467:ARG:O	1:B:471:GLU:HB2	2.11	0.51
1:C:700:GLY:HA3	1:C:714:MET:O	2.11	0.50
1:B:727:LEU:HD23	1:B:759:LEU:HD11	1.94	0.49
1:C:542:GLN:NE2	1:C:542:GLN:HA	2.27	0.47
1:B:697:TRP:CH2	1:B:719:LYS:HE3	2.48	0.47
1:A:727:LEU:HD21	1:A:763:GLU:HG3	1.96	0.47

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:644:GLN:HE21	1:D:644:GLN:HA	1.79	0.47
1:B:724:GLN:NE2	6:B:901:HOH:O	2.32	0.46
1:A:466:VAL:HG13	1:A:470:LYS:HE3	1.97	0.46
1:C:638:TYR:CD1	1:C:671:THR:HG21	2.51	0.46
1:B:551:LEU:HD22	1:B:622:VAL:HB	1.98	0.45
1:B:642:ARG:NH2	6:B:910:HOH:O	2.49	0.45
1:B:697:TRP:CZ3	1:B:719:LYS:HE3	2.52	0.45
1:D:493:MET:SD	1:D:535:HIS:HA	2.56	0.45
1:A:576:GLN:NE2	6:A:911:HOH:O	2.49	0.45
1:C:469:CYS:SG	6:C:1079:HOH:O	2.17	0.45
1:D:588:THR:HG21	6:D:1031:HOH:O	2.15	0.45
1:B:492:TYR:CZ	1:B:496:ARG:HD2	2.52	0.45
1:D:497:SER:HA	1:D:542:GLN:NE2	2.32	0.45
1:B:510:ARG:HG2	1:B:608:HIS:CE1	2.52	0.44
1:D:686:LYS:NZ	6:D:908:HOH:O	2.49	0.44
1:A:466:VAL:CG1	1:A:470:LYS:HE3	2.48	0.44
1:A:749:GLU:N	1:A:750:PRO:CD	2.80	0.44
1:C:713:MET:SD	5:C:804[B]:KHU:C20	3.06	0.43
1:D:498:CYS:HB3	1:D:553:ARG:HB3	1.99	0.43
1:C:727:LEU:HD23	1:C:759:LEU:CD1	2.48	0.43
1:A:477:PHE:HB3	1:A:535:HIS:CE1	2.54	0.43
1:C:467:ARG:O	1:C:471:GLU:HB2	2.19	0.43
1:A:675:LEU:O	1:A:678:VAL:HG22	2.19	0.42
1:B:646:GLU:OE2	1:B:650:GLN:OE1	2.37	0.42
1:B:551:LEU:HD23	1:B:551:LEU:HA	1.90	0.42
1:C:477:PHE:HB3	1:C:535:HIS:CE1	2.54	0.42
1:D:675:LEU:O	1:D:678:VAL:HG22	2.20	0.42
1:A:756[A]:ARG:NH1	6:A:902:HOH:O	2.35	0.42
1:B:638:TYR:CD1	1:B:671:THR:HG21	2.55	0.42
1:C:553:ARG:HD3	6:C:1034:HOH:O	2.19	0.42
1:C:551:LEU:HD23	1:C:551:LEU:HA	1.95	0.42
1:C:496:ARG:NH1	6:C:921:HOH:O	2.53	0.42
1:C:492:TYR:CZ	1:C:496:ARG:HD2	2.55	0.41
1:A:461:GLN:NE2	1:A:461:GLN:CA	2.83	0.41
1:C:727:LEU:HD23	1:C:759:LEU:HD12	2.02	0.41
1:D:638:TYR:CD1	1:D:671:THR:HG21	2.55	0.41
1:B:722:VAL:HB	1:B:723:PRO:HD3	2.02	0.41
1:D:742:THR:HG23	1:D:749:GLU:HB2	2.02	0.41
1:C:735:ILE:HB	1:C:736:PRO:HD3	2.03	0.41
1:D:535:HIS:O	1:D:538:TYR:HB3	2.20	0.41
1:A:542:GLN:NE2	1:A:542:GLN:HA	2.36	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:471:GLU:HB3	1:C:477:PHE:CD1	2.55	0.41
1:D:568:ARG:NH1	6:D:916:HOH:O	2.54	0.41
1:A:722:VAL:HB	1:A:723:PRO:HD3	2.03	0.40
5:A:804:KHU:C20	5:A:804:KHU:C28	2.99	0.40
1:B:727:LEU:HD22	1:B:731:ASN:ND2	2.36	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	312/343 (91%)	305 (98%)	7 (2%)	0	100	100
1	B	313/343 (91%)	307 (98%)	6 (2%)	0	100	100
1	C	311/343 (91%)	303 (97%)	8 (3%)	0	100	100
1	D	310/343 (90%)	300 (97%)	10 (3%)	0	100	100
All	All	1246/1372 (91%)	1215 (98%)	31 (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	283/305 (93%)	278 (98%)	5 (2%)	59	55

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	282/305 (92%)	273 (97%)	9 (3%)	39	30
1	C	282/305 (92%)	276 (98%)	6 (2%)	53	48
1	D	282/305 (92%)	276 (98%)	6 (2%)	53	48
All	All	1129/1220 (92%)	1103 (98%)	26 (2%)	50	45

All (26) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	471	GLU
1	A	504	GLU
1	A	605	LEU
1	A	644	GLN
1	A	720	ASP
1	B	459	LEU
1	B	471	GLU
1	B	504	GLU
1	B	575	LEU
1	B	605	LEU
1	B	638	TYR
1	B	650	GLN
1	B	719	LYS
1	B	727	LEU
1	C	463	THR
1	C	471	GLU
1	C	504	GLU
1	C	517	LYS
1	C	575	LEU
1	C	605	LEU
1	D	459	LEU
1	D	498	CYS
1	D	617	SER
1	D	638	TYR
1	D	644	GLN
1	D	709	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	461	GLN
1	A	484	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	495	HIS
1	A	542	GLN
1	A	604	GLN
1	A	644	GLN
1	A	743	GLN
1	B	484	ASN
1	B	576	GLN
1	B	604	GLN
1	B	650	GLN
1	B	743	GLN
1	B	761	GLN
1	C	542	GLN
1	C	604	GLN
1	C	743	GLN
1	D	484	ASN
1	D	542	GLN
1	D	604	GLN
1	D	621	GLN
1	D	644	GLN
1	D	709	GLN
1	D	731	ASN
1	D	743	GLN
1	D	761	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

4 non-standard protein/DNA/RNA residues 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	$\# Z > 2$
1	CME	C	509	1	8,9,10	0.45	0	5,9,11	0.34	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
1	CME	B	509	1	8,9,10	0.43	0	5,9,11	0.29	0
1	CME	A	509	1	8,9,10	0.55	0	5,9,11	0.40	0
1	CME	D	509	1	8,9,10	0.51	0	5,9,11	0.43	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
1	CME	C	509	1	-	2/5/8/10	-
1	CME	B	509	1	-	1/5/8/10	-
1	CME	A	509	1	-	2/5/8/10	-
1	CME	D	509	1	-	3/5/8/10	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	B	509	CME	SD-CE-CZ-OH
1	C	509	CME	CE-SD-SG-CB
1	A	509	CME	CZ-CE-SD-SG
1	C	509	CME	CZ-CE-SD-SG
1	D	509	CME	CZ-CE-SD-SG
1	A	509	CME	SD-CE-CZ-OH
1	D	509	CME	CE-SD-SG-CB
1	D	509	CME	SD-CE-CZ-OH

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates

There are no monosaccharides in this entry.

5.6 Ligand geometry

Of 16 ligands modelled in this entry, 10 are monoatomic - leaving 6 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
5	KHU	B	803[B]	-	29,32,32	1.19	1 (3%)	33,45,45	2.40	8 (24%)
5	KHU	C	804[B]	-	29,32,32	1.23	1 (3%)	33,45,45	2.17	9 (27%)
5	KHU	B	803[A]	-	29,32,32	1.20	1 (3%)	33,45,45	2.30	8 (24%)
5	KHU	A	804	-	29,32,32	1.11	1 (3%)	33,45,45	2.36	12 (36%)
5	KHU	C	804[A]	-	29,32,32	1.25	2 (6%)	33,45,45	2.31	10 (30%)
5	KHU	D	803	-	29,32,32	1.14	1 (3%)	33,45,45	2.05	7 (21%)

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
5	KHU	B	803[B]	-	-	5/12/16/16	0/4/4/4
5	KHU	C	804[B]	-	-	5/12/16/16	0/4/4/4
5	KHU	B	803[A]	-	-	5/12/16/16	0/4/4/4
5	KHU	A	804	-	-	5/12/16/16	0/4/4/4
5	KHU	C	804[A]	-	-	5/12/16/16	0/4/4/4
5	KHU	D	803	-	-	5/12/16/16	0/4/4/4

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	C	804[B]	KHU	N15-N13	-5.35	1.28	1.38
5	B	803[A]	KHU	N15-N13	-5.23	1.28	1.38
5	B	803[B]	KHU	N15-N13	-5.19	1.28	1.38
5	C	804[A]	KHU	N15-N13	-5.09	1.29	1.38
5	D	803	KHU	N15-N13	-4.90	1.29	1.38

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	804	KHU	N15-N13	-4.62	1.29	1.38
5	C	804[A]	KHU	C5-C14	-2.15	1.47	1.49

All (54) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	803[B]	KHU	C3-N2-N1	7.79	109.37	103.70
5	B	803[A]	KHU	C3-N2-N1	7.59	109.22	103.70
5	C	804[B]	KHU	C3-N2-N1	6.92	108.74	103.70
5	C	804[A]	KHU	C3-N2-N1	6.59	108.50	103.70
5	A	804	KHU	C28-C21-N22	6.30	124.23	114.98
5	A	804	KHU	C3-N2-N1	5.58	107.76	103.70
5	D	803	KHU	C28-C21-N22	5.41	122.92	114.98
5	B	803[B]	KHU	C11-C6-N1	5.37	122.81	117.86
5	D	803	KHU	C3-N2-N1	5.06	107.38	103.70
5	B	803[B]	KHU	C28-C21-N22	5.05	122.39	114.98
5	B	803[A]	KHU	C28-C21-N22	5.01	122.33	114.98
5	A	804	KHU	C11-C6-N1	4.77	122.26	117.86
5	D	803	KHU	C11-C6-N1	4.72	122.20	117.86
5	C	804[A]	KHU	C11-C6-N1	4.68	122.17	117.86
5	C	804[B]	KHU	C18-C17-C16	-4.65	118.07	121.31
5	B	803[A]	KHU	C11-C6-N1	4.52	122.02	117.86
5	B	803[B]	KHU	C18-C17-C16	-4.39	118.25	121.31
5	C	804[A]	KHU	C28-C21-N22	4.19	121.13	114.98
5	A	804	KHU	O25-C21-N22	-4.18	117.55	123.04
5	A	804	KHU	C14-N13-N15	4.14	124.29	118.76
5	B	803[A]	KHU	C18-C17-C16	-4.10	118.45	121.31
5	C	804[B]	KHU	C28-C21-N22	4.04	120.92	114.98
5	C	804[A]	KHU	C14-N13-N15	3.91	123.99	118.76
5	D	803	KHU	C18-C17-C16	-3.86	118.61	121.31
5	D	803	KHU	O25-C21-N22	-3.77	118.08	123.04
5	A	804	KHU	C18-C17-C16	-3.66	118.76	121.31
5	B	803[B]	KHU	O25-C21-N22	-3.53	118.39	123.04
5	C	804[A]	KHU	C18-C17-C16	-3.52	118.85	121.31
5	C	804[B]	KHU	C11-C6-N1	3.44	121.03	117.86
5	B	803[B]	KHU	C14-N13-N15	3.28	123.15	118.76
5	C	804[A]	KHU	C17-C18-N15	3.26	121.12	117.70
5	B	803[A]	KHU	C14-N13-N15	3.24	123.09	118.76
5	C	804[B]	KHU	C19-N15-N13	3.22	117.67	113.80
5	C	804[B]	KHU	C17-C18-N15	3.18	121.03	117.70
5	D	803	KHU	C14-N13-N15	2.92	122.67	118.76
5	B	803[B]	KHU	C17-C18-N15	2.92	120.76	117.70

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	C	804[B]	KHU	C23-N22-C21	-2.90	122.72	127.99
5	C	804[B]	KHU	C14-N13-N15	2.82	122.53	118.76
5	C	804[A]	KHU	C20-C19-N15	2.81	123.92	119.22
5	C	804[A]	KHU	C17-C16-C14	-2.81	115.33	117.84
5	C	804[B]	KHU	O25-C21-N22	-2.80	119.36	123.04
5	C	804[A]	KHU	C19-N15-C18	2.77	122.62	118.50
5	B	803[A]	KHU	O25-C21-N22	-2.61	119.62	123.04
5	B	803[A]	KHU	C17-C18-N15	2.59	120.42	117.70
5	C	804[A]	KHU	O25-C21-N22	-2.59	119.63	123.04
5	A	804	KHU	C20-C19-N15	2.50	123.39	119.22
5	A	804	KHU	C17-C18-N15	2.48	120.30	117.70
5	D	803	KHU	C17-C18-N15	2.41	120.23	117.70
5	B	803[A]	KHU	O25-C21-C28	-2.15	118.06	122.06
5	B	803[B]	KHU	C23-N22-C21	-2.09	124.20	127.99
5	A	804	KHU	C19-C20-C23	2.09	121.50	118.75
5	A	804	KHU	O25-C21-C28	-2.07	118.22	122.06
5	A	804	KHU	C19-N15-C18	2.06	121.57	118.50
5	A	804	KHU	F12-C11-C6	-2.01	119.49	121.04

There are no chirality outliers.

All (30) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	804	KHU	C7-C6-N1-N2
5	B	803[A]	KHU	C7-C6-N1-N2
5	C	804[A]	KHU	C7-C6-N1-N2
5	C	804[B]	KHU	C7-C6-N1-N2
5	D	803	KHU	C7-C6-N1-N2
5	C	804[B]	KHU	C28-C21-N22-C23
5	B	803[A]	KHU	C28-C21-N22-C23
5	C	804[A]	KHU	C28-C21-N22-C23
5	D	803	KHU	C28-C21-N22-C23
5	A	804	KHU	C28-C21-N22-C23
5	A	804	KHU	O25-C21-N22-C23
5	B	803[A]	KHU	O25-C21-N22-C23
5	B	803[B]	KHU	C28-C21-N22-C23
5	B	803[B]	KHU	O25-C21-N22-C23
5	C	804[A]	KHU	O25-C21-N22-C23
5	C	804[B]	KHU	O25-C21-N22-C23
5	D	803	KHU	O25-C21-N22-C23
5	A	804	KHU	C20-C19-N15-N13
5	C	804[A]	KHU	C20-C19-N15-N13

Continued on next page...

Continued from previous page...

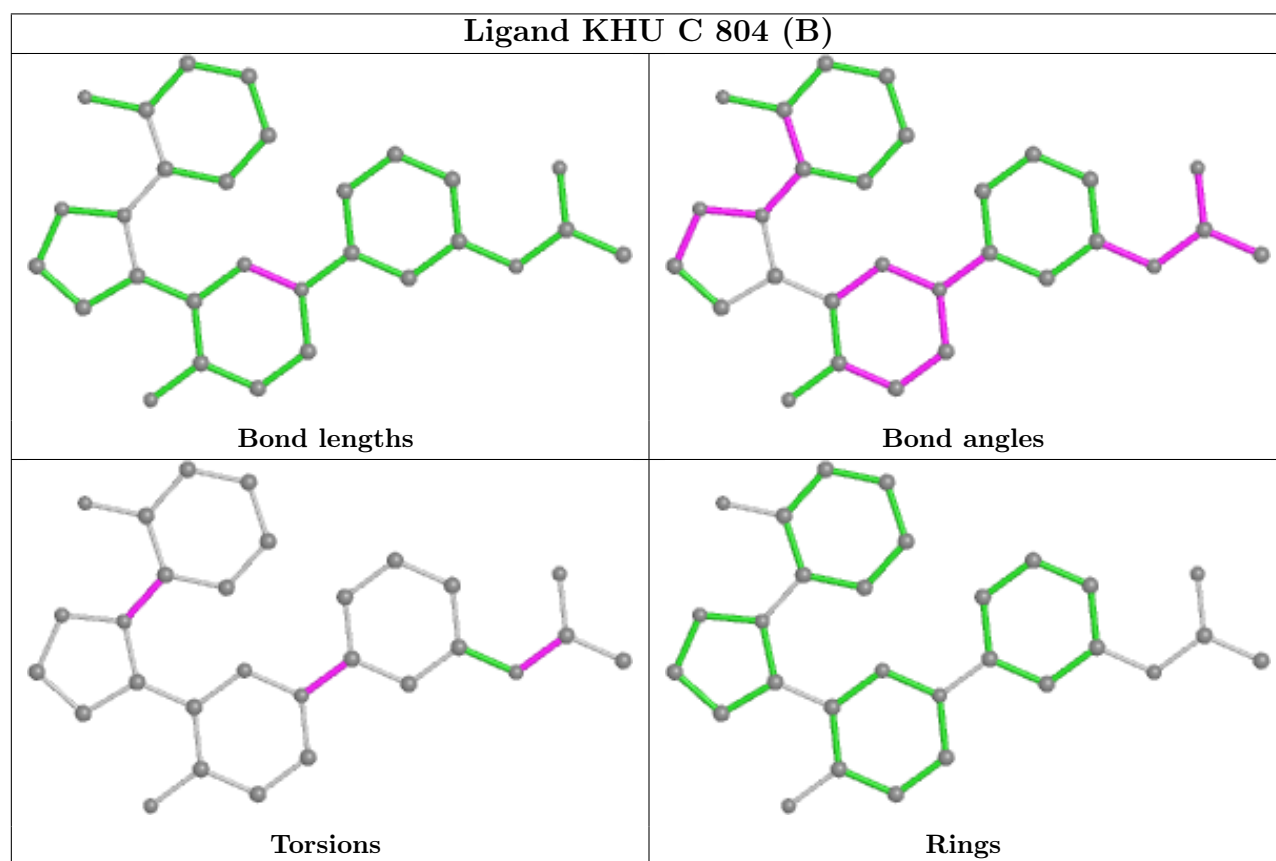
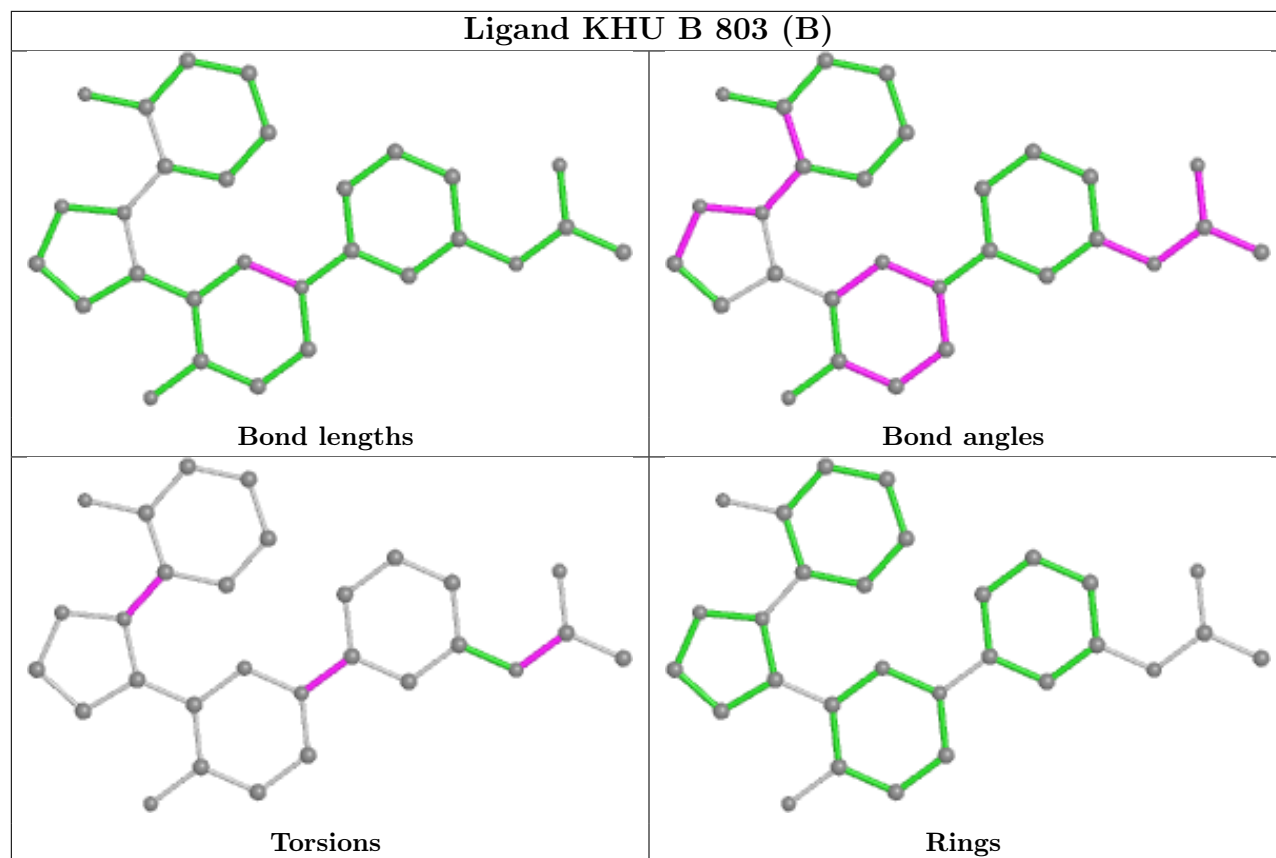
Mol	Chain	Res	Type	Atoms
5	C	804[B]	KHU	C20-C19-N15-C18
5	C	804[B]	KHU	C26-C19-N15-C18
5	A	804	KHU	C26-C19-N15-N13
5	B	803[A]	KHU	C20-C19-N15-N13
5	B	803[A]	KHU	C26-C19-N15-N13
5	B	803[B]	KHU	C20-C19-N15-N13
5	B	803[B]	KHU	C26-C19-N15-N13
5	C	804[A]	KHU	C26-C19-N15-N13
5	D	803	KHU	C20-C19-N15-N13
5	D	803	KHU	C26-C19-N15-N13
5	B	803[B]	KHU	C7-C6-N1-N2

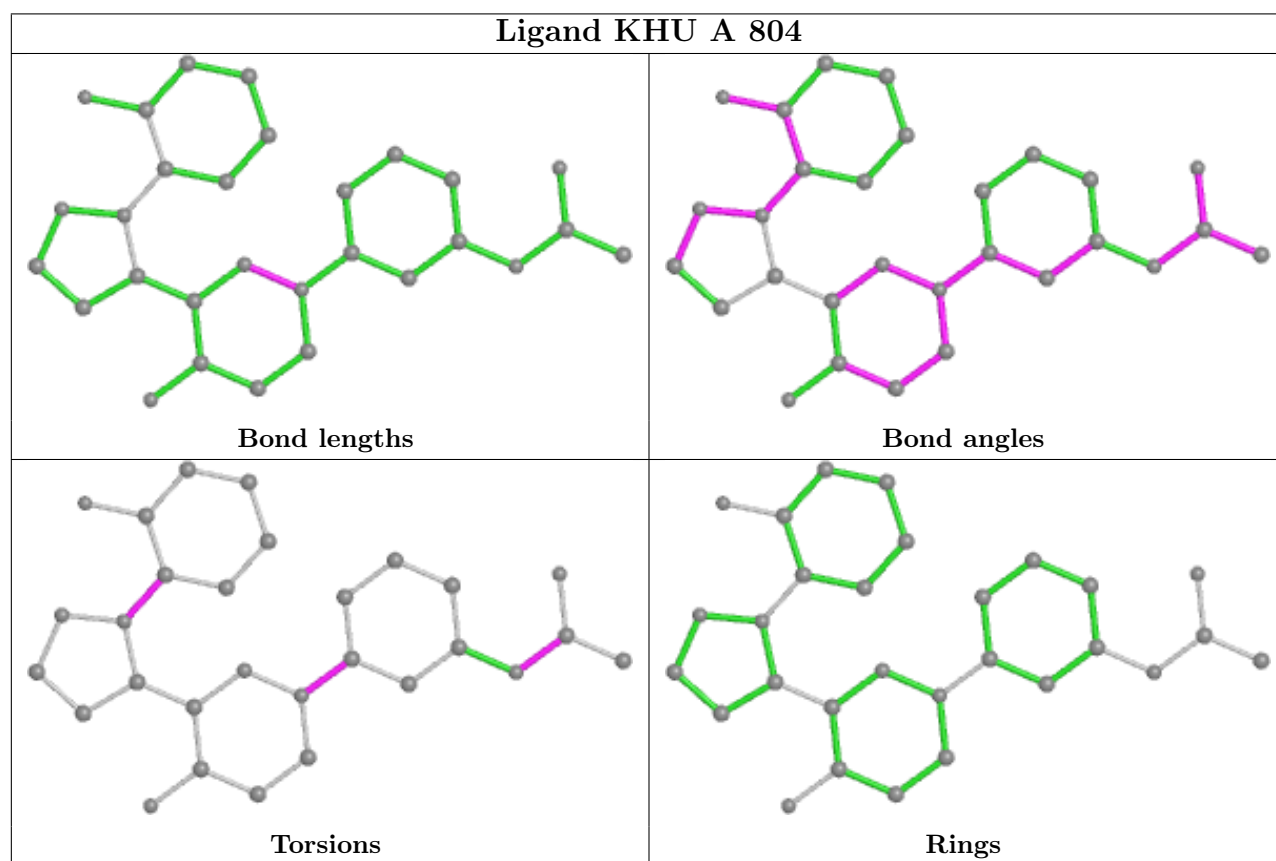
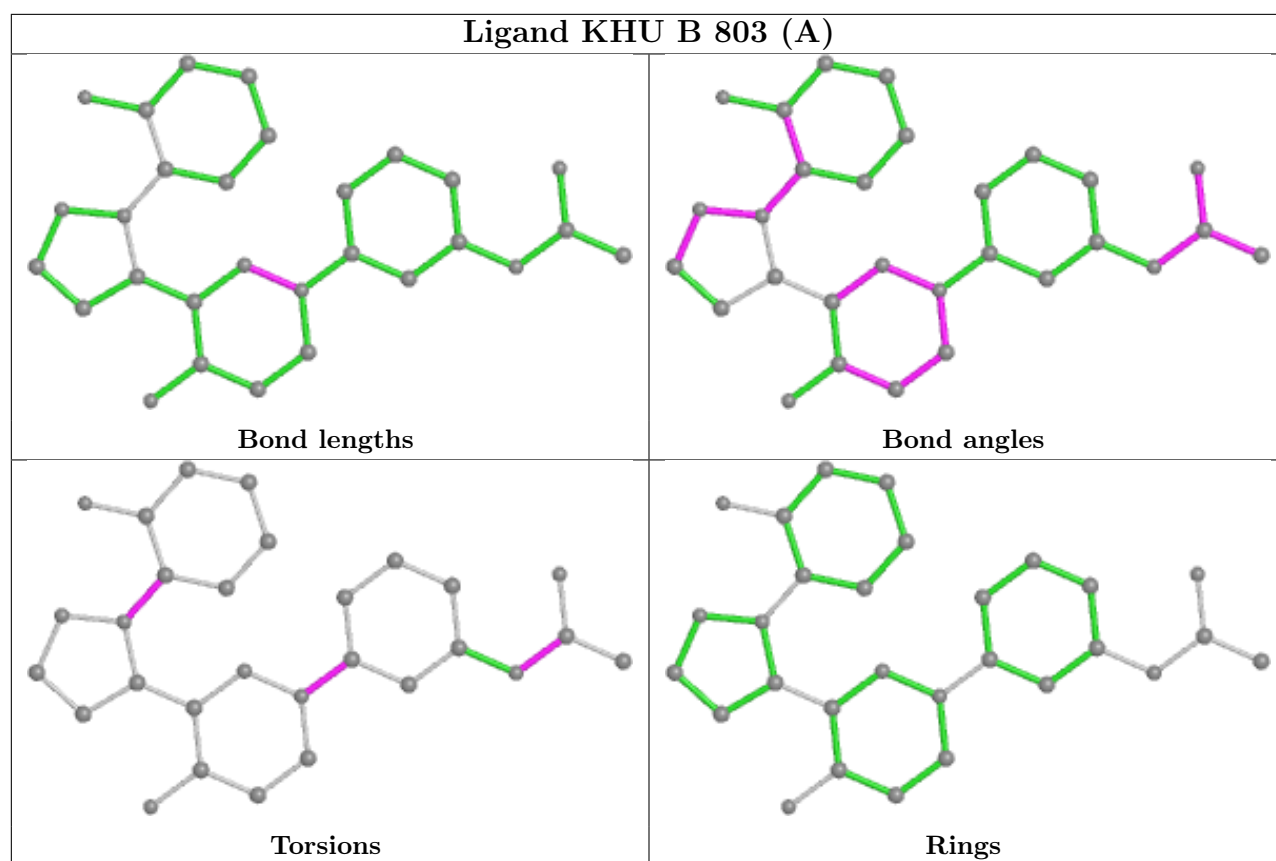
There are no ring outliers.

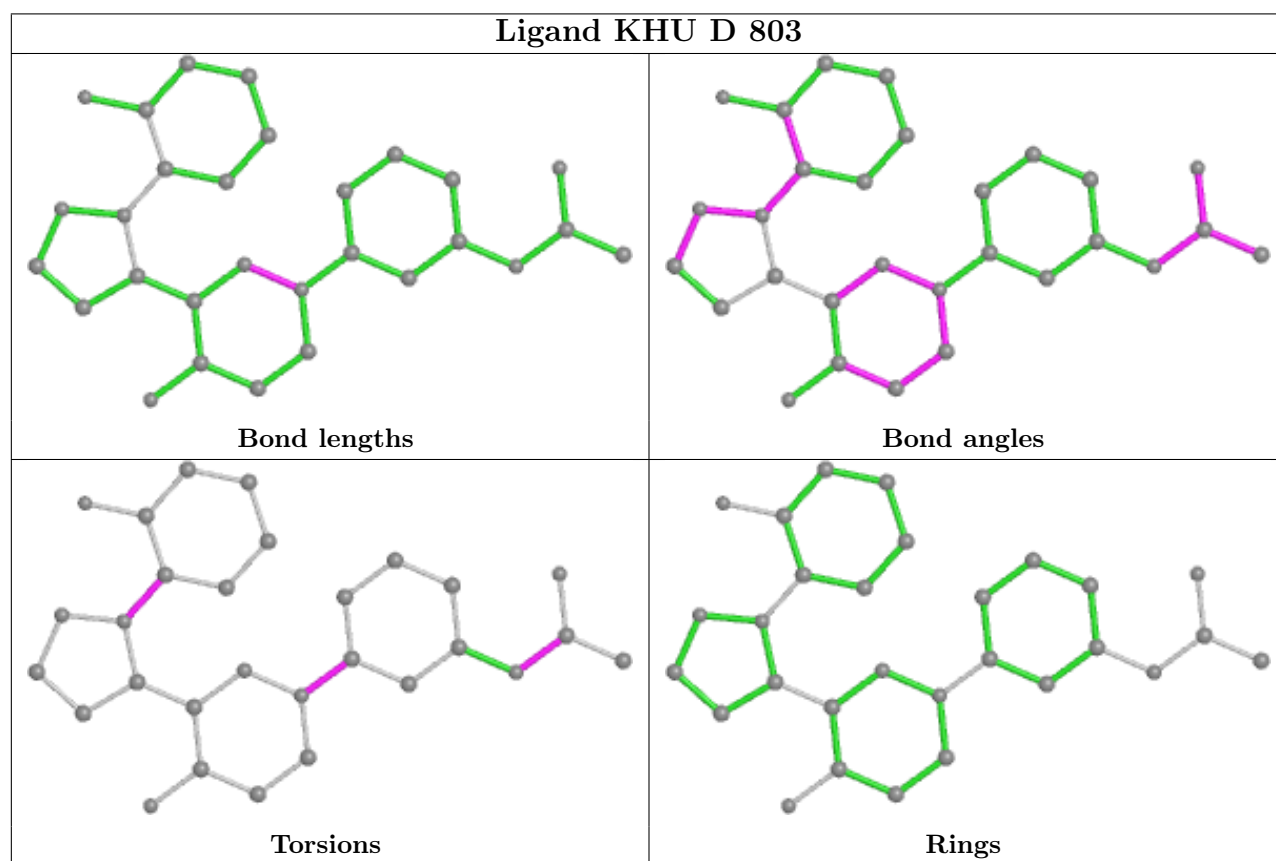
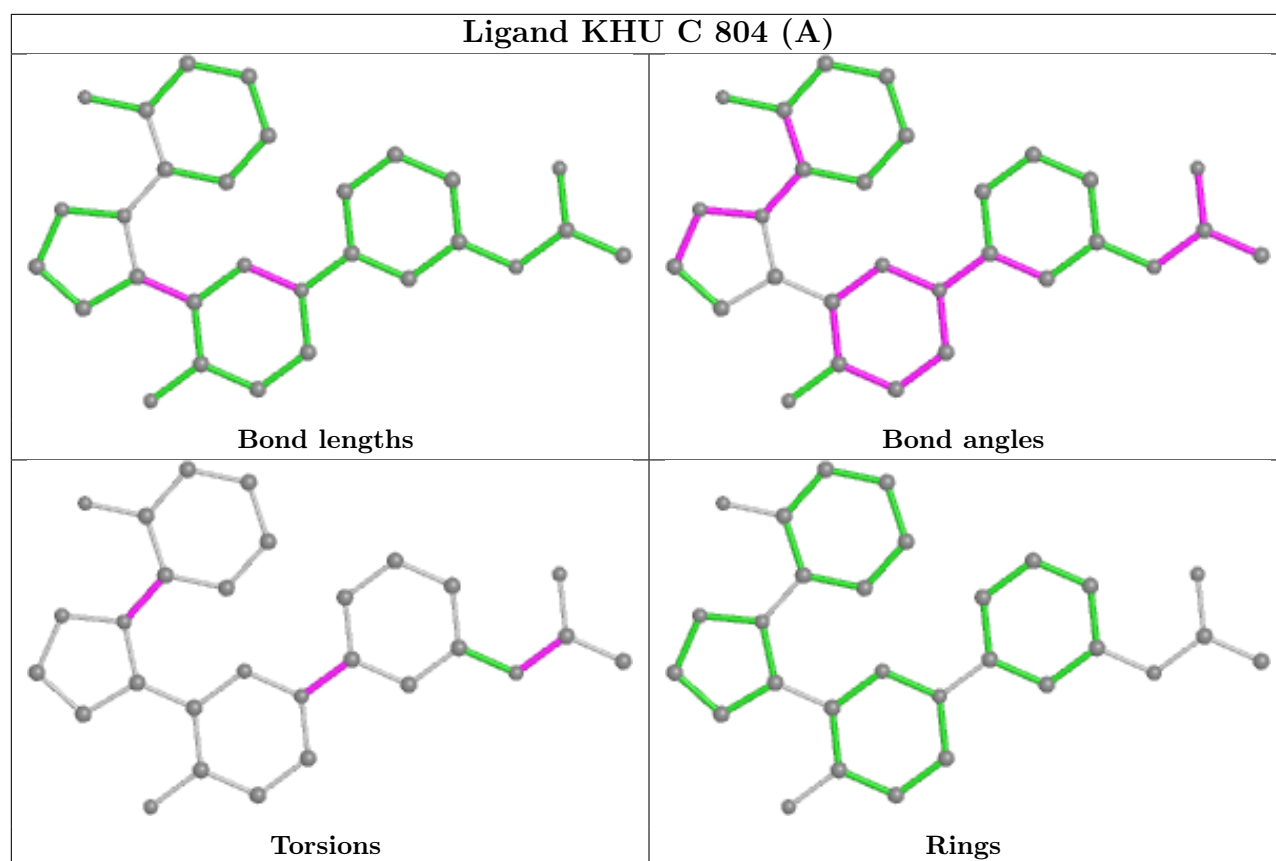
6 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	803[B]	KHU	1	0
5	C	804[B]	KHU	2	0
5	B	803[A]	KHU	1	0
5	A	804	KHU	1	0
5	C	804[A]	KHU	1	0
5	D	803	KHU	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 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	312/343 (90%)	0.03	6 (1%) 66 69	21, 32, 57, 86	0
1	B	314/343 (91%)	0.03	7 (2%) 62 64	19, 32, 58, 90	0
1	C	312/343 (90%)	0.10	11 (3%) 44 47	21, 33, 56, 88	0
1	D	309/343 (90%)	0.26	17 (5%) 25 28	28, 41, 63, 89	0
All	All	1247/1372 (90%)	0.10	41 (3%) 46 49	19, 35, 59, 90	0

All (41) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	771	THR	6.5
1	C	768	GLY	6.3
1	C	770	GLU	5.5
1	A	458	GLY	5.1
1	D	765	VAL	4.3
1	B	769	GLU	4.2
1	D	768	GLY	4.1
1	D	459	LEU	4.1
1	D	767	ARG	4.0
1	D	766	ILE	3.7
1	C	769	GLU	3.7
1	B	768	GLY	3.6
1	A	459	LEU	3.4
1	D	727	LEU	3.4
1	D	764	LYS	3.3
1	C	460	MET	3.3
1	D	720	ASP	3.2
1	B	770	GLU	2.9
1	C	765	VAL	2.8
1	A	650	GLN	2.8
1	C	766	ILE	2.7

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	C	767	ARG	2.7
1	B	720	ASP	2.5
1	A	506	GLU	2.5
1	A	770	GLU	2.5
1	D	657	ASN	2.4
1	D	722	VAL	2.4
1	D	724	GLN	2.4
1	D	545	HIS	2.4
1	D	708	ILE	2.4
1	D	762	TRP	2.4
1	D	560	CYS	2.3
1	C	459	LEU	2.2
1	D	462	PHE	2.2
1	C	545	HIS	2.1
1	C	533	VAL	2.1
1	C	720	ASP	2.1
1	A	462	PHE	2.1
1	B	767	ARG	2.0
1	D	460	MET	2.0
1	B	460	MET	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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
1	CME	C	509	10/11	0.90	0.13	36,43,64,66	0
1	CME	D	509	10/11	0.91	0.18	42,51,79,80	0
1	CME	B	509	10/11	0.92	0.16	37,46,75,77	0
1	CME	A	509	10/11	0.94	0.12	36,45,67,72	0

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands

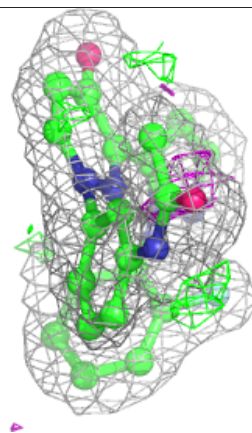
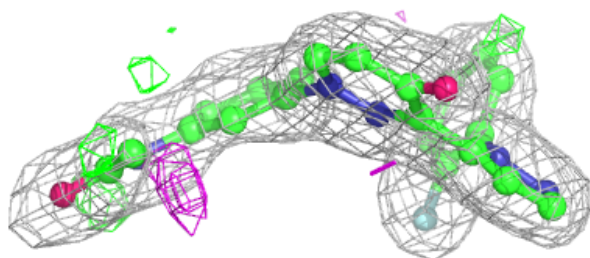
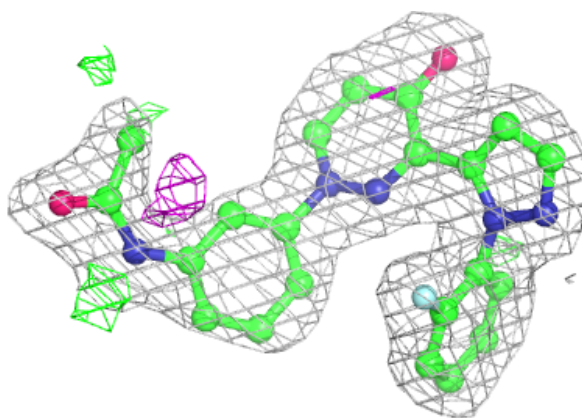
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	KHU	A	804	29/29	0.93	0.12	27,31,48,49	0
5	KHU	B	803[A]	29/29	0.93	0.15	29,33,39,41	29
5	KHU	B	803[B]	29/29	0.93	0.15	29,33,47,49	29
4	CL	C	803	1/1	0.94	0.10	52,52,52,52	0
5	KHU	C	804[A]	29/29	0.94	0.17	28,32,37,40	29
5	KHU	C	804[B]	29/29	0.94	0.17	26,28,33,35	29
5	KHU	D	803	29/29	0.94	0.10	33,39,58,65	0
4	CL	A	803	1/1	0.96	0.06	49,49,49,49	0
3	MG	C	802	1/1	0.98	0.14	24,24,24,24	0
3	MG	D	802	1/1	0.98	0.05	31,31,31,31	0
2	ZN	D	801	1/1	0.99	0.06	33,33,33,33	0
3	MG	A	802	1/1	0.99	0.09	20,20,20,20	0
2	ZN	B	801	1/1	1.00	0.07	24,24,24,24	0
3	MG	B	802	1/1	1.00	0.11	17,17,17,17	0
2	ZN	C	801	1/1	1.00	0.09	27,27,27,27	0
2	ZN	A	801	1/1	1.00	0.08	25,25,25,25	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.

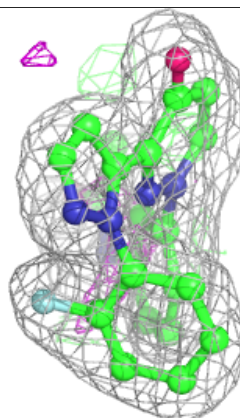
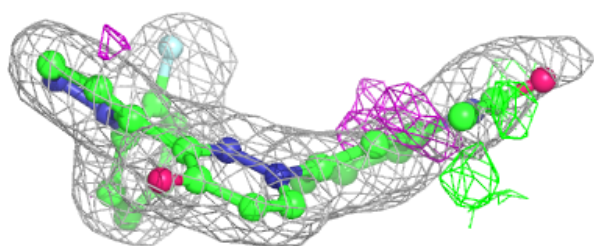
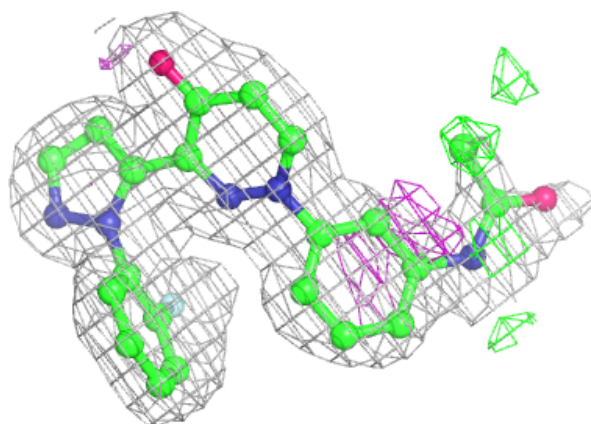
Electron density around KHU A 804:

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

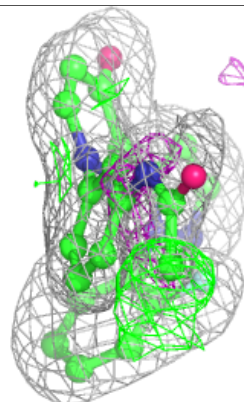
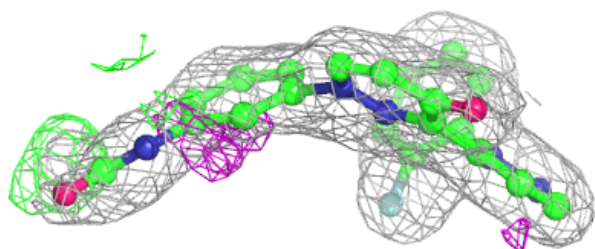
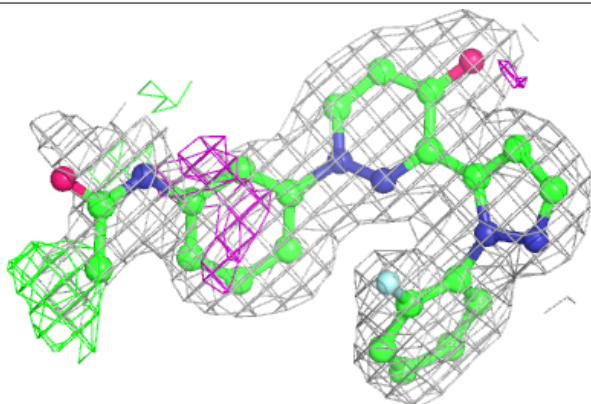


Electron density around KHU B 803 (A):

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

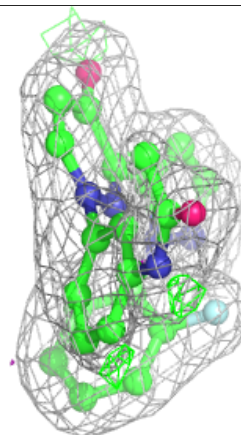
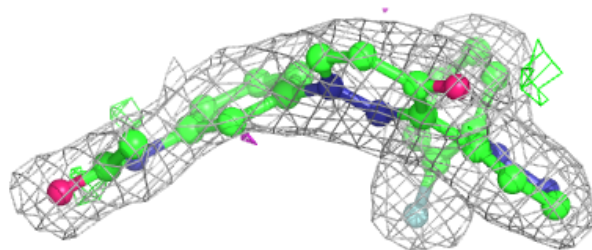
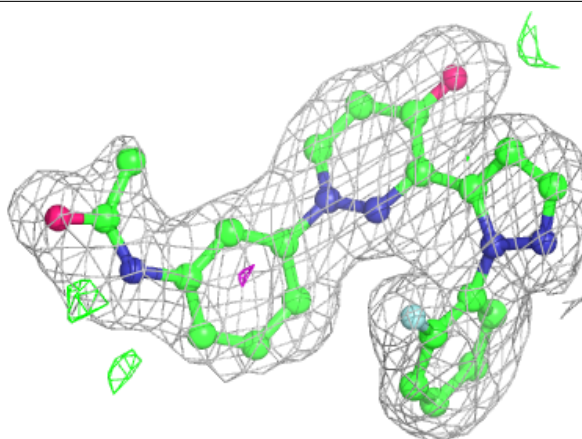
**Electron density around KHU B 803 (B):**

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



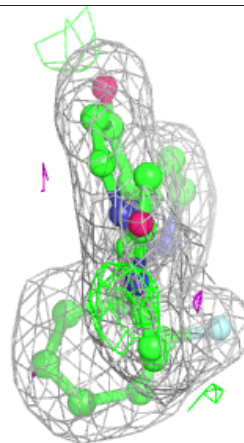
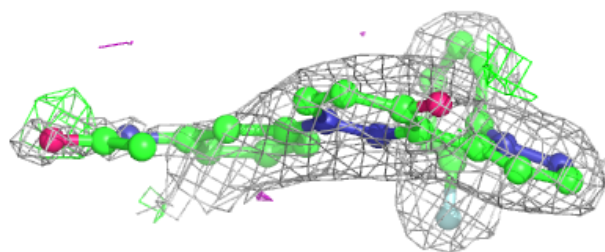
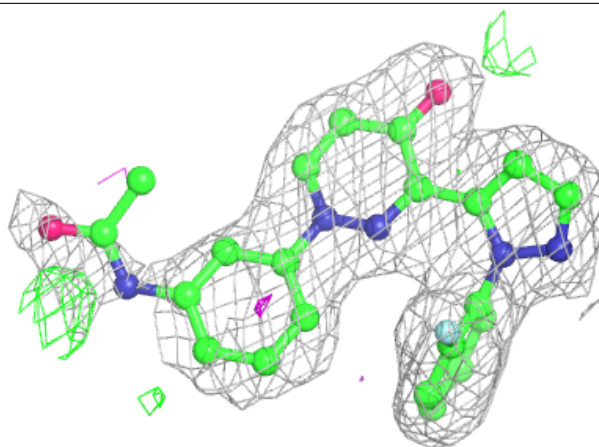
Electron density around KHU C 804 (A):

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

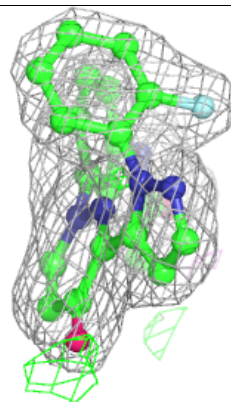
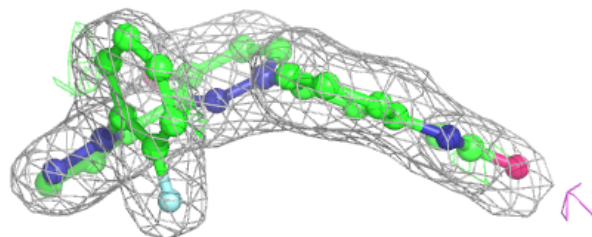
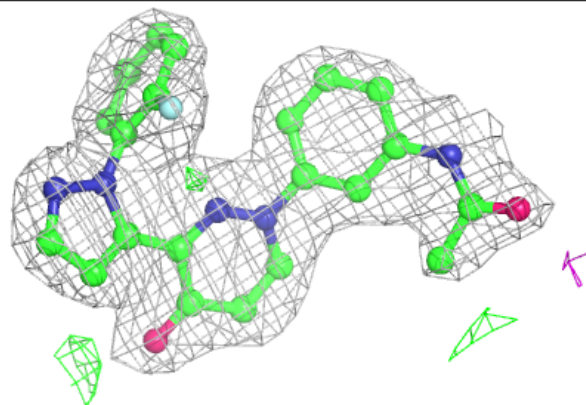


Electron density around KHU C 804 (B):

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

**Electron density around KHU D 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.