



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 22, 2026 – 01:25 AM UTC

PDB ID : 7AGN / pdb_00007agn
Title : Human carbonic anhydrase II in complex with 4-(2-aminoethylsulfanyl)-2,3,5,6-tetrafluoro-N-methyl-benzenesulfonamide
Authors : Paketuryte, V.; Smirnov, A.; Manakova, E.; Grazulis, S.
Deposited on : 2020-09-23
Resolution : 1.15 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

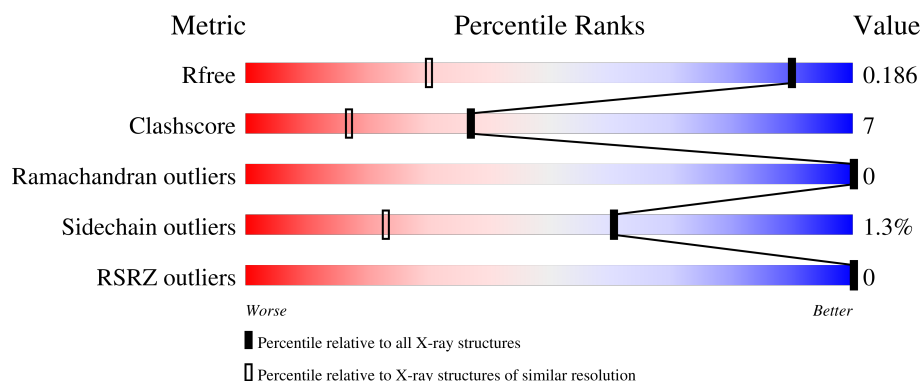
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

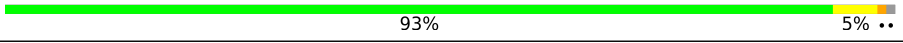
The reported resolution of this entry is 1.15 Å.

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	1380 (1.16-1.12)
Clashscore	190562	1393 (1.16-1.12)
Ramachandran outliers	187476	1369 (1.16-1.12)
Sidechain outliers	187428	1369 (1.16-1.12)
RSRZ outliers	180081	1379 (1.16-1.12)

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	260	
1	B	260	
1	C	260	
1	D	260	

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
5	BCN	A	304	-	-	X	-
5	BCN	B	305	-	-	X	-
5	BCN	C	303	-	-	X	-
5	BCN	D	304	-	-	X	-

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 10132 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.

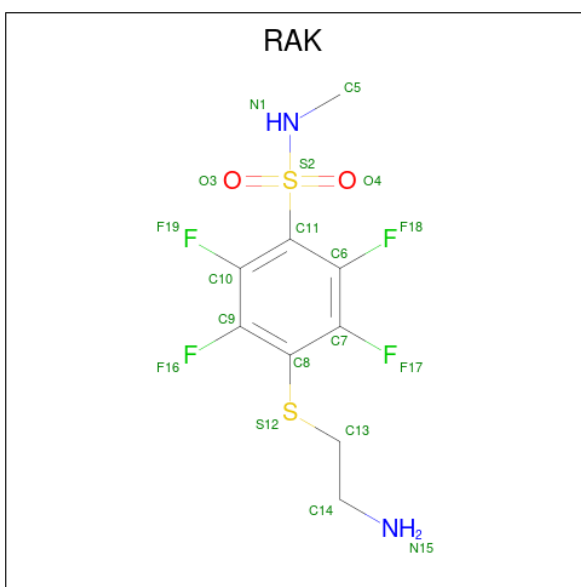
- Molecule 1 is a protein called carbonic anhydrase 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	258	Total	C	N	O	S	0	14	0
			2165	1385	372	406	2			
1	B	258	Total	C	N	O	S	0	12	0
			2142	1373	365	402	2			
1	C	258	Total	C	N	O	S	0	15	0
			2165	1385	371	407	2			
1	D	258	Total	C	N	O	S	0	19	0
			2196	1403	376	415	2			

- Molecule 2 is ZINC ION (CCD ID: ZN) (formula: Zn).

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

- Molecule 3 is 4-(2-azanylethylsulfanyl)-2,3,5,6-tetrakis(fluoranyl)- {N}-methyl-benzenesulfonamide (CCD ID: RAK) (formula: C₉H₁₀F₄N₂O₂S₂) (labeled as "Ligand of Interest" by depositor).

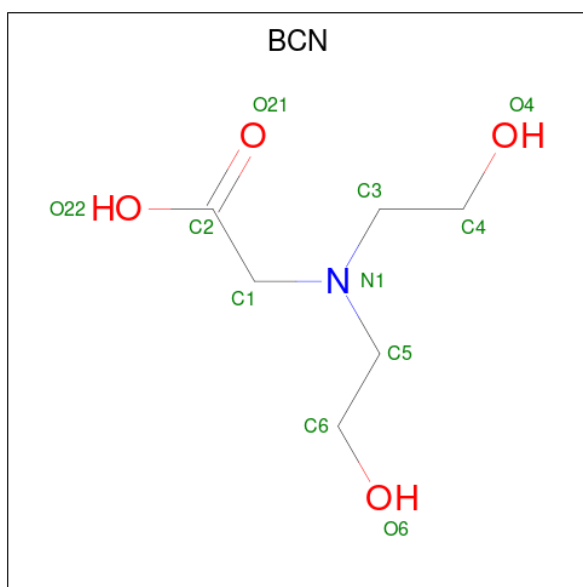


Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
3	A	1	Total	C	F	N	O	S	0	0
			19	9	4	2	2	2		
3	B	1	Total	C	F	N	O	S	0	0
			19	9	4	2	2	2		
3	C	1	Total	C	F	N	O	S	0	0
			19	9	4	2	2	2		
3	D	1	Total	C	F	N	O	S	0	0
			19	9	4	2	2	2		

- Molecule 4 is SODIUM ION (CCD ID: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	Na	0	0
			1	1		
4	B	2	Total	Na	0	0
			2	2		
4	D	1	Total	Na	0	0
			1	1		

- Molecule 5 is BICINE (CCD ID: BCN) (formula: C₆H₁₃NO₄).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	C	N	O	0	0
			11	6	1	4		
5	B	1	Total	C	N	O	0	0
			11	6	1	4		
5	C	1	Total	C	N	O	0	0
			11	6	1	4		
5	D	1	Total	C	N	O	0	0
			11	6	1	4		

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	344	Total	O	0	0
			344	344		
6	B	336	Total	O	0	0
			336	336		
6	C	331	Total	O	0	0
			331	331		
6	D	325	Total	O	0	0
			325	325		

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: carbonic anhydrase 2

Chain A:  88% 10% ..



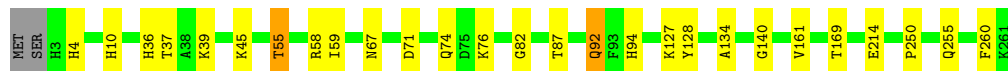
- Molecule 1: carbonic anhydrase 2

Chain B:  93% 5% ..



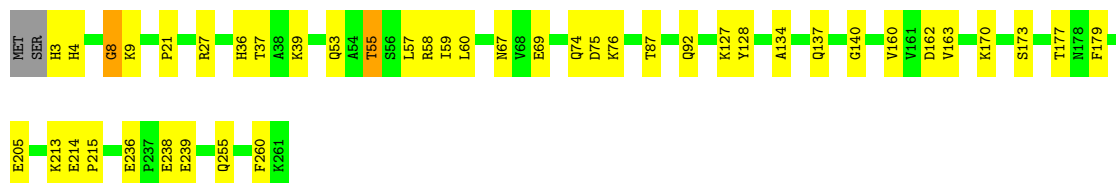
- Molecule 1: carbonic anhydrase 2

Chain C:  89% 10% ..



- Molecule 1: carbonic anhydrase 2

Chain D:  83% 16% ..



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	73.89Å 41.14Å 84.26Å 90.00° 109.51° 90.00°	Depositor
Resolution (Å)	69.65 – 1.15 69.65 – 1.15	Depositor EDS
% Data completeness (in resolution range)	87.9 (69.65-1.15) 88.5 (69.65-1.15)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.10	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.10 (at 1.15Å)	Xtriage
Refinement program	REFMAC 5.8.0189	Depositor
R, R_{free}	0.147 , 0.186 0.147 , 0.186	Depositor DCC
R_{free} test set	29196 reflections (8.71%)	wwPDB-VP
Wilson B-factor (Å ²)	10.5	Xtriage
Anisotropy	0.135	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 44.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.458 for -h,k,-l	Xtriage
F_o, F_c correlation	0.98	EDS
Total number of atoms	10132	wwPDB-VP
Average B, all atoms (Å ²)	16.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 96.52 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 4.9996e-10. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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: NA, ZN, RAK, BCN

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	1.28	8/2230 (0.4%)	1.18	3/3030 (0.1%)
1	B	1.24	3/2207 (0.1%)	1.16	2/2999 (0.1%)
1	C	1.20	2/2231 (0.1%)	1.20	7/3035 (0.2%)
1	D	1.20	4/2261 (0.2%)	1.17	9/3074 (0.3%)
All	All	1.23	17/8929 (0.2%)	1.18	21/12138 (0.2%)

All (17) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	161	VAL	CA-CB	8.10	1.64	1.54
1	D	236	GLU	C-N	7.34	1.42	1.33
1	C	161	VAL	CA-CB	7.16	1.63	1.54
1	A	56	SER	C-O	6.67	1.32	1.23
1	B	169	THR	CA-C	6.42	1.60	1.52
1	A	36	HIS	CE1-NE2	6.33	1.38	1.32
1	A	161	VAL	CA-CB	6.27	1.62	1.54
1	D	8	GLY	N-CA	6.00	1.52	1.45
1	B	69	GLU	CA-CB	-5.92	1.44	1.53
1	A	236	GLU	C-N	5.80	1.41	1.33
1	A	82	GLY	C-N	5.46	1.38	1.33
1	C	169	THR	CA-C	5.35	1.59	1.52
1	D	60	LEU	CA-C	-5.35	1.46	1.52
1	A	12	GLY	N-CA	5.31	1.51	1.44
1	D	177	THR	CA-CB	5.09	1.61	1.53
1	A	11	ASN	N-CA	5.04	1.50	1.46
1	A	36	HIS	CG-ND1	5.04	1.43	1.38

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	76	LYS	CA-C-N	8.01	133.92	121.99
1	C	76	LYS	C-N-CA	8.01	133.92	121.99
1	A	179	PHE	CA-CB-CG	-7.36	106.44	113.80
1	D	179	PHE	CA-CB-CG	-6.44	107.36	113.80
1	B	76	LYS	CA-C-N	6.29	132.35	122.17
1	B	76	LYS	C-N-CA	6.29	132.35	122.17
1	D	76	LYS	CA-C-N	5.97	130.37	122.42
1	D	76	LYS	C-N-CA	5.97	130.37	122.42
1	C	74	GLN	CA-C-N	-5.67	112.98	122.17
1	C	74	GLN	C-N-CA	-5.67	112.98	122.17
1	D	74	GLN	CA-C-N	-5.52	114.30	122.41
1	D	74	GLN	C-N-CA	-5.52	114.30	122.41
1	A	180	ASP	CA-C-O	5.51	123.99	119.36
1	C	260	PHE	CA-C-N	5.42	131.46	121.70
1	C	260	PHE	C-N-CA	5.42	131.46	121.70
1	C	76	LYS	O-C-N	5.30	125.48	120.71
1	D	55	THR	CB-CA-C	-5.12	103.29	111.17
1	D	21[A]	PRO	N-CA-C	5.11	120.54	113.65
1	D	21[B]	PRO	N-CA-C	5.11	120.54	113.65
1	D	76	LYS	O-C-N	5.02	126.25	120.58
1	A	59	ILE	CB-CA-C	5.01	118.29	110.83

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	2165	0	2065	28	1
1	B	2142	0	2044	21	0
1	C	2165	0	2052	28	0
1	D	2196	0	2085	48	1
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	19	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	19	0	0	0	0
3	C	19	0	0	0	0
3	D	19	0	0	0	0
4	A	1	0	0	0	0
4	B	2	0	0	0	0
4	D	1	0	0	0	0
5	A	11	0	12	6	0
5	B	11	0	12	9	0
5	C	11	0	12	10	0
5	D	11	0	12	13	0
6	A	344	0	0	9	1
6	B	336	0	0	7	2
6	C	331	0	0	15	2
6	D	325	0	0	19	0
All	All	10132	0	8294	122	5

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 7.

All (122) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:36[B]:HIS:CD2	6:D:408:HOH:O	1.99	1.15
1:C:10[B]:HIS:CD2	6:C:524:HOH:O	2.02	1.13
1:C:10[B]:HIS:CD2	6:C:425:HOH:O	2.10	1.03
1:D:8:GLY:HA3	6:D:406:HOH:O	1.60	1.02
1:A:58[A]:ARG:NH1	1:D:239:GLU:CG	2.28	0.97
1:C:214[B]:GLU:HA	5:C:303:BCN:H61	1.48	0.96
1:A:58[A]:ARG:NH1	1:D:239:GLU:HG2	1.81	0.95
1:D:214[B]:GLU:OE2	6:D:401:HOH:O	1.85	0.94
1:B:215:PRO:CG	5:B:305:BCN:H62	1.99	0.92
1:A:137:GLN:NE2	6:A:403:HOH:O	2.04	0.89
1:C:214[A]:GLU:HA	5:C:303:BCN:H61	1.53	0.88
1:C:36[B]:HIS:ND1	6:C:401:HOH:O	1.87	0.86
1:A:214[B]:GLU:OE2	6:A:401:HOH:O	1.94	0.85
1:D:36[B]:HIS:HD2	6:D:408:HOH:O	1.40	0.84
1:B:215:PRO:CD	5:B:305:BCN:H62	2.10	0.82
1:D:214[B]:GLU:HA	5:D:304:BCN:H41	1.61	0.81
1:B:238:GLU:OE1	6:B:401:HOH:O	1.99	0.81
1:A:58[A]:ARG:NH1	1:D:239:GLU:HG3	1.93	0.81
5:B:305:BCN:H52	6:B:457:HOH:O	1.80	0.80

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:87[A]:THR:HG21	6:B:506:HOH:O	1.81	0.80
1:D:8:GLY:CA	6:D:406:HOH:O	2.20	0.79
1:A:175[A]:ASP:OD1	6:A:402:HOH:O	1.99	0.78
1:C:214[B]:GLU:OE2	6:C:402:HOH:O	2.01	0.78
1:A:58[A]:ARG:HH11	1:D:239:GLU:CG	1.95	0.77
1:C:36[B]:HIS:HE1	6:C:624:HOH:O	1.68	0.77
1:B:215:PRO:HD2	5:B:305:BCN:H62	1.69	0.74
1:C:214[B]:GLU:CA	5:C:303:BCN:H61	2.16	0.74
1:B:214[B]:GLU:OE2	6:B:402:HOH:O	2.06	0.74
1:C:37:THR:O	6:C:403:HOH:O	2.07	0.73
1:A:58[A]:ARG:HH12	1:D:239:GLU:HG2	1.50	0.73
1:D:214[A]:GLU:HA	5:D:304:BCN:H41	1.69	0.73
1:A:55:THR:HG22	6:A:627:HOH:O	1.87	0.73
1:A:228:LYS:NZ	6:A:405:HOH:O	2.23	0.72
5:A:304:BCN:H51	6:A:452:HOH:O	1.89	0.71
1:D:214[B]:GLU:CA	5:D:304:BCN:H41	2.21	0.70
1:D:137:GLN:NE2	6:D:404:HOH:O	2.21	0.69
1:D:37[A]:THR:O	6:D:402:HOH:O	2.07	0.68
1:B:215:PRO:CG	5:B:305:BCN:C6	2.72	0.66
1:A:38:ALA:O	6:A:404:HOH:O	2.14	0.65
1:A:214[A]:GLU:HA	5:A:304:BCN:H32	1.78	0.64
1:A:58[A]:ARG:NH2	1:D:238:GLU:O	2.29	0.64
1:B:215:PRO:HG2	5:B:305:BCN:H62	1.77	0.64
1:A:58[A]:ARG:HH12	1:D:239:GLU:CG	2.03	0.63
1:A:58[A]:ARG:HH11	1:D:239:GLU:HG3	1.59	0.62
1:A:10[B]:HIS:CE1	1:B:155:PRO:HG2	2.35	0.62
1:D:9:LYS:N	6:D:406:HOH:O	2.32	0.61
1:D:127:LYS:HE3	1:D:128:TYR:CZ	2.37	0.60
1:C:87[A]:THR:HG21	6:C:417:HOH:O	2.00	0.59
1:B:76:LYS:CD	6:B:622:HOH:O	2.50	0.59
1:A:215:PRO:CD	5:A:304:BCN:H52	2.33	0.58
1:D:214[B]:GLU:HA	5:D:304:BCN:C4	2.34	0.58
1:C:39:LYS:HB2	1:C:255:GLN:NE2	2.20	0.56
1:D:69:GLU:HB3	6:D:622:HOH:O	2.05	0.56
1:A:215:PRO:HD2	5:A:304:BCN:H52	1.88	0.56
1:A:69:GLU:HB3	6:A:636:HOH:O	2.04	0.56
1:D:75:ASP:OD2	6:D:403:HOH:O	2.18	0.56
1:A:260:PHE:HD2	1:A:261:LYS:HD3	1.70	0.55
1:A:10[B]:HIS:HB2	6:A:420:HOH:O	2.06	0.55
1:C:39:LYS:CB	1:C:255:GLN:NE2	2.70	0.55
1:A:214[B]:GLU:HA	5:A:304:BCN:H32	1.89	0.54

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:214[B]:GLU:HA	5:C:303:BCN:C6	2.31	0.54
5:D:304:BCN:H51	6:D:481:HOH:O	2.07	0.54
1:D:215:PRO:CD	5:D:304:BCN:H52	2.38	0.53
1:C:55[B]:THR:OG1	1:C:71:ASP:HB3	2.09	0.53
1:B:214[B]:GLU:HA	5:B:305:BCN:H32	1.90	0.53
1:D:255:GLN:NE2	6:D:402:HOH:O	2.42	0.53
1:C:127:LYS:HE3	1:C:128:TYR:CZ	2.45	0.52
1:D:127:LYS:NZ	6:D:405:HOH:O	2.24	0.52
1:D:170[B]:LYS:CE	6:D:506:HOH:O	2.56	0.52
1:D:214[B]:GLU:CB	5:D:304:BCN:H41	2.42	0.50
1:C:10[B]:HIS:HD2	6:C:524:HOH:O	1.67	0.49
1:D:127:LYS:HE3	1:D:128:TYR:OH	2.12	0.49
1:D:55:THR:HG22	6:D:613:HOH:O	2.13	0.48
1:C:59:ILE:HA	1:C:67[B]:ASN:O	2.13	0.48
1:D:215:PRO:HD2	5:D:304:BCN:H32	1.93	0.48
1:B:215:PRO:HG3	5:B:305:BCN:C6	2.44	0.48
1:C:67[A]:ASN:HB3	1:C:92:GLN:NE2	2.28	0.47
1:C:255:GLN:NE2	6:C:403:HOH:O	2.42	0.47
1:B:260:PHE:HD2	1:B:261:LYS:HB2	1.80	0.47
1:A:45:LYS:O	1:A:82:GLY:HA2	2.14	0.47
1:A:215:PRO:HD2	5:A:304:BCN:H32	1.97	0.46
1:A:260:PHE:CD2	1:A:261:LYS:HD3	2.50	0.46
1:C:67[A]:ASN:CG	1:C:92:GLN:HE22	2.23	0.46
5:C:303:BCN:C4	6:C:594:HOH:O	2.63	0.46
1:C:58:ARG:HD2	6:C:479:HOH:O	2.16	0.46
1:D:160:VAL:O	1:D:163:VAL:HG12	2.17	0.45
1:C:134:ALA:O	1:C:140:GLY:HA3	2.16	0.45
5:C:303:BCN:H42	6:C:594:HOH:O	2.16	0.45
1:D:134:ALA:O	1:D:140:GLY:HA3	2.17	0.45
5:C:303:BCN:H31	6:C:504:HOH:O	2.17	0.45
1:D:213:LYS:HD2	1:D:260:PHE:CZ	2.52	0.45
1:C:67[A]:ASN:OD1	1:C:94:HIS:HB3	2.16	0.45
1:C:4:HIS:CG	6:C:415:HOH:O	2.69	0.44
1:B:134:ALA:O	1:B:140:GLY:HA3	2.16	0.44
1:D:39:LYS:HB3	1:D:255:GLN:NE2	2.32	0.44
1:D:58[C]:ARG:NH1	1:D:173:SER:HB2	2.32	0.44
1:C:214[A]:GLU:HG3	5:C:303:BCN:H52	2.00	0.44
1:C:45:LYS:O	1:C:82:GLY:HA2	2.18	0.44
1:A:58[A]:ARG:NH2	1:A:60:LEU:HB2	2.32	0.44
1:A:213:LYS:HD2	1:A:260:PHE:CZ	2.52	0.43
1:B:260:PHE:CD2	1:B:261:LYS:HD3	2.53	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:134:ALA:O	1:A:140:GLY:HA3	2.18	0.43
5:C:303:BCN:C3	6:C:504:HOH:O	2.65	0.43
1:C:127:LYS:HE3	1:C:128:TYR:OH	2.18	0.43
1:B:36:HIS:ND1	6:B:404:HOH:O	2.17	0.42
1:D:57:LEU:CD2	6:D:613:HOH:O	2.67	0.42
1:D:87[A]:THR:HG21	6:D:410:HOH:O	2.18	0.42
1:B:260:PHE:HD2	1:B:261:LYS:HD3	1.84	0.42
1:D:215:PRO:HD2	5:D:304:BCN:H52	2.02	0.42
1:B:215:PRO:HD2	5:B:305:BCN:H32	2.01	0.42
1:D:3:HIS:CE1	6:D:603:HOH:O	2.73	0.42
1:B:55:THR:HG21	1:D:162:ASP:OD2	2.19	0.42
1:B:87[A]:THR:CG2	6:B:506:HOH:O	2.55	0.41
1:D:214[A]:GLU:CA	5:D:304:BCN:H41	2.37	0.41
1:B:55:THR:CG2	1:D:162:ASP:OD2	2.69	0.41
1:D:57:LEU:HD23	6:D:613:HOH:O	2.21	0.41
1:C:214[B]:GLU:CB	5:C:303:BCN:H61	2.50	0.41
1:D:214[A]:GLU:HG3	5:D:304:BCN:H32	2.03	0.41
1:D:27:ARG:HG3	1:D:205:GLU:HB3	2.03	0.41
1:D:59:ILE:HA	1:D:67[B]:ASN:O	2.21	0.40
5:D:304:BCN:H42	5:D:304:BCN:H11	1.18	0.40
1:D:214[A]:GLU:HA	5:D:304:BCN:C4	2.45	0.40

All (5) 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)
6:C:480:HOH:O	6:C:634:HOH:O[1_545]	1.93	0.27
6:B:403:HOH:O	6:B:459:HOH:O[1_565]	2.05	0.15
1:A:73:SER:OG	6:A:419:HOH:O[1_565]	2.07	0.13
1:D:53:GLN:OE1	6:B:410:HOH:O[1_565]	2.07	0.13
6:C:404:HOH:O	6:C:473:HOH:O[1_565]	2.10	0.10

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	270/260 (104%)	257 (95%)	13 (5%)	0	100	100
1	B	268/260 (103%)	256 (96%)	12 (4%)	0	100	100
1	C	271/260 (104%)	264 (97%)	7 (3%)	0	100	100
1	D	275/260 (106%)	264 (96%)	11 (4%)	0	100	100
All	All	1084/1040 (104%)	1041 (96%)	43 (4%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	232/225 (103%)	227 (98%)	5 (2%)	45	8
1	B	229/225 (102%)	227 (99%)	2 (1%)	70	39
1	C	232/225 (103%)	227 (98%)	5 (2%)	45	8
1	D	235/225 (104%)	233 (99%)	2 (1%)	70	39
All	All	928/900 (103%)	914 (98%)	14 (2%)	61	19

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	13	PRO
1	A	58[A]	ARG
1	A	58[B]	ARG
1	A	92	GLN
1	A	261	LYS
1	B	92	GLN
1	B	261	LYS
1	C	55[A]	THR
1	C	55[B]	THR
1	C	92	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	C	250[A]	PRO
1	C	250[B]	PRO
1	D	4	HIS
1	D	92	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	4	HIS
1	C	92	GLN
1	C	136	GLN
1	C	255	GLN
1	D	3	HIS
1	D	4	HIS
1	D	255	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](#)

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](#)

Of 16 ligands modelled in this entry, 8 are monoatomic - leaving 8 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	BCN	A	304	-	10,10,10	1.23	2 (20%)	11,11,11	1.95	2 (18%)
5	BCN	C	303	-	10,10,10	0.75	1 (10%)	11,11,11	2.23	5 (45%)
5	BCN	D	304	-	10,10,10	0.67	0	11,11,11	2.08	3 (27%)
3	RAK	D	302	2	19,19,19	1.49	2 (10%)	24,28,28	2.02	9 (37%)
3	RAK	B	302	2	19,19,19	1.70	4 (21%)	24,28,28	1.71	3 (12%)
3	RAK	C	302	2	19,19,19	1.16	1 (5%)	24,28,28	1.45	4 (16%)
5	BCN	B	305	-	10,10,10	1.28	1 (10%)	11,11,11	2.72	6 (54%)
3	RAK	A	302	2	19,19,19	1.82	3 (15%)	24,28,28	1.48	5 (20%)

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	BCN	A	304	-	-	4/10/10/10	-
5	BCN	C	303	-	-	4/10/10/10	-
5	BCN	D	304	-	-	5/10/10/10	-
3	RAK	D	302	2	-	5/13/13/13	0/1/1/1
3	RAK	B	302	2	-	3/13/13/13	0/1/1/1
3	RAK	C	302	2	-	4/13/13/13	0/1/1/1
5	BCN	B	305	-	-	3/10/10/10	-
3	RAK	A	302	2	-	2/13/13/13	0/1/1/1

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	302	RAK	C5-N1	-4.75	1.40	1.46
3	A	302	RAK	O3-S2	4.35	1.48	1.43
3	D	302	RAK	O4-S2	4.35	1.48	1.43
3	B	302	RAK	O3-S2	4.06	1.48	1.43
3	B	302	RAK	C5-N1	-3.53	1.41	1.46
5	B	305	BCN	O22-C2	-2.71	1.21	1.30
3	C	302	RAK	C8-S12	-2.39	1.75	1.78
3	B	302	RAK	C8-C7	-2.26	1.35	1.39
5	A	304	BCN	O21-C2	2.12	1.29	1.22
3	D	302	RAK	F18-C6	2.07	1.37	1.34
3	A	302	RAK	F18-C6	-2.06	1.32	1.34
5	C	303	BCN	C3-N1	-2.04	1.42	1.47

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	304	BCN	O22-C2	-2.04	1.24	1.30
3	B	302	RAK	O4-S2	-2.01	1.41	1.43

All (37) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	302	RAK	C10-C11-C6	-5.37	112.98	116.65
3	D	302	RAK	C10-C11-C6	-4.85	113.34	116.65
5	B	305	BCN	C5-N1-C3	4.72	122.69	111.44
5	A	304	BCN	C6-C5-N1	4.39	128.85	113.44
3	D	302	RAK	C9-C10-C11	4.24	126.91	121.78
5	C	303	BCN	C5-N1-C3	3.98	120.91	111.44
5	D	304	BCN	C2-C1-N1	-3.95	101.25	113.77
5	B	305	BCN	C6-C5-N1	3.84	126.92	113.44
5	B	305	BCN	C1-N1-C3	3.79	121.05	111.91
3	B	302	RAK	O3-S2-C11	-3.75	103.28	108.74
3	C	302	RAK	O3-S2-C11	-3.70	103.35	108.74
3	A	302	RAK	O3-S2-C11	-3.68	103.38	108.74
5	C	303	BCN	C1-N1-C5	3.32	119.92	111.91
3	D	302	RAK	O3-S2-C11	-3.31	103.92	108.74
5	A	304	BCN	C2-C1-N1	-3.31	103.28	113.77
5	D	304	BCN	O6-C6-C5	3.24	124.56	111.22
3	B	302	RAK	C7-C6-C11	3.17	125.61	121.78
5	B	305	BCN	C2-C1-N1	-3.16	103.76	113.77
5	D	304	BCN	O4-C4-C3	3.01	123.62	111.22
5	C	303	BCN	C1-N1-C3	2.99	119.11	111.91
3	C	302	RAK	F16-C9-C8	-2.71	116.07	119.79
3	A	302	RAK	C8-C7-C6	-2.71	117.71	121.91
3	D	302	RAK	F19-C10-C9	-2.57	114.16	119.27
5	C	303	BCN	C6-C5-N1	-2.53	104.56	113.44
3	C	302	RAK	C10-C11-C6	-2.40	115.01	116.65
3	D	302	RAK	O4-S2-C11	-2.37	105.28	108.74
3	A	302	RAK	C7-C6-C11	2.37	124.64	121.78
5	B	305	BCN	O22-C2-O21	-2.27	117.49	123.33
3	D	302	RAK	C8-C9-C10	-2.25	118.42	121.91
3	D	302	RAK	F17-C7-C8	-2.19	116.78	119.79
3	C	302	RAK	O3-S2-N1	2.17	111.07	107.06
5	B	305	BCN	C4-C3-N1	2.16	121.01	113.44
3	D	302	RAK	F18-C6-C7	-2.12	115.05	119.27
3	A	302	RAK	C7-C8-S12	-2.11	117.10	121.81
3	D	302	RAK	O3-S2-N1	2.08	110.90	107.06
3	A	302	RAK	O3-S2-N1	2.07	110.89	107.06

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	C	303	BCN	O22-C2-C1	2.01	121.30	113.38

There are no chirality outliers.

All (30) torsion outliers are listed below:

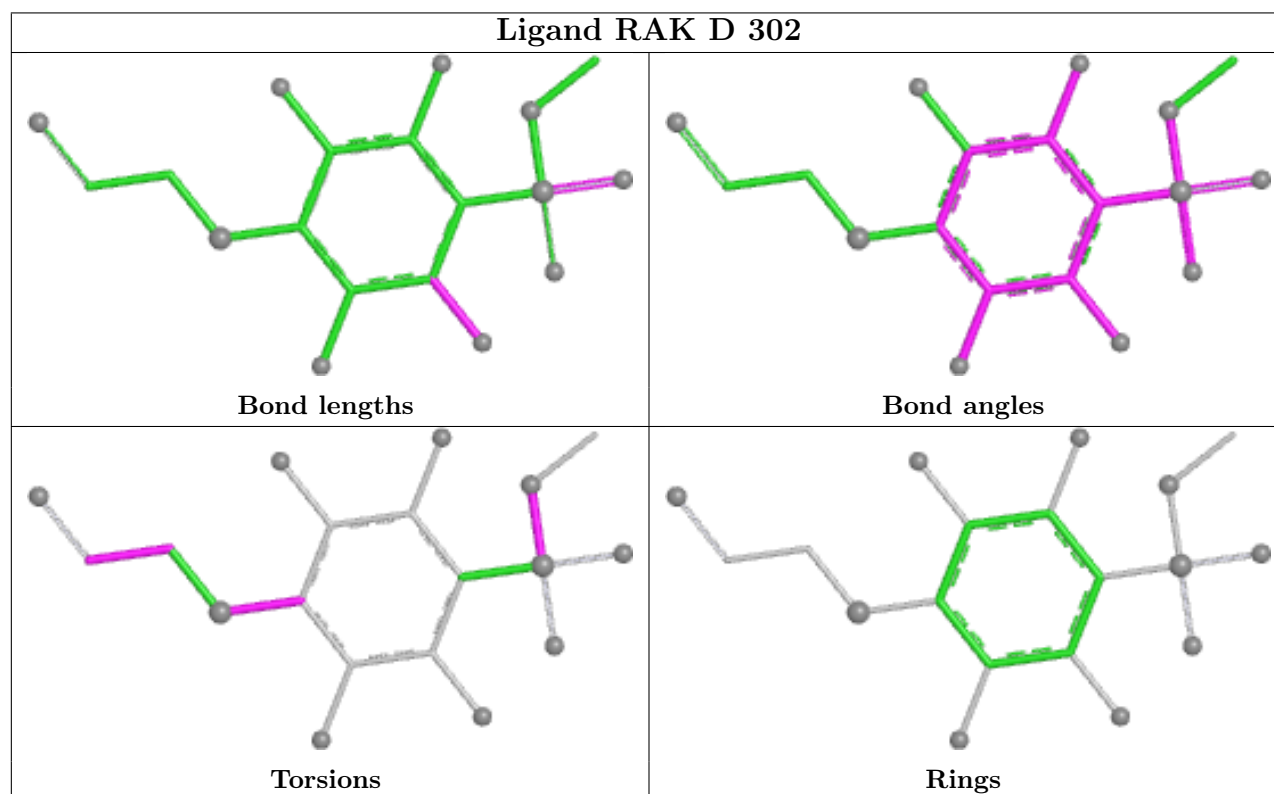
Mol	Chain	Res	Type	Atoms
3	B	302	RAK	S12-C13-C14-N15
3	C	302	RAK	C14-C13-S12-C8
3	D	302	RAK	S12-C13-C14-N15
5	B	305	BCN	C6-C5-N1-C3
5	C	303	BCN	C6-C5-N1-C1
5	D	304	BCN	C4-C3-N1-C1
5	C	303	BCN	C4-C3-N1-C5
5	C	303	BCN	N1-C3-C4-O4
5	C	303	BCN	N1-C5-C6-O6
5	D	304	BCN	N1-C5-C6-O6
5	D	304	BCN	N1-C3-C4-O4
3	A	302	RAK	C5-N1-S2-O3
3	B	302	RAK	C5-N1-S2-O3
3	C	302	RAK	C5-N1-S2-O3
3	C	302	RAK	C5-N1-S2-O4
3	D	302	RAK	C5-N1-S2-O3
5	A	304	BCN	N1-C5-C6-O6
5	A	304	BCN	C2-C1-N1-C5
5	A	304	BCN	C2-C1-N1-C3
5	D	304	BCN	C2-C1-N1-C3
5	D	304	BCN	C2-C1-N1-C5
3	C	302	RAK	C9-C8-S12-C13
3	D	302	RAK	C9-C8-S12-C13
5	A	304	BCN	N1-C3-C4-O4
5	B	305	BCN	C2-C1-N1-C3
5	B	305	BCN	C2-C1-N1-C5
3	A	302	RAK	C5-N1-S2-O4
3	B	302	RAK	C5-N1-S2-O4
3	D	302	RAK	C5-N1-S2-C11
3	D	302	RAK	C5-N1-S2-O4

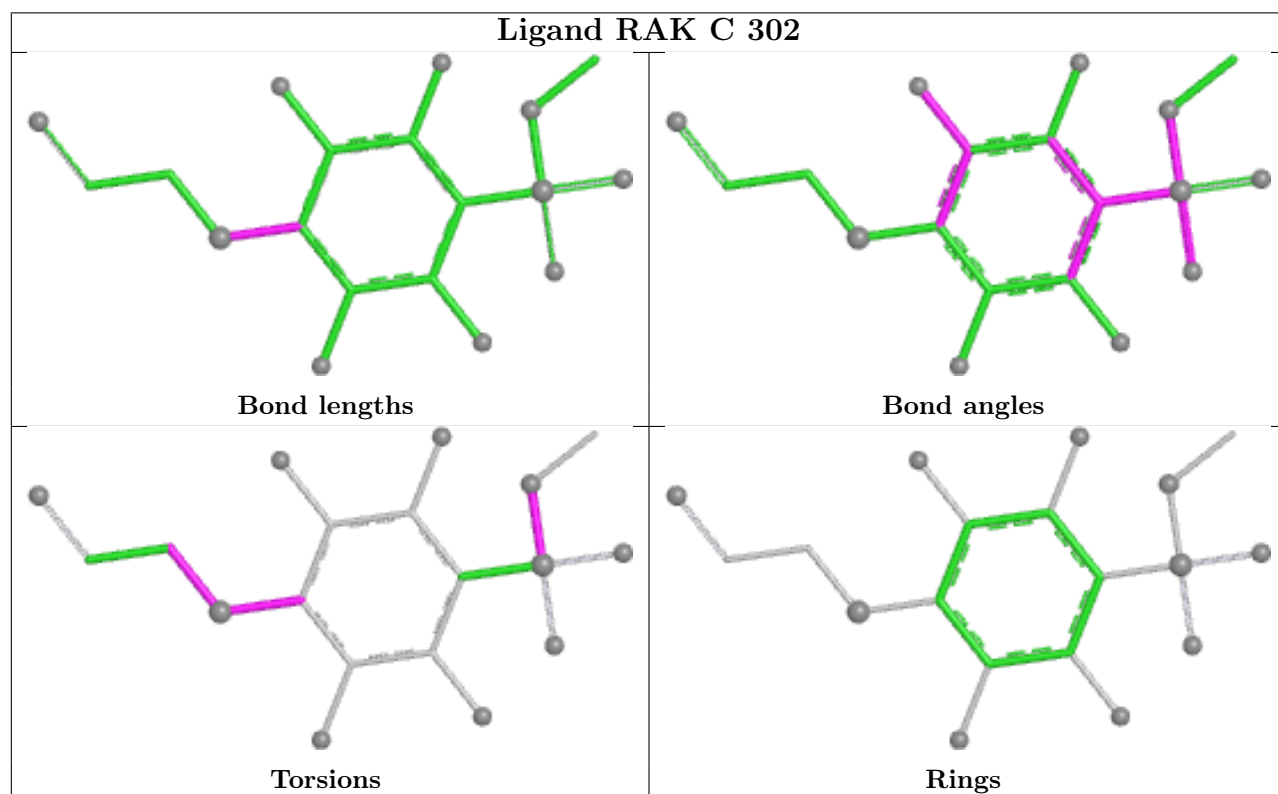
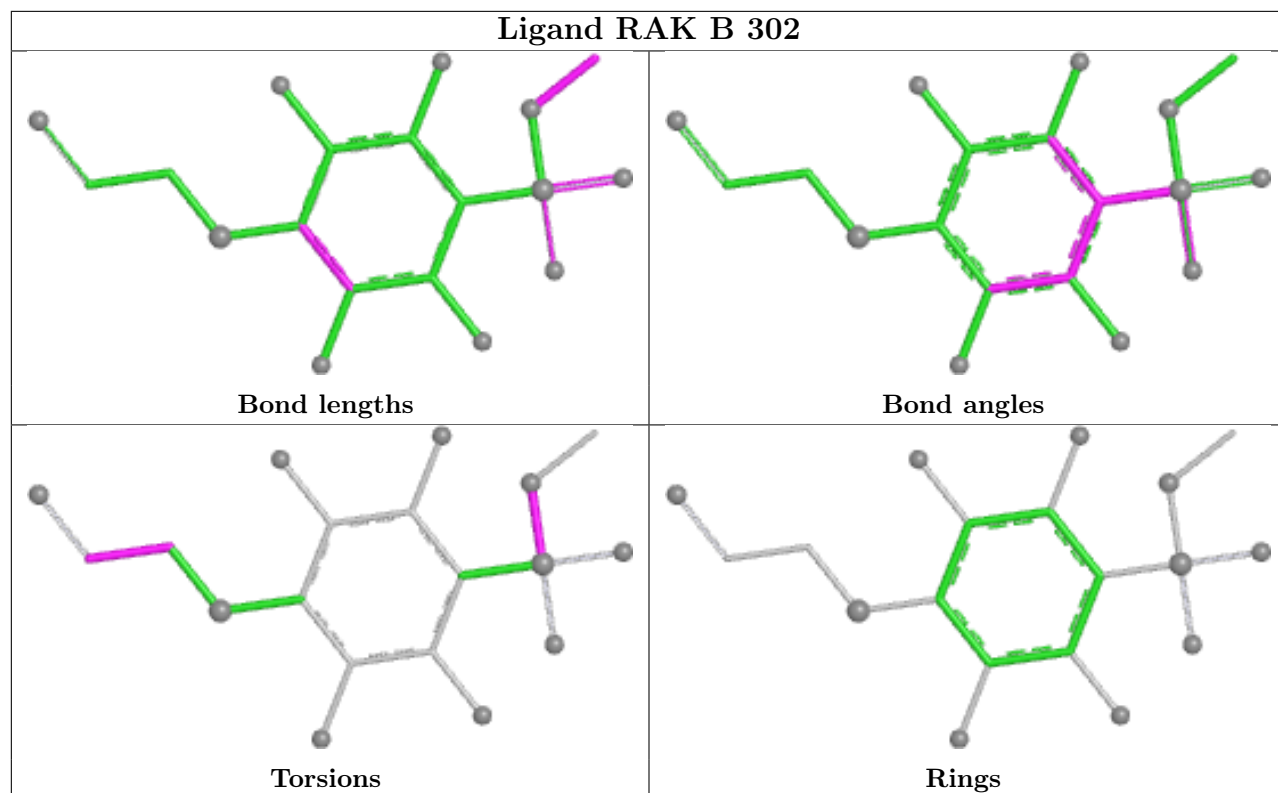
There are no ring outliers.

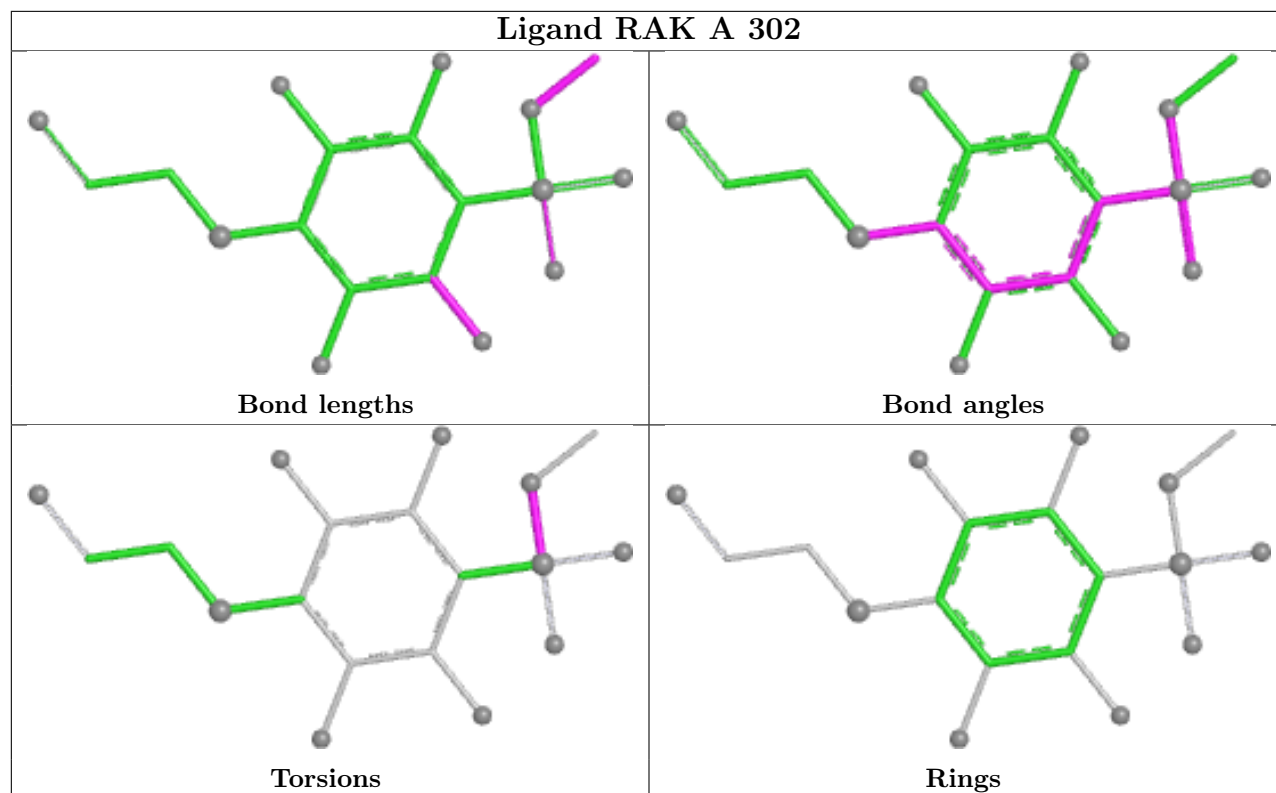
4 monomers are involved in 38 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	304	BCN	6	0
5	C	303	BCN	10	0
5	D	304	BCN	13	0
5	B	305	BCN	9	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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	258/260 (99%)	-1.43	0 100 100	6, 14, 26, 55	14 (5%)
1	B	258/260 (99%)	-1.46	0 100 100	5, 13, 25, 43	13 (5%)
1	C	258/260 (99%)	-1.46	0 100 100	3, 12, 25, 46	16 (6%)
1	D	258/260 (99%)	-1.43	0 100 100	4, 14, 24, 50	21 (8%)
All	All	1032/1040 (99%)	-1.44	0 100 100	3, 13, 25, 55	64 (6%)

There are no RSRZ outliers to report.

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.

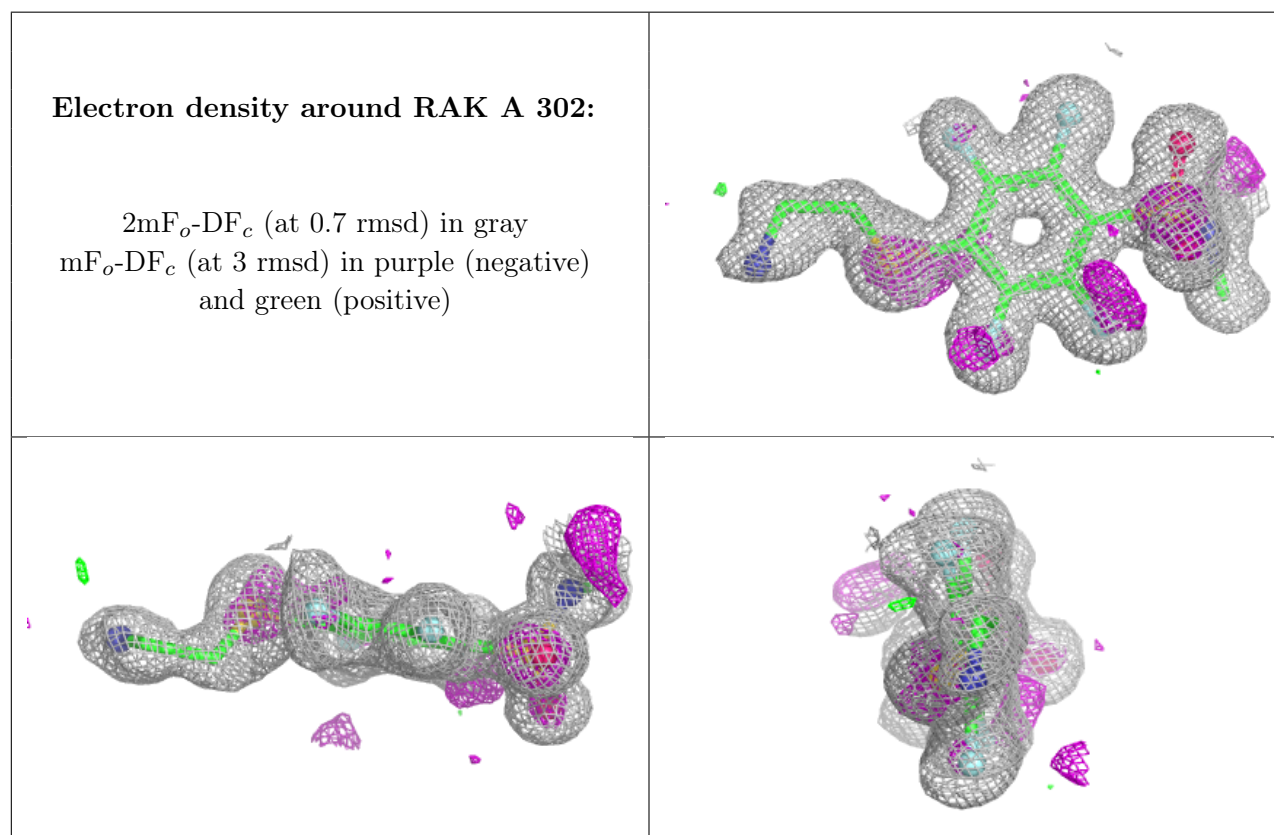
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	NA	B	304	1/1	0.99	0.06	37,37,37,37	0
4	NA	D	303	1/1	0.99	0.04	42,42,42,42	0
5	BCN	A	304	11/11	0.99	0.02	20,26,29,32	0
5	BCN	D	304	11/11	0.99	0.02	18,27,38,38	0

Continued on next page...

Continued from previous page...

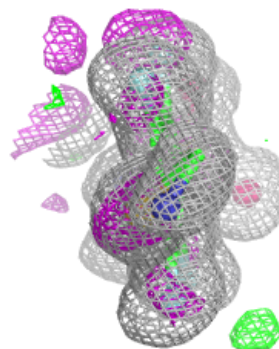
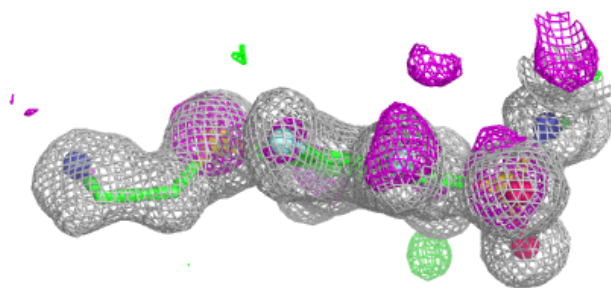
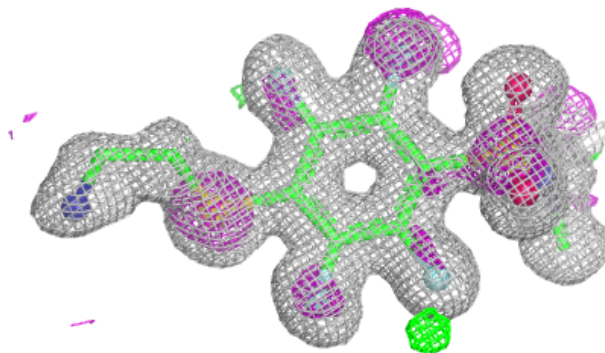
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	RAK	A	302	19/19	1.00	0.01	10,14,30,41	0
3	RAK	B	302	19/19	1.00	0.02	8,12,31,34	0
3	RAK	C	302	19/19	1.00	0.02	8,12,28,43	0
3	RAK	D	302	19/19	1.00	0.02	9,15,35,51	0
4	NA	A	303	1/1	1.00	0.03	34,34,34,34	0
4	NA	B	303	1/1	1.00	0.01	32,32,32,32	0
2	ZN	A	301	1/1	1.00	0.01	8,8,8,8	0
2	ZN	B	301	1/1	1.00	0.01	7,7,7,7	0
2	ZN	C	301	1/1	1.00	0.01	7,7,7,7	0
5	BCN	B	305	11/11	1.00	0.02	21,26,35,37	0
5	BCN	C	303	11/11	1.00	0.02	21,24,34,34	0
2	ZN	D	301	1/1	1.00	0.01	8,8,8,8	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.

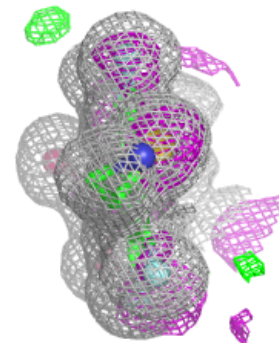
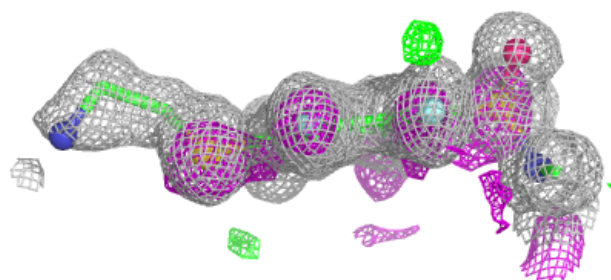
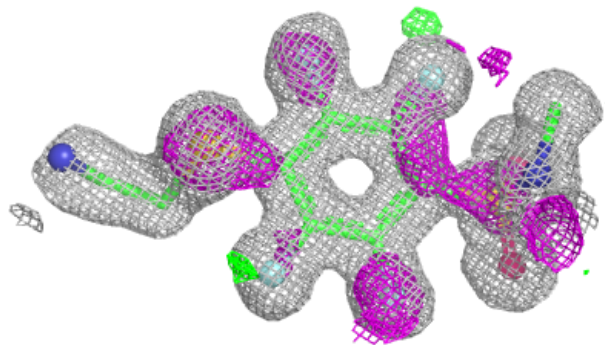


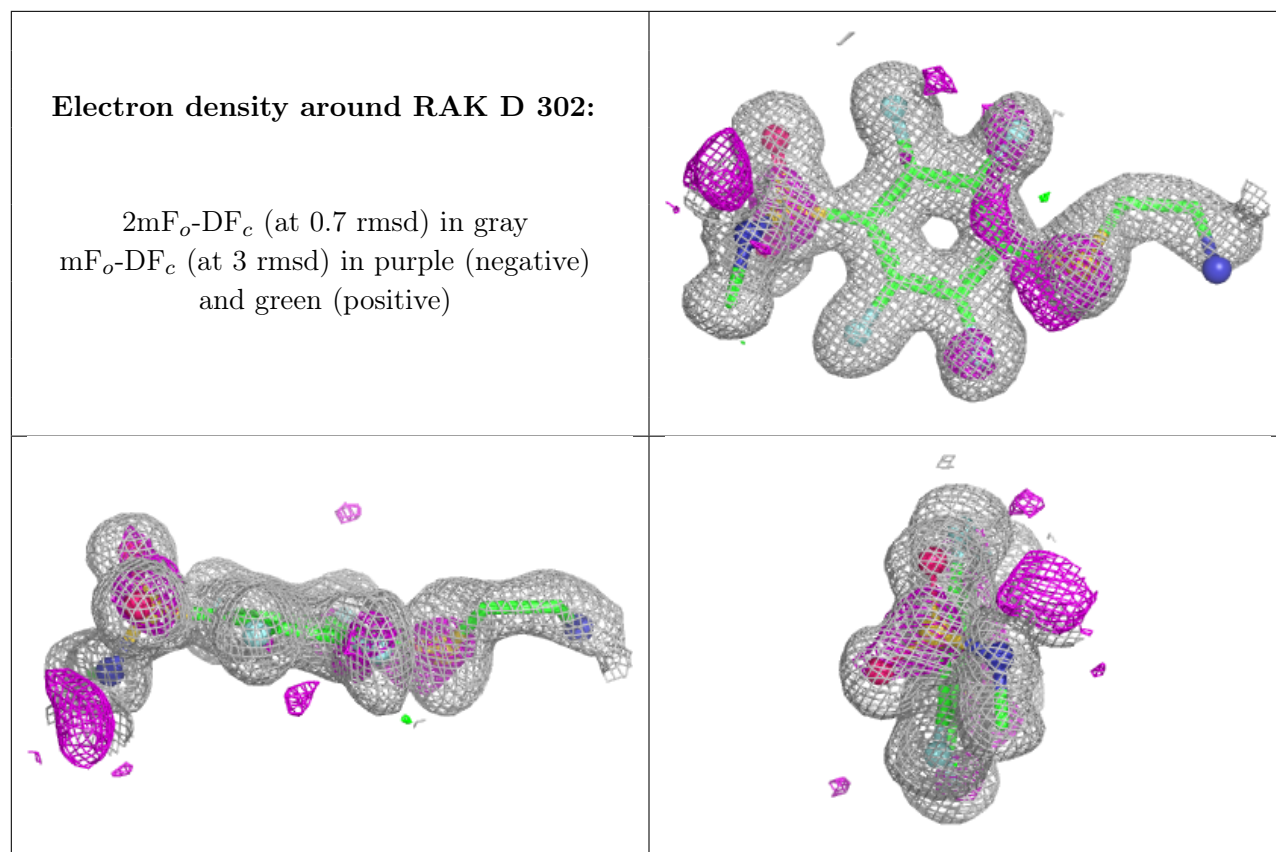
Electron density around RAK B 302:

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

**Electron density around RAK C 302:**

$2mF_o-DF_c$ (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.