



Full wwPDB EM Validation Report ⓘ

Jul 9, 2025 – 01:33 PM JST

PDB ID : 9J51 / pdb_00009j51
EMDB ID : EMD-61139
Title : CryoEM structure of human XPR1 in complex with phosphate in state A
Authors : Zhang, W.H.; Chen, Y.K.; Guan, Z.Y.; Liu, Z.
Deposited on : 2024-08-11
Resolution : 3.10 Å(reported)

This is a Full wwPDB EM 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/EMValidationReportHelp>

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:

EMDB validation analysis : **FAILED**
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4-5-2 with Phenix2.0rc1
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : **FAILED**
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.44

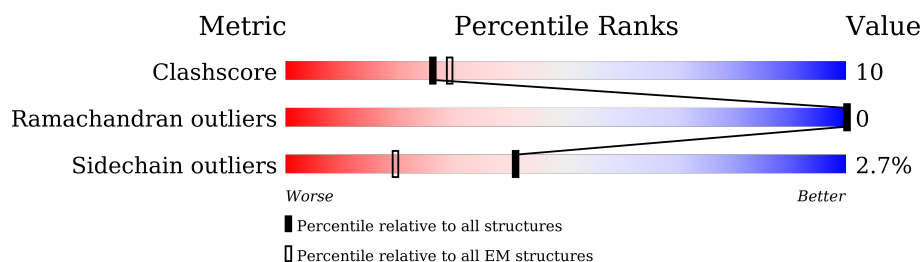
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.10 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)	EM structures (#Entries)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	A	720	<div> <div>39%</div> <div>14%</div> <div>47%</div> </div>
1	B	720	<div> <div>39%</div> <div>13%</div> <div>•</div> <div>47%</div> </div>

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 6581 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 Solute carrier family 53 member 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	380	Total	C	N	O	S	0	0
			3174	2135	508	516	15		
1	B	382	Total	C	N	O	S	0	0
			3186	2143	510	518	15		

There are 48 discrepancies between the modelled and reference sequences:

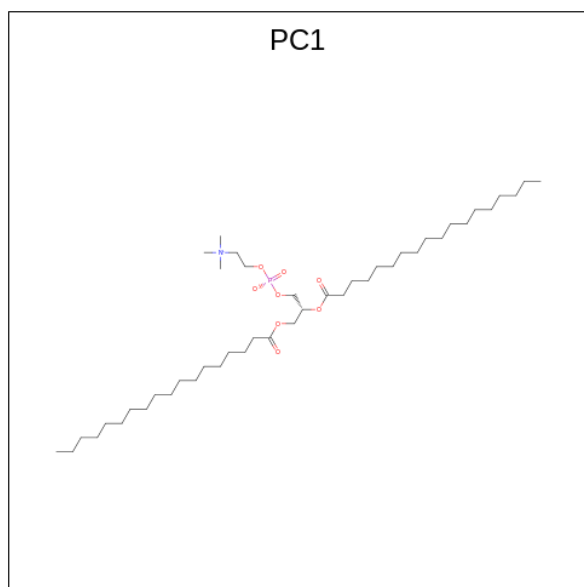
Chain	Residue	Modelled	Actual	Comment	Reference
A	697	LEU	-	expression tag	UNP Q9UBH6
A	698	GLU	-	expression tag	UNP Q9UBH6
A	699	ASP	-	expression tag	UNP Q9UBH6
A	700	TYR	-	expression tag	UNP Q9UBH6
A	701	LYS	-	expression tag	UNP Q9UBH6
A	702	ASP	-	expression tag	UNP Q9UBH6
A	703	HIS	-	expression tag	UNP Q9UBH6
A	704	ASP	-	expression tag	UNP Q9UBH6
A	705	GLY	-	expression tag	UNP Q9UBH6
A	706	ASP	-	expression tag	UNP Q9UBH6
A	707	TYR	-	expression tag	UNP Q9UBH6
A	708	LYS	-	expression tag	UNP Q9UBH6
A	709	ASP	-	expression tag	UNP Q9UBH6
A	710	HIS	-	expression tag	UNP Q9UBH6
A	711	ASP	-	expression tag	UNP Q9UBH6
A	712	ILE	-	expression tag	UNP Q9UBH6
A	713	ASP	-	expression tag	UNP Q9UBH6
A	714	TYR	-	expression tag	UNP Q9UBH6
A	715	LYS	-	expression tag	UNP Q9UBH6
A	716	ASP	-	expression tag	UNP Q9UBH6
A	717	ASP	-	expression tag	UNP Q9UBH6
A	718	ASP	-	expression tag	UNP Q9UBH6
A	719	ASP	-	expression tag	UNP Q9UBH6
A	720	LYS	-	expression tag	UNP Q9UBH6
B	697	LEU	-	expression tag	UNP Q9UBH6
B	698	GLU	-	expression tag	UNP Q9UBH6

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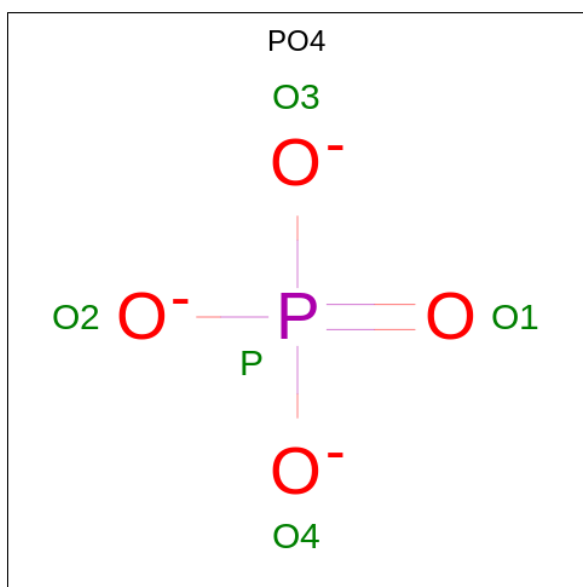
Chain	Residue	Modelled	Actual	Comment	Reference
B	699	ASP	-	expression tag	UNP Q9UBH6
B	700	TYR	-	expression tag	UNP Q9UBH6
B	701	LYS	-	expression tag	UNP Q9UBH6
B	702	ASP	-	expression tag	UNP Q9UBH6
B	703	HIS	-	expression tag	UNP Q9UBH6
B	704	ASP	-	expression tag	UNP Q9UBH6
B	705	GLY	-	expression tag	UNP Q9UBH6
B	706	ASP	-	expression tag	UNP Q9UBH6
B	707	TYR	-	expression tag	UNP Q9UBH6
B	708	LYS	-	expression tag	UNP Q9UBH6
B	709	ASP	-	expression tag	UNP Q9UBH6
B	710	HIS	-	expression tag	UNP Q9UBH6
B	711	ASP	-	expression tag	UNP Q9UBH6
B	712	ILE	-	expression tag	UNP Q9UBH6
B	713	ASP	-	expression tag	UNP Q9UBH6
B	714	TYR	-	expression tag	UNP Q9UBH6
B	715	LYS	-	expression tag	UNP Q9UBH6
B	716	ASP	-	expression tag	UNP Q9UBH6
B	717	ASP	-	expression tag	UNP Q9UBH6
B	718	ASP	-	expression tag	UNP Q9UBH6
B	719	ASP	-	expression tag	UNP Q9UBH6
B	720	LYS	-	expression tag	UNP Q9UBH6

- Molecule 2 is 1,2-DIACYL-SN-GLYCERO-3-PHOSPHOCHOLINE (CCD ID: PC1) (formula: $C_{44}H_{88}NO_8P$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
2	A	1	Total	C	N	O	P	0
			54	44	1	8	1	
2	A	1	Total	C	N	O	P	0
			54	44	1	8	1	
2	B	1	Total	C	N	O	P	0
			54	44	1	8	1	
2	B	1	Total	C	N	O	P	0
			54	44	1	8	1	

- Molecule 3 is PHOSPHATE ION (CCD ID: PO4) (formula: O_4P) (labeled as "Ligand of Interest" by depositor).



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

ILE	ARG	L495	L463	R263	GLU
GLU	ASP	S404	S404	S264	VAL
ASP	ILE	D506	V405	W265	ALA
THR	SER			P267	PRO
ASP	VAL		M408	L268	PHE
ASP	ALA	Y512		I269	TYR
GLU	PRO		E411	L270	THR
ALA	LEU	I515	E425	I271	CYS
ASN	ASN	V516	S426	L277	LYS
THR	ALA	F517	K427	L278	ILE
LEU	ASP	Y518	G428	L279	ASN
GLU	ASP	I519	L429		GLN
ASP	GLN	I520	L430		LEU
GLN	THR		P431	L285	ILE
THR	LEU	T525	ASN		ILE
LEU	LEU	L526	ASN	Y290	SER
LEU	GLU		SER	G291	GLU
HIS	GLN	D529	GLU	W292	THR
ASP	MET		GLU	R293	ALA
GLY	MET	D533	GLU	Q294	ALA
ASP	ASP		SER		VAL
LYS	GLN	R548	GLY	H299	VAL
ASP	ASP		ILE		THR
ASP	ASP	V552	ILE		THR
HIS	ASP		CYS	F303	ASN
ASP	GLY		HIS		GLU
ASP	VAL	I563	LYS		LEU
ILE	ARG	I564	TYR	N306	
ASP	ASN	E565	THR	P307	GLU
TYR	ASN	D566	TYR	R308	ASP
LYS	ARG	V567	G446	S309	GLY
ASP	GLN	I568	W447	N310	ASP
ASP	LYS	L569	R448		ARG
ASP	ASN	R570		G324	GLN
ASP	ARG		C453	I325	LYS
ASP	SER	W573	I454	L331	ALA
LYS	TRP	T574	P455	L332	MET
	LYS		A456		LYS
	TYR	D590	W457	F336	ARG
	ASN				LEU
	GLN	F596	I461		ARG
	SER	A597	Q462	I339	VAL
	ILE	P598	C463		VAL
	SER	L599	L464	I342	PRO
	LEU	E600	R465	Y352	LEU
	ARG		D469	M355	GLY
	ARG	R603		V356	ALA
	PRO	N608	A473		ALA
	LEU		L477	L359	GLN
	ALA	L612		I360	ALA
	SER	E613	G481		PRO
	GLN	N614	K482	K369	PRO
	SER		Y483	D353	LEU
	LYS	L617	S484	D358	GLY
	ALA	N618	T485	D388	ALA
	ARG		T486	Q399	ALA
	ASP	F623	F487	S402	PRO
	THR	R624	M489		
	LYS	ALA			
	VAL	VAL			
	LEU				

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	143463	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	50	Depositor
Minimum defocus (nm)	1200	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor

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: PO4, PC1

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	0.16	0/3279	0.36	0/4460
1	B	0.15	0/3292	0.32	0/4479
All	All	0.16	0/6571	0.34	0/8939

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	3174	0	3174	65	0
1	B	3186	0	3186	63	0
2	A	108	0	176	10	0
2	B	108	0	176	5	0
3	A	5	0	0	0	0
All	All	6581	0	6712	131	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 10.

All (131) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:482:LYS:O	1:A:485:THR:OG1	2.09	0.71
1:A:452:GLN:NE2	1:A:577:ILE:O	2.28	0.67
1:A:548:ARG:NH1	1:A:613:GLU:OE2	2.25	0.65
1:A:285:LEU:HD21	2:A:801:PC1:H332	1.78	0.65
1:B:465:ARG:NH1	1:B:469:ASP:OD2	2.29	0.65
1:A:534:TRP:HE1	1:A:607:TRP:CD1	2.16	0.64
1:B:489:MET:HE1	1:B:574:THR:HB	1.80	0.63
1:B:552:VAL:HG23	1:B:617:LEU:HD11	1.80	0.63
1:B:271:ILE:O	1:B:352:TYR:OH	2.13	0.62
1:B:270:ARG:NH2	1:B:590:ASP:OD2	2.33	0.62
1:A:377:LEU:HD11	1:A:392:ALA:HB1	1.83	0.61
1:B:244:PHE:O	1:B:248:ASN:ND2	2.27	0.61
1:B:482:LYS:O	1:B:485:THR:OG1	2.17	0.60
1:A:251:LEU:HD21	1:A:331:LEU:HB3	1.82	0.60
1:B:399:GLN:OE1	1:B:608:ASN:ND2	2.29	0.59
1:A:534:TRP:O	1:A:548:ARG:NH2	2.31	0.59
1:B:264:SER:HB3	1:B:429:LEU:HB3	1.84	0.58
1:B:404:SER:HB3	1:B:455:PRO:HG2	1.84	0.58
1:B:529:ASP:HA	1:B:533:ASP:HB2	1.87	0.57
1:A:529:ASP:OD2	1:A:570:ARG:NH2	2.31	0.57
1:B:267:PRO:HG3	1:B:429:LEU:HD22	1.88	0.56
1:A:576:GLN:O	1:A:580:THR:OG1	2.23	0.56
1:B:548:ARG:NH2	1:B:613:GLU:OE2	2.36	0.55
1:A:354:PHE:O	1:A:358:PHE:N	2.38	0.55
1:A:399:GLN:NE2	1:A:608:ASN:OD1	2.40	0.55
1:B:425:GLU:OE1	1:B:427:LYS:NZ	2.36	0.55
1:A:465:ARG:NE	1:A:469:ASP:OD2	2.32	0.54
1:B:268:LEU:HD21	1:B:331:LEU:HD11	1.89	0.54
1:A:466:ARG:NH2	1:A:621:GLY:O	2.34	0.54
1:B:278:LEU:HD11	2:B:801:PC1:H3B2	1.90	0.54
1:B:292:TRP:HZ2	1:B:608:ASN:HB3	1.74	0.53
1:B:277:LEU:HD21	1:B:597:ALA:HB1	1.90	0.53
1:A:370:SER:OG	2:A:801:PC1:O14	2.24	0.53
1:B:265:ILE:H	1:B:265:ILE:HD13	1.73	0.53
1:A:306:ASN:HB2	2:A:801:PC1:H121	1.90	0.52
1:A:521:SER:O	1:A:525:THR:HG22	2.10	0.52
1:B:453:CYS:O	1:B:457:TRP:N	2.35	0.51
1:B:369:LYS:HD2	2:B:801:PC1:H143	1.93	0.51
1:A:279:ILE:HD13	1:A:324:GLY:HA2	1.93	0.50
2:A:801:PC1:H222	2:A:801:PC1:H361	1.93	0.50
1:A:366:PHE:O	1:A:371:ARG:NE	2.32	0.50
1:A:499:HIS:HB3	1:A:504:HIS:HB3	1.93	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:526:LEU:HD11	1:B:567:VAL:HG12	1.92	0.50
1:A:470:THR:HG22	1:A:472:ARG:HG3	1.94	0.50
1:A:526:LEU:HD11	1:A:567:VAL:HG12	1.93	0.49
1:A:342:ILE:HD11	1:A:346:VAL:HG11	1.95	0.49
1:A:482:LYS:HZ3	1:A:528:TRP:CD1	2.31	0.49
1:A:404:SER:O	1:A:408:MET:HG2	2.13	0.48
1:B:279:ILE:HD13	1:B:324:GLY:HA2	1.95	0.48
1:B:517:PHE:HA	1:B:520:ILE:HG22	1.95	0.48
1:A:618:ASN:N	1:A:618:ASN:OD1	2.46	0.48
1:B:600:GLU:OE2	1:B:603:ARG:NH2	2.31	0.48
1:A:292:TRP:HZ2	1:A:608:ASN:HB3	1.79	0.48
1:A:377:LEU:HD23	1:A:377:LEU:HA	1.75	0.47
1:A:618:ASN:O	1:A:620:CYS:N	2.48	0.47
1:A:452:GLN:HE21	1:A:581:SER:HB3	1.78	0.47
1:A:458:LEU:O	1:A:462:GLN:HG3	2.15	0.47
1:B:515:ILE:O	1:B:519:ILE:HG12	2.15	0.46
1:A:361:ASN:HB3	1:A:371:ARG:NH1	2.30	0.46
1:B:292:TRP:CZ2	1:B:612:LEU:HD12	2.51	0.46
1:B:306:ASN:O	1:B:310:ASN:ND2	2.48	0.46
1:A:457:TRP:HA	1:A:487:PHE:HZ	1.80	0.46
1:A:245:ILE:O	1:A:249:ILE:HG12	2.16	0.46
1:A:497:SER:OG	1:A:583:THR:OG1	2.34	0.46
1:B:482:LYS:HZ3	1:B:525:THR:HG22	1.82	0.46
1:A:292:TRP:HE1	1:A:609:PHE:HA	1.81	0.45
1:B:352:TYR:HD1	1:B:355:MET:HE2	1.80	0.45
1:B:457:TRP:O	1:B:461:ILE:HG12	2.16	0.45
1:B:356:VAL:O	1:B:360:ILE:HG12	2.16	0.45
1:B:408:MET:HB3	1:B:448:ARG:HH21	1.81	0.45
1:B:623:PHE:O	1:B:624:ARG:HB2	2.15	0.45
1:B:402:SER:OG	1:B:600:GLU:OE2	2.30	0.45
1:B:332:LEU:HD22	1:B:336:PHE:HE2	1.80	0.45
1:A:484:SER:HA	1:A:487:PHE:CD2	2.52	0.45
1:A:278:LEU:HD21	2:A:801:PC1:H2A2	1.99	0.45
1:B:481:GLY:O	1:B:485:THR:HG23	2.17	0.44
1:A:254:ALA:O	1:A:258:LYS:N	2.48	0.44
1:B:262:ASP:OD1	1:B:263:ARG:NH1	2.50	0.44
1:B:473:ALA:HA	1:B:477:LEU:HD23	1.99	0.44
1:A:460:PHE:HE1	1:A:480:ALA:HB1	1.81	0.44
1:A:551:ILE:HG13	1:A:559:TYR:CZ	2.53	0.44
1:B:240:PHE:HA	1:B:325:ILE:HD11	2.00	0.44
2:A:802:PC1:H252	2:A:802:PC1:H352	1.98	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:565:GLU:OE2	1:B:569:LEU:HD12	2.18	0.44
1:A:374:LEU:HD22	2:A:801:PC1:H241	1.99	0.44
1:A:369:LYS:HB3	2:A:801:PC1:H132	2.00	0.44
1:B:596:PHE:HD1	1:B:599:LEU:HD12	1.82	0.43
1:A:264:SER:O	1:A:267:PRO:HD2	2.18	0.43
1:A:457:TRP:O	1:A:461:ILE:HG12	2.18	0.43
1:B:307:PRO:O	1:B:308:ARG:NH1	2.44	0.43
1:B:359:LEU:HD22	2:B:801:PC1:H2B2	2.00	0.43
1:B:290:TYR:CE1	1:B:294:GLN:HG3	2.54	0.43
1:B:506:ASP:N	1:B:506:ASP:OD1	2.51	0.43
1:B:339:ILE:HD12	1:B:342:ILE:HD12	2.01	0.43
1:B:411:GLU:HG2	1:B:448:ARG:HB3	2.01	0.43
1:A:493:ALA:HB2	1:A:514:TRP:HE1	1.82	0.43
1:A:397:ALA:HB2	1:A:462:GLN:HE22	1.83	0.43
1:A:534:TRP:HE1	1:A:607:TRP:HD1	1.63	0.43
1:B:462:GLN:C	1:B:464:LEU:H	2.27	0.43
1:A:340:SER:HB3	1:A:342:ILE:HG22	2.01	0.43
1:A:450:ILE:O	1:A:454:ILE:HG13	2.19	0.43
1:A:270:ARG:NE	1:A:590:ASP:OD2	2.52	0.42
1:B:393:ASP:OD1	1:B:393:ASP:N	2.45	0.42
1:A:283:PHE:HE1	2:A:802:PC1:H272	1.83	0.42
1:A:380:ARG:O	1:A:384:ALA:HB2	2.20	0.42
1:B:285:LEU:HD21	2:B:801:PC1:H342	2.01	0.42
1:B:294:GLN:HE22	2:B:802:PC1:H121	1.83	0.42
1:A:467:TYR:HB2	1:A:476:HIS:HB2	2.02	0.42
1:A:526:LEU:HD21	1:A:567:VAL:HG12	2.01	0.42
1:B:299:HIS:HB2	1:B:303:PHE:HD2	1.85	0.41
1:A:563:ILE:O	1:A:567:VAL:HG13	2.20	0.41
1:B:563:ILE:O	1:B:567:VAL:HG13	2.20	0.41
1:B:614:ASN:O	1:B:618:ASN:HB2	2.20	0.41
1:A:361:ASN:O	1:A:371:ARG:NH1	2.53	0.41
1:B:482:LYS:NZ	1:B:525:THR:HG22	2.35	0.41
1:A:247:LEU:HB3	1:A:328:CYS:HB3	2.02	0.41
1:B:230:PRO:HG2	1:B:233:THR:HB	2.02	0.41
1:B:495:LEU:HD23	1:B:495:LEU:HA	1.84	0.41
1:A:452:GLN:NE2	1:A:581:SER:HB3	2.36	0.41
1:A:460:PHE:CE1	1:A:480:ALA:HB1	2.56	0.41
1:A:531:LYS:HA	1:A:531:LYS:HD2	1.91	0.41
1:A:575:ILE:HD12	1:A:575:ILE:HA	1.96	0.41
2:A:802:PC1:H261	2:A:802:PC1:H232	1.89	0.41
1:B:263:ARG:NE	1:B:427:LYS:HB2	2.36	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:361:ASN:HB3	1:A:371:ARG:CZ	2.51	0.41
1:B:548:ARG:HH12	1:B:613:GLU:HG2	1.85	0.40
1:B:573:TRP:HB2	1:B:600:GLU:OE1	2.21	0.40
1:A:297:VAL:HG23	1:A:616:HIS:CD2	2.56	0.40
1:B:512:TYR:O	1:B:515:ILE:HG22	2.21	0.40
1:A:240:PHE:HE2	1:A:318:GLU:HG3	1.86	0.40
1:B:484:SER:HA	1:B:487:PHE:CD2	2.56	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 PDB entries followed by that with respect to all EM entries.

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	376/720 (52%)	356 (95%)	20 (5%)	0	100	100
1	B	378/720 (52%)	359 (95%)	19 (5%)	0	100	100
All	All	754/1440 (52%)	715 (95%)	39 (5%)	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 PDB entries followed by that with respect to all EM entries.

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	338/644 (52%)	327 (97%)	11 (3%)	33	62

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	339/644 (53%)	332 (98%)	7 (2%)	48	72
All	All	677/1288 (53%)	659 (97%)	18 (3%)	41	67

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	236	ARG
1	A	386	PHE
1	A	394	PHE
1	A	405	VAL
1	A	530	LEU
1	A	551	ILE
1	A	580	THR
1	A	605	PHE
1	A	618	ASN
1	A	619	ASN
1	A	624	ARG
1	B	265	ILE
1	B	303	PHE
1	B	398	ASP
1	B	405	VAL
1	B	517	PHE
1	B	570	ARG
1	B	624	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	452	GLN
1	A	462	GLN
1	A	544	ASN
1	A	616	HIS
1	B	618	ASN
1	B	619	ASN

5.3.3 RNA ⓘ

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](#)

5 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	PC1	A	801	-	53,53,53	0.49	0	59,61,61	0.48	1 (1%)
3	PO4	A	803	-	4,4,4	1.34	1 (25%)	6,6,6	0.50	0
2	PC1	B	801	-	53,53,53	0.49	0	59,61,61	0.48	1 (1%)
2	PC1	A	802	-	53,53,53	0.50	0	59,61,61	0.48	1 (1%)
2	PC1	B	802	-	53,53,53	0.49	0	59,61,61	0.46	1 (1%)

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	PC1	B	801	-	-	16/57/57/57	-
2	PC1	B	802	-	-	22/57/57/57	-
2	PC1	A	801	-	-	16/57/57/57	-
2	PC1	A	802	-	-	14/57/57/57	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	803	PO4	P-O1	2.38	1.56	1.50

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	802	PC1	O12-P-O14	2.39	124.04	112.24
2	B	802	PC1	O12-P-O14	2.36	123.88	112.24
2	B	801	PC1	O12-P-O14	2.31	123.68	112.24
2	A	801	PC1	O12-P-O14	2.22	123.20	112.24

There are no chirality outliers.

All (68) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	802	PC1	C11-O13-P-O14
2	A	802	PC1	C11-O13-P-O11
2	A	802	PC1	O13-C11-C12-N
2	A	802	PC1	O22-C21-O21-C2
2	B	801	PC1	C11-O13-P-O12
2	B	801	PC1	C11-O13-P-O14
2	B	802	PC1	C22-C21-O21-C2
2	B	802	PC1	O22-C21-O21-C2
2	A	802	PC1	C22-C21-O21-C2
2	B	801	PC1	C32-C31-O31-C3
2	A	801	PC1	C31-C32-C33-C34
2	B	801	PC1	O32-C31-O31-C3
2	A	801	PC1	C21-C22-C23-C24
2	A	802	PC1	C1-O11-P-O13
2	B	801	PC1	C11-O13-P-O11
2	B	802	PC1	C1-O11-P-O13
2	A	801	PC1	C32-C31-O31-C3
2	A	801	PC1	O32-C31-O31-C3
2	A	801	PC1	C32-C33-C34-C35
2	B	802	PC1	C31-C32-C33-C34
2	A	801	PC1	C39-C3A-C3B-C3C
2	B	801	PC1	C36-C37-C38-C39
2	B	802	PC1	C36-C37-C38-C39
2	B	802	PC1	C32-C31-O31-C3
2	A	801	PC1	C38-C39-C3A-C3B
2	B	802	PC1	C11-C12-N-C15
2	B	802	PC1	O32-C31-O31-C3
2	A	801	PC1	C35-C36-C37-C38

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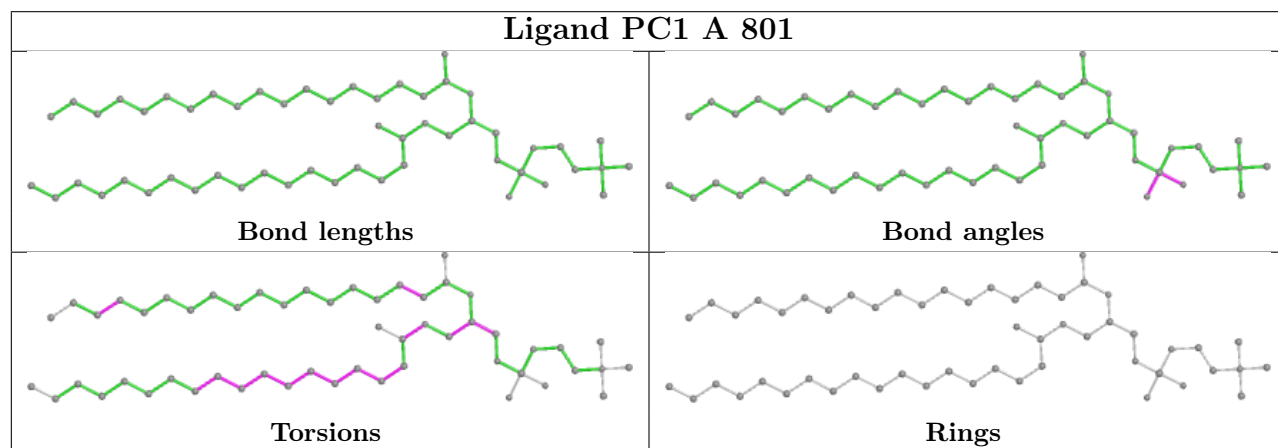
Mol	Chain	Res	Type	Atoms
2	A	801	PC1	C34-C35-C36-C37
2	B	801	PC1	C32-C33-C34-C35
2	B	802	PC1	C32-C33-C34-C35
2	B	802	PC1	C25-C26-C27-C28
2	B	802	PC1	C1-C2-C3-O31
2	A	802	PC1	C21-C22-C23-C24
2	A	802	PC1	C22-C23-C24-C25
2	B	802	PC1	C24-C25-C26-C27
2	A	801	PC1	O11-C1-C2-O21
2	A	802	PC1	O21-C2-C3-O31
2	B	802	PC1	O21-C2-C3-O31
2	B	802	PC1	C37-C38-C39-C3A
2	B	802	PC1	C2D-C2E-C2F-C2G
2	A	801	PC1	C36-C37-C38-C39
2	B	801	PC1	C37-C38-C39-C3A
2	B	801	PC1	C22-C23-C24-C25
2	A	802	PC1	C11-O13-P-O12
2	A	802	PC1	C1-O11-P-O14
2	B	802	PC1	C1-O11-P-O14
2	B	802	PC1	C11-C12-N-C13
2	A	801	PC1	O11-C1-C2-C3
2	B	801	PC1	O13-C11-C12-N
2	B	802	PC1	C11-C12-N-C14
2	B	802	PC1	C3C-C3D-C3E-C3F
2	A	801	PC1	C33-C34-C35-C36
2	A	802	PC1	C31-C32-C33-C34
2	B	801	PC1	C23-C24-C25-C26
2	A	802	PC1	C1-C2-C3-O31
2	A	801	PC1	C2E-C2F-C2G-C2H
2	B	801	PC1	O21-C2-C3-O31
2	A	801	PC1	C1-C2-C3-O31
2	A	801	PC1	C37-C38-C39-C3A
2	B	801	PC1	C35-C36-C37-C38
2	B	801	PC1	O11-C1-C2-O21
2	B	801	PC1	C28-C29-C2A-C2B
2	B	802	PC1	C2C-C2D-C2E-C2F
2	B	801	PC1	C1-C2-C3-O31
2	B	802	PC1	C26-C27-C28-C29
2	A	802	PC1	C23-C24-C25-C26
2	B	802	PC1	C3A-C3B-C3C-C3D

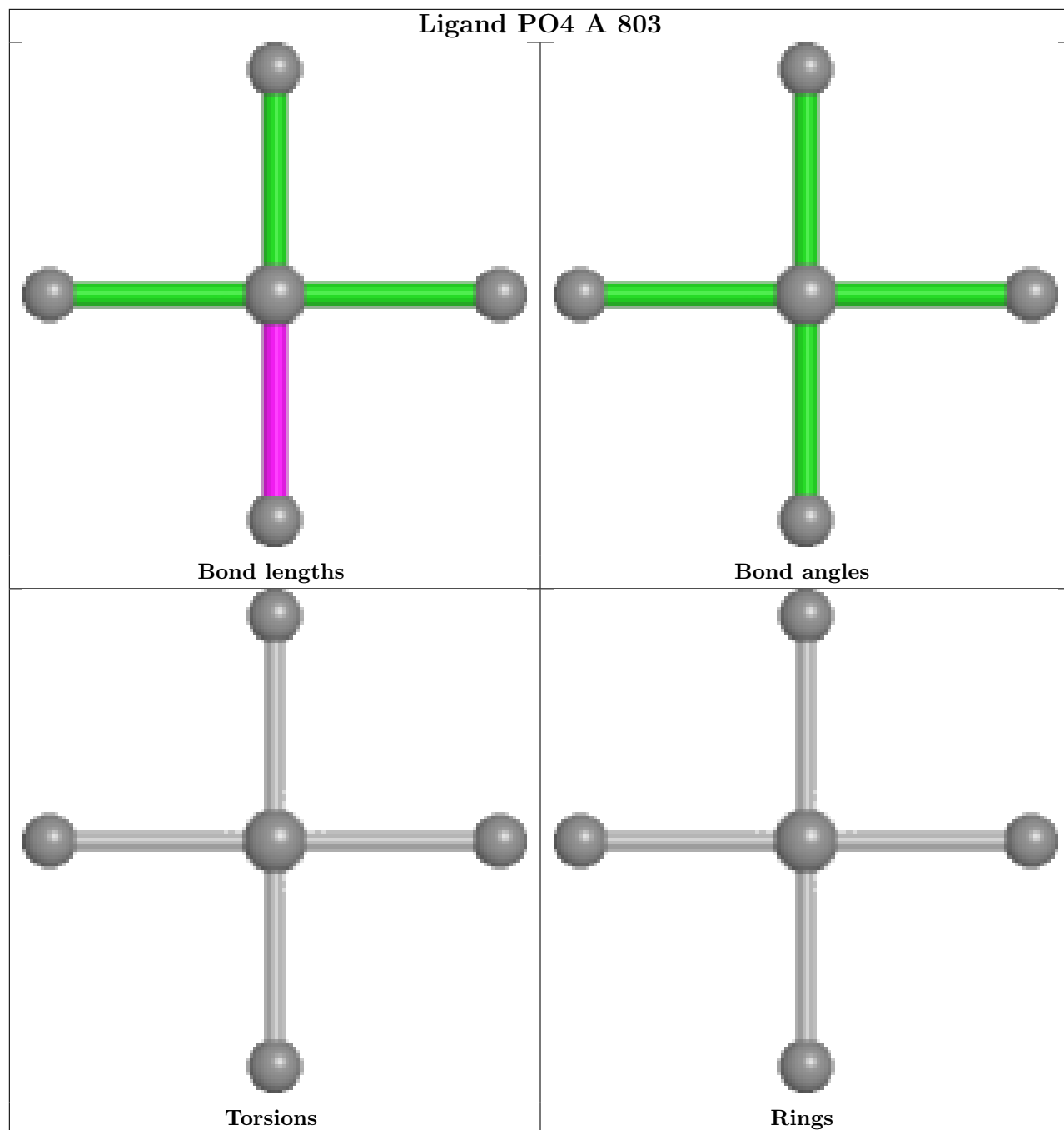
There are no ring outliers.

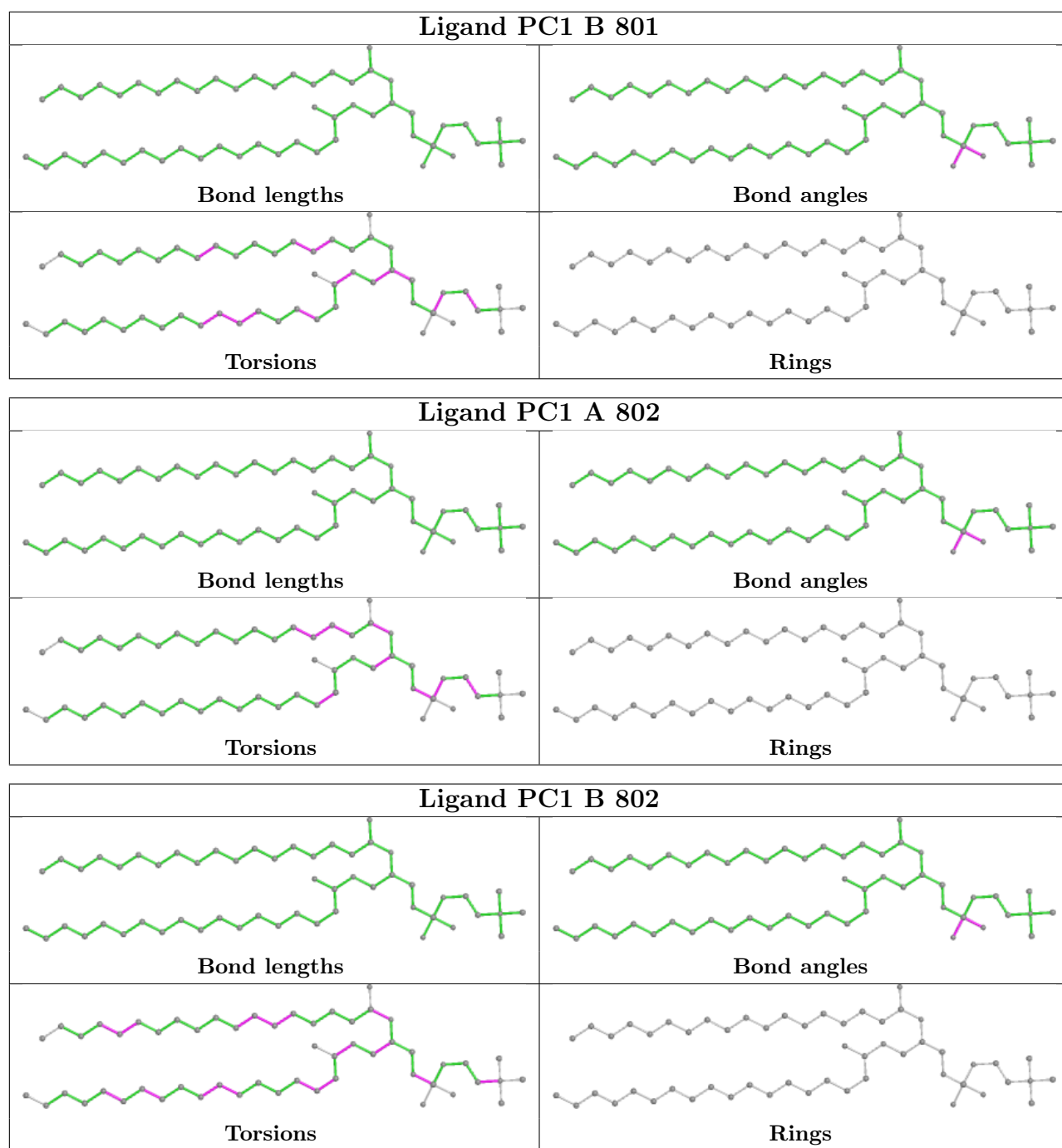
4 monomers are involved in 15 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	801	PC1	7	0
2	B	801	PC1	4	0
2	A	802	PC1	3	0
2	B	802	PC1	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.