



wwPDB X-ray Structure Validation Summary Report ⓘ

May 26, 2020 – 06:41 pm BST

PDB ID : 1I97
Title : CRYSTAL STRUCTURE OF THE 30S RIBOSOMAL SUBUNIT FROM THERMUS THERMOPHILUS IN COMPLEX WITH TETRACYCLINE
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Deposited on : 2001-03-18
Resolution : 4.50 Å(reported)

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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 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) : **NOT EXECUTED**
EDS : **NOT EXECUTED**
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.11

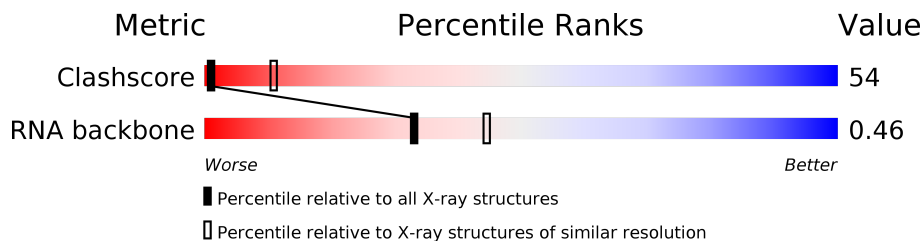
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 4.50 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))
Clashscore	141614	1123 (5.20-3.80)
RNA backbone	3102	1063 (6.00-3.00)

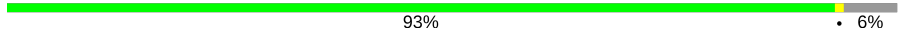
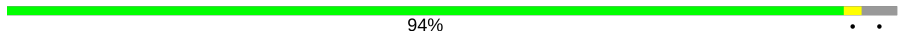
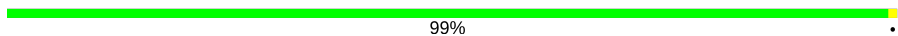


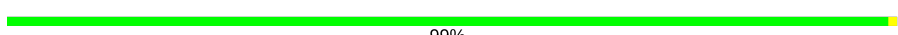
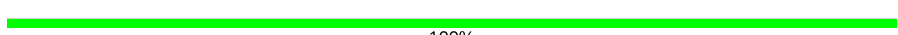





The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. 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 $\leq 5\%$.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	1514	8% 67% 21%
2	B	255	97%
3	C	238	87% 13%
4	D	208	98%
5	E	161	96%
6	F	101	100%
7	G	155	99%
8	H	138	100%
9	I	128	97%

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Mol	Chain	Length	Quality of chain
10	J	104	 93% 6%
11	K	128	 94%
12	L	131	 99%
13	M	125	 74% 26%
14	N	60	 98%
15	O	88	 99%
16	P	88	 100%
17	Q	104	 99%
18	R	87	 94% 6%
19	S	92	 87% 13%
20	T	105	 94% 6%
21	U	26	 88% 8%

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
24	TAC	A	2001	X	-	X	-
24	TAC	A	2003	X	-	X	-
24	TAC	A	2004	X	-	X	-
24	TAC	A	2005	X	-	X	-
24	TAC	A	2006	X	-	X	-
24	TAC	D	2002	X	-	X	-

2 Entry composition

There are 25 unique types of molecules in this entry. The entry contains 36361 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 RNA chain called 16S RRNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
1	A	1514	32534	14482	6022	10517	1513	0	0	0

- Molecule 2 is a protein called 30S RIBOSOMAL PROTEIN S2.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf	Trace
			Total	C			
2	B	249	249	249	0	0	249

- Molecule 3 is a protein called 30S RIBOSOMAL PROTEIN S3.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf	Trace
			Total	C			
3	C	206	206	206	0	0	206

- Molecule 4 is a protein called 30S RIBOSOMAL PROTEIN S4.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf	Trace
			Total	C			
4	D	208	208	208	0	0	208

- Molecule 5 is a protein called 30S RIBOSOMAL PROTEIN S5.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf	Trace
			Total	C			
5	E	156	156	156	0	0	156

- Molecule 6 is a protein called 30S RIBOSOMAL PROTEIN S6.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf	Trace
			Total	C			
6	F	101	101	101	0	0	101

- Molecule 7 is a protein called 30S RIBOSOMAL PROTEIN S7.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
7	G	155	Total C 155 155	0	0	155

- Molecule 8 is a protein called 30S RIBOSOMAL PROTEIN S8.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
8	H	138	Total C 138 138	0	0	138

- Molecule 9 is a protein called 30S RIBOSOMAL PROTEIN S9.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
9	I	127	Total C 127 127	0	0	127

- Molecule 10 is a protein called 30S RIBOSOMAL PROTEIN S10.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
10	J	98	Total C 98 98	0	0	98

- Molecule 11 is a protein called 30S RIBOSOMAL PROTEIN S11.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
11	K	123	Total C 123 123	0	0	123

- Molecule 12 is a protein called 30S RIBOSOMAL PROTEIN S12.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
12	L	131	Total C 131 131	0	0	131

- Molecule 13 is a protein called 30S RIBOSOMAL PROTEIN S13.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
13	M	93	Total C 93 93	0	0	93

- Molecule 14 is a protein called 30S RIBOSOMAL PROTEIN S14.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
14	N	60	Total C 60 60	0	0	60

- Molecule 15 is a protein called 30S RIBOSOMAL PROTEIN S15.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
15	O	88	Total C 88 88	0	0	88

- Molecule 16 is a protein called 30S RIBOSOMAL PROTEIN S16.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
16	P	88	Total C 88 88	0	0	88

- Molecule 17 is a protein called 30S RIBOSOMAL PROTEIN S17.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
17	Q	104	Total C 104 104	0	0	104

- Molecule 18 is a protein called 30S RIBOSOMAL PROTEIN S18.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
18	R	82	Total C 82 82	0	0	82

- Molecule 19 is a protein called 30S RIBOSOMAL PROTEIN S19.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
19	S	80	Total C 80 80	0	0	80

- Molecule 20 is a protein called 30S RIBOSOMAL PROTEIN S20.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
20	T	99	Total C 99 99	0	0	99

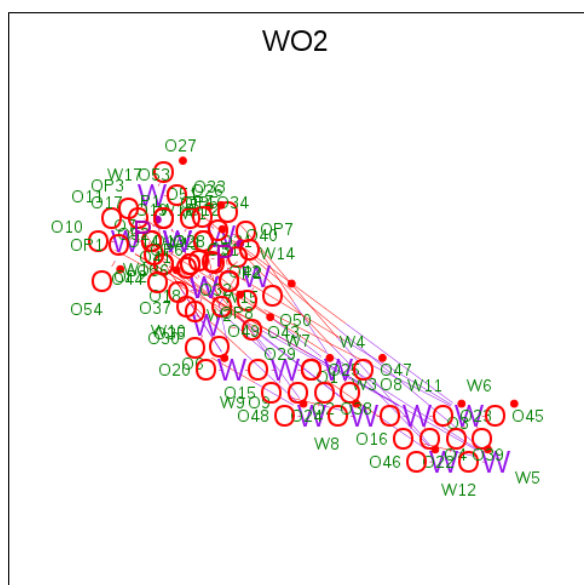
- Molecule 21 is a protein called 30S RIBOSOMAL PROTEIN THX.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
21	U	24	Total C 24 24	0	0	24

- Molecule 22 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

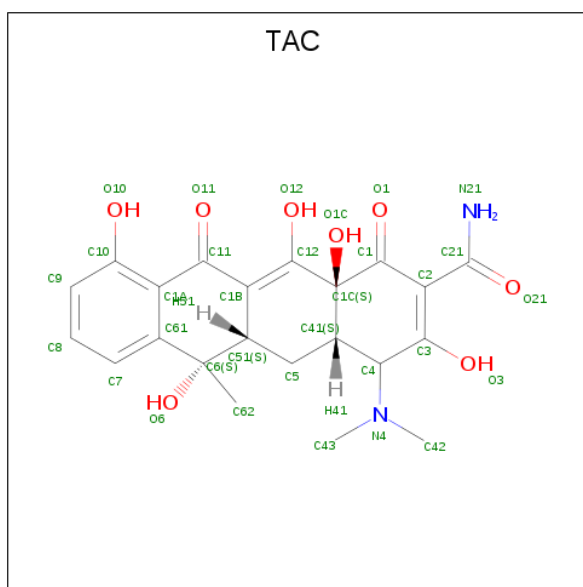
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
22	P	1	Total Mg 1 1	0	0
22	G	1	Total Mg 1 1	0	0
22	Q	2	Total Mg 2 2	0	0
22	D	2	Total Mg 2 2	0	0
22	K	1	Total Mg 1 1	0	0
22	E	1	Total Mg 1 1	0	0
22	A	63	Total Mg 63 63	0	0
22	T	3	Total Mg 3 3	0	0
22	L	1	Total Mg 1 1	0	0

- Molecule 23 is OCTADECATUNGSTENYL DIPHOSPHATE (three-letter code: WO2) (formula: $O_{62}P_2W_{18}$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
23	A	1	Total	O	P	W	0	0
			82	62	2	18		
23	A	1	Total	O	P	W	0	0
			82	62	2	18		
23	A	1	Total	O	P	W	0	0
			82	62	2	18		
23	A	1	Total	O	P	W	0	0
			82	62	2	18		
23	B	1	Total	O	P	W	0	0
			82	62	2	18		
23	B	1	Total	O	P	W	0	0
			82	62	2	18		
23	B	1	Total	O	P	W	0	0
			82	62	2	18		
23	D	1	Total	O	P	W	0	0
			82	62	2	18		
23	E	1	Total	O	P	W	0	0
			82	62	2	18		
23	G	1	Total	O	P	W	0	0
			82	62	2	18		
23	H	1	Total	O	P	W	0	0
			82	62	2	18		
23	J	1	Total	O	P	W	0	0
			82	62	2	18		
23	K	1	Total	O	P	W	0	0
			82	62	2	18		
23	R	1	Total	O	P	W	0	0
			82	62	2	18		

- Molecule 24 is TETRACYCLINE (three-letter code: TAC) (formula: $C_{22}H_{24}N_2O_8$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	
24	A	1	Total	C	N	O	0	0
			32	22	2	8		
24	A	1	Total	C	N	O	0	0
			32	22	2	8		
24	A	1	Total	C	N	O	0	0
			32	22	2	8		
24	A	1	Total	C	N	O	0	0
			32	22	2	8		
24	A	1	Total	C	N	O	0	0
			32	22	2	8		
24	D	1	Total	C	N	O	0	0
			32	22	2	8		

- Molecule 25 is ZINC ION (three-letter code: ZN) (formula: Zn).

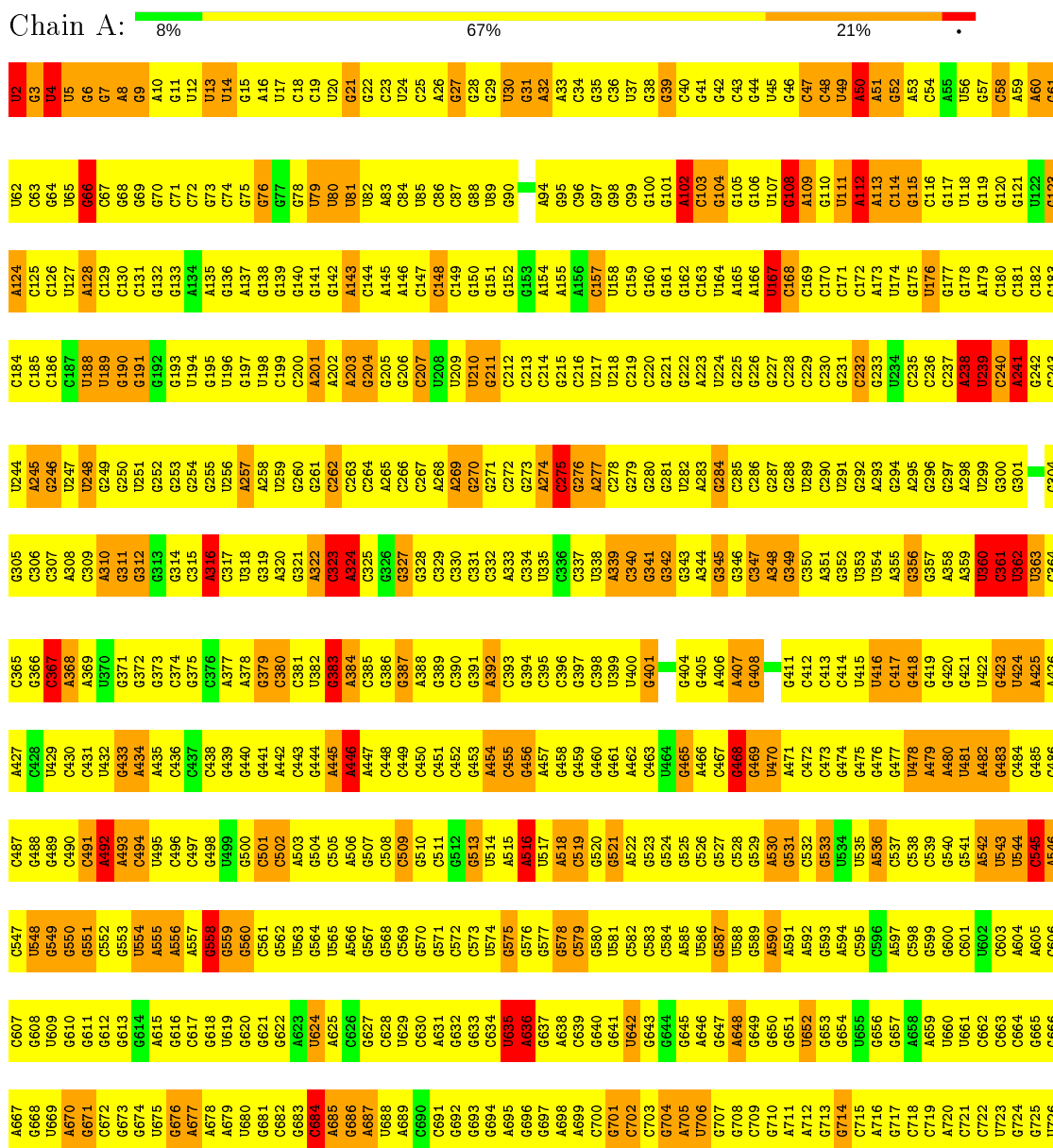
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
25	D	1	Total	Zn	0	0
			1	1		
25	N	1	Total	Zn	0	0
			1	1		

3 Residue-property plots

These plots are drawn for all protein, RNA and DNA 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. 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. 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.

Note EDS was not executed.

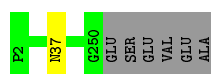
- Molecule 1: 16S rRNA




C127	C728	C788	U848	C908	U968	G1032	A1092	G1152	U1216	C1278	A1338	G1400	A1470
C728	C728	C789	A849	C909	U969	C1033	A1093	G1155	A1217	C1279	U1339	G1401	G1471
A730	A730	C791	A850	C910	C970	U1034	C1094	G1156	C1218	A1280	C1340	C1402	A1472
C731	C731	C792	G851	C911	G971	G1035	C1095	G1159	A1219	A1281	A1341	C1403	C1473
C732	C732	C793	C852	A912	A972	C1036	C1096	G1160	U1220	U1282	C1342	C1404	U1474
G733	G733	C794	G853	C913	C973	U1037	C1097	G1161	C1221	U1283	C1343	C1405	U1475
U734	U734	C795	C854	A914	U974	U1038	C1098	G1162	G1222	C1284	C1344	C1406	A1476
G735	G735	C796	G855	A915	C975	U1039	G1099	G1163	C1223	G1285	A1345	U1409	A1477
A736	A736	C797	C856	C916	C976	G1040	C1100	G1164	C1224	G1286	U1346	A1410	C1478
C737	C737	A798	C857	C917	U977	U1041	C1101	G1165	C1225	U1287	C1347	C1411	A1479
G738	G738	A799	C858	C918	A978	C1042	G1102	G1166	A1226	U1288	C1348	C1412	A1480
C739	C739	C800	C859	G919	G979	G1043	U1103	G1167	C1227	U1289	C1349	C1413	G1481
U740	U740	G801	C860	U920	C980	U1044	A1104	G1168	U1228	G1290	C1350	C1414	G1482
C741	C741	G802	U861	C921	G981	C1045	G1105	G1169	A1229	G1291	C1351	A1415	U1483
A742	A742	U803	G862	C922	A982	G1046	U1107	A1170	C1230	G1292	G1352	A1416	A1484
G744	G744	G804	G863	A923	A983	U1047	C1108	G1171	A1231	G1293	C1353	G1417	G1485
C745	C745	C805	G864	C924	C984	U1048	G1109	G1172	A1232	U1294	U1354	G1418	C1486
G746	G746	C806	G865	C925	G985	A1049	C1110	G1173	A1233	G1295	C1355	C1421	U1487
C747	C747	C807	A866	U926	A986	C1050	C1111	G1174	G1234	U1296	A1356	C1422	U1488
G748	G748	G808	G867	U927	G987	C1051	C1112	G1175	C1235	G1297	A1357	G1423	U1489
C749	C749	C809	U868	C928	U988	U1052	G1113	U1176	C1236	C1298	U1358	G1424	A1490
U810	U810	C810	C869	C929	U989	G1053	C1114	G1177	A1237	A1299	A1359	G1425	C1491
A811	A811	U811	C870	G930	A990	U1054	C1115	U1178	U1238	A1300	C1360	A1426	C1492
U751	U751	G812	G871	G931	A991	U1055	G1116	G1179	C1239	C1301	G1361	G1427	G1493
G752	G752	C813	C872	U932	G992	U1056	U1117	U1180	C1240	C1302	U1362	C1428	G1494
C753	C753	G814	C873	U933	G993	C1057	U1118	U1181	C1241	G1303	U1363	G1429	A1495
U754	U754	U815	C874	U934	C994	U1058	C1119	A1182	A1242	G1304	C1364	U1430	A1496
C755	C755	U816	C875	U935	C995	G1059	G1120	G1183	C1243	A1305	C1365	A1431	G1497
U756	U756	U817	C876	A936	U996	U1060	C1121	G1184	C1244	C1306	C1366	G1432	U1498
G757	G757	C818	C877	G937	G997	G1061	C1122	G1185	C1245	C1307	C1367	G1433	U1499
C758	C758	U819	A878	U938	G998	A1062	C1123	U1186	G1246	G1308	C1368	G1434	G1500
U759	U759	G820	C879	C939	G999	G1063	G1124	U1187	G1247	G1309	C1369	G1435	C1501
A760	A760	G821	C880	G940	U1002	U1064	G1125	U1188	C1248	A1310	C1370	G1436	G1502
C761	C761	G822	C881	A941	C1003	U1065	G1126	G1189	A1249	U1311	U1371	A1437	G1503
A762	A762	G823	C882	G942	G1004	U1067	C1127	G1190	C1251	A1312	U1372	G1438	C1504
U764	U764	U824	A884	C943	C1005	U1068	A1128	G1191	G1252	A1313	G1374	G1439	U1505
C765	C765	C825	A885	A945	G1006	U1069	U1130	U1193	G1253	G1315	U1375	G1440	G1506
G766	G766	G826	A886	A946	C1010	G1070	C1131	A1194	G1257	C1316	A1376	G1441	A1507
C767	C767	U827	C887	C947	G1011	U1071	U1132	G1195	G1258	C1317	C1377	G1442	A1508
G768	G768	G828	U888	G948	A1012	U1072	A1133	G1196	C1259	G1318	A1378	A1444	U1509
G769	G769	G829	C889	C949	G1013	U1073	G1136	G1197	U1259	G1319	C1379	G1445	A1510
U772	U772	G830	A890	G950	G1014	A1074	G1137	C1198	A1260	A1320	A1380	G1446	A1511
A773	A773	G831	A891	A951	G1015	A1075	G1138	C1199	A1261	A1321	C1381	G1447	C1512
G774	G774	G832	A892	A952	G1016	G1076	U1139	U1200	U1262	U1322	C1382	G1448	C1513
A775	A775	C833	G893	G953	A1017	U1077	A1139	G1201	C1263	C1323	G1383	G1453	U1514
G776	G776	G834	G894	A954	G1018	C1078	C1140	G1202	G1264	G1324	C1384	C1454	G1515
U777	U777	C835	A895	A955	G1019	C1079	U1141	G1203	C1265	C1325	C1385	C1455	C1516
C778	C778	G836	A896	C956	C1020	C1080	G1142	G1204	U1266	U1326	C1386	C1456	C1517
C779	C779	U837	U897	C957	G1021	G1081	C1143	G1205	A1267	A1327	G1387	G1459	C1518
C780	C780	G838	U898	U958	U1022	C1082	C1144	A1206	A1268	G1328	U1388	G1462	C1519
U840	U840	G839	G899	U959	A1023	A1083	C1145	C1207	A1269	U1329	U1389	G1463	C1520
A841	A841	U840	A900	A960	G1024	A1084	G1146	C1208	A1270	A1330	C1391	G1464	G1521
G842	G842	C901	A901	C961	C1025	C1085	C1147	C1209	G1271	A1331	G1392	G1465	G1522
C843	C843	U962	G902	G962	A1026	G1086	G1148	C1210	U1272	U1332	U1393	G1466	G1523
U844	U844	G903	G903	A963	C1027	A1087	A1149	C1211	U1273	U1333	A1395	G1467	G1524
C845	C845	G904	G904	A964	U1028	G1088	A1150	C1212	G1274	G1334	U1396	G1468	G1525
U846	U846	G905	G905	A965	A1029	C1089	A1151	C1213	G1275	C1335	U1397	G1469	G1526
C907	C907	U966	C907	G967	G1030	G1090	A1152	C1214	G1276	G1336	G1398	G1470	G1527
					U1031	C1091	C1153	C1215	C1277	G1337	G1399	G1471	G1528

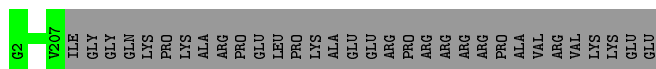
● Molecule 2: 30S RIBOSOMAL PROTEIN S2

Chain B:  97%



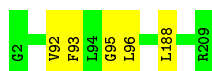
● Molecule 3: 30S RIBOSOMAL PROTEIN S3

Chain C:  87%



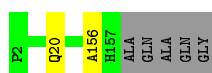
- Molecule 4: 30S RIBOSOMAL PROTEIN S4

Chain D: 98%



- Molecule 5: 30S RIBOSOMAL PROTEIN S5

Chain E: 96%



- Molecule 6: 30S RIBOSOMAL PROTEIN S6

Chain F: 100%

There are no outlier residues recorded for this chain.

- Molecule 7: 30S RIBOSOMAL PROTEIN S7

Chain G: 99%



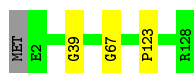
- Molecule 8: 30S RIBOSOMAL PROTEIN S8

Chain H: 100%

There are no outlier residues recorded for this chain.

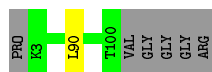
- Molecule 9: 30S RIBOSOMAL PROTEIN S9

Chain I: 97%



- Molecule 10: 30S RIBOSOMAL PROTEIN S10

Chain J: 93% 6%



- Molecule 11: 30S RIBOSOMAL PROTEIN S11

Chain K:  94%



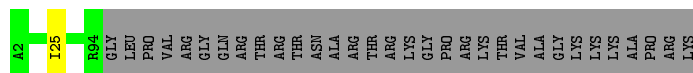
- Molecule 12: 30S RIBOSOMAL PROTEIN S12

Chain L:  99%



- Molecule 13: 30S RIBOSOMAL PROTEIN S13

Chain M:  74% 26%



- Molecule 14: 30S RIBOSOMAL PROTEIN S14

Chain N:  98%



- Molecule 15: 30S RIBOSOMAL PROTEIN S15

Chain O:  99%



- Molecule 16: 30S RIBOSOMAL PROTEIN S16

Chain P:  100%

There are no outlier residues recorded for this chain.

- Molecule 17: 30S RIBOSOMAL PROTEIN S17

Chain Q:  99%



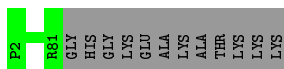
- Molecule 18: 30S RIBOSOMAL PROTEIN S18

Chain R:  94% 6%



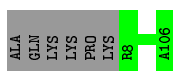
- Molecule 19: 30S RIBOSOMAL PROTEIN S19

Chain S: 87% 13%



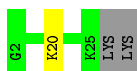
- Molecule 20: 30S RIBOSOMAL PROTEIN S20

Chain T: 94% 6%



- Molecule 21: 30S RIBOSOMAL PROTEIN THX

Chain U: 88% 8%



4 Data and refinement statistics

Xtrriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, α , β , γ	406.90Å 406.90Å 175.20Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	35.00 – 4.50	Depositor
% Data completeness (in resolution range)	(Not available) (35.00-4.50)	Depositor
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	CNS	Depositor
R, R_{free}	0.223 , 0.254	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	36361	wwPDB-VP
Average B, all atoms (Å ²)	77.0	wwPDB-VP

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: ZN, WO2, MG, TAC

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	0.65	6/36417 (0.0%)	0.96	88/56838 (0.2%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	69

The worst 5 of 6 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	822	U	O3'-P	17.42	1.82	1.61
1	A	1178	G	O3'-P	10.60	1.73	1.61
1	A	872	G	O3'-P	8.69	1.71	1.61
1	A	4	U	N1-C2	6.91	1.44	1.38
1	A	1330	A	O3'-P	6.03	1.68	1.61

The worst 5 of 88 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	239	U	P-O3'-C3'	49.44	179.03	119.70
1	A	871	G	P-O3'-C3'	-44.80	65.94	119.70
1	A	919	G	P-O3'-C3'	43.73	172.17	119.70
1	A	872	G	P-O3'-C3'	-26.95	87.36	119.70
1	A	820	G	P-O3'-C3'	-26.57	87.81	119.70

There are no chirality outliers.

5 of 69 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	2	U	Sidechain
1	A	21	G	Sidechain
1	A	27	G	Sidechain
1	A	4	U	Sidechain
1	A	50	A	Sidechain

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	32534	0	16424	2783	0
2	B	249	0	0	1	0
3	C	206	0	0	0	0
4	D	208	0	0	12	0
5	E	156	0	0	2	0
6	F	101	0	0	0	0
7	G	155	0	0	2	0
8	H	138	0	0	0	0
9	I	127	0	0	5	0
10	J	98	0	0	1	0
11	K	123	0	0	5	0
12	L	131	0	0	1	0
13	M	93	0	0	1	0
14	N	60	0	0	1	0
15	O	88	0	0	1	0
16	P	88	0	0	0	0
17	Q	104	0	0	3	0
18	R	82	0	0	0	0
19	S	80	0	0	0	0
20	T	99	0	0	0	0
21	U	24	0	0	1	0
22	A	63	0	0	0	0
22	D	2	0	0	0	0
22	E	1	0	0	0	0
22	G	1	0	0	0	0
22	K	1	0	0	0	0
22	L	1	0	0	0	0
22	P	1	0	0	0	0
22	Q	2	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
22	T	3	0	0	0	0
23	A	328	0	0	0	0
23	B	246	0	0	1	0
23	D	82	0	0	0	0
23	E	82	0	0	1	0
23	G	82	0	0	3	0
23	H	82	0	0	0	0
23	J	82	0	0	1	0
23	K	82	0	0	4	0
23	R	82	0	0	0	0
24	A	160	0	115	159	0
24	D	32	0	23	12	0
25	D	1	0	0	0	0
25	N	1	0	0	0	0
All	All	36361	0	16562	2812	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 54.

The worst 5 of 2812 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:239:U:H1'	24:A:2005:TAC:C9	1.30	1.54
1:A:872:G:C5	1:A:873:C:C5	2.02	1.46
4:D:92:VAL:CA	24:D:2002:TAC:H423	1.41	1.46
1:A:872:G:C5	1:A:873:C:C6	2.11	1.38
1:A:239:U:H1'	24:A:2005:TAC:C8	1.52	1.36

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

There are no protein backbone outliers to report in this entry.

5.3.2 Protein sidechains [i](#)

There are no protein residues with a non-rotameric sidechain to report in this entry.

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	1513/1514 (99%)	322 (21%)	119 (7%)

5 of 322 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	3	G
1	A	4	U
1	A	5	U
1	A	6	G
1	A	8	A

5 of 119 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	A	545	C
1	A	800	C
1	A	1345	A
1	A	558	G
1	A	684	C

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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

Of 97 ligands modelled in this entry, 77 are monoatomic - leaving 20 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
23	WO2	A	1581	-	60,116,116	51.46	10 (16%)	6,348,348	13.00	2 (33%)
24	TAC	A	2001	-	33,35,35	1.88	7 (21%)	42,58,58	2.08	8 (19%)
23	WO2	G	1006	-	60,116,116	51.46	10 (16%)	6,348,348	13.00	2 (33%)
23	WO2	A	1580	-	60,116,116	51.46	10 (16%)	6,348,348	13.00	2 (33%)
23	WO2	R	1008	-	60,116,116	51.46	10 (16%)	6,348,348	13.02	2 (33%)
23	WO2	J	1009	-	60,116,116	51.45	10 (16%)	6,348,348	13.00	2 (33%)
24	TAC	A	2004	-	33,35,35	1.89	7 (21%)	42,58,58	2.09	8 (19%)
24	TAC	A	2003	-	33,35,35	1.90	7 (21%)	42,58,58	2.10	8 (19%)
23	WO2	K	1014	-	60,116,116	51.46	10 (16%)	6,348,348	13.00	2 (33%)
23	WO2	B	1004	-	60,116,116	51.45	10 (16%)	6,348,348	12.99	2 (33%)
23	WO2	H	1010	-	60,116,116	51.46	10 (16%)	6,348,348	13.01	2 (33%)
23	WO2	B	1002	-	60,116,116	51.46	10 (16%)	6,348,348	13.00	2 (33%)
23	WO2	A	1582	-	60,116,116	51.46	10 (16%)	6,348,348	13.00	2 (33%)
24	TAC	A	2006	-	33,35,35	1.89	7 (21%)	42,58,58	2.10	8 (19%)
23	WO2	D	1012	-	60,116,116	51.45	10 (16%)	6,348,348	12.99	2 (33%)
24	TAC	A	2005	-	33,35,35	1.88	7 (21%)	42,58,58	2.09	8 (19%)
24	TAC	D	2002	-	33,35,35	1.88	7 (21%)	42,58,58	2.09	8 (19%)
23	WO2	E	1005	-	60,116,116	51.44	9 (15%)	6,348,348	12.99	2 (33%)
23	WO2	B	1001	-	60,116,116	51.46	10 (16%)	6,348,348	13.00	2 (33%)
23	WO2	A	1579	-	60,116,116	51.46	10 (16%)	6,348,348	13.00	2 (33%)

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
24	TAC	A	2001	-	1/1/13/13	1/8/74/74	0/4/4/4
24	TAC	A	2005	-	1/1/13/13	1/8/74/74	0/4/4/4
24	TAC	A	2004	-	1/1/13/13	1/8/74/74	0/4/4/4
24	TAC	A	2003	-	1/1/13/13	1/8/74/74	0/4/4/4
24	TAC	A	2006	-	1/1/13/13	1/8/74/74	0/4/4/4
24	TAC	D	2002	-	1/1/13/13	1/8/74/74	0/4/4/4

The worst 5 of 181 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
23	R	1008	WO2	P2-OP5	397.57	8.56	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
23	H	1010	WO2	P2-OP5	397.57	8.56	1.53
23	A	1581	WO2	P2-OP5	397.55	8.56	1.53
23	G	1006	WO2	P2-OP5	397.54	8.56	1.53
23	B	1001	WO2	P2-OP5	397.54	8.56	1.53

The worst 5 of 76 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
23	R	1008	WO2	OP6-P2-OP5	-29.53	61.91	111.56
23	H	1010	WO2	OP6-P2-OP5	-29.52	61.93	111.56
23	A	1581	WO2	OP6-P2-OP5	-29.52	61.94	111.56
23	A	1580	WO2	OP6-P2-OP5	-29.52	61.94	111.56
23	A	1579	WO2	OP6-P2-OP5	-29.51	61.94	111.56

5 of 6 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
24	A	2006	TAC	C4
24	A	2003	TAC	C4
24	D	2002	TAC	C4
24	A	2004	TAC	C4
24	A	2005	TAC	C4

5 of 6 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
24	A	2006	TAC	C41-C4-N4-C42
24	A	2003	TAC	C41-C4-N4-C42
24	D	2002	TAC	C41-C4-N4-C42
24	A	2004	TAC	C41-C4-N4-C42
24	A	2005	TAC	C41-C4-N4-C42

There are no ring outliers.

11 monomers are involved in 181 short contacts:

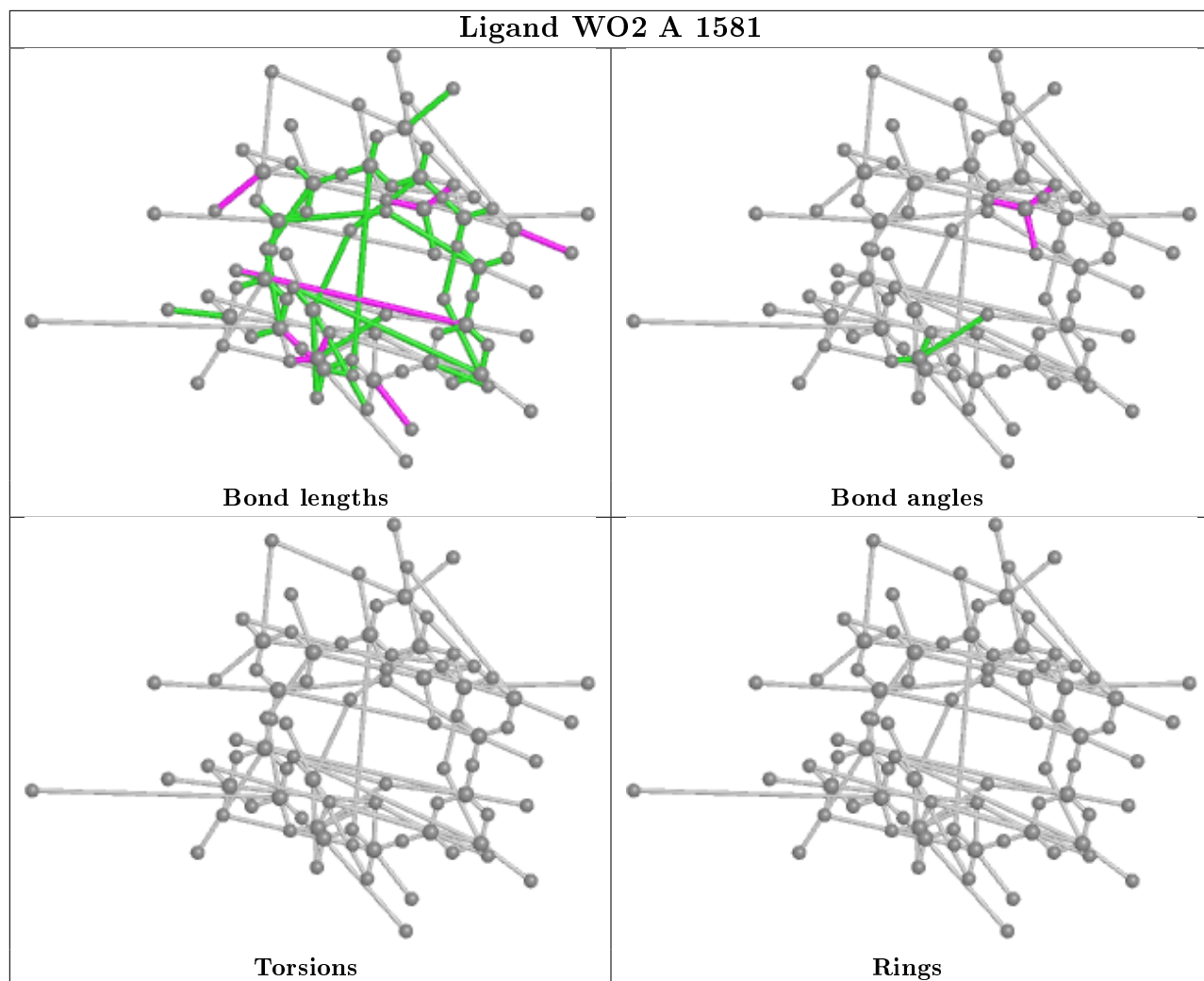
Mol	Chain	Res	Type	Clashes	Symm-Clashes
24	A	2001	TAC	14	0
23	G	1006	WO2	3	0
23	J	1009	WO2	1	0
24	A	2004	TAC	50	0
24	A	2003	TAC	32	0

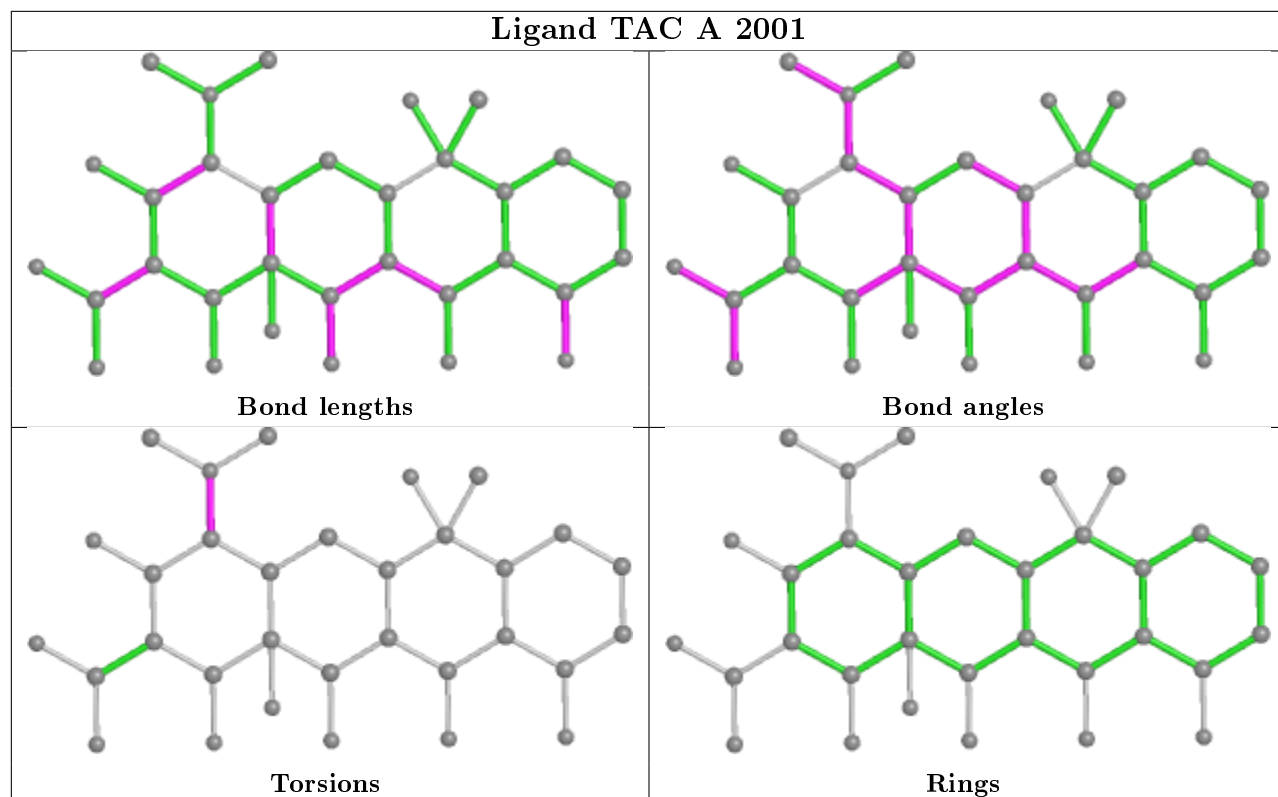
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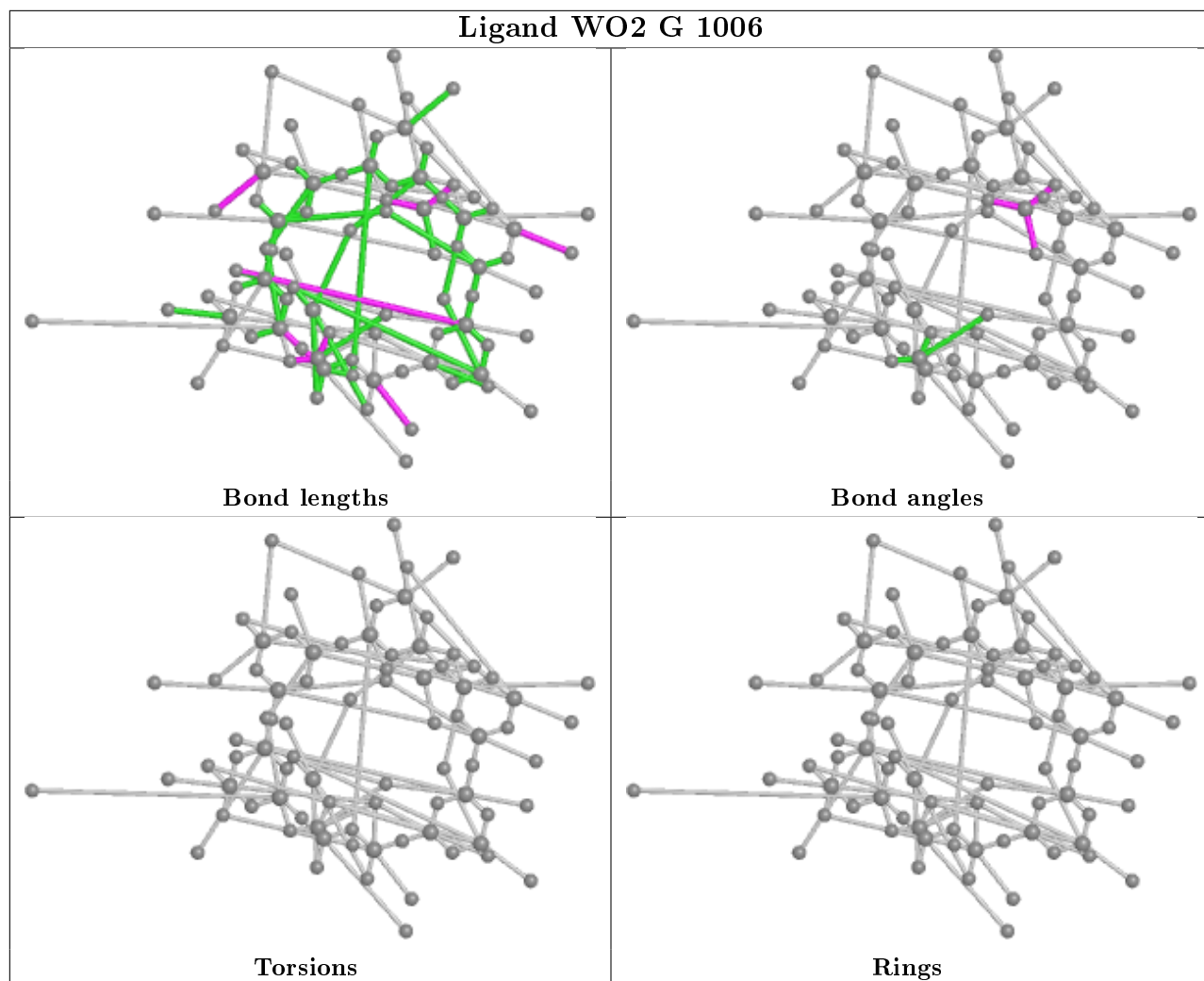
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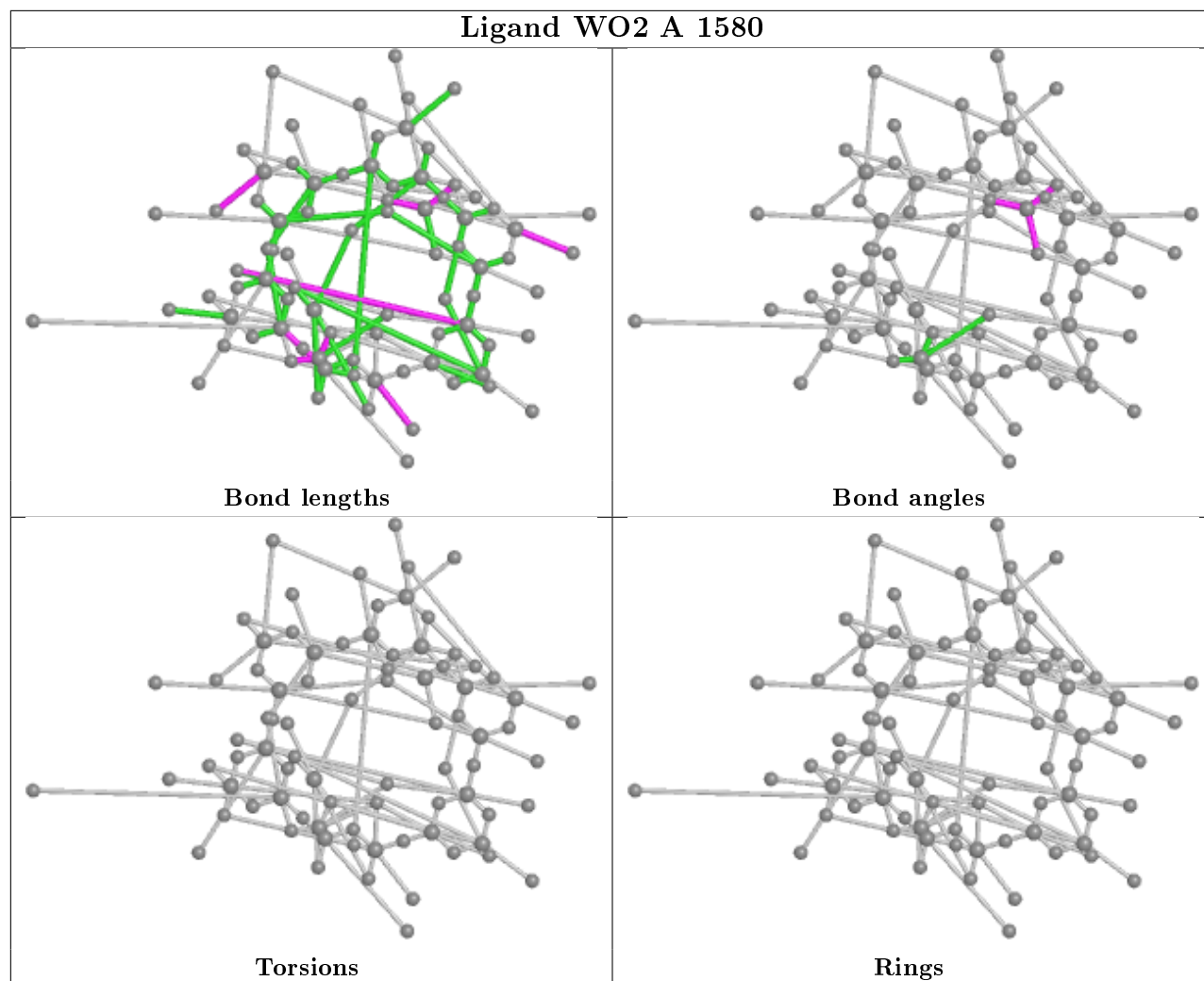
Mol	Chain	Res	Type	Clashes	Symm-Clashes
23	K	1014	WO2	4	0
24	A	2006	TAC	21	0
24	A	2005	TAC	42	0
24	D	2002	TAC	12	0
23	E	1005	WO2	1	0
23	B	1001	WO2	1	0

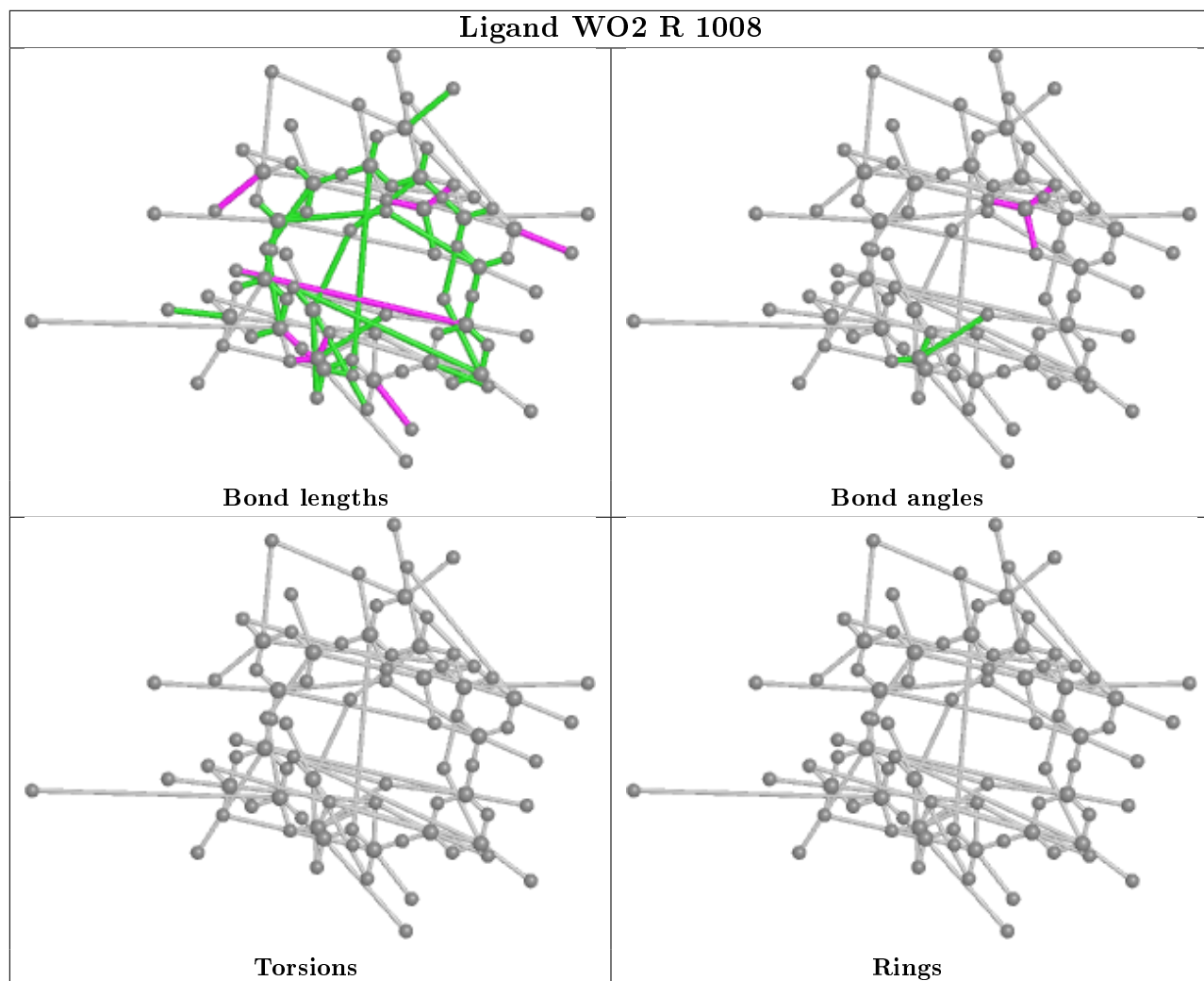
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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.

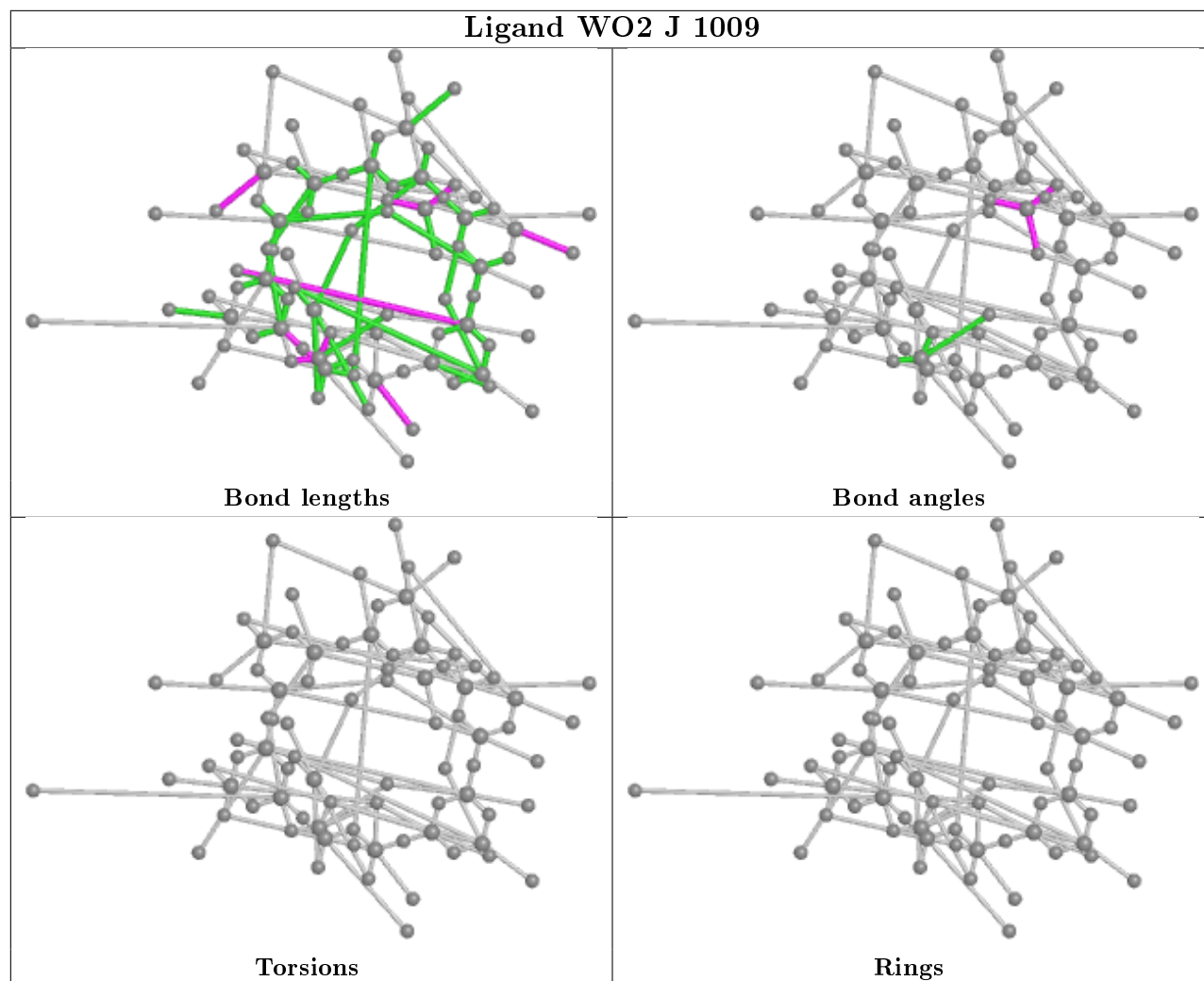


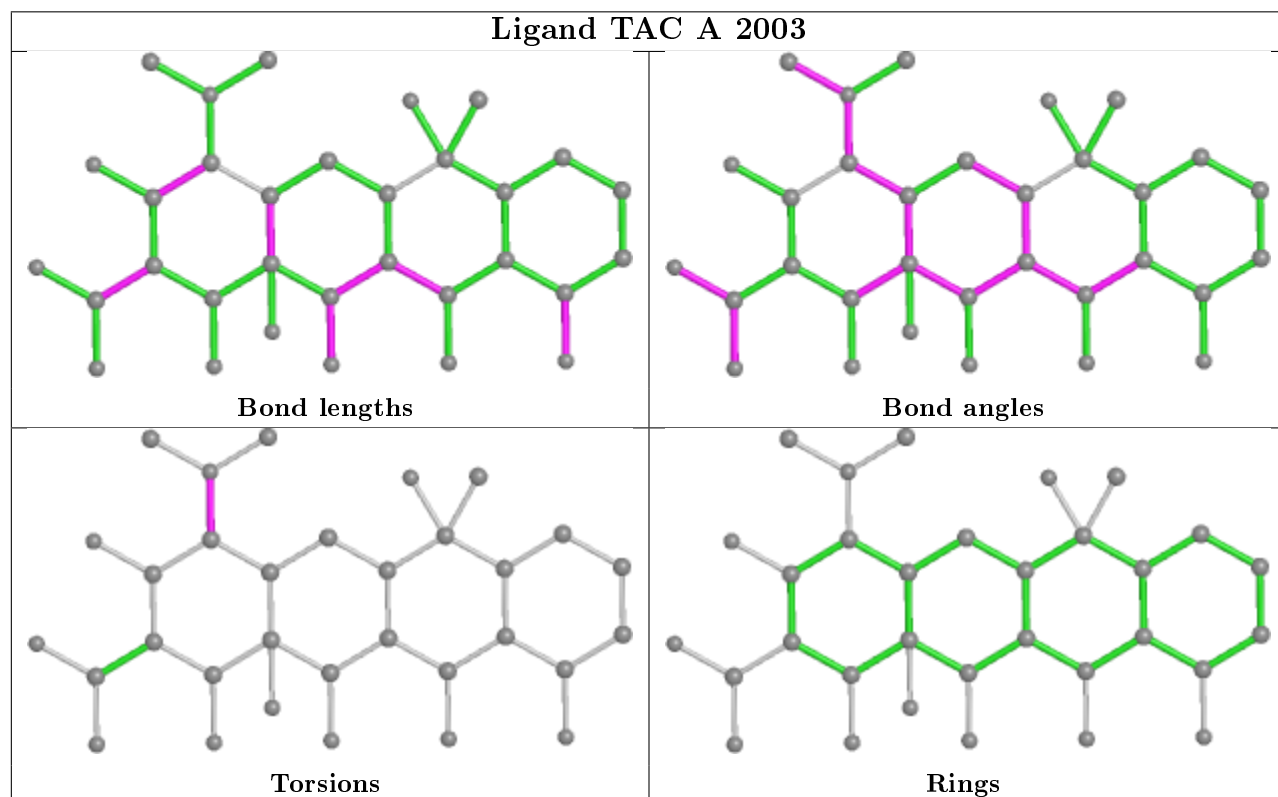
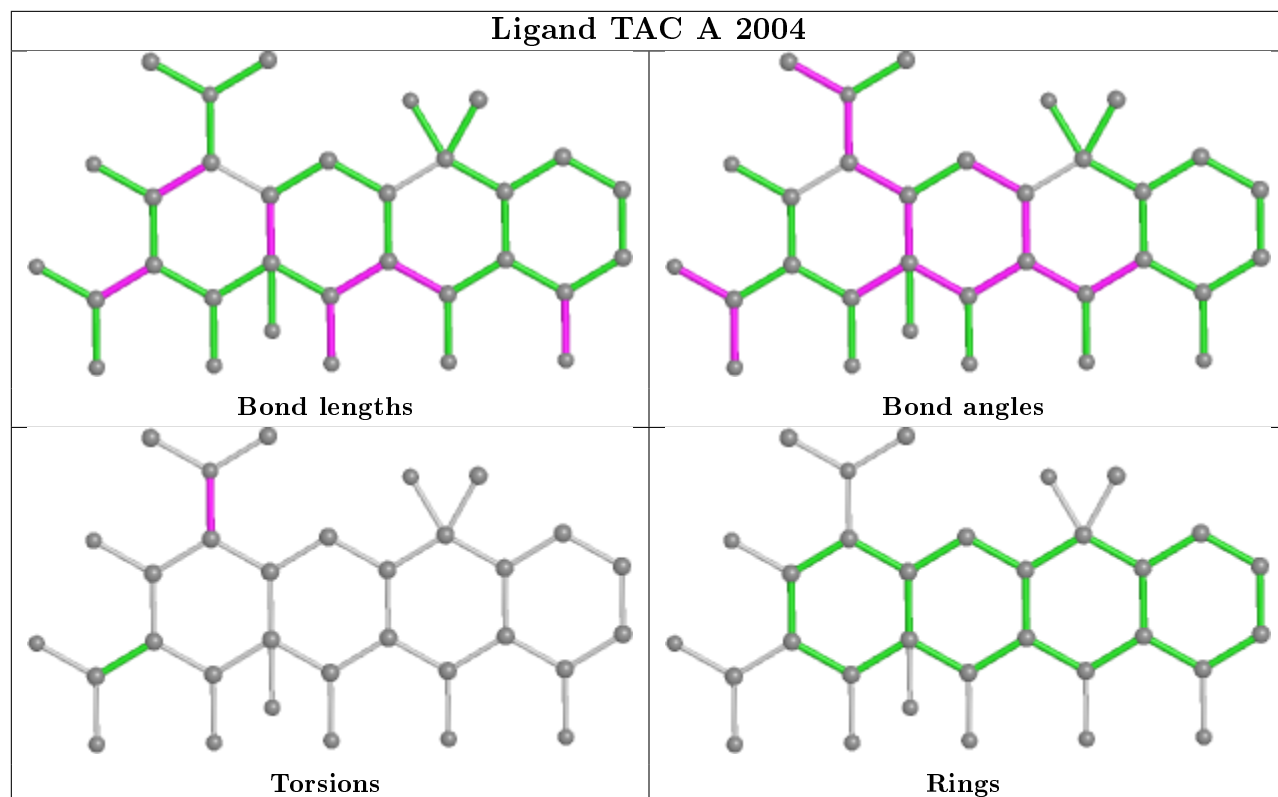


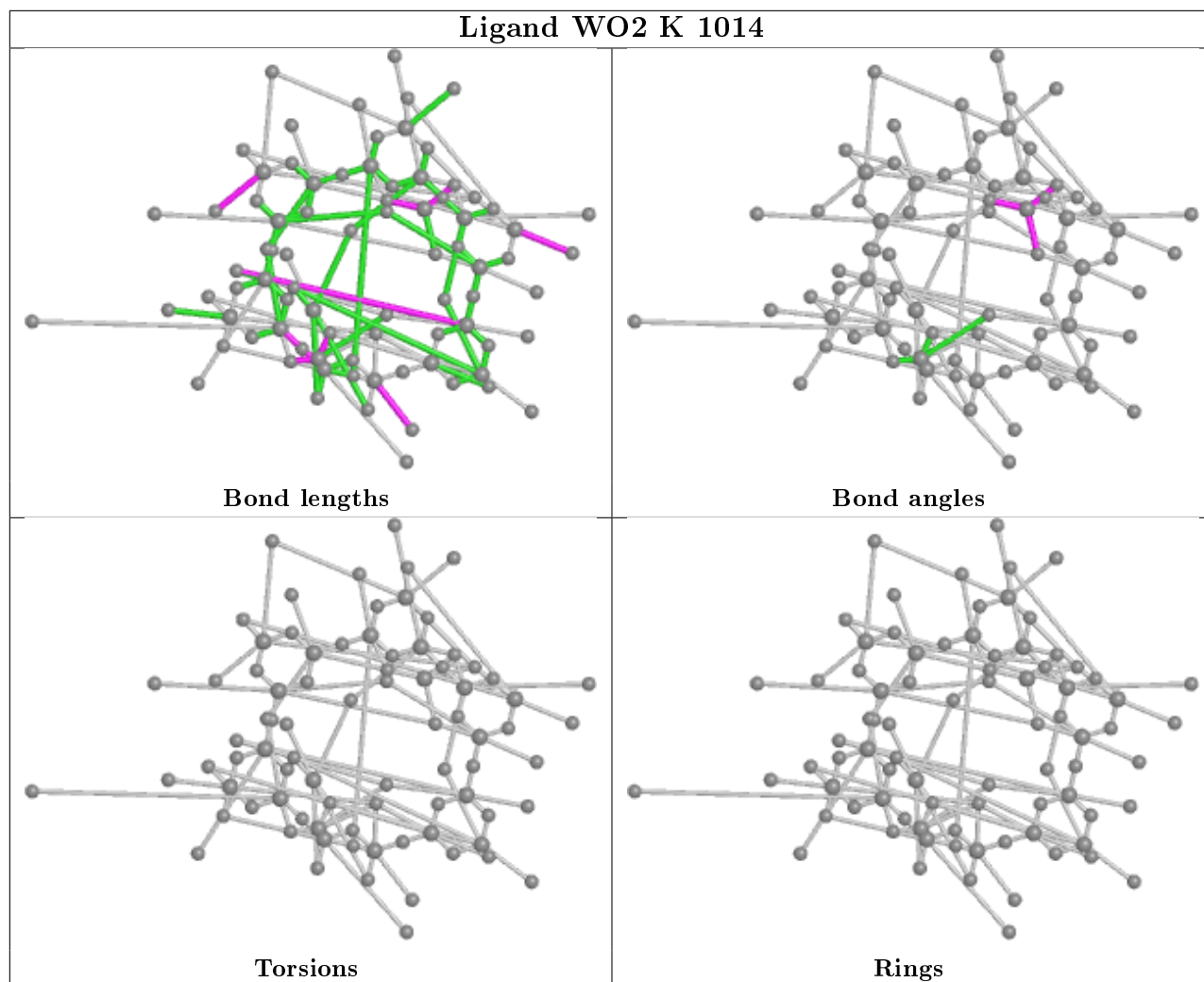


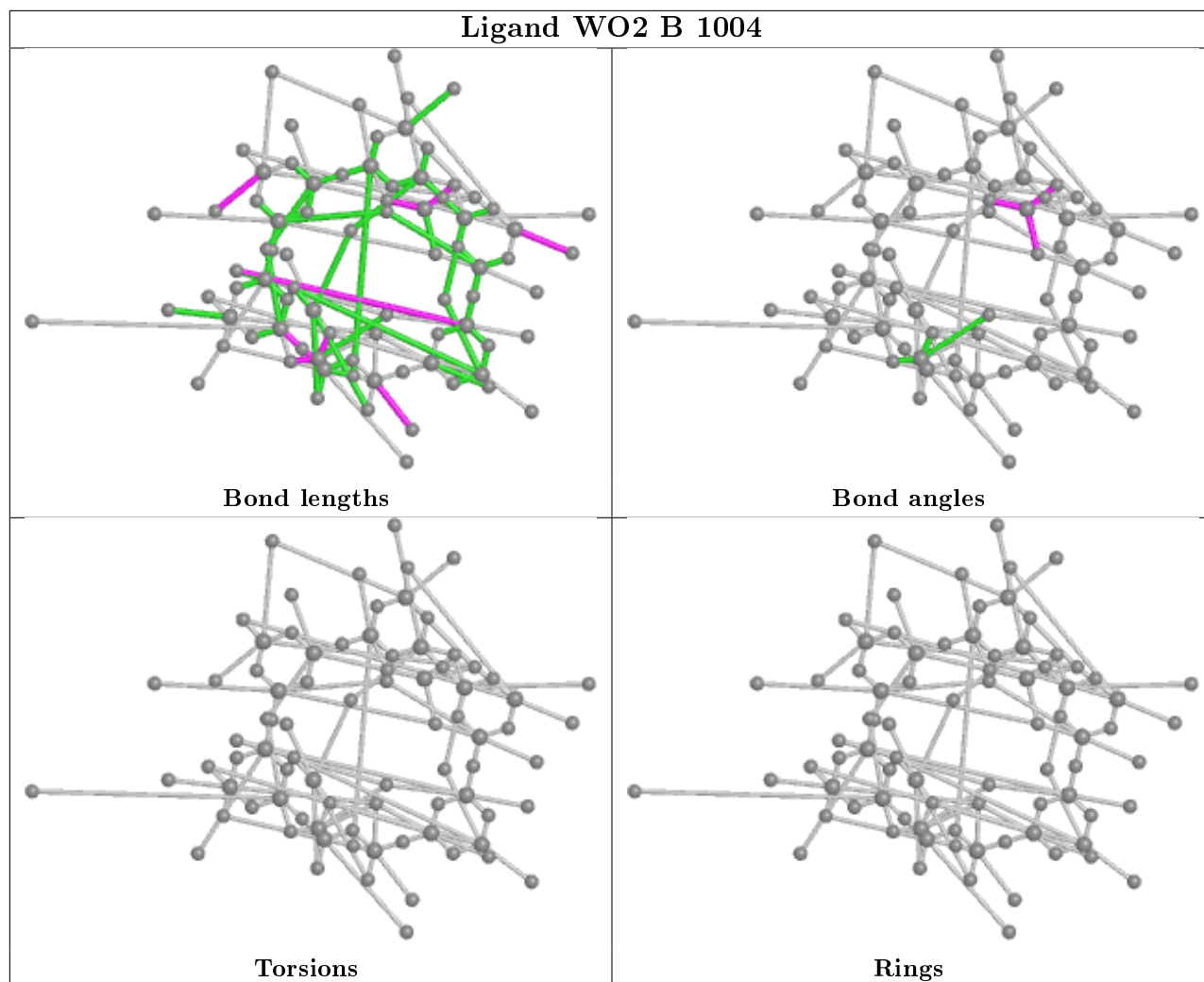


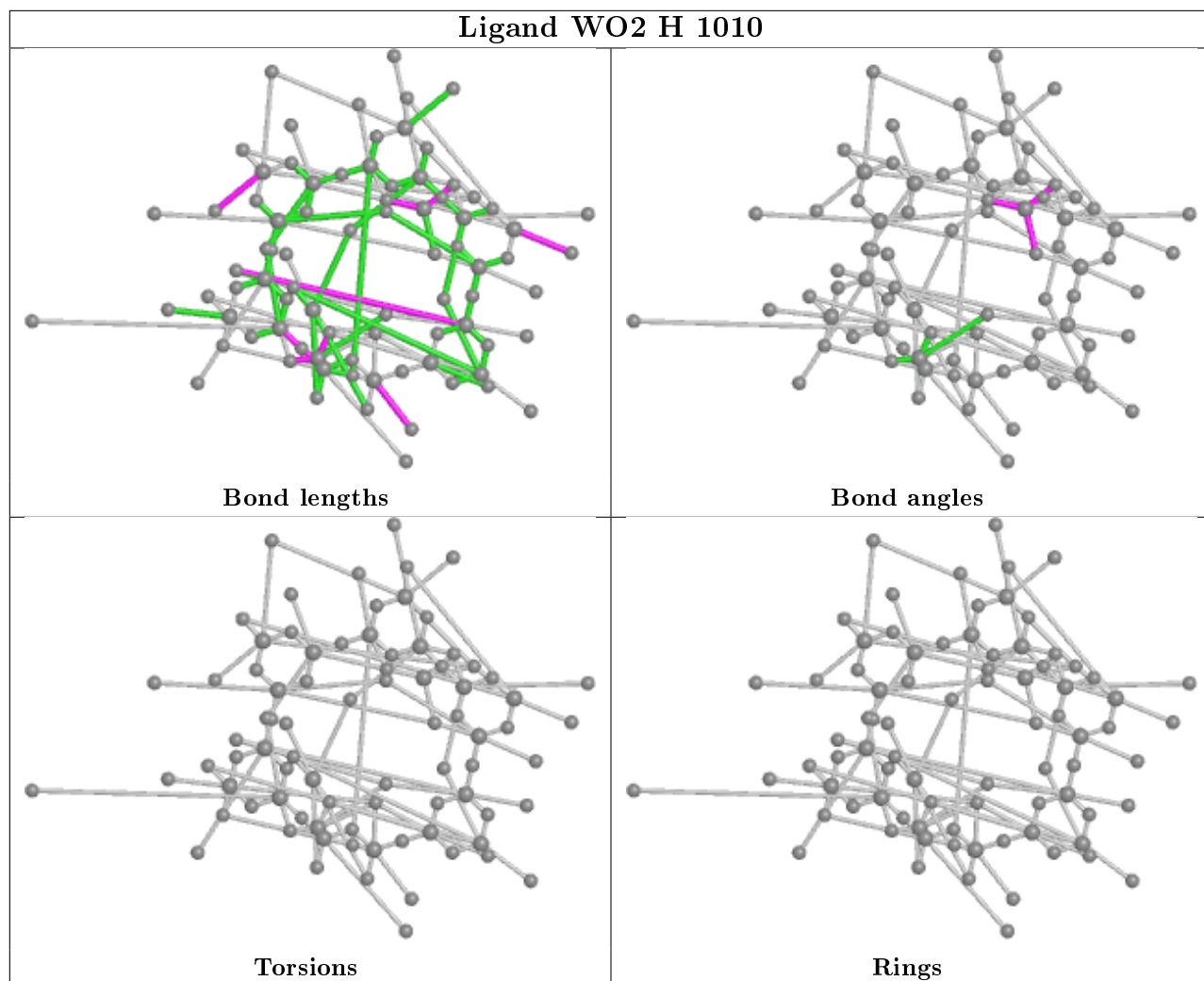


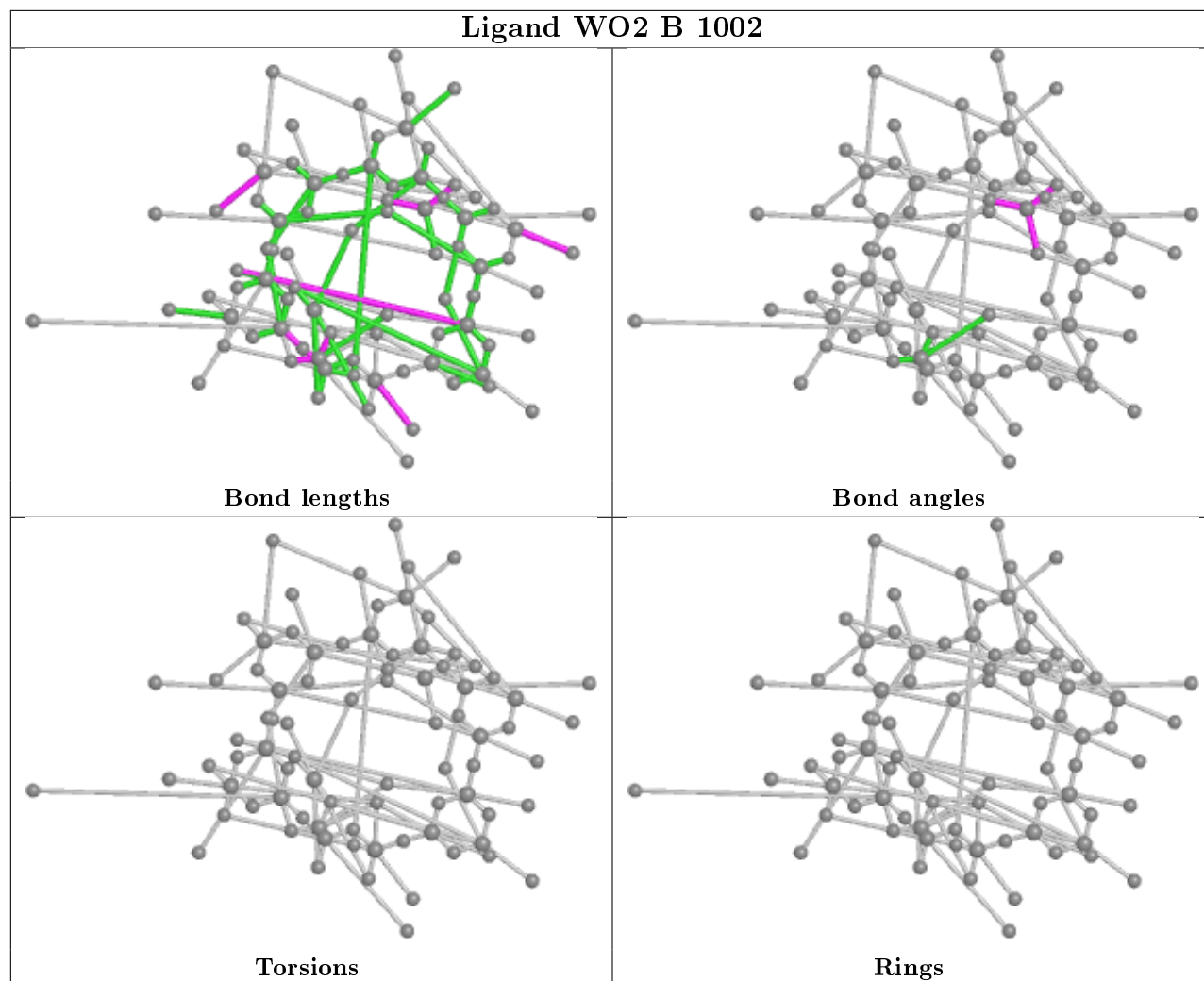


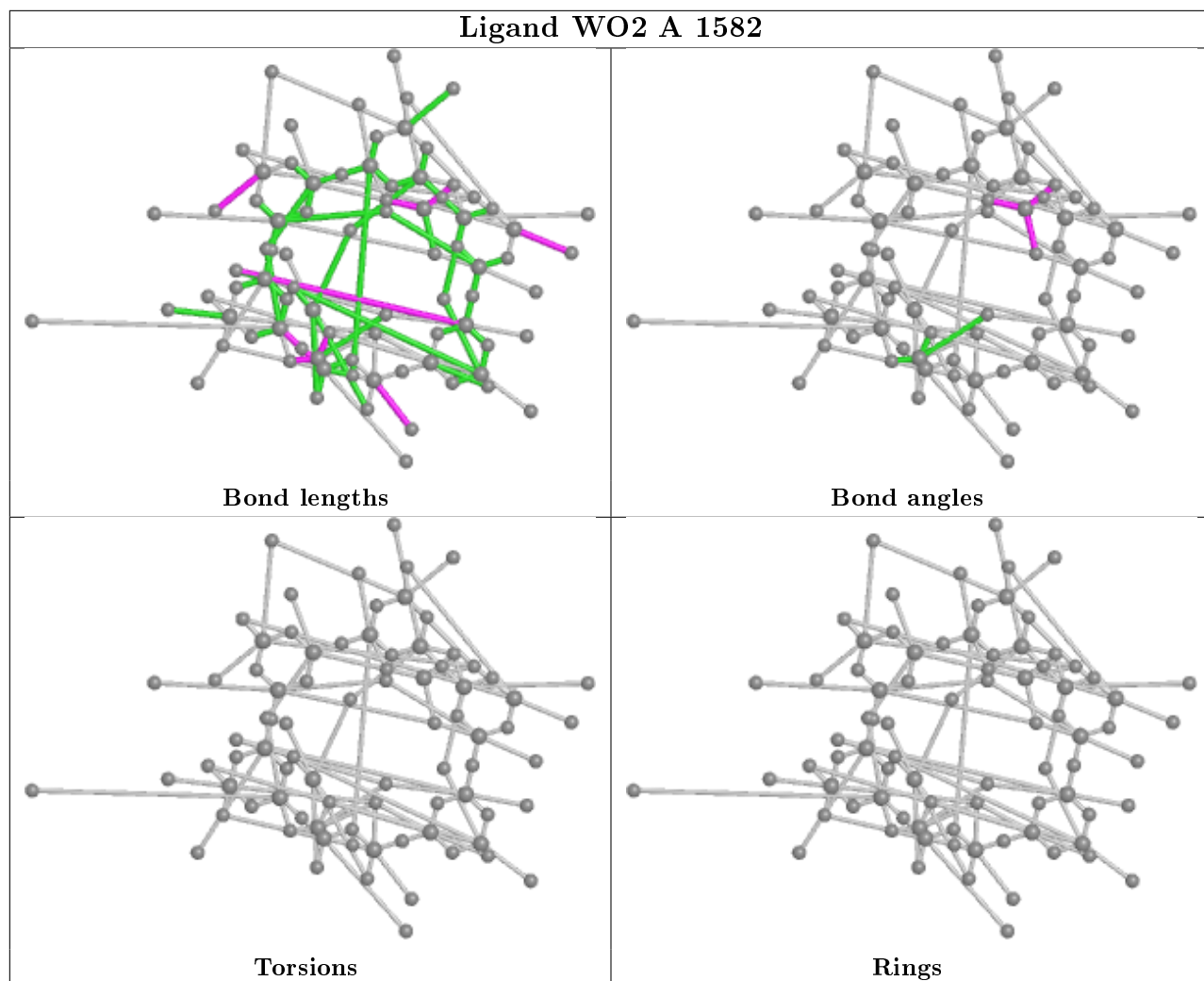


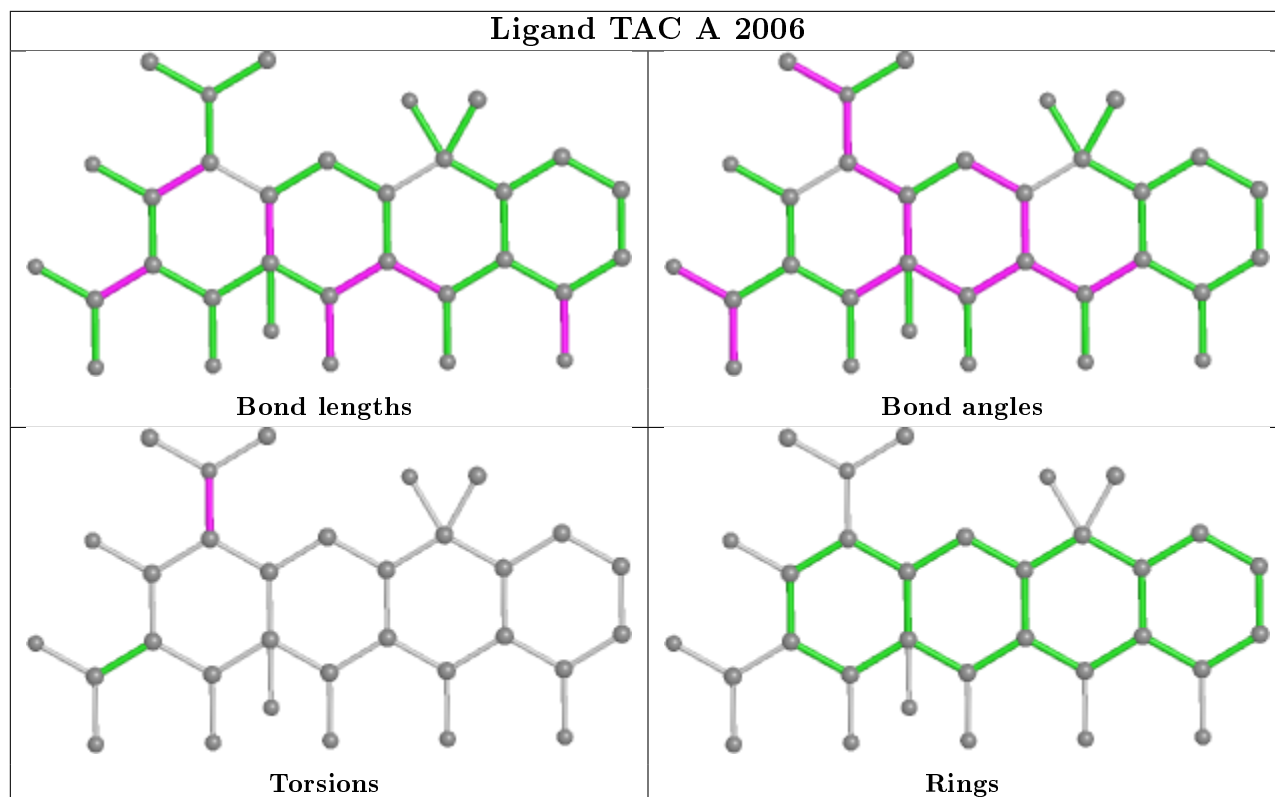


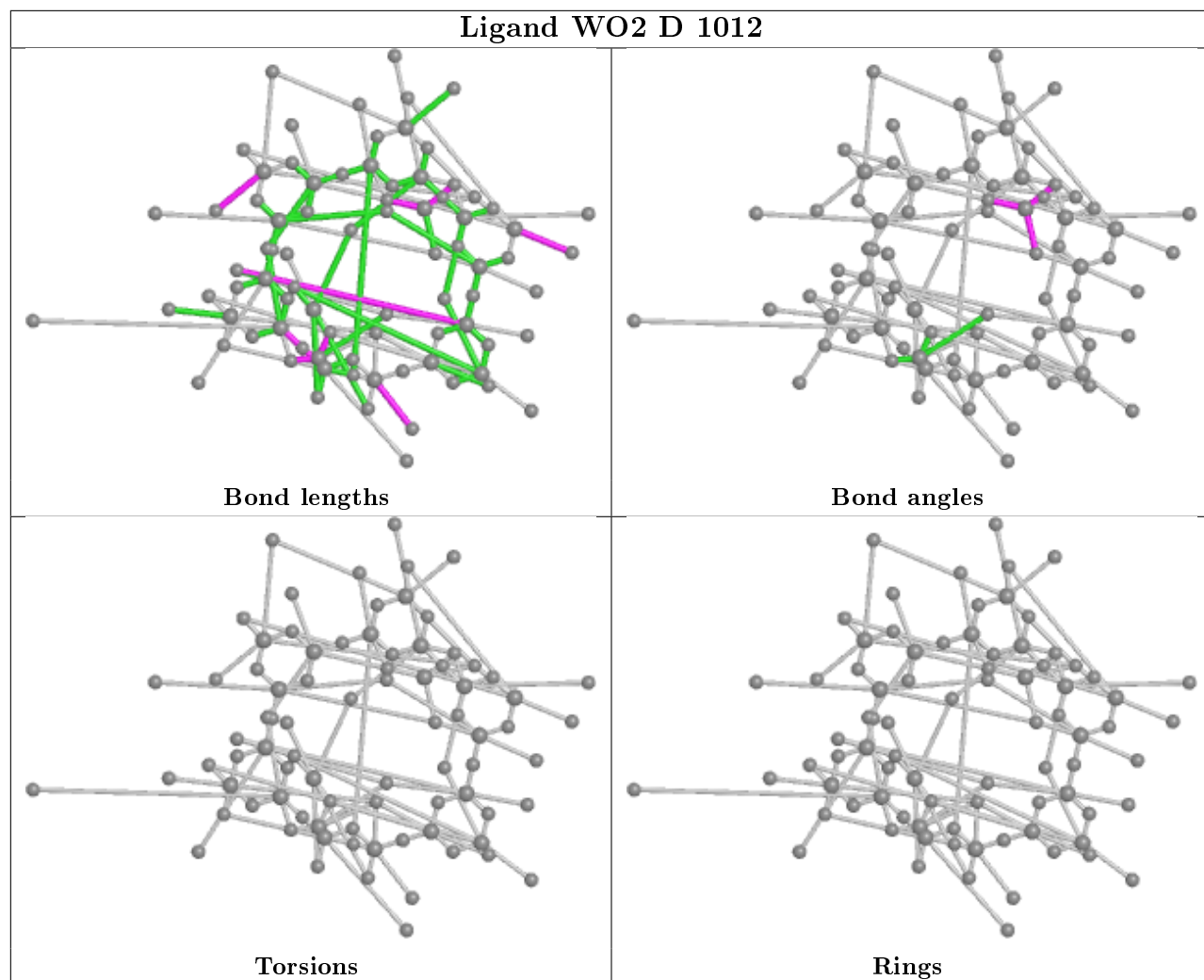


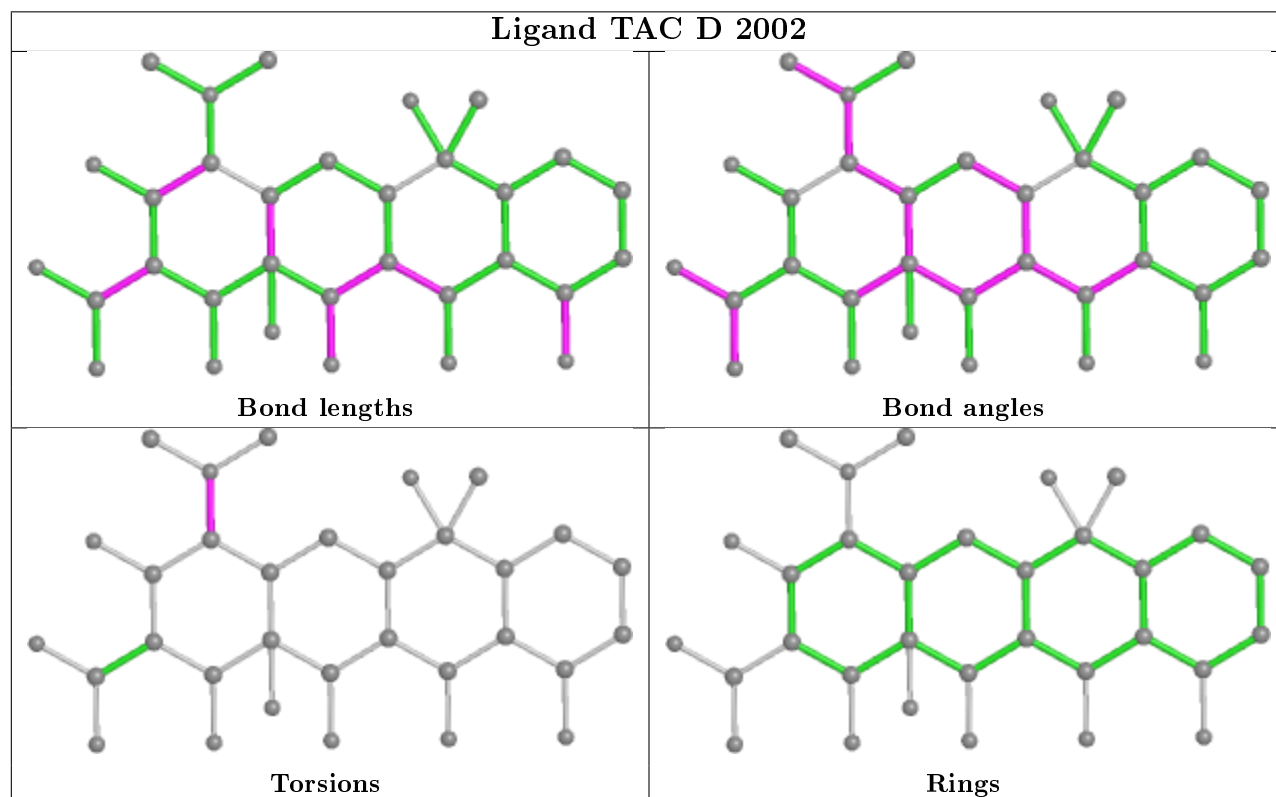
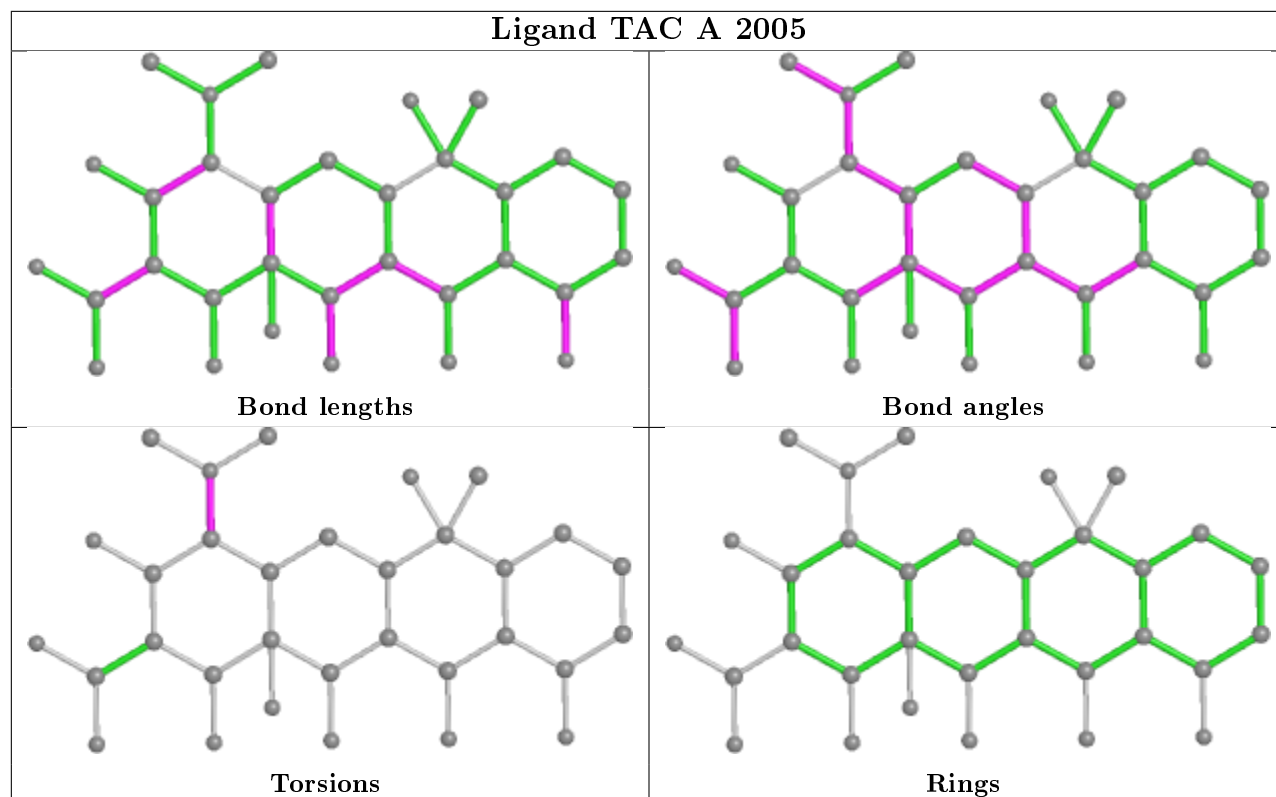


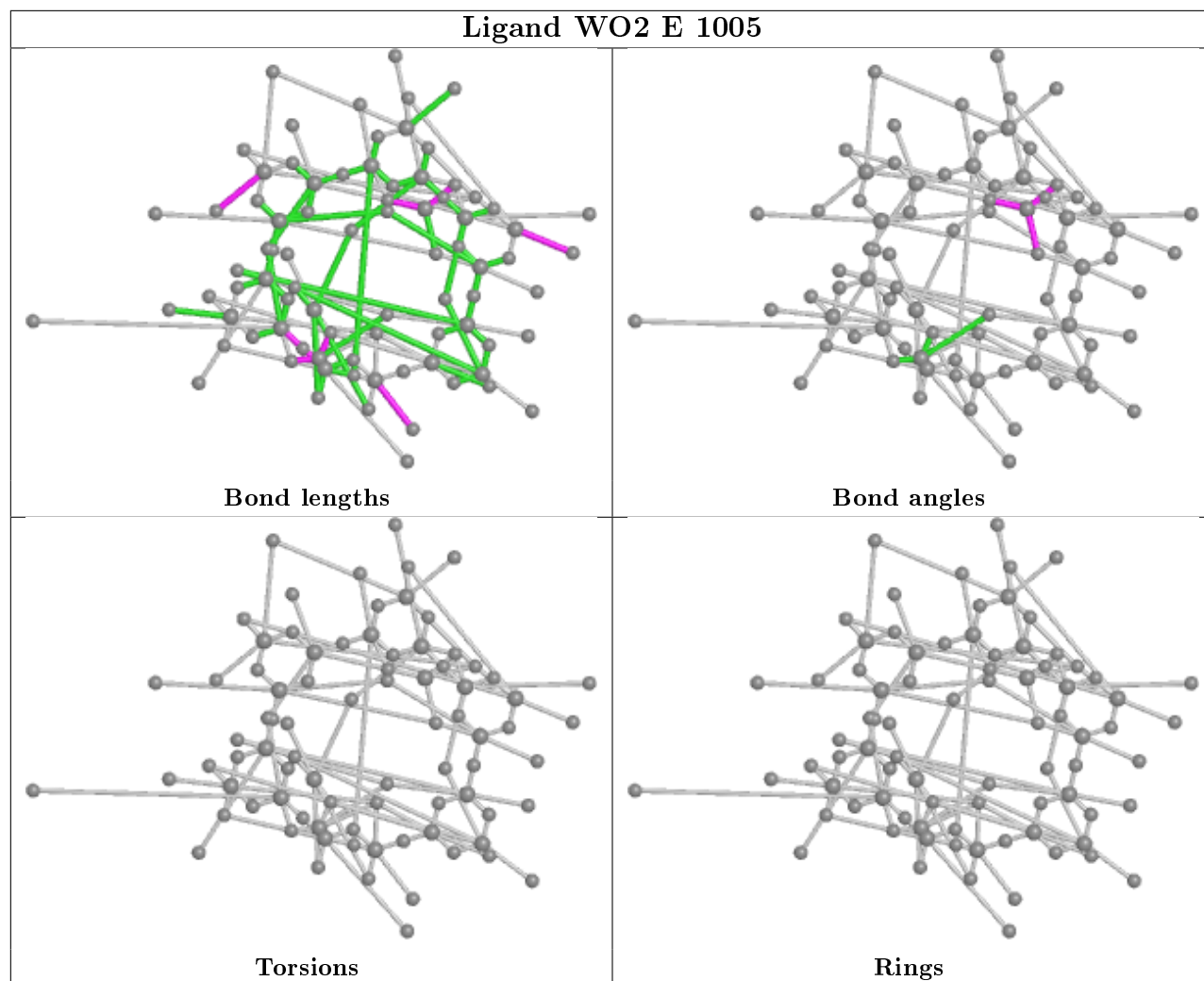


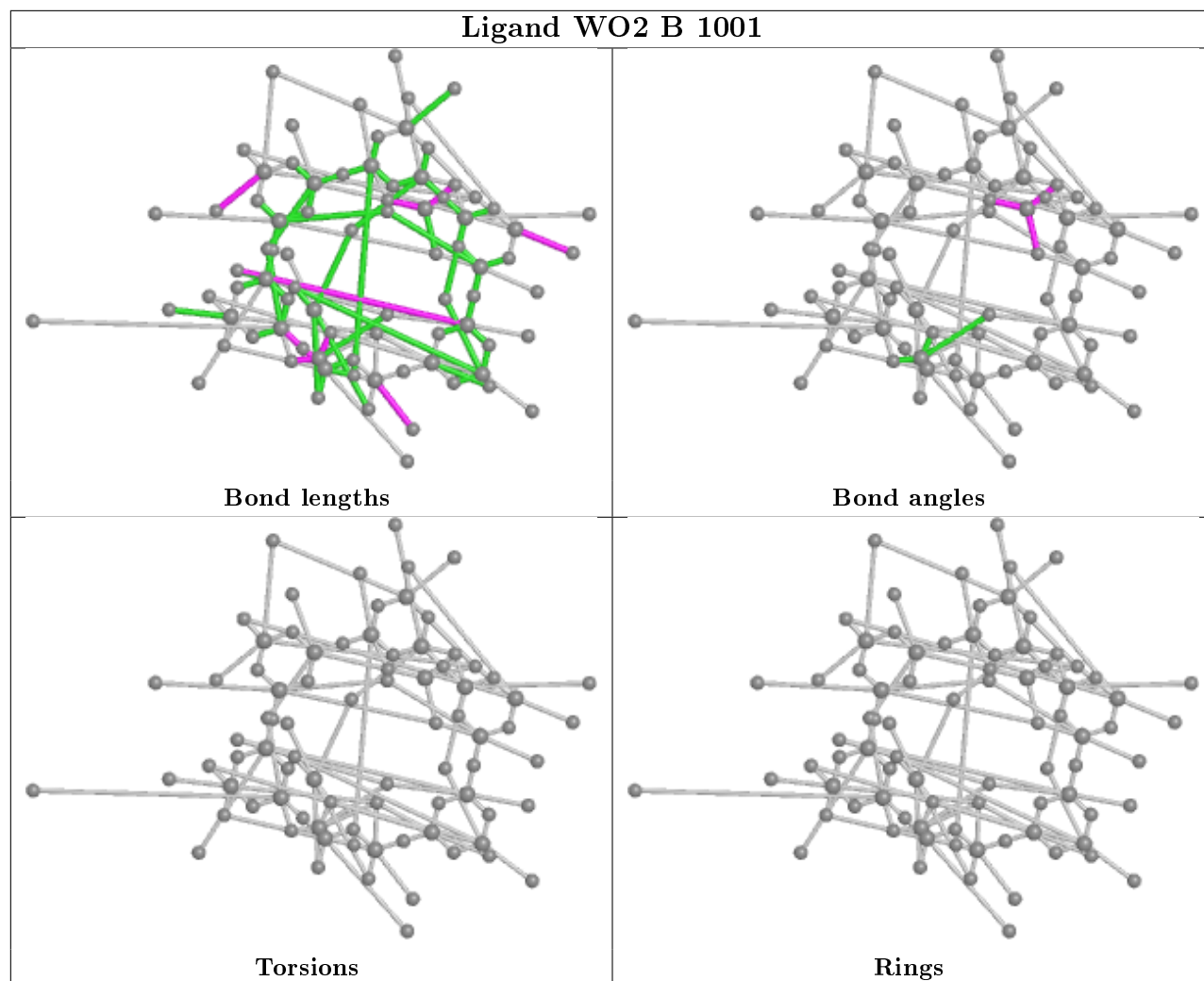


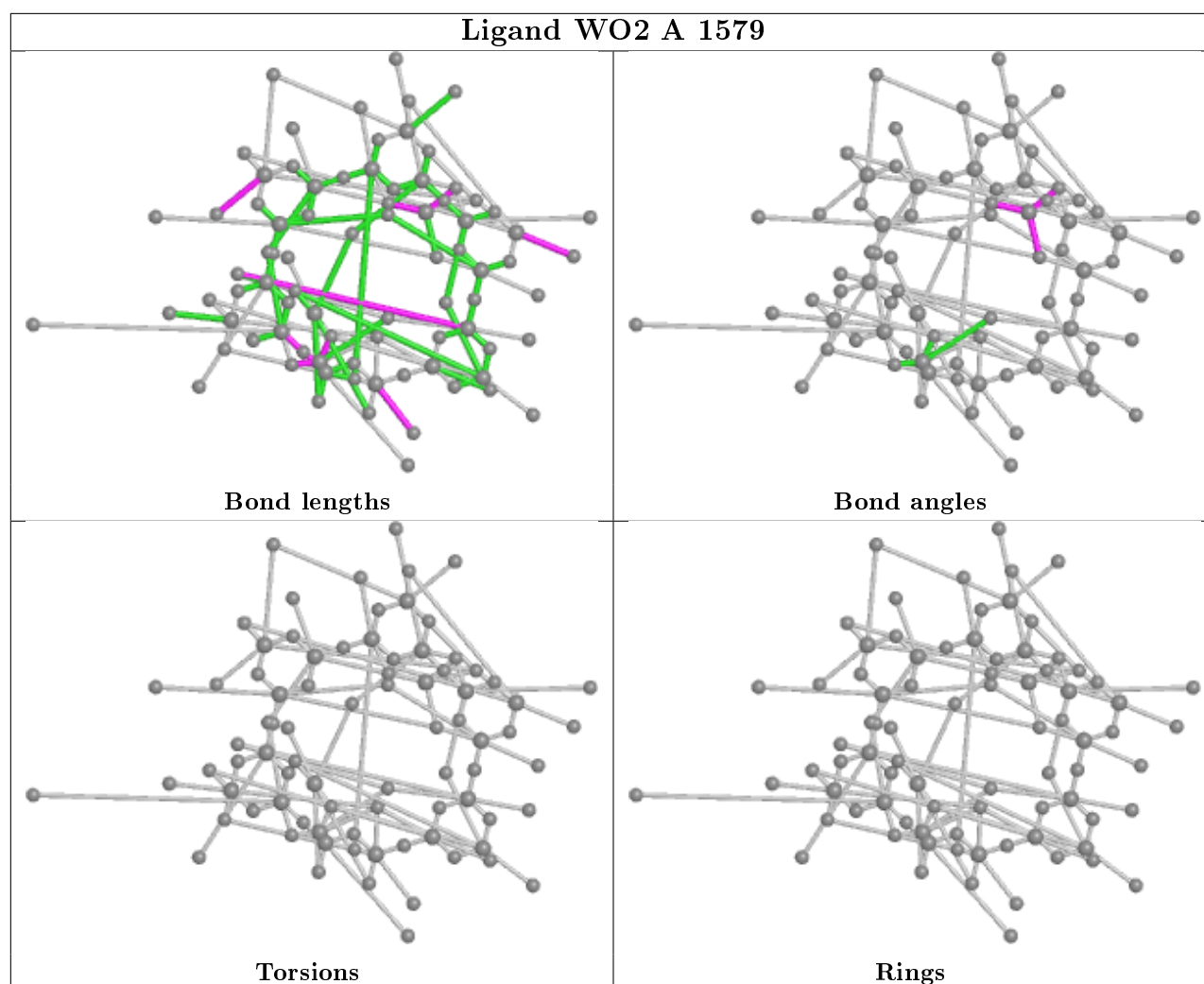












5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	A	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	822:U	O3'	823:C	P	1.82

6 Fit of model and data

6.1 Protein, DNA and RNA chains

EDS was not executed - this section is therefore empty.

6.2 Non-standard residues in protein, DNA, RNA chains

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

6.4 Ligands

EDS was not executed - this section is therefore empty.

6.5 Other polymers

EDS was not executed - this section is therefore empty.