Interpretation of the Longest C-C Bond Reported by Ishigaki et al

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Abstract. The recently observed longest C-C bond of length 1.806 Å has been interpreted in this short article in terms of the Bohr radii of C and O, just when the hydroxyl groups break away from C by reduction with Zn. A figure drawn to scale has been presented.

Introduction. Recently, Ishigaki et al [1] have reported (see [2]) the longest C-C bond of length, $d(C_1C_2)$ = 1.806 = Å. In this aricle the author provides an interpretation of this bond length, based on the earlier success of similar explanation of the long O-O bond [3]. Various radii of atoms and many bond lengths and bond angles have previously been quantitatively related to the respective Bohr radii obtained from the first ionization potentials [4-9]. The long C-C bond is explained here in terms of the Bohr radii (a_B) of C and O.

Present work. The longest observed C-C bond length, $d(C_1-C_2)$, is shown in Fig. 1. The various radii are clearly described in the left column in the Fig.1. The Figure shows the oxygen atoms of the hydroxyl groups just before Zn breaks them off from C_1 and C_2.

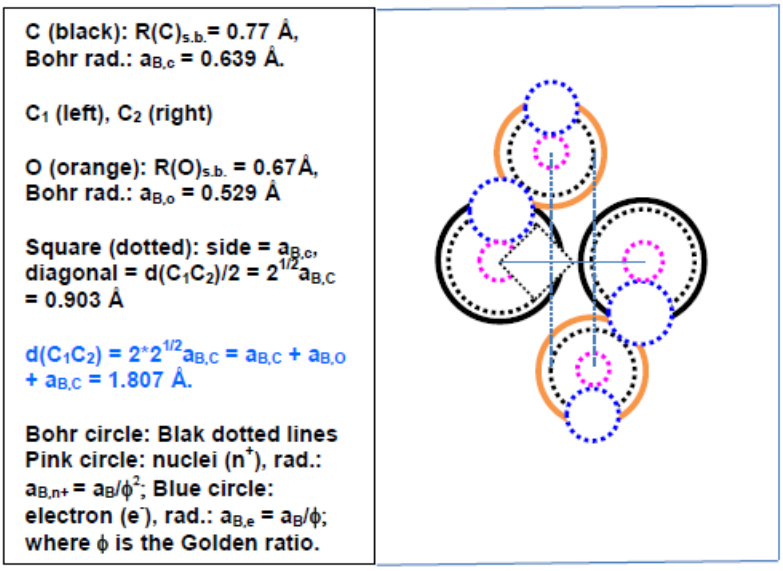

Figure 1. The long C_1-C_2 distance as the sum of the Bohr radii of C and O.

It can be seen that $d(C_1C_2)$ is exactly equal to the sum,

$$d(C_1C_2) = a_{B,C} + a_{B,O} + a_{B,C} = 0.639 + 0.529 + 0.639 = 2*2^{1/2}a_{B,C} = 1.807 \text{ Å} \ldots . (1)$$

which is also exactly equal to twice the diagonal of a square with Bohr radius of carbon as a side.

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