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COMPLETING THE MODELING OF LEWIS ELECTRON DOT STRUCTURE IN THE MOLECULES

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ABSTRACT

One step is added to steps taken before for distributing of electrons in Lewis Molecules (molecules which obey lewis electron dot structure).

This new modeling of lewisprposed by us was applied to Co_2 and N_2. It is also applicable to other lewis molecules

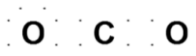
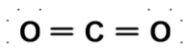
KEY WORDS: Lewis electron dot structure, Vallence electrons.

INTRODUCTION

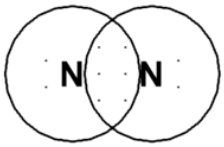
In any general chemistry book [1,2] as a typical lewis Dot structure appears as bonding among atoms. This explation , formulated by Gilbert lewis , is that atoms combine in order to achieve a more stable electron configuration. Maximum stability results when an atom is isoelectronic with a noble gas. When atoms combine together to from a molecule , we study chemical bonding, we are concerned primarily with valence electrons of the atom. A lewis dot symbols consist of an element and one dot for each valence electron in an atom of an element .

Theory

We need to complete the modeling of lewis dot electron structure in the molecules. In many introductory books in chemistry for Co_2 or N_2 the following structures are proposed.

Co_2  or 

A triple bond arises when two atoms share three pairs of electrons as in the nitrogen molecules (N_2):

 Or 

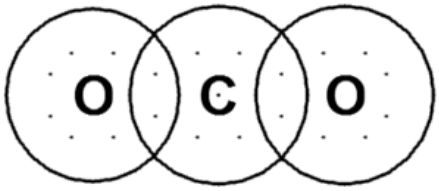
$8e^- 8e^-$

But in the steps going through to find the lewis electronic structure , we write two double bond Structure for Co_2 and one triple bond for N_2. This question arises how one are made two double bonds in.

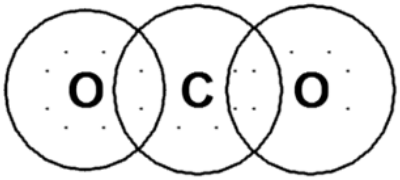
In this work with one logical path the lewis structure is completed. In the first example Co_2 we have one C with four valence electron and two oxygens each with 6 valence electrons.

Hence Co_2 has total of 16 valence electrons:
C : 4 valence electrons
O : 6 valence electrons
O : 6 valence electrons
Co_2 : 16 Total valence electrons

First we choose wiht single bonds.

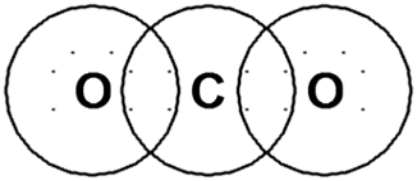


We are applying Octet rule where each atom has eight electros surrounding the atom. The total electrons surrounding the molecule is 20 electrons. This is inviolation with the total valence electrons of Co_2 which is 16. Hence we made one of the single bond a double bond. We are applying octet rule



again where each atom has eight electrons surrounding the atom. The total electrons surrounding the molecule is 18 electrons.

This is in violation with the total valence electrons of Co_2 which is 16. Hence we make the single bond left with a double bond.

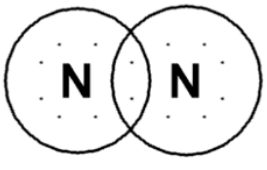


In this structure the molecule has two double bonds. We are applying octet rule where each atom has eight electrons surrounding the atom. The total electrons surrounding the molecule is 16 electrons. This is correct number of electrons surrounding the molecule according to what we cameup with in the beginning of this example.

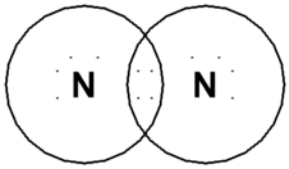
In the second example N_2 we have two nitrogen atoms. In each nitrogen atom there are five valence electrons.

Hence N_2 has total of 10 valence electrons :
N : 5 valence electrons
N : 5 valence electrons
N_2 : 10 Total valence electrons

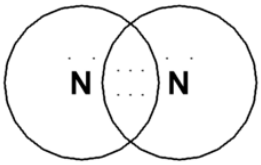
First we choose N_2 with single bonds. We are applying octed rule where each atom has eight electrons surronding at the atom.



The total electrons surrounding the molecule is 14 electrons. This is in violation with the total valence electrons of N_2 which is 10. Hence we make the single bond a double bond:



We are applying octet rule again where each atom has eight electron surrounding the atom. The total electrons surrounding the molecule is 12 electrons. This is in violation with the total valence electrons of N_2 which is 10. Hence we make the double bond a triple bonds. In this structure the molecule has a triple bond.



We are applying octet rule where each atom has eight electrons surrounding the atom.. The total electrons surrounding the molecule is 10 electrons. This is correct number of electrons surrounding the molecule a ccording to what we came up with in the beginning of this example.

CONCLUSION

When I was teaching the general chemistry book I realized that lewis electron dot structure is not complete for atoms in the molecule with more than a single bond like Co_2 and N_2 with double bonds and triple bonds respectively. For Co_2 and N_2 we should not jump to two double bonds for Co_2 and one triple bond for N_2 . We should first distribute electrons surrounding atom in the molecules such as has two single bonds and has a single bond. We make sure the octet rule is followed. Then the number of electrons in the molecule is counted if it is not matched with the total valence electrons of atoms of the molecules we have came up with wrong electron dot structure. We make the single bond in the molecules a double bond such as $Co_2$and N_2. The octet rule is followed. Later the total number of electrons in the molecule is counted again in the molecules if it dose not match the total number of electrons, we go to distribute the electrons with triple bound ,and this procedure as seen in the body of this manuscript for Co_2 and N_2 . This procedure works for the other lewis molecules as well.

REFERENCES

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