Question #49763, Chemistry, Inorganic Chemistry

explain the octet rule

Answer:

Figure1

Communication in the carbon dioxide (CO_2) - all atoms are surrounded by 8 electrons according octet rule. Consequently, CO_2 is stable molecule.

Octet rule - invited Lewis to explain the reasons for the formation of covalent chemical bonds. According to this rule in the formation of molecules, atoms satisfy their need to achieve 8 electrons in the valence shell electron configuration of such noble gases due to their pairwise merging the valence electrons. By its importance is fundamental discovery Lewis is on a par with such discoveries as elements of the Periodic Law and the Theory of structure of organic compounds. The widely held view that the octet rule is satisfied only in limited circumstances as wrong as the assertion that the periodic law of elements does not have universal. All examples of "non-compliance" octet rule can be divided into the following three groups:

1. The sum of the valence electrons of the atoms forming the molecule is odd. Example - a molecule of nitric oxide NO.

In this case, the amount of valence electron of the nitrogen atom (5) and oxygen (6) is equal to 11, so that an oxygen molecule reaches eight electron shell and the nitrogen atom - no. In this case, initially impossible to achieve both atoms eight electron shell. The desire of the nitrogen atom to fill its electron shell explains the chemical reactivity of the molecule.

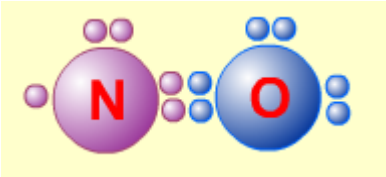

figure 2

2. The molecule is formed by the three-center bonds, for example KI3. In this molecule, the anion of iodine is associated with a three-center four-electron molecule of iodine bond. Similar three-center, two-electron bonds but are present in the molecule B_2H_6.

3. In the formation of chemical bonds are involved d-orbitals. In this case, typically octets (in the limit, that is, if all five d-orbitals) is converted into the 18-electron rule. Since in many cases part of d-orbitals in the formation of chemical bonds in some elements remains a contentious issue, there is an illusion of default rules octets. Classic examples of the rule of 18 electrons are molecules $Fe(CO)_5$, $Ni(CO)_4$, $Co_2(CO)_8$, $Fe(C_5H_5)_2$ (ferrocene) and many others.

Thus, the main rule in octets Lewis is not the number 8 (or 18), and the sharing of electrons as the basis for the formation of a covalent chemical bond, and due to this approximation to the electronic configuration of the inert gas - eight or eighteen electron e.