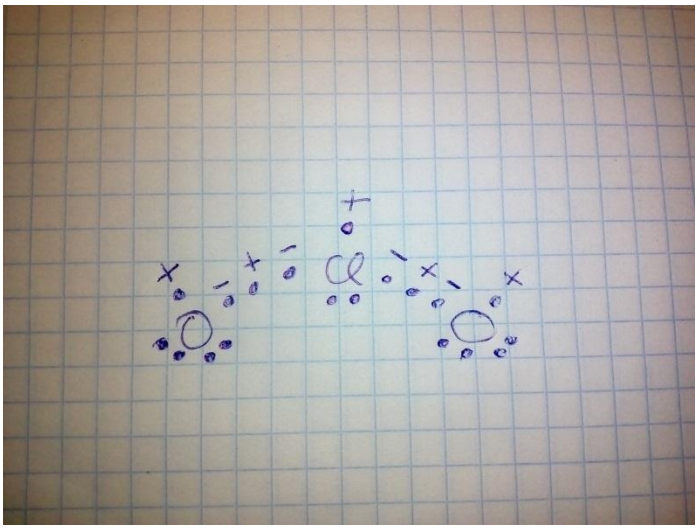
Formulas of chlorine, iodine and bromine dioxides.

Bezverkhniy Volodymyr Dmytrovych.

Ukraine, e-mail: bezvold@ukr.net

The structural formulas of chlorine, iodine and bromine dioxides with three-electron bonds are presented.

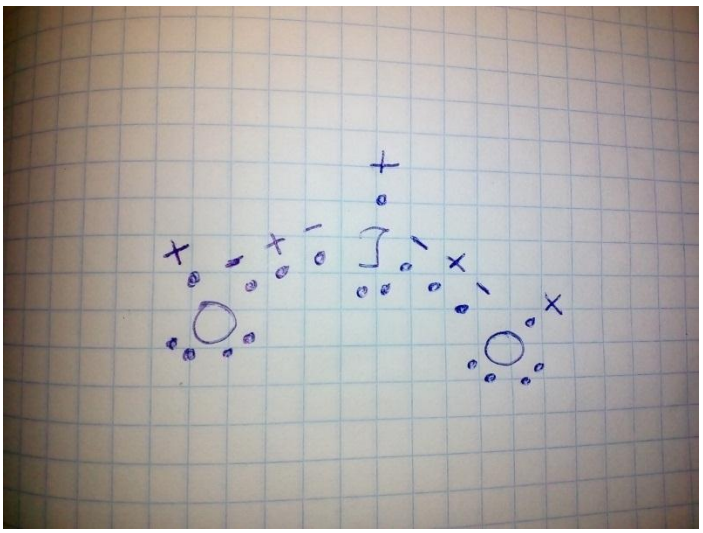
1. Formula of chlorine dioxide (ClO_2).



The structural formula of chlorine dioxide with a three-electron bond is presented, which correctly conveys the properties of chlorine dioxide, and explains the OCl bond order of 1.5, since this is a typical three-electron bond.

The lack of tendency of chlorine dioxide to form a dimer is explained by the fact that the central chlorine atom has a tetrahedral environment (two three-electron bonds, a lone pair of electrons and one unpaired electron), and therefore the repulsion of the lone pairs will be significant.

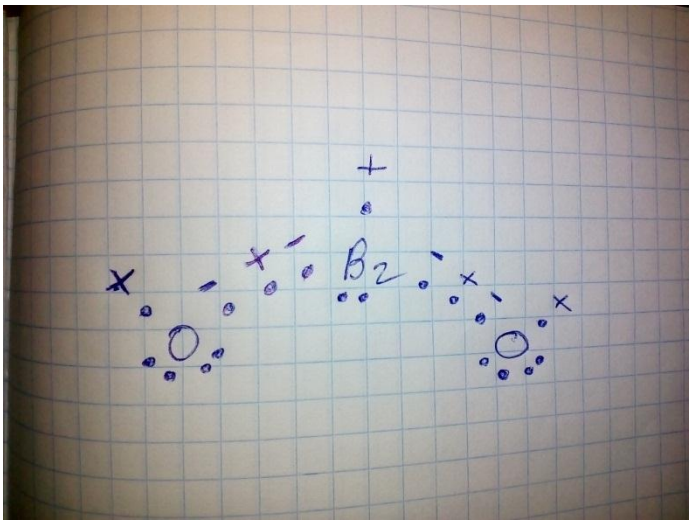
2. Formula of iodine dioxide (IO_2).



The structural formula of iodine dioxide with a three-electron bond is presented, which correctly conveys the properties of iodine dioxide, and explains the OI bond order of 1.5, since this is a typical three-electron bond.

The tendency of iodine dioxide to form a dimer (I2O4) and the absence of such a tendency in chlorine dioxide (ClO2) is explained by the fact that the central atom has a tetrahedral environment (two three-electron bonds, a lone pair of electrons and one unpaired electron), and in the case of chlorine we have a strong repulsion of lone electron pairs, and in the case of iodine, due to an increase in the bond length, the repulsion becomes significantly less.

3. Formula of bromine dioxide (BrO2).



The structural formula of bromine dioxide with a three-electron bond is presented, which correctly conveys the properties of bromine dioxide, and explains the OBr bond order of 1.5, since this is a typical three-electron bond.