

To the question of the nature of chemical bonds the dependence of chemical bond energy on its length

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Abstract

In the article, the dependence of chemical bond energy on its length is discussed. It is shown that this solution for hydrogen molecule can be brought to virial theorem. This solution allows the calculations of the whole spectrum of possible values of chemical bond energy levels. The paper does not deal with the calculations of energy levels occupation according to environmental conditions such as temperature, pressure, solvent, catalyst, substrate nature, etc. Despite that, the information on precise values of energy levels for all states and the capability to determine instrumentally the transition energy differences can provide unambiguous estimation of the current chemical bond energy state. It should be noted that the information on the energy values of split and forming bonds under current conditions allows estimating the possibility of chemical reaction. It is well known that the chemical bond energy depends on the bond length and this dependence can be described by the Yukawa potential. Moreover, the constant g is close (but not equal) to $2/3e$. These facts as well as the direction of chemical bond let us to doubt the statement that the interaction of atoms forming this bond has the electromagnetic nature only. It is still premature to conclude that chemical science is studying its own fundamental interaction. At the same time, the chemical bond is similar to both strong and electromagnetic interaction – it is an experimentally observed fact.

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