The chemical composition of detonation products of condensed explosives and the electric conductivity value

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The nature of the high electric conductivity at the detonation of condensed explosives at the moment is not fully investigated. Several possible conductivity mechanisms were considered so far: chemical ionization, thermal emission, thermal ionization, the electron conductivity, ionic mechanism, ionization of water, the contact mechanism. However, none of them have become a hypothesis of the predictive power.

In recent years, the experimental data of the electric properties obtained for the different explosives with very various initial conditions and detonation characteristics. It is possible to make conclusions about the key factors responsible for the high electric conductivity at the detonation of explosives. In this paper, for the first time were considered in details the correlation between the electrical conductivity and the composition of detonation products at the Chapman-Jouget, which accounts for more than 97% by weight: CO, CO$_2$, N$_2$, H$_2$O, condensed carbon C. In the work was used the experimental data for the different initial density of five explosive (PETN, HMX, RDX, TNT, TATB) and the results of the calculation using the BKW modified equation [1]. It has been shown that the electric conductivity is related with the carbon content.