

THE EFFECT OF DIFFUSION OF ACTIVE PARTICLES ON THE IGNITION OF EXPLOSIVE MATERIALS BY A PULSED ELECTRON BEAM

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In [G.A. Ivanov, A.V. Khanef // *Russian Journal of Physical Chemistry B.* – 2013. – Vol. 7. – No. 6. – P. 741– 747] the radiation-thermal mechanism of PETN initiation was discussed. Physicochemical principle of the mechanism is that the part of the electron beam energy is used for the formation of active particles, which becomes seeds for the autocatalytic reaction of the thermal decomposition of explosive materials. In this work the equations of heat conductivity with Arrhenius source of heat and the equation of the level of conversion with the autocatalytic reaction are expanded with the equation of diffusion of active particles. The lifetime of active particles has two components: 1 – characteristic time of deactivation of particles; 2 – characteristic lifetime of particles in autocatalytic reaction. System of these equations have been analyzed and numerically solved in this work. It was shown that the ignition delay time is increased when the diffusion of particles from the electron absorption area is taken into account.

Keywords: *active particles, autocatalytic, diffusion, electron beam, ignition.*