CALCULATION OF SPHERICAL INCLUSION'S HEATING TAKING INTO ACCOUNT THE ABSORPTION CROSS SECTION OF A PARTICLE AND WAVELENGTH OF LASER RADIATION

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The modeling and numerical calculation of a laser heating of the absorbing inclusion placed in a transparent matrix of explosive is carried out. The inclusion with spherical shape with R_0 radiuses in the range from 10^{-5} to 10^{-2} cm are used. Duration of a laser pulse changed ranging from 10^{-9} to 10^{-3} with allowed to investigate process in approach adiabatic and quasistationary the heating modes.

The object of research is the pressed powders of tetranitrate of pentaerythritol (PETN) and azid of lead. In calculations, dependence of absorption cross section of particles from the laser wavelength λ_0, the particle's radius R_0 and complex index of refraction n_0 according to Mi's theory was considered. The discrete set of wavelengths was used: 354,7 nm; 532 nm; 1064 nm and 10600 nm.

It has been shown for particles with same radius, there is a characteristic duration laser pulse at which the maximum heating reached.

The maximum of heating is displaced towards particles with great values of R_0 with increase of laser pulse duration. The maximum of heating corresponds the assumed border dividing the adiabatic and quasistationary modes of heating.

Feature of the accounting of absorption cross section is that in this case temperature of small size inclusions sharply decreases. It leads to sharp reduction of heat in the thermal center which is formed near small size inclusions and respectively to sharp reduction of their reactionary ability in the course of explosive decomposition.

***Keywords:** modeling, spherical inclusion, PETN, absorption cross section, Mie theory.*