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Experimental investigation behavior of porous media under fast volume heating VLADIMIR EFREMOV, ANTON MESCHERYAKOV, VLADIMIR FORTOV, Institute for High Energy Densities Russian Academy of Science, BORIS DEMIDOV, RRC Kurchatov Institute — Exact simulation of shock wave generation in porous media under powerful volume heating requires development of models of energy transformation from deposited energy to shock wave energy. Transparent nanostructural dielectric (SiO_2 aerogel) with density $0.04 - 0.25\, g/cm^3$ was choicen as the investigated porous medium. Solid mica ($2.7\, g/cm^3$) was used for comparison. Electron beam (current 10-20 kA, energy 300 keV, duration 100 ns) was used for heating. Both aerogel and mica samples were considerable thinner than the corresponding electron stopping depths. Thin aerogel and mica plates were placed side by side and simultaneously irradiated by electron beam perpendicular to their surface for comparison of light radiation of porous and solid media. Images were recorded by fast frame cameras. Irradiated aerogel was much brighter than mica during the heating despite the equal deposited energy. Expansion velocities of aerogel and mica were measured using streak camera. Expansion velocity of mica was higher than expansion velocity of aerogal by a factor of 3. This discrepancy can be considered as a result of pore collapse immediately during the volumetric energy deposition. As a result, velocities of expansion of both porous and solid thin targets for energy density $2 - 10\ kJ/g$ were measured. These data were used to obtain numerical model.

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