

COMBUSTION OF GRAINS OF CONDENSED ENERGETIC MATERIALS WITH A CURVED BURNING SURFACE

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Abstract: Combustion of homogeneous condensed energetic materials with a curved burning surface is considered. Differential equations describing the shapes of the burning surface are derived and solved, taking into account the dependence of the burning rate on the curvature of the burning surface for planar and cylindrical grains. For a planar grain, the solution is obtained in an analytical form. It is shown that there is a critical curvature of the burning surface above which the stationary combustion becomes impossible and extinction occurs. The results show that the dependence of the burning rate on the curvature of the burning surface should be taken into account when determining the burning rate in a constant-pressure bomb. For this reason, when recalculating the burning rate of a test sample and its pressure dependence on the combustion of the grain with a planar burning surface, the effect of the curvature of the burning surface must be taken into account.

Keywords: condensed energetic materials; burning rate; curvature of the burning surface; critical diameter

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