COMBUSTION SURFACE LIMITS FOR A VOLUMETRIC FOAM METAL MATRIX WITH CERAMIC COATING

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Abstract: The limits of surface combustion in a volumetric permeable metal foam matrix with a surface alumina ceramic coating formed by multichamber detonation sprayer were studied. The positive role of a cylindrical radiation screen located inside the matrix cavity on expansion of the concentration combustion limits was found. It is shown that combustion of the ultra lean mixtures in a volumetric matrix without any screen is possible for the air-excess ratio up to 2, and with the screen — above 2, thus the stable combustion border can move in a domain of low specific firing rates up to 10 W/cm^2. Location of the radiation screen allows realizing the steady surface combustion of the rich mixtures in the range of the air-excess ratio of 0.45–0.5 at the specific firing rate in an interval of 5–15 W/cm^2.

Keywords: combustion limits; radiation burners; surface burning; radiation screen

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