CHARACTERISTICS OF COMBUSTION OF RICH METHANE–AIR MIXTURES AT ELEVATED PRESSURES

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Abstract: The experimental study aimed at the influence of initial pressure on the combustion characteristics of fuel-rich methane–air mixtures is carried out. It is established that the maximum explosion pressure and the flame temperature for near-limit mixtures are almost constant at various initial pressures. These characteristics of mixture, having constant composition, change significantly with increasing in the initial pressure. The composition of combustion products for near-limit mixtures and mixtures with constant composition (15,6% CH_4 in air) at various initial pressures is analyzed. It is shown that with increasing in concentration of the fuel in the mixture, the contents of H_2, CO_2, and O_2 in the products remain virtually unchanged and H_2O and CO concentrations decrease. Thus, the amount of methane in the combustion products increases significantly. The qualitative interpretation of the obtained results is given.

Keywords: upper (lower) flammability limit; flame temperature; maximum explosion pressure; normal burning velocity; combustion products; rate of explosion pressure rise

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