Investigation of flames of methane–air mixtures stabilized on a flat porous burner

Mislavskii V V[1,2,@], Gubernov V V[1], Pestovskii N V[1], Tskhai S N[1] and Miroshnichenko T P[1]

[1] Lebedev Physical Institute of the Russian Academy of Sciences, Leninsky Avenue 53, Moscow 119991, Russia
[2] Moscow Institute of Physics and Technology, Institutskiy Pereulok 9, Dolgoprudny, Moscow Region 141701, Russia

[@] forestcat@mail.ru

In the present work, we studied the structure of methane–air flame in different combustion modes. For this, a flat porous cylindrical burner with a diameter of 15 mm was created. The burner contains a part with a porous filling and a set of capillaries with an inner diameter of 0.2 mm. The temperature distribution in the flame was measured by fine-fiber pyrometry for stationary combustion modes. The resulting data represent calibration measurements for further comparison with coherent anti-Stokes Raman spectroscopy temperature measurements.
The measurement of the dependence of the molar concentration of the OH radical on the distance to the burner surface has been carried out. The measurements were carried out using the laser induced fluorescence (LIF) technique. Excitation wavelength 281 nm [transition A–X (0.1)], registration of the LIF signal at a wavelength of 313 nm [transition A–X (0.0) and (1.1)].
The experimental results were compared with the data obtained by direct numerical calculation based on a model with a detailed GRI reaction mechanism.