PLASMA CATALYSIS BURNING VISCOUS HYDROCARBONS

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During combustion and reforming of hydrocarbons with high viscosity there is a problem of their dispersion. Traditional gasdynamic jets are not suitable for solving these problems. Therefore, the creation of new plasma-liquid systems that would allow effective spray hydrocarbons with high viscosity is an important and promising direction.

Plasma catalysis burning hydrocarbons with high viscosity was investigated in this work. Plasma jet was used for spraying of high viscosity hydrocarbons. Plasma source was original rotational gliding arc. Plasma system consisted of the area where the plasma is formed, an area where there is partial conversion of hydrocarbons into synthesis gas and combustion chamber in which plasma injected with hydrocarbons and products of its transformation. The current-voltage characteristics of the discharge in the presence and absence of hydrocarbons in the system were measured. Diagnostics of plasma torch and the flame was carried by emission spectroscopy. Emission spectra were registered in the wavelength range 200-1000 nm by using a spectral device S-150-2-3648 USB. Determined temperature population of excited electronic, vibrational and rotational levels and their distribution along the plasma torch depending on the size of the gas flow and current. Temperature was determined by the continuous spectrum of radiation. Axial distribution of temperature in the flame during plasma catalytic combustion of hydrocarbons was measured. The influence of the combustion chamber and its size on the efficiency of the plasma system was investigated.