POWER SUPPLY FOR OBTAINING THE LOW-TEMPERATURE PLASMA JET*

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In our days, the plasma jets and a plasma sources based on the atmospheric-pressure discharges in the gas flow attract considerable interest not only the researchers but and for the technology and medicine applications [1–7]. The common property for this kind of systems for obtaining the plasma jet is allowing the gas flowing through the discharge gap and a plasma area [1–8]. A wide variety of the electrode configurations, the gases types, and the discharges types are used in the atmospheric-pressure plasma sources [1–8].

The present paper describes results of the investigation of glow discharge burning modes when powered by the high-voltage power supply whit the reactive ballast intended for obtaining low-temperature plasma jet. In the considered system, plasma jet is obtained by using the DC glow-like discharge sustained in the non-steady-state low-current plasmatron with coaxial electrodes. Specialized power supply provides an output voltage up to 6 kV for initiate the discharge, and then realizes discharge current limiting mode. Maximal value of the glow discharge current limited at level about of 140 mA by impedance of inductive-resistive ballast. One of the significant differences of the investigated power supply system from the classical circuit with resistive ballast is the low-frequency modulation of the output voltage, which provides a significant ripple of the discharge current magnitude.

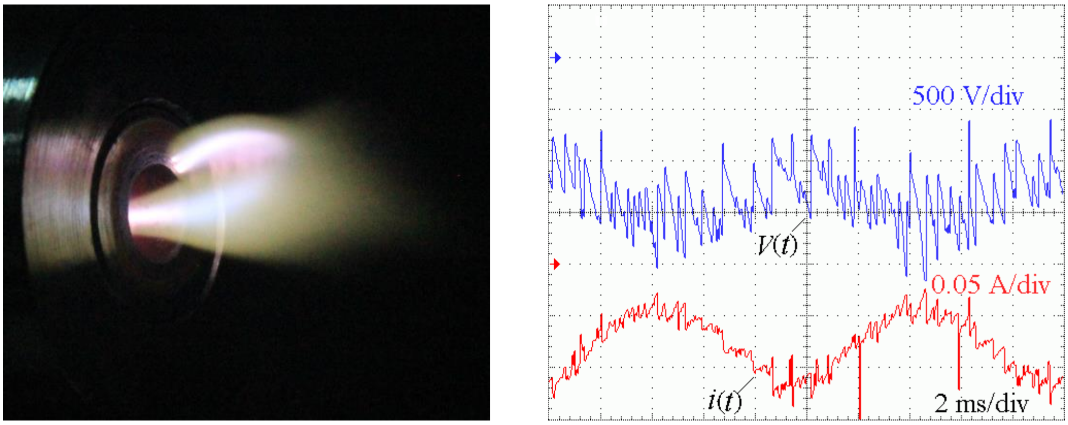

Fig. 1. Photography of plasma jet on the exit of plasmatron nozzle and the glow discharge burning voltage and current waveforms. $V(t)$ – discharge burning voltage, $i(t)$ – discharge current. The gas flow rate G(air) = 0.1 g/s.

Interpretation of the experimental data obtained as a result of the analysis of the waveforms of the discharge current and the discharge burning voltage allows us to reveal the specifics of the DC glow discharge sustaining when powered by the proposed supply system.

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