

PULSE POWER SUPPLY FOR PLASMA CATHODE LOW ENERGY PULSE ELECTRON SOURCE*

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Low-energy intense electron beams with a pulse duration of a few, tens and hundreds of microseconds are currently widely used for research on creating the scientific foundations of technologies in the field of surface modification of metal and metal-ceramic materials. The greatest number of studies were carried out with the use of electron sources in the pulse duration range of 1–4 μs . [1] or in the range of 20 - 300 μs . [2, 3]. At the same time, the range 4–20 μs is of interest and remains unexplored at the moment.

The paper presents a description of a pulsed power supply for an arc discharge of a plasma cathode for a pulsed source of electrons with energies up to 25 keV. The source is suitable for powering the SOLO arc plasma cathode with an additional discharge initiation cell [4]. A feature of the developed switching power supply is the possibility of generating current pulses with an amplitude of up to 2000 A and a duration of 7 μs . The formation of short current pulses is ensured by the use of an isolating transformer with low stray inductance and a multi-channel thyristor pulse shaper. Fig. 1a shows the power supply circuit and Fig. 1b shows the waveforms of trigger pulse current for arc discharge initiation, as well as the pulses of the main arc supply channel.

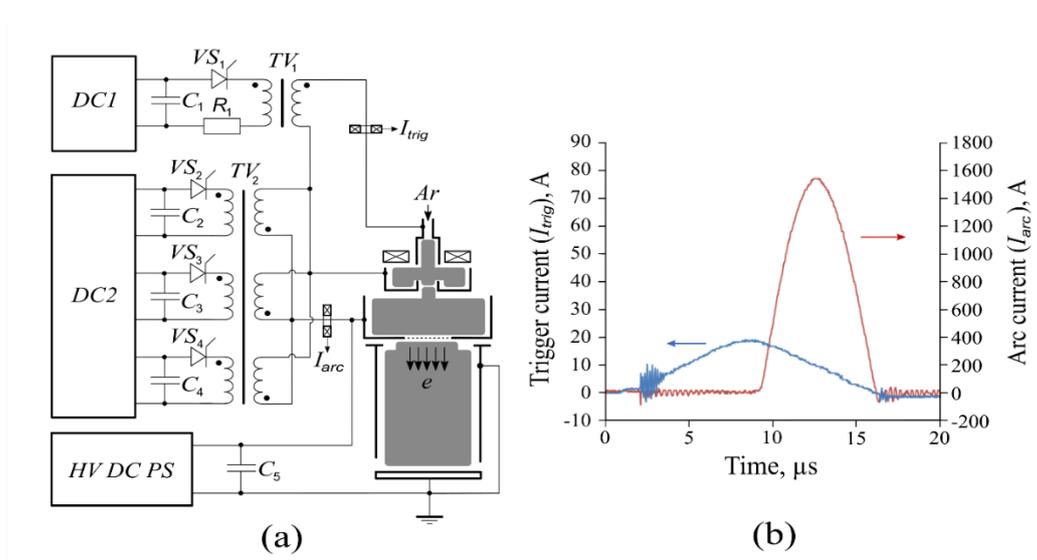


Fig.1. Scheme of high power supply for low energy pulse electron source (a) and typical output waveforms (b).

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