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# COMBINED ELECTRIC DISCHARGE "ARC + DISCHARGE WITH LIQUID ELECTROLYTE CATHODE"

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One of the features of discharge with liquid electrolyte cathode is volumetric combustion. By changing geometry of cathode zone on electrolyte surface, it is possible to give plasma column various shapes, in particular, it is possible to form a "flat wall" [1, 2]. In this work, a device that allows to create plasma column in form of a "hollow cylinder" has been developed. It contains one anode *1* and two cathodes: metal *2* and electrolyte *3* (Fig. 1). An aqueous solution of sodium chloride is used as an electrolyte cathode. It flows out of the annular channel *4* with dielectric walls. A negative potential is fed to the graphite ring *5*, mounted inside the channel. The discharge between the electrolyte cathode *2* and the metal anode *1* is volumetric and forms a "hollow cylinder". The arc burns between metal electrodes *1* and *2* inside the "hollow cylinder". Electrical power is supplied from a single source. The currents flowing in the device are regulated by two ballast resistors *6* and *7*.

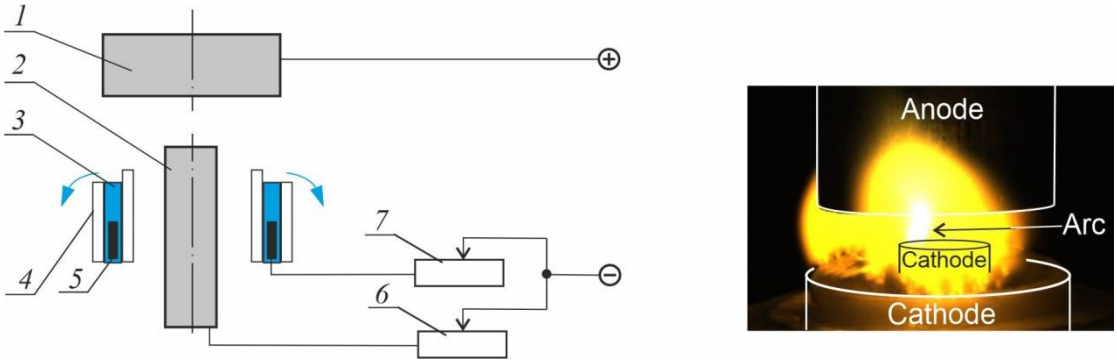


Fig. 1. Diagram of the experimental setup and snapshot of the discharges.

The gas discharge current with liquid electrolyte cathode was set in the range of 5-10 A, and arc current varied in range of 1-10 A. Metallic cathodes made of copper and duralumin were used. At elevated currents, the duralumin cathode was underwent to intense destruction. This result is quite expected, since arc burns in an oxidising environment.

Oscillograms of currents and voltages were obtained. Stable current regimes with small-scale pulsations have been recorded. Spectral studies in visible range have been carried out. A characteristic feature of the spectra was presence of the Balmer lines $H_\alpha$ and $H_\beta$.

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