Thermal processes on electrodes during testing a lossless cathode in a diode circuit

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The article considers the experimental and analytical study results of the energy processes occurring during the tests on a lossless cathode, operating at the electrons thermal emission from a heated emitter surface. In particular, we consider thermal processes at the electrodes occurring during testing of a lossless cathode in a diode circuit. We analyzed the terms in the power balance at the electrodes for the steady-state heat transfer case. We investigated the mutual radiation exchange between the cathode and the anode. We show experimentally and theoretically that the anode presence has a significant effect on the cathode thermal balance. The cathode-compensators used in the electric propulsion system will increase gas economy and improve mass-dimension characteristics. In addition, when developing the electric propulsion system, which uses new working substances, the cathode-compensator design will not need to be changed.

Keywords: *lossless cathode, cathode-compensator, heat balance, diode circuit*

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