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# DIAGNOSTICS OF A LOW-PRESSURE ARC PLASMA ($N_2$, 0.1-1 PA) IN THE MODE OF ALUMINUM ANODIC EVAPORATION*

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The use of an arc with a thermionic cathode burning in vapors of the anode material for the coating deposition provides high deposition rates, a controlled level of ion assistance, and the absence of microdroplets characteristic of a cathode arc. The use for this purpose of a low-pressure arc with a self-heating hollow cathode makes it possible to use an active gaseous medium for the synthesis of binary coatings, for example, nitride or oxide coatings. The rate of deposition of such coatings, their structure, and properties depend on such parameters of the discharge plasma as the plasma density and its electron temperature, the anode potential drop, the mass composition of the plasma, the degree of vapor ionization, and the degree of reactive gas dissociation. In this work, to diagnose the discharge plasma, probe diagnostics and optical emission spectroscopy were used. The results of measurements obtained in wide ranges of discharge current (5-30 A), reactive gas pressure ($N_2$, 0.1-1 Pa), and evaporation rate of Al ($(2 – 8)*10^{-8}$ g/cm$^2$ s ) are presented. It has been shown by optical actinometry that the creation of dense counter flows of nitrogen and fast electrons in the narrowing of the discharge gap ensures an increase in the degree of $N_2$ dissociation up to 30%.

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