UDC 538.95

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CREATION OF A MODEL OF EROSION PROCESSES IN ELECTRODE SPOTS DURING VACUUM DISCHARGE

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In works [1, 2], calculations were performed for different current densities of $10^{10}...10^{12}$ A/m^2 and for different spot movement speeds of $1...0.5 \cdot 10^2$ m/c. As can be seen from the dependences for the anode, when the density (Figs. 1, 2) is less than 10^{10} A/m^2, there are no breaks in the erosion coefficient, but at 10^{11} A/m^2, breaks of a finite value appear, which indicates the emission of material clusters.
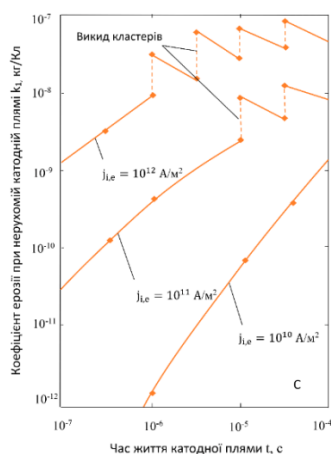

Figure 1 − Graph of the dependence of the erosion coefficient on the lifetime of a fixed spot on the cathode
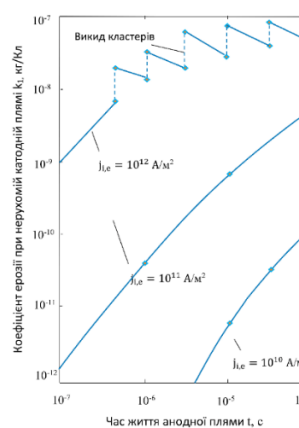
Figure 2 − Graph of the dependence of the erosion coefficient on the life time of a fixed spot on the anode

The dependence of a significant decrease in the erosion coefficient with an increase in the rate of stains was determined. The obtained theoretical values of the current density coincide in order with the known experimental values [1,2]. All this testifies to the adequacy of the model and the possibility of using it to determine the critical values of the technological parameters of other electrode materials.

References

1. Baranov, O. Current Distribution on the Substrate in a Vacuum Arc Deposition Setup. / O. Baranov, M. Romanov, // Plasma Processes and Polymers. – 2008. – № 5. – P. 256.
2. Shyrokyj, Y.V. Simulation of an arc discharge on copper cathode for the generation of nanostructures / Y.V. Shyrokyi, G. I. Kostyuk //Open Information and Computer Integrated Technologies, – № 91. – 2021. – C. 62–76.
3. Shyrokyj, Y.V. Simulation of an arc discharge on copper cathode for the generation of nanostructures / Y.V. Shyrokyi, G. I. Kostyuk //Open Information and Computer Integrated Technologies, – № 91. – 2021. – C. 62–76.