

FORMATION OF SURFACE AMORPHOUS ALLOYS FOR IMPROVING THE ELECTRICAL STRENGTH OF METALLIC ELECTRODES

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The initiation of electric breakdown of vacuum gaps is usually associated with geometrical and/or chemical nonuniformities of the electrode surface having high emissive activity: microprotrusions, pores, micro- and nano-particles, dielectrical or semi-conductive films, secondary phase inclusions [1]. In the conditions of using modern methods of materials surface cleaning [2], the factor of electrical strength limitation of vacuum gaps should be sought not only on the surface, but also inside surface layer of electrode material. Recent theories indicate that the initiators of the vacuum breakdown may be defects of crystal structure of electrode material, most likely the dislocations [3].

In this work a possibility of the electrical insulation improvement in vacuum by formation of amorphous alloys on the metallic electrodes surfaces has been studied. It is assumed that the polishing of the electrodes with a low-energy high-current electron beam in a specially selected mode will allow us to evaporate or dissolve a significant part of the foreign inclusions in the near-surface volume of the electrode and make the surface itself smooth. The use of amorphous alloys will avoid the factors of electrical strength limitation connected with defects of the crystal structure of the electrode material.

REFERENCES

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