

HIGH-ADHESION COATINGS – SURFACE ALLOYS FORMED BY LOW ENERGY HIGH CURRENT ELECTRON BEAM: PROPERTIES AND APPLICATIONS

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Surface alloys are the high-adhesion coatings of controlled composition fused with a metallic substrate by concentrated energy fluxes.

“RITM-SP” is electron-beam machine equipped by a magnetron sputtering system enabling the formation of surface alloys of required thickness [1-2]. The process of formation of surface alloys consists of the deposition of films on a treated substrate followed by a liquid- phase mixing of the deposited film and the substrate upper layer with a LEHCEB in a single vacuum cycle or in other words without breaking vacuum. The thicknesses of the resulting surface alloys may vary from tenths to tens of micrometers.

In the work some examples of application of electron-beam machine RITM-SP for formation of surface alloys are given. The alloys investigated were Cu-Cr and Ag-Brass. The purpose of their formation was to enhance the mechanicals and electrical properties.

SEM, TEM, optical microscopy, XRD, and element analysis were used for characterization of synthesized surface alloys. Tribological tests were carried out according to the "pin-on-disc" scheme with the TRIBOtester device (France). As a counterbody, a ball made of 100Cr6 steel of radius of 3 mm was used. The load was 2 N, friction path of 40 m, track radius of 2 mm, and a sliding speed of 25 mm/s. The tests were carried out under normal conditions without a lubricant.

REFERENCES

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