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A new method for the formation of tribotechnical coatings by the method of electrospark alloying

Abstract

The wear of the contact joints parts, in particular of the anti-friction purpose, is the reason for the disbalancing of the unit due to the change in the size of the worn parts, which leads to the instability of the equipment, loss of productivity and reduction of product quality. Molybdenum disulfide MoS2 is a well-known solid lubricant that is chemically and thermally stable up to 600 0C, which guarantees its unchanged presence in the composite both during the manufacturing process and during the operation of the material. There are known methods of surface treatment, which make it possible to obtain a sulfomolybdenum coating during sequential or simultaneous saturation of Mo and S steel surfaces. The method of electrospark alloying (ESA) expands the possibilities of obtaining tribological coatings. The purpose of the work is to improve the quality of the surface layer of steel parts involved in friction pairs by developing a method of obtaining a wear-resistant tribological coating containing molybdenum disulfide on their surface by the method of electrospark alloying. Coatings on austenitic steel were studied, because a large number of important parts of pumping equipment assemblies are made of complex alloyed steels of the austenitic class. The coating was obtained under different processing modes. Metallographic, X-ray microspectral, X-ray structural analyzes were used, microhardness and tribotechnical properties were determined for analyze the quality of the obtained coatings. As a result of studies of the process of sulfomolybdenation of metal surfaces by the ESA method, it is shown that the coatings consist of 3 zones: the upper "white" hardened layer, the diffusion zone and the base metal. The hardness of the

"white" layer is up to 1438 HV, depending on the processing mode. Electron microscopic studies of the obtained coatings showed that the formed layer has a homogeneous composition. X-ray structural analysis of the coatings showed that there is a MoS_2 26-44% in the surface, depending on the processing mode. Tribological studies confirm the effectiveness of the proposed surface treatment technology based on the ESA method.

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