ABSTRACT

Thesis: 94 pages, 46 drawings, 13 tables, 47 sources of literature.

Aim: study of the structure, phase composition and properties of the surface layers of steel 3 after gradual electric-spark alloying by titanium, aluminum and graphite.

Research methods: microstructural, microhardness, X-ray, mass transfer kinetics analysis and tests for wear resistance.

Research subject strengthen the surface layers of the steel 3 after the electric-spark alloying by aluminum and graphite anodes in different sequences.

Scientific novelty: first found that applying gradual electric-spark alloying by titanium, aluminum and graphite in the steel leads to the formation of coating thickness of 20 - 45 microns with increased to 11.1 - 14.8 GPa microhardness and increased to 8.1 -11,2 times the wear resistance due to the presence in the doped layer $TiAl_3$, Al_2O_3, TiC, TiO_2, Fe_3O_4, Al_2Ti, C, α-Fe and α-Ti phase.

Practical meaning: coverage received in the serial electric-spark alloying Al-, Ti-, C-anodes by new technological modes complex with high physical and mechanical properties, providing the ability to use them for processing parts, working in conditions of friction and contact stress the purpose extension operation.

GRADUAL ELECTRIC-SPARK ALLOYING, STEEL 3, TITANIUM ALUMINUM, GRAPHITE, FUNCTIONAL COATINGS