

## ABSTRACT

**Thesis:** 28 pages, 13 figures, 2 tables, 15 literatures.

**The object of the study:** the formation of structure and phase composition of surface layers on Steel 45 after the gradual electric-spark alloying (Ti, Zr) in the interelectrode environments (argon and air).

**Subject of the study:** strengthened surface layers of iron alloys after electro-spark alloying in the gradual interelectrode environments argon alloying titanium and zirconium anode using various alloying schemes.

**The aim of the study:** to investigate the microstructure and microhardness of the surface layers of steel 45 after the gradual electric-spark alloying with titanium and zirconium in the interelectrode environments argon.

**The methods of the study:** gravimetric, microstructural and microhardness analysis.

**Scientific novelty:** it found that the deposition sequence of Ti and Zr to electric-spark alloying of steel 45 under an argon atmosphere leads to the doped layer thickness of 35-45 microns with a microhardness 7,7-13,7 GPa. This is due to the emergence of various chemical compounds cathode materials and anodes.

**Practical use:** the results are of practical importance for the development of new modes of electric-spark alloying to enhance surface of steel products. Developed modes of electric-spark alloying can improve physical and mechanical properties of steel 45, which allows its use in conditions of sliding friction.

ELECTRIC-SPARK ALLOYING, TITANIUM, ZIRCONIUM, ARGON, STEEL 45, STRUCTURE, MICROHARDNESS, COATINGS, ALLOYED LAYER