

## ABSTRACT

The work contains 125 p., 35 fig., 38 tab., 57 source.

MULTICOMPONENT HIGH-ENTROPY COATINGS, ELECTRON-BEAM MELTING, ENTHALPY, ENTROPY, MICROSTRUCTURE, POWDER, HARDNESS, PHASE COMPOSITION.

Object of study is high - entropy AlNiFeCoCrTiV<sub>x</sub> coatings, where  $x = 0; 0.5; 1; 1.5$ .

The aim of the work is to study the influence of V on structure and mechanical properties of the multicomponent Al-Ni-Fe-Co-Cr-Ti-V<sub>x</sub> coatings, obtained by electron beam welding.

Multicomponent AlNiFeCoCrTiV<sub>x</sub> coatings were obtained and researched complex (microstructural, X-ray analysis and hardness analysis).

It was established that the addition of 0.5 and 1 mol of V to AlCuNiFeCrTi coating leads to the formation of the bcc-solid solution and two intermetallic compounds. AlCoNiFeCrTi coatings include a second bcc-phase and an intermetallic compound. Further increase of the V content leads to the change in the chemical composition of phases and increase of intermetallic component.

It was proved that, the increase of V content from 0 to 1.5 mol leads to the increasing of micro-hardness of the alloys from 8.37 GPa to 10.97 GPa. Ductility characteristic decreases from 0.58 to 0.46 and the boundary of fluidity ( $\sigma_{0.2}$ ) increases from 1,65 to 2,11. It can be explained by the fact that with the increasing of the intermetallic components appearance, which have different content in matrix with bcc-solid solution and also it is a strengthening phase.

It was researched that during testing of the crack toughness at loading from 2 N to 10 N, crack formation does not take place, it shows that the coating material is able to resist the fragile breaking and to stop formation of cracks.