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TECHNICAL FACULTY IN BOR



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STUDY OF ISOTHERMAL AGEING IN Cu-Al-Ni-Fe ALLOY

Student: Nemanja Marić

Mentor: prof. dr Ivana Marković

University of Belgrade, Technical Faculty in Bor, Bor, Serbia

Abstract

Nickel-aluminum bronzes are widely applicable engineering materials with high strength and good corrosion resistance. Their mechanical properties can be additionally improved by precipitation strengthening, which achieves greater hardness, toughness, and elasticity compared to tin bronzes [1-8]. The cast Cu-Al-Ni-Fe alloy was produced by melting the pure metals and casting the melt into the sand mold. After the casting, the ingot was heated to 900 °C for 2 h and quenched in cold water. Quenched samples were further strengthened by ageing at 400 °C and 450 °C. Isothermal ageing was performed at listed temperatures for different times up to 10 h. After each stage of heat treatment, the hardness and microhardness values of all presented microstructural phases were examined, while the microstructure was analyzed using optical and SEM microscopy with EDS. The α , β' , and k phases were visible in the microstructure of all isothermally aged samples. The sample aged at 400 °C for 1 h – 3 h showed the highest values of hardness and microhardness of β' phase.

Keywords: *Nickel-aluminum bronzes, Isothermal ageing, K phases*

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