

## Structure, Electrical Conductivity and Magnetoresistive Properties of Binary Film Alloys Based on Fe, Co and Ni as a Component of Heisler Alloys

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The phase state, electrical conductivity and magnetoresistive properties of binary film alloys based on Fe, Co and Ni prepared by the method evaporation in high vacuum in the temperature range 100-700 K have been studied. It has been shown that the fcc-phase is observed for as-deposited and annealed up to 700 K Fe<sub>0,50</sub>Ni<sub>0,50</sub> thin films with a thickness  $d = 10-100$  nm, the fcc-phase is observed. For Fe<sub>0,67</sub>Ni<sub>0,33</sub> Fe<sub>0,50</sub>Co<sub>0,50</sub> and Fe<sub>0,67</sub>Co<sub>0,33</sub> thin films, the bcc-phase is fixed. It was found that the size dependences of the resistivity, temperature coefficient of resistance and magnetoresistance are realized for all structurally continuous film alloys. The character of size dependences is a like the corresponding dependences for the pure metal films. It has been shown that for Fe<sub>0,67</sub>Ni<sub>0,33</sub>, Fe<sub>0,50</sub>Co<sub>0,50</sub> and Fe<sub>0,67</sub>Co<sub>0,33</sub> the size dependences of both longitudinal and transverse magnetoresistance appear much weaker than for Fe<sub>0,50</sub>Ni<sub>0,50</sub> thin alloy. For Fe<sub>0,67</sub>Ni<sub>0,33</sub>, Fe<sub>0,50</sub>Co<sub>0,50</sub> and Fe<sub>0,67</sub>Co<sub>0,33</sub> thin alloys, the value of both longitudinal and transverse magnetoresistance is weakly depending on the temperature.

Keywords: Permalloy, Crystal structure, Phase state, Magnetoresistance, Concentration effect, Temperature effect.