

**Influence of transition and rare earth elements on magnetic properties of Fe-Nb-B-M (M=Ni, Ag, Gd, Tb) bulk nanocrystalline alloys.**

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Fe-based nanocrystalline materials exhibit, in a comparison with their crystalline form, unique magnetic properties. In this work we present magnetic properties of the  $(\text{Fe}_{80}\text{Nb}_6\text{B}_{14})_{1-x}\text{M}_x$  (where M=Ni, Ag, Gd, Tb and  $x=0.1, 0.2, 0.4$ ) bulk alloys prepared by the use of mould casting technique. The main goal of the work is to study an influence of the alloying additions of transition (Ni,Ag) and rare earth (Gd,Tb) elements on magnetic and structural properties. Magnetic measurements were carried out in the temperature range 2 K - 1100 K and magnetic field up to 7 T. Nanocrystalline character of the prepared alloys was confirmed by the XRD diffraction. Phases identification was carried out with the use of additional Mössbauer measurements. It was shown that in the case of the alloy with 10 at. % of Tb the alloying addition causes a significant magnetic hardening. This behaviour occurs for the composition near the compensation point between antiferromagnetically coupled Fe and Tb atoms. In the presented paper other magnetic properties in a context of structural changes are widely discussed.

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