Effect of Short Annealing on Soft Magnetic Properties of Fe(Co)SnBP Alloys

Beata Butvinová[1, a)], Peter Švec Sr.[1], Alen Fos[1], Irena Janotová[1], Ján Škoviera[1] and Igor Maťko[1]

[1]*Institute of Physics, Slovak Academy of Sciences, Dúbravská cesta 9, 845 11 Bratislava, Slovakia*

[a)] *Corresponding author: beata.butvinova@savba.sk*

Abstract. The effect of Co on the magnetic properties of short annealed (annealing time 5 minutes at Ar atmosphere) nanocrystalline alloy $(Fe_{1-x}Co_x)_{83}Sn_3B_{12}P_2$ with x = 0 and 10 at % has been investigated. Addition of Co to the FeSnBP alloy has a significant effect especially on the magnetic properties with a slight effect on the microstructure after nanocrystallization. Annealing under the temperature of the first onset crystallization has the advantage of increasing the magnetic saturation while the coercivity is relatively low. Annealing over the first transformation is beneficial for achieving high saturation magnetic polarization but the coercivity increase. This is probably also due to the increase in grain size of both alloys. The best values of the saturation magnetic polarization is 1.80 T was observed for Co-containing nanocrystalline alloy. The lowest coercivity of 14 A/m was measured for Co-free short annealed alloy.