Magnetic Characteristics of $(Fe_{75}Co_{10}B_{15})Cu_0$ and $Cu_{1.5}$ Amorphous and Nanocrystalline Alloys

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Abstract. The effect of adding Cu on magnetic characteristics of the rapidly quenched alloy $(Fe_{75}Co_{10}B_{15})_{100-x}Cu_x$ with x= 0 and 1.5 at % in amorphous and nanocrystalline state has been investigated. The results of XRD measurements confirmed the nanocrystalline structure with bcc-Fe(Co) phase for both investigated alloys after isothermal annealing at various temperatures. The addition of Cu to the FeCoB alloy has a significant effect the achieved degree of the nanocrystallization and on the soft magnetic properties of the compared alloys. Annealing in vicinity of the first onset crystallization temperature has the advantage of increasing the saturation magnetic polarization to 2 T for Cu-free nanocrystalline alloy while the coercivity is relatively increased. The lowest coercivity of 25 A/m was measured for Cu of 1.5 at % alloy annealed at 420°C for lower time (30 seconds), it achieved the saturation J_s = 1.84T.

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