Properties of Nanocrystalline Alloys after Electron Beam Irradiation of Amorphous Precursor

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Abstract. Electron-beam was used for irradiation of amorphous precursors of $(Fe_{64}Co_{21}B_{15})_{95}P_4Cu_1$ and $(Fe_{64}Co_{21}B_{15})_{96}P_4$ alloys and then by heat treatment nanocrystalline structure was created. Changes in microstructure were not observed under the doses of 4 MGy. All irradiated samples were compared with non-irradiated one. Samples were studied by Mössbauer spectroscopy and XRD. Irradiation had an influence on the volumetric fraction of the constituent phases and on their magnetic microstructure. Traces of crystalline phase was observed in amorphous structure up to approximately 5%. After the heat treatment nanocrystalline sample prepared from irradiated precursor contained more crystalline phase than non-irradiated. This technology of prepare of nanocrystalline alloys indicate that irradiation of amorphous precursor has an influence on the final structure and properties of nanocrystalline alloy.