Annealing effect on soft magnetic properties and magnetoimpedance of Finemet $Fe_{73.5}Si_{13.5}B_9Nb_3Au_1$ alloy

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Abstract: Effect of annealing on the soft magnetic properties of $Fe_{73.5}Si_{13.5}B_9Nb_3Au_1$ amorphous ribbon has been investigated by means of structure examination, magnetoimpedance ratio (MIR) and incremental permeability ratio (PR) spectra measured in the frequency range of 1-10 MHz at a fixed current of 10 mA X-ray diffraction analysis showed that the as-cast sample was amorphous and it became nanocrystalline under a proper heat treatment. When annealing amorphous alloy at 530 ?C for 30, 60, 90 min, soft magnetic properties have been improved drastically. Among the samples investigated, the sample annealed at 530 ?C for 90 min showed the softest magnetic behavior. The MIR and PR curves revealed the desirable changes in anisotropy field depending upon annealing.

Author Keywords: Amorphous magnetic meterials; Magnetoimpedance; Nanocrystalline materials; Permeability

Index Keywords: Amorphous alloys; Annealing; Magnetic anisotropy; Magnetic permeability; Magnetic properties; Nanostructured materials; X ray diffraction analysis; Amorphous magnetic materials; Magnetoimpedance ratio (MIR); PR curves; Softest magnetic behavior; Iron alloys

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