

# Annealing effect on soft magnetic properties and magnetoimpedance of Finemet Fe<sub>73.5</sub>Si<sub>13.5</sub>B<sub>9</sub>Nb<sub>3</sub>Au<sub>1</sub> alloy

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**Abstract:** Effect of annealing on the soft magnetic properties of Fe<sub>73.5</sub>Si<sub>13.5</sub>B<sub>9</sub>Nb<sub>3</sub>Au<sub>1</sub> 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. © 2006 Elsevier B.V. All rights reserved.

**Author Keywords:** Amorphous magnetic materials; 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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