

GIANT MAGNETOIMPEDANCE IN SOFT MAGNETS

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Magnetic field dependence of the electrical impedance in a magnetic material (magneto-impedance) may be very strong in the case of soft magnetic conductors (in a form of thin wire, ribbon, film or various composite structures) at sufficiently high frequencies of an ac-current. The giant magnetoimpedance (GMI) effect, which is a manifestation of strong change of penetration depth of the ac current through a magnetic conductor (skin effect), is related to changes in the dynamics of magnetization process which affect the magnetic permeability. This effect attracts much attention because of its potential applications and as a tool for magnetic materials characterization. In the present work, GMI effect and its relation with magnetic anisotropy was studied in Co-based amorphous ribbons modified by thermal treatment (which leads to changes in magnetic and magneto-impedance characteristic of the ribbon because of alterations in local magnetic anisotropy). The samples with residual stress, stress relaxed and with intentionally induced anisotropy were studied. The magnetization characteristics and impedance dependence on magnetic field at various frequencies of an ac-current (up to 30 MHz) have been measured. The influence of various anisotropy contributions has been determined and a possibility of tailoring of magnetoimpedance effect has been demonstrated.

9.7 cm

13.4 cm

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