

# Magnetoimpedance of Soft Ferromagnetic CoSiB Microwire Suitable for Sensor Applications

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**Abstract.** In presented article the soft ferromagnetic microwire  $\text{Co}_{77}\text{Si}_{15}\text{B}_8$  with a glass cover of a diameter of 90  $\mu\text{m}$  prepared by rapid quenching and drawing method has been studied. The investigated as-cast CoSiB microwire with negative magnetostriction exhibits both single-peak and double-peak behaviours of giant magneto-impedance (GMI) ratio dependences on the external magnetic field strength  $H$ . The obtained results are theoretically interpreted taking into account the cylindrical core-shell ferromagnetic domain structure, where the central area (core) of the microwire is longitudinally magnetized and the shell of the microwire exhibits circumferential anisotropy induced during the wire preparation. Single-peak behaviour of GMI ratio dependences revealed the irreversible domain wall movement in longitudinally magnetized core occurring at low magnetic field. Recorded double-peak behaviour of GMI ratio measurements corresponding to the rotation of magnetization in the shell of the microwire exhibit the maximum value  $(\Delta Z/Z)_{\text{max}}=185\%$ .