

SURFACE IMPEDANCE TENSOR BEHAVIOUR IN AMORPHOUS FeSiB AND CoSiB WIRES

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An experimental study on the influence of a dc magnetic field on the real and imaginary parts of axial diagonal (ζ_{zz}) and off-diagonal ($\zeta_{\phi z}$) components of the surface magnetoimpedance (MI) tensor has been performed in amorphous $\text{Fe}_{77.5}\text{Si}_{7.5}\text{B}_{15}$ and $\text{Co}_{72.5}\text{Si}_{12.5}\text{B}_{15}$ wires with diameters of 126 μm and 120 μm respectively. The ac drive current was 5 mArms flowing along the wires in the frequency range from 0.45 to 0.8 MHz.

The impedance characteristics have been analysed in the as-cast wires and after annealed at 350°C during 20 minutes with a constant torsional stress of $\pi/20$ rad/cm in the counter-clockwise sense. That heat-stress treatment was carried out in a vertical furnace, specially prepared for this study.

The MI behaviours can be ascribed to the different domain structures of positive and negative magnetostriction wires, before and after the intrinsic anisotropy distribution has been also modified by the annealing treatment.

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Figures:

