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Optimization of Giant Magnetoimpedance in amorphous $(Co_{1-x}Fe_x)_{89}Zr_7B_4$ ribbons A. CHATURVEDI, M.H. PHAN, H. SRIKANTH, University of South Florida, A. LEARY, M.E. MCHENRY, Carnegie Mellon University — The giant magnetoimpedance (GMI) effect is observed upon the application of a static magnetic field on a soft ferromagnetic material carrying an ac current. GMI is a tool that can be used in a number of applications and especially important for magnetic sensors. There is currently a need for optimizing the effect in new materials and fine tune the material parameters for enhanced GMI and sensitivity. We report systematic studies of the GMI effect and its field sensitivity in $(Co_{1-x}Fe_x)_{89}Zr_7B_4$ amorphous ribbons with x=0.00, 0.025, 0.05, 0.075 and 0.10. Magnetoimpedance measurements were carried out along the ribbon axis in applied dc magnetic fields up to 120 Oe over a frequency range of $0.1 \sim 13$ MHz. We find that while the highest value of GMI is achieved for the x = 0 sample, the highest field sensitivity of GMI is achieved for the x=0.025 sample. The Fe doping causes a significant modification of a transverse domain structure thus reducing the GMI effect. We have also studied systematically the influence of Fe doping on field hysteresis and symmetry in GMI profiles, as well as relative contributions of resistance and reactance to magnetoimpedance for all the samples.

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