

Abstract Submitted
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Giant Magnetoimpedance in Co-Based Amorphous Ribbons Coated in Magnetic Nanoparticles for Biosensing Applications N. LAURITA, A. CHATURVEDI, K. STOJAK, S. CHANDRA, M.H. PHAN, H. SRIKANTH, University of South Florida — Giant magnetoimpedance (GMI) is a large change in the ac impedance of a ferromagnetic conductor subject to a dc magnetic field. It forms the basis for developing highly sensitive magnetic sensors. We report studies aimed at developing GMI as a magnetic biosensing technique. We have investigated the GMI effect and its field sensitivity in Co-based amorphous alloys with and without coated magnetic nanoparticles. Fe_3O_4 and CoFe_2O_4 nanoparticles (mean size, 5-10 nm) were patterned onto the ribbon surfaces and the number of particle layers was varied from 10 to 80. The influences of particles size, concentration, and layer thickness on the GMI and field sensitivity have been investigated systematically. The coating of the nanoparticles has been shown to enhance the GMI and field sensitivity, both of which increase with increase of particle concentration and layer thickness. Overall, our studies demonstrate the possibility of using GMI as a magnetic biosensor with high sensitivity for applications in biomolecular detection.

Nicholas Laurita
University of South Florida

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