

Large enhancement of the GMI effect in multi-ferromagnetic ribbons

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Abstract: A kind of composite material consisting of stacked magnetic ribbons, each isolated with thin plastic sheets, for high-performance sensor applications. Impedance measurements were conducted in the frequency range of 1-10 MHz for a varying dc magnetic field within ± 300 Oe. The giant magnetoimpedance (GMI) effect and its field sensitivity were achieved in these composite materials. The GMI effect was found increase strongly with increasing number of ferromagnetic ribbons. The GMI ratio and its field sensitivity reached the highest values of 220 % and 25 %/Oe for the composite containing five ribbons, which indicates that the newly developed composite material is very promising for high-performance GMI sensor applications. The increase in the GMI effect in the composite sample was shown to be attributable to a decrease in the electrical resistance and the increase of effective permeability.

Author Keywords: Ferromagnetic ribbon; GMI sensor; Magnetoimpedance effect

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