

Changes in magnetic and magnetoresistive characteristics of Ni-Fe/Au/Co/Au multilayers induced by annealing

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Magnetic layered structures characterized by alternating in-plane and out-of-plane magnetization configuration at remanence are interesting for different applications, particularly as magnetoresistive sensors (GMR-type) with a linear $R(H)$ dependence. We have demonstrated that for a proper choice of the deposition conditions and thickness of constituent layers, sputter-deposited (Ni₈₀Fe₂₀/Au/Co/Au) multilayers exhibit such a behavior for magnetic field applied perpendicularly to the surface (H_{\perp}). In this contribution the influence of annealing on magnetization reversal and magnetoresistance was studied. Measurements performed for as-deposited samples and after subsequent isothermal annealing ($150^{\circ}\text{C} < T_a < 250^{\circ}\text{C}$) show that the GMR effect is stable under annealing below 200°C . It even slightly increases, for T_a above 200°C , what opens a path for the GMR value control and therefore is important for applications. The most pronounced changes were observed in the central part of the $M(H_{\perp})$ and $R(H_{\perp})$ curves, influenced by both the nucleation H_N and the saturation H_S fields. They are related to the appearance and disappearance of stripe domain structure in Co layers. The influence of T_a on values of H_N and H_S will be discussed.

9.7 cm

13.4 cm

Subject category :

2. Magnetic Films, Surfaces and Multilayers

Presentation mode :

poster

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