MAGNETIC PROPERTIES AND GMR OF SPUTTERED Permalloy/Au MULTILAYERS

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9.7 cm

Permalloy/Au multilayers are among the most promising materials from the application point of view as they show the highest GMR field sensitivity. However, magnetic and GMR properties of Py/Au multilayers strongly depend on the deposition techniques. In this work we present properties of a series of Mls prepared with the double face to face sputtering technique. The Py = $Ni_{83}Fe_{17}$ sublayer thickness has been kept constant within each film and amounts to 2.4 nm. Gold sublayer has been deposited in a narrow wedge form and its mean thickness varied from 1 to 3.5 nm. The existence of a well defined periodic structure was confirmed by X-ray diffraction. The samples were studied by vibrating sample magnetometer, longitudinal Kerr effect and GMR effect measurements. The results can be summarized as follows: i) the Mls are magnetically soft with $H_c \leq 1$ Oe and show uniaxial anisotropy with $H_k \approx 10$ Oe, ii) for d_{Au} close to 1.1 nm the antiferromagnetic exchange coupling is present in a very narrow Au thickness range (∼0.2 nm), iii) the relatively small GMR value (1.5% at RT) is caused by non-perfect AF coupling. Temperature dependences of the magnetization reversal and the GMR effect are discussed.

13.4 cm

Subject category :
2. Magnetic Films, Surfaces and Multilayers

Presentation mode :
poster

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