A METHOD TO ENHANCE THE MR EFFECT IN EVAPORATED NiFe/Cu MULTILAYERS

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Thermally evaporated $Ni_{80}Fe_{20}$ (Py) and $Ni_{80}Fe_{20}$/Cu (Py/Cu) multilayers were deposited on to oxidised Si wafers and glass substrate at room temperature. The thickness of the Py layers, t_{Py}, ranged from 4 to 10 nm while that of the copper layer, t_{Cu}, was ranged from 3 to 8 nm. The samples were examined by means of atomic force microscopy (AFM), vibrating sample magnetometer (VSM), magnetoresistance and Hall effect measurements. The AFM images show a rough surface. For t_{Py}=5 nm the maximum roughness is around 10 nm and the mean value is 0.9 nm. The VSM measurements show almost identical shape hysteresis curves for the Py layers and Py/Cu multilayers. The MR measurements show an anisotropic behaviour and very small values for GMR. These facts suggest the existence of the Py bridges through the Cu interlayer and the absence of the antiferromagnetic coupling between the Py layers. In order to increase the MR response we deposited Mn and FeMn pinning layers on the top Py layer. We performed in situ conductance measurements for samples deposited on to glass substrate to get some correlations between the MR effect and conductance parameters.

9.7 cm

13.4 cm

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