

**PLANAR HALL EFFECT IN SPINVALVE STRUCTURE OF
Si(100)/NiFe(x)/CoFe/Cu/CoFe/IrMn/Ta**

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Abstract

Spin-valve structures of Si(100)/NiFe(x)/CoFe/Cu/CoFe/IrMn/Ta with different thickness of NiFe layer for Planar Hall Effect (PHE) were investigated. The samples were deposited by radio frequency reactive magnetron sputtering at room temperature on silicon (100) wafer in a uniform magnetic field of 100 Oe was applied parallel to plane of samples, which was used to induce a uniaxial magnetic anisotropy of ferromagnetic layers and to align the pinning direction of the IrMn layers. The base pressure was less than of 10^{-9} Torr. The sputtering gas pressure of Ar was 1.0×10^{-3} Torr for all layers. The PHR ratios were measured by the PHR measurement system. The PHR ratios of the Si(100)/NiFe(15Å)/CoFe/Cu/CoFe/IrMn/Ta was obtained about 200 % (Fig. 1). Noteworthy, PHR ratio was found to vary as function of NiFe layer thickness. Additionally, this planar hall effect of structure and microstructure of the ferromagnetic layers of the samples exhibited a strong dependence on the interlayers coupling between pinned layer and free layer. On the basis of these properties, these spin-valve structures could be exploited to determine several magnetic features and with very high PHR ratios, it will be good candidate for application in magnetic sensors as well as biosensors field.

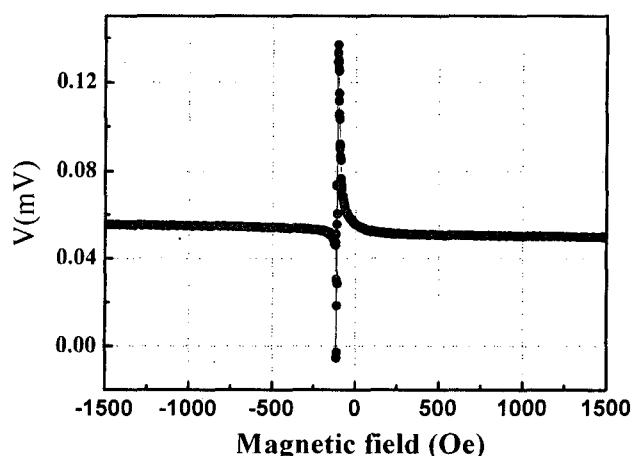


Fig. 1. PHR profile of Si/Ta(5)/NiFe(4.5)/CoFe(1.5)/Cu(2.6)/CoFe(3)/IrMn(10)/Ta(5) with the PHR ratio of about 200%.

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