MAGNETIC ANISOTROPIES OF NiMn/Ni, NiMn/Cu/Ni THIN FILMS

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9.7 cm

Magnetoresistance of spin glass (SG) $Ni_{73}Mn_{27}/SiO_2/Ni$ thin film indicated that the unidirectional magnetic anisotropy in the SG layer is enhanced by decreasing the thickness of the SiO_2 layer [1]. In this study, we performed the magnetic measurements of the reentrant spin glass (RSG) $Ni_{78}Mn_{22}/Ni$ and the $Ni_{78}Mn_{22}/Cu/Ni$, prepared using the Ar ion-beam sputtering, to discuss the contribution of neighbor ferromagnetic layer to the SG and RSG layers.
The unidirectional anisotropy field of the NiMn/Ni film decreased from that of NiMn film and magnetizations of both the layers switched together at a same field. This is possibly due to strong magnetic coupling. The switchings of magnetizations of the magnetic layers in NiMn/Cu/Ni films are nearly separated. The unidirectional anisotropy field was almost same as that of NiMn film, independently of the Cu thickness (50Å - 5000Å). As a result, the contribution of the ferromagnetic layer to the magnetic properties of the SG layer is observed only in the pure spin glass region. This suggests that the spin glass nature is influenced by the influx of ferromagnetically polarized electrons through the weak electrical coupling between two layers.

[1] T. Ando, T. Sato and E. Ohta, J. Mag. Mag. Mat. **113**, 115 (1992)

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