Asymmetric induced magnetic moment of top and bottom Pd layers in Pd/Co/Pd trilayer system

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Spin transport properties of a non-ferromagnetic metal (A) / ferromagnet (B) / non-ferromagnetic metal (A) system have been extensively studied. Interfacial phenomena such as spin-orbit torque and Dzyaloshinskii-Moriya interaction are known to affect the spin transport properties in such systems. [1, 2] Even with a symmetric A/B/A structure, it has been argued that the structural difference of the top A/B and bottom B/A interface lead to a broken space inversion symmetry. In this study, the induced magnetic moment of the Pd layers in a Pd/Co/Pd trilayer system were investigated. The magnetic proximity effect is known to induce ferromagnetic behavior in Pd adjacent to a ferromagnetic element. [3] Using x-ray magnetic circular dichroism and x-ray resonant magnetic scattering, it is found that the induced magnetization of the Pd at the top Pd/Co and bottom Co/Pd interface is different. The asymmetry of the Pd moment is possibly due to the difference in strain of the top and bottom Pd. These results suggest that the asymmetry in the interfacial induced magnetic moment need to be considered in explaining interfacial spin transport phenomena.

참고문헌

[1] J. C. Thomas *et al.,* PRB **88**, 214401 (2013)
[2] M. Jamali *et al.,* PRL **111**, 246602 (2013)
[3] J.J. Hauser, Phys. Rev. **187**, 580 (1969)