EC05

Magnetic Properties of V Thin Films on the fcc Co(001) Surface

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Magnetic properties of Vanadium thin films deposited on the fcc Co(001) surface was studied using Surface Magneto-Optical Kerr Effect (SMOKE) and X-ray Magnetic Circular Dichroism(XMCD) method. Submonolyer V thin filmes were deposited on the fcc Co(001), which was prepared by deposition of 3-5 ML Co on the Cu(001) surface at room temperature. SMOKE results showed the reduction of coercivity and remanent magnetizationafter Vanadium deposition. However, unlike the theoretical prediction of Vanadium-induced perpendicular magnetic anisotropy[1], the magnetic easy axis of the system remained at inplane [110] direction after Vanadium deposition. XMCD experiment was performed at EPU6 beamline at Pohang Light Source. Induced magnetic moment of V was clearly confirmed from XMCD spectra, even at 0.25 ML V thickness.Using V and Co XMCD spectra, element specific hysteresis loop were successfully measured, and the results showed the anitiferromagnetic coupling between V and Co, as seen in figure 1. The post-annealing up to 470 K was tried after deposition but no remarkable change of magnetic properties was observed after annealing.

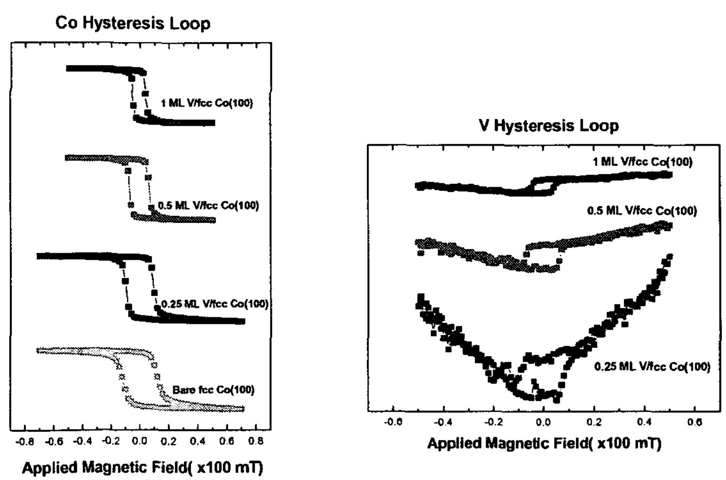

Fig. 1. Element specific hyteresis loops for V/fcc Co(100) system

REFERENCES
[1] Jisang Hong, Surface Science **600**, 2323(2006)

EC06

Nano-magnetophotonics: Control of Light by Introducing Artificial Nanostructures and Their Applications

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Introduction of artificial nano-scaled structures to magnetic materials gives us a variety of opportunities for controlling light and spin waves traveling in the structured materials. Magnetophotonic crystals (MPCs) [1, 2] can be classified into such materials, where optical-order periodic structures composed of magnetic and/or dielectric materials are introduced so as to create photonic band gap and to confine light in the vicinity of additional defects in the periodic structures. One- and two-dimensional MPCs have already found their optoelectronic applications such as magneto-optic (MO) spatiallight modulator [3] and optical waveguide isolator [4].

Enhancement of MO Faraday and Kerr effects can be achieved by utilizing the surface plasmon resonance [5]: For instance, when Au nano-particles are embedded in magnetic garnet thin film, the Faraday rotation angle of film shows considerable enhancement at the wavelength of plasmon resonance. This is also the case for Kerr rotation, suggesting that the MO responses can be manipulated by the use of localized evanescent field associated with the plasmon resonance. More sophisticated structures for the plasmon- assisted magnetophotonics have been also proposed and discussed based upon the theoretical calculations [6].

The enhanced MO effects are very attractive for various optoelectronic applications. For instance, holographic data storage requires a high-speed spatial light modulator (SLM) in which light intensity or phase is modulated in a two-dimensional pixel alignment. Transmission-type and reflection-type 1D-MPCs have been used as the constitutive materials in MO SLMs. Basic performance of the devices are also introduced at the conference.

REFERENCES
[1] M. Inoue et al., *J. Phys. D: Appl. Phys.* (2006), **39**, No.8, pp.R151-R161.
[2] M. Inoue et al., "Magnetic Nanostructures", eds. B. Aktaş, L. Tagirov and F. Mikailov, *Springer Series in Materials Science*, (2007), pp.29-43.
[3] K. H. Shin et al., *J. Appl. Phys.*, 10th Joint MMM/Intermag Proc., (2007) in press.
[4] Z. Wang et al., *Appl. Phys. B*, (2005), **81**, pp.369-375.
[5] M. Inoue et al., in preparation for publication, (2007).
[6] A. Fedyanin et al., Proc. Plasmonics 2006, Singapore, (2006), 76.