

[S-02]

Magnetic property and annealing effect of Fe/Pt(111)

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The magnetic thin films with perpendicular magnetic anisotropy (PMA) have been studied very extensively because of their applicability for high-density magnetic recording media. Fe/Pt multilayer also has perpendicular magnetic anisotropy[1] in restricted condition. We have studied the magnetic properties of Fe films grown on Pt(111) with surface magneto-optical Kerr effect (SMOKE) and X-ray photoelectron spectroscopy (XPS). We found that Fe film with 4 ML thickness has perpendicular easy axis, and thicker films have longitudinal easy axis. The hysteresis loop is not good square-like form, which indicates that the film does not behave as single domain. Annealing the film of 4 ML thickness at 580 K change the easy axis from perpendicular to longitudinal direction, which is thought to arise from the smoothness of the interface. Thicker films show both the perpendicular and longitudinal magnetic hysteresis after annealing treatment. The electronic structures of the films thicker than 2 ML are similar to each other, and do not change by annealing at near 600 K. Annealing higher than ~ 700 K induces mixing of Fe and Pt, which is also indicated by low energy electron diffraction (LEED).

[References]

- [1] T. Katayama, Y. Suzuki, Y. Nishihara, T. Sugimoto, and M. Hashimoto, J. Appl. Phys. 69, 5658 (1991)