EC01

Surface Magnetism of Fe/Pt(110)

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Ever since the use of scanning tunnelling microscope in magnetic thin film study, a lot of controversial issues have been raised or solved. One of the interesting examples would be the magnetism in Fe on Cu(001) surface[1]. Recently we have studied Fe ovelayers on Pt(110) surface using scanning tunnelling microscopy, surface magneto-optic Kerr effect, and photoelectron spectroscopy. Several issues will be discussed.

(1) Fe-Pt surface alloy formed on Pt(110)
(2) Surface magnetism in Fe/Pt(110); magnetic anisotropy
(3) Origin of exchange bias; model system for the exchange bias
(4) Order-disorder phase transition

The first two topics will be the specific issues on the phenomena of Fe overlayers on Pt(110) surface. The last two topics would give you an idea on the origin of the exchangebias in atomic scale and the new approach the thermodynamic behaviour in atomic scale. There have been several models to explain the exchange bias phenomena, but so far there is no direct proof of their origin in atomic scale. Our approach to solve this problem in atomic scale starts from the atomic structure of the Fe-Pt alloy surface, where the exchange bias has been shown. We will show you the results of our simulation, where the importance of the interface is clearly shown. Also we have shown the direct observation of the order-disorder phase transition at this surface in atomic scale. With our STM images, we can actually count the thermodynamics in atomic scale.

REFERENCES

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EC02

Magnetic Properties of the Metal/Column-IV Semiconductor Interfaces

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The study of the interfacial properties at early stages of deposition provides key information for the purpose of minimizing the size and enhancing the performances of devices. Detailed understanding of magnetic metal/semiconductor interfaces will pave theway towards the integration of spintronic devices in the integrated devices mainstream technology. Magnetic properties and the related phenomena of metal/semiconductor interfaces are reported. Special attention is paid to the microstructure of the interface, interdiffusion of overlayer atoms, surfactant, immiscible buffer layers, and their effects on the magnetic properties of the films. During the growth of a thin film the microstructure of the interface plays a key role on the magnetic anisotropy and the behavior of magnetic phase transition [1, 2]. At elevated temperatures, interdiffusion of overlayer atoms with the substrate results in the morphological changes of the surface. The in-depth composition and surface morphology dominate the magnetic phases at different coverages and temperatures. No exchange bias phenomenon appears when oxygen reacts as surfactant which is introduced at the topmost layer [3]. The surfactant affects the electronic structure and leads the changes of stress anisotropy. The compound layer can be efficiently reduced to zero by using an immiscible buffer with sufficient thickness [4]. Segregation of the buffer atoms damages the magnetic structure and lowers the thermal stability of the magnetization.

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