[Ⅲ~18][초청]

Rare-earth thin film studies of Gd/W(110), Y/W(110) and Gd/W(100)

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Rare-earth (RE) elements have been subject of a great deal of varied research due to the unusual crystal, electronic and magnetic properties which are caused by atomic core-like 4f states perturbed by the presence of a non-localised valence band. Advances in the crystal growth of RE metals and surface preparation techniques have resulted in an increase in experimental activity in RE surface science. Over the last decade there have been a number of studies on the electronic and magnetic properties of RE thin films grown on the various substrates such as a Mo, W, Fe, Ni and semiconductor. In particular, the epitaxially grown Gd film on W(110) has been studied intensively to understand the unusual magnetic properties such as a surface-enhanced Curie temperature which is approximately 20 °C higher than that of bulk.

In this presentation I will report the studies of Gd/W(110), Gd/W(100) and Y/W(110) with respect to growth mode, interface electronic structure and overlayer crystal structure using VUV photoemission spectroscopy, X-ray photoemission spectroscopy (XPS), Scanning Tunnelling Microscopy (STM) and Low-Energy Electron Diffraction (LEED), and two new techniques for monitoring a growth mode, which are developed and tested in this work, will be introduced. One utilizes the two cross-section effects, i.e., the Cooper-minimum and the giant resonant photoemission precesses, and the other is based on the single scattering theory and the concept of mean free path for calculating the relative intensity of LEED spots.