EXAFS end-station (XDD beamline)

The XDD beamline (http://ssls.nus.edu.sg/facility/beamlines/xdd/xdd.htm) at SSLS delivers a tunable monochromatized photon source with high resolution in a wide energy range (2.3-10 keV). This hard x-ray light source is ideal for diffractometry, fluorescence detection and absorption spectroscopy, especially the study of XAFS (x-ray absorption fine structure) and XANES (X-ray Absorption Near Edge Structure).

Fig. 1 XDD endstation with manipulator and proportional counter detector.

We have setup a vacuum chamber (see Figure. 1) for the study XAFS and XANES of *in-situ* samples. There are two detection modes currently workable in the endstation: total electron yield mode using the sample current and fluoresce yield mode using a proportional counter detector. Both detection modes with different surface sensitivities are suitable for study in surface science as demonstrated in the following example to study a thin alloy film.

Figure 2 reports results of Rh L3-edge XANES of $Fe_{45}Rh_{55}$ alloy measured using total electron yield mode. The film is 80 nm and the results are quite good with high voltage bias applied to an extractor near the samples to enhance the electron yield.

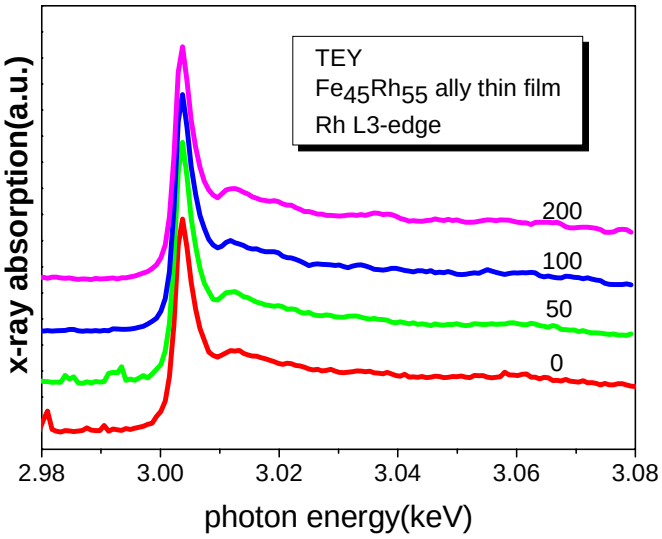

Fig.2 Normalized XAS of a 80 nm thick $Fe_{45}Rh_{55}$ thin film at Rh L3-edge, collected in sample current mode at a bias of 0, 50, 100 and 200V, respectively.

Figure 3 reports the Rh L3-edge XANES of the same alloy sample measured using proportional counter detector with different distance to the sample surface. With a decreasing work distance of the detector from 80 mm to 10 mm, the XANES shows more saturation effects.

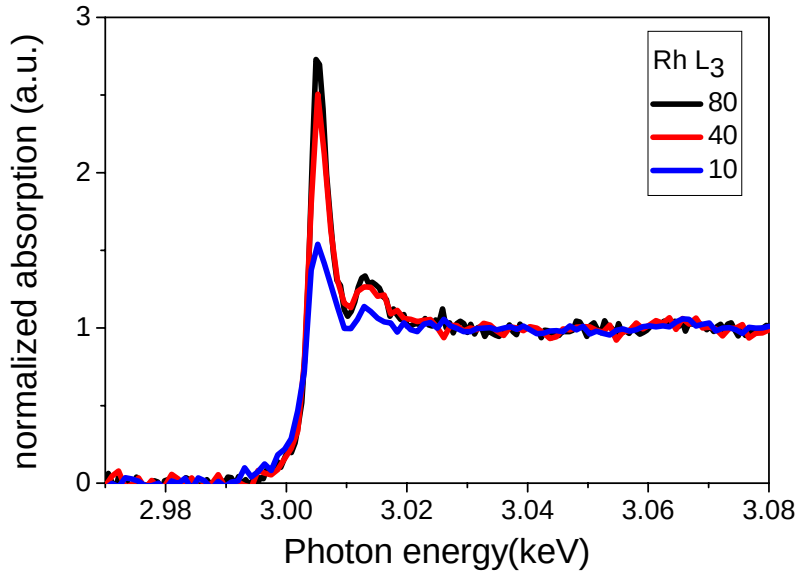

Fig.3 Normalized fluorescent XAS of the 80 nm thick $Fe_{60}Rh_{40}$ thin film at Rh L3-edge using the proportional counter detector with three different distances from the film.