Surface Structure Analysis of Solid Liquid Interfaces

Masashi Nakamura, Osamu Endou, Ohta Toshiaki and Masatoki Ito*

Faculty of Science and Technology, Keio University

Graduate School of Science, Tokyo University

As the second trial at BL09XU beamline, we studied √7x√7-Pt(111)-I in H2SO4 solution. Prior to in-situ SXD measurements, the super structure of iodine √7x√7 on Pt(111) has been confirmed by in-situ scanning tummeling microscope(STM) and cyclic voltammogram. From a STM image, the size of √7x√7 super structure was 8 nm in average which is not well ordered.

The single crystal(2mmx 10mm diameter) was sealed using a 4μ-Prolene X-ray window film. Wavelength of 1.30 A was used with in-plane geometry.

Fig.1 shows the result for the low ordered diffraction peak(3/7,6/7,0.2) for a √7x√7-Pt(111)-I. The weak intensity(~2500cps) due to adsorbed iodine atoms on Pt(111) coupled with a broad half width of a locking curve(~0.8 degree) can be explained by the small ordered domain sizes of the adsorbed iodine super structure. This means that one should use a Pt(111) of which the terrace extends over. Fig. 2 also shows the result for the peak (1/3,1/3,0.05) of a √3x√3-Au(111)-I. The weak and broad peak of iodine super-structure is also interpreted by the irregular iodine structures on Au(111) electrode.

Fig.1 ——(3/7, 6/7, 0.2)—

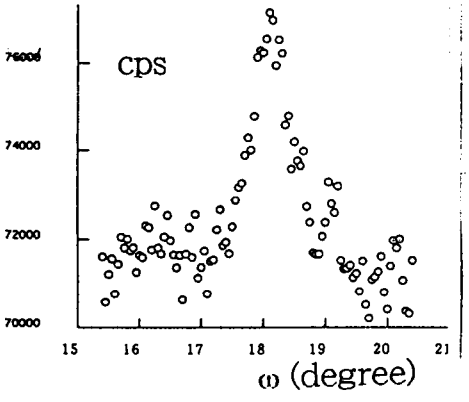

Fig.2 (1/3, 1/3, 0.05)