

Surface Structure Analysis of Solid Liquid Interfaces

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

The single crystal (2mm x 10mm diameter) was sealed using a 4 μ -Prolene X-ray window film.

Wavelength of 1.30 Å was used with in-plane geometry.

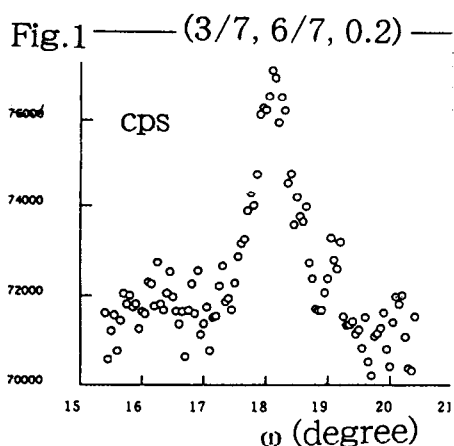


Fig.1 shows the result for the low ordered diffraction peak (3/7, 6/7, 0.2) for a $\sqrt{7}\times\sqrt{7}$ -Pt(111)-I. The weak intensity (~2500 cps) due to adsorbed iodine atoms on Pt(111) coupled with a broad half width of a locking curve (~0.8 degree) can be explained by the small ordered domain sizes 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 $\sqrt{3}\times\sqrt{3}$ -Au(111)-I. The weak and broad peak of iodine super-structure is also interpreted by the irregular iodine structures on Au(111) electrode.

