TEMPERATURE DEPENDENCE OF STRUCTURAL BEHAVIOR FOR PD NANOPARTICLES

YAGI Shinya, TSUKADA Chie, MIZUTANI Tsuyoshi, OGAWA Satoshi

Nagoya University, Nagoya, Japan

Abstract

A chemical reduction method does not high cost and fit for the mass production. However since the chemical reduction method uses a molecule like water-soluble polymer as a surfactant, it has a possibility that the NPs surface is probably polluted by the adsorbed surfactant molecule. On the other hand, a gas evaporation method has been investigated by Hayashi et al. Because that method uses He gas, the NPs surface can not be polluted by any molecules. If the NPs are heated under vacuum condition, we have a interesting about “Do the crystallinity and the surface chemical state for the NPs change?” In these years, we have produced a very compact NP fabrication system with the gas evaporation method. Therefore we can study the surface chemical state and structural change by the combination the compact NP fabrication system and the in-situ spectral measurement. I this study, we have fabricated the Pd NPs by the gas evaporation method and have investigated the temperature dependence of the structural behavior for the Pd NPs by means of in-situ X-ray photoelectron spectroscopy(XPS) and atomic force microscopy(AFM).

The Pd NPs fabricated by using He gas (6N5, research grade) and deposited on the Si wafer. The AFM observation was done with NanoScope III-a Veeco Instrument. The XPS measurements were carried done with Phoibos-150 (CCD, SPECS) and MgKα line. The sample annealing was done with the electron bombardment system under UHV condition.

In the session, we will discuss about the structural behavior including size change with temperature dependence.

Keywords: Pd nanoparticle, gas evaporation method, XPS

Author did not supply full text of the paper/poster