The Characteristic Composition of Nanoparticles in the Ambient Air in Hsinchu Science Park in Taiwan

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There are many Hi-tech manufactories located in the Hsinchu science park such as the semiconductor industry. These manufactories developed some nanometer scale product (Ex: smaller transistors for computer chips) for many years. Currently, the manufacturing standard for a feature on a memory chip is 90 nm, but it is predicted that this will have fallen to 22 nm by 2016 years. Thus, numerous nanoparticles would possibly be released to the ambient air near Hsinchu science park. However, the formation and growth of particles in the ambient air might be associated with day or night, workday or weekend, environmental factors (RH%, CH_4, Temperature, NMHC, THC, NO, NO_X, CO) and pollutant source.

The characteristic composition of nanoparticles generated from different sources would also be various. Thus, the heavy metals and soluble anions contained in the nanoparticles would be analyzed by LA-ICP-MS and IC, respectively. The oxidation state and speciation of copper would be measured by X-ray absorption spectroscopy (XAS).The component fits of the XANES (x-ray absorption near edge structural) spectrum (Figure1) showed that approximately 39% CuO, 34% $CuSO_4$ and 27% $Cu(NO_3)_2$ were existed in the fine particles which were collected from Hsinchu Science Park. It was interested that not all of sulfate or nitrate ions were in the form of ammonium compounds. Sulfur compounds might be released from Hi-tech industrial and accumulated to form fine or coarse particles.

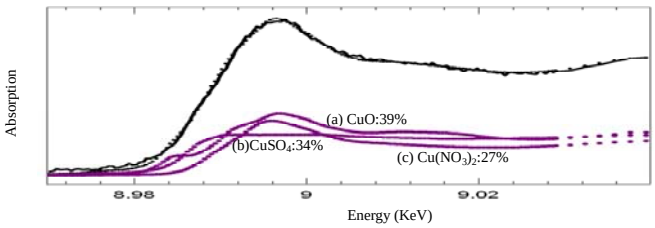

Figure 1. XANES spectrum of copper species in the fine particle collected from Hsinchu Science Park.

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