Surface Compositional and Structural Depth Profiling Analysis by Medium Energy Ion Scattering Spectroscopy

Dae Won Moon
Surface Analysis Group
Korea Research Institute of Standards and Science
Yousoung P.O. # 102, Taejon, 305-606 Korea

Most of the surface analysis tools have limited depth profiling capability in terms of the profiling range and the depth resolution. For example, angle-resolved XPS can profile the surface composition within the electron escape depth range and sputtering based depth profiling techniques has depth resolution deterioration problems due to ion beam bombardment effects. However, MEIS can profile the surface composition and structure with atomic layer depth resolution quantitatively and non-destructively.

In this presentation, I'd like to show you our recent results of MEIS on the effect of Ar^+ ion beam bombardment on the surface composition and structure depth profiles of amorphous Ta_2O_5 , Si(100), GaAs(100) thin film surfaces. The altered surface and subsurface layers were depth profiled nondestructively and quantitatively, by MEIS as a function of the ion incidence angle and the ion dose with the depth resolution of better than 1.0 nm. With these results, discussions will be given on the possibility that the quantitative and nondestructive nature of the MEIS analysis with almost atomic layer depth resolution be utilized for the surface composition and depth profiling analysis standardization method.