

## Sputtering of Solid Surfaces at Ion Bombardment

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Ion beam technology has recently attracted much interest because it has exciting technological potential for surface analysis, ion beam mixing, surface cleaning and etching in thin film growth and semiconductor fabrication processes, etc. Especially, ion beam sputtering has been widely used for sputter depth profiling with x-photoelectron spectroscopy (XPS), Auger electron spectroscopy(AES), and secondary-ion mass spectroscopy(SIMS). However, The problem of surface compositional change due to ion bombardment remains to be understood and solved. So far sputtering processes have been studied by surface analysis tools such as XPS, AES, and SIMS which use the sputtering process again. It would be improbable to measure the modified surface composition profiles accurately due to ion beam bombardment with surface analysis techniques based on sputter depth profiling. However, recently Medium energy ion scattering spectroscopy(MEIS) has been applied to study the sputtering of solid surface at ion bombardment and has been proved that it has been extremely valuable in probing the surface composition and structure nondestructively and quantitatively with less than 1.0 nm depth resolution. To understand the sputtering processes of solid surface at ion bombardment, The Molecular Dynamics(MD) and Monte Carlo(MC) simulation has been used and give an intimate insight into the sputtering processes of solid surfaces.

In this presentation, the sputtering processes of alloys and compound samples at ion bombardment will be reviewed and the MEIS results for the  $\text{Ar}^+$  sputter induced altered layer of the  $\text{Ta}_2\text{O}_5$  thin film and damage profiling of  $\text{Ar}^+$  ion sputtered Si(100) surface will be discussed with the results of MD and MC simulation.