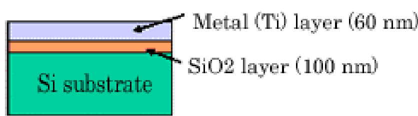
Chemical Status Analysis using AES (2)

Oxidation/Reduction of Ti and SiO2 on Thin Film Interface

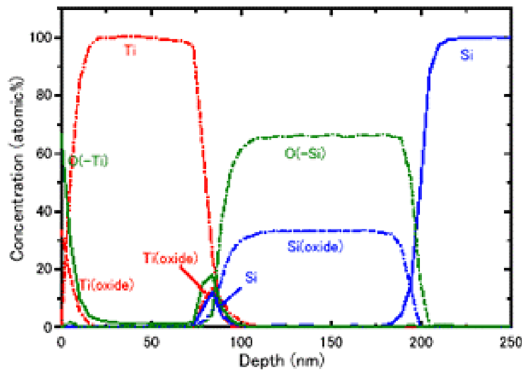
Some of the semiconductor devices have a structure where thin metal films such as Ti and Pt are developed on SiO_2 over Si substrate. The interface of these metal films is often subject to chemical reaction under certain conditions, failing to materialize as originally intended.

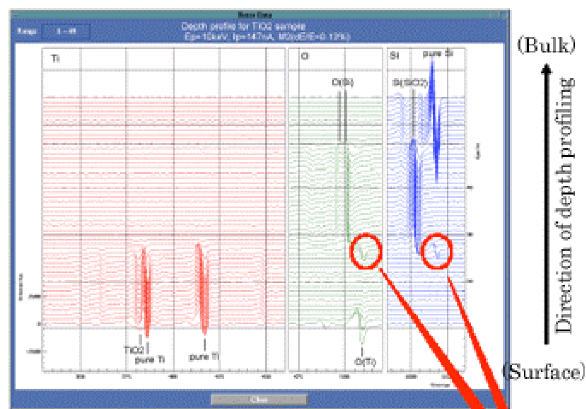
High energy resolution Auger analysis is widely used to study the chemical status of such interface.

Thin film structure



Depth profile at high energy resolution





High energy resolution (ΔE/E=0.1%) spectrum acquired from depth profiling

The spectrum shows that O bonded with Ti at the Ti/SiO2 interface, while Si turned to metal Si instead of being oxidized.Ti was oxidized by the oxygen of SiO2, and as a result SiO2 was reduced.

AES spectra of solid materials at different chemical status

Higher energy resolution for analysis captures fine shapes of Auger spectra conventional CMA was unable to detect, enabling analysis of various chemical status as in XPS. The following are some of the Auger spectra acquired at a high energy resolution High energy resolution (∠E/E=0.1%) depth profile

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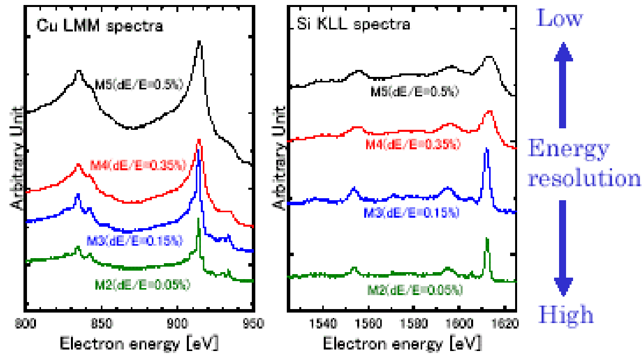

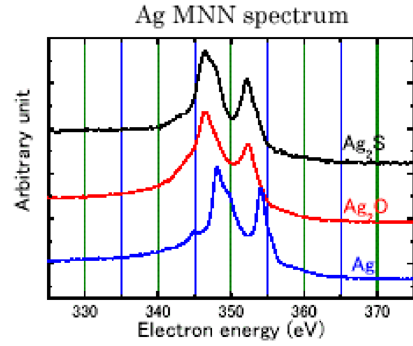

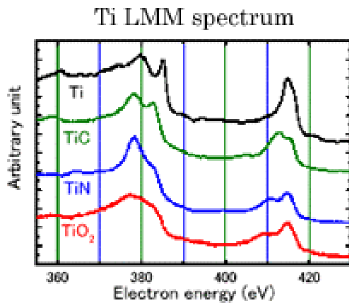

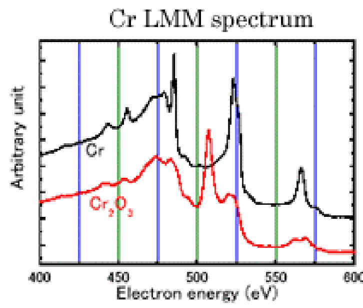

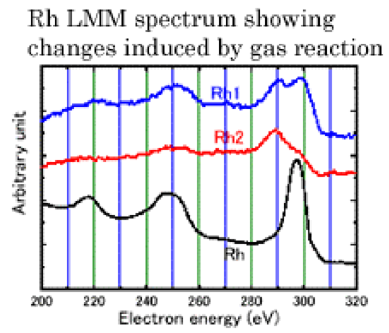

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