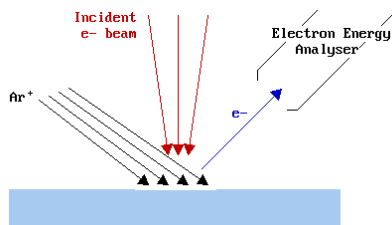


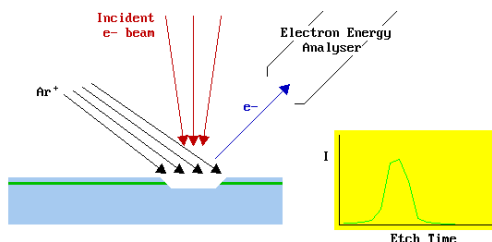
7.5: Auger Depth Profiling

As described in the Section on [Auger Spectroscopy](#) is a surface sensitive spectroscopic technique yielding compositional information. In its basic form it provides compositional information on a relatively large area ($\sim 1 \text{ mm}^2$) of surface using a broad-focused electron beam probe. In this manner, sufficient signal can be readily obtained whilst keeping the incident electron flux low, and thus avoiding potential electron-induced modifications of the surface. As a consequence the technique is non-destructive when used in this manner.

To obtain information about the variation of composition with depth below the surface of a sample, it is necessary to gradually remove material from the surface region being analyzed, whilst continuing to monitor and record the Auger spectra. This controlled surface etching of the analyzed region can be accomplished by simultaneously exposing the surface to an ion flux which leads to sputtering (i.e. removal) of the surface atoms.



For example, suppose there is a buried layer of a different composition several nanometres below the sample surface. As the ion beam etches away material from the surface, the Auger signals corresponding to the elements present in this layer will rise and then decrease again.



The diagram above shows the variation of the Auger signal intensity one might expect from such a system for an element that is only present in the buried layer and not in the rest of the solid. In summary, by collecting Auger spectra as the sample is simultaneously subjected to etching by ion bombardment, it is possible to obtain information on the variation of composition with depth below the surface - this technique is known by the name of **Auger Depth Profiling**.

This page titled [7.5: Auger Depth Profiling](#) is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [Roger Nix](#).