IUVSTA Short Course on Secondary Ion Mass Spectrometry

"Depth Profiling"

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The ability of SIMS to provide high sensitivity across the periodic table and excellent depth resolution made depth profiling a major application for SIMS analysis. The inorganic applications, especially semiconductor processing, dominated the field for many years, but the emergence of new ion sources, such as C_{60} and argon cluster beams, has made possible organic depth profiling of many materials. The same parameters need to be considered for any application and it is important for anyone who generates or needs SIMS depth profiling data to understand how those parameters should be chosen.

This tutorial will address the choice of primary and secondary ion species, primary beam energy and angle of incidence, sputtering rate, raster and gate, count rate saturation, crater depth measurement, ion implanted standards for quantification, depth resolution, mass interferences, and detection limit. Insulator analysis will also be addressed and a general approach to an unknown sample will be discussed.

The course material will utilize many of the concepts outlined in the two SIMS books authored or co-authored by the instructor.

Topics for Discussion: How do I determine the parameter settings to obtain the information I need? What would be a good sequence of mass spectra and depth profiles to investigate a new material, especially one with multilayers? I want quantitative information, so how can I create standards? Can we create standards for organic materials? What are my options for analysis of an insulating material?

Requests for Students: An inquisitive mind.