

## **Session # 32: Current Topics in Low Voltage SEM**

### **New tools for Micro-Characterization at low Beam voltages (The right tools for the right Job)**

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In recent years we have seen refinement of the Si(Li) detectors for microanalysis with energy resolutions approaching theoretical limits, the reintroduction of Wavelength Dispersive Spectrometers (WDS) for specialized applications and the wealth of texture information enabled with Electron Back Scatter Diffraction (EBSD) analysis. Most recently, two new tools have made their way into the analysts' toolkit: specifically the commercial introductions of microcalorimeters and Silicon Drift Detectors (SDD). These new tools expand the dynamic range of analysis in new and diverse dimensions. The microcalorimeter enabled simultaneous high energy resolution collection at low energies for EDS work at very low excitation energies which is particularly suited for analysis of materials used in semiconductor processing.

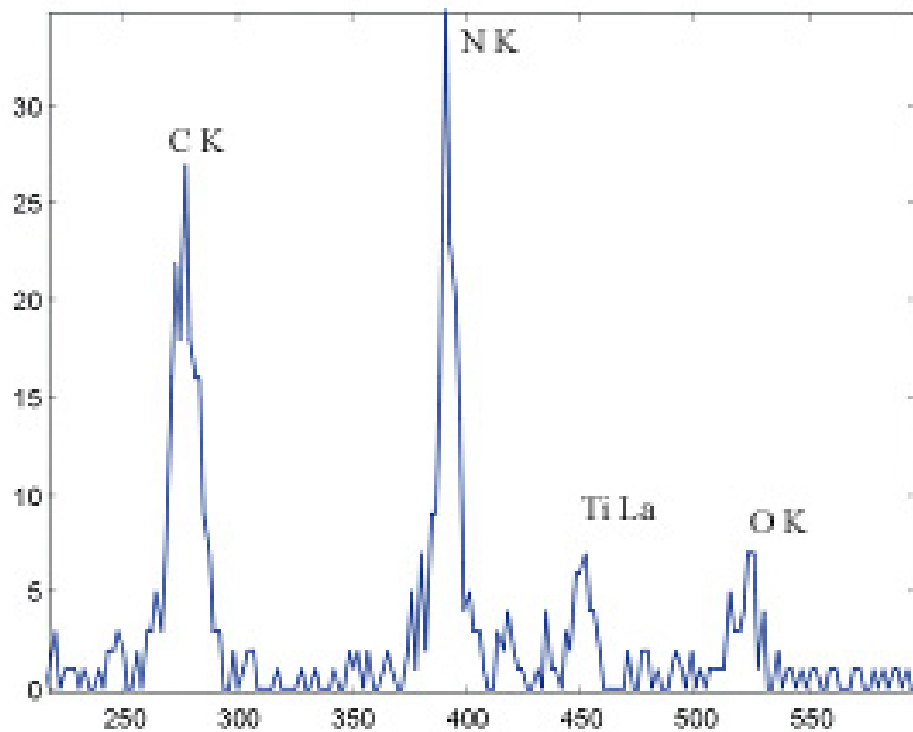
This paper describes analysis of small particles of at 5keV excitation where excellent resolution (<20eV @ 1.5keV) is a requirement.

The microcalorimeter is an energy dispersive spectrometer, capable of resolutions below 10eV @ 1.5keV and is ideal tool for simultaneous energy acquisition at energies below 5keV where line overlaps are a major obstacle for accurate qualitative analysis.

The interest in analysis using low beam energies has brought WDS back to the forefront of tools for microanalysis. The WDS is a sequential spectrometer, capable of resolutions similar to the microcalorimeter. The drawbacks using previous generations of EDS systems has been the speed and ease of use, this paper will address both these issues.

This paper will describe the operations of both techniques and compare their performances for today's analytical requirements. The data presented will exhibit the conditions under which the technique is applicable to various samples.

Finally, we will report on the use of specialized SDD and EBSD application where the combination of these complimentary techniques provides chemistry and crystallography of materials on a microscopic scale previously difficult or otherwise not possible.



TiN Particle Analyzed using Microcalorimeters EDS

## TiN Tool Coating

