

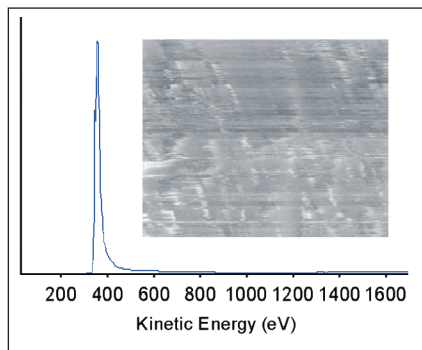
AES, SEM and SAM charge compensation

Key Words

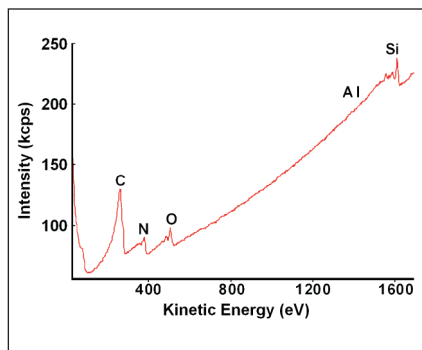
- Surface Analysis
- Effective Charge Compensation for AES, SEM and SAM

The analysis of insulating materials by electron beam techniques such as Scanning Electron Microscopy (SEM), Auger Electron Spectroscopy (AES) and Scanning Auger Microscopy (SAM) has always proved difficult due to sample charging. This causes peak movement or secondary electron peaks to dominate the spectrum.

Effective charge compensation for all surface analysis techniques requires that excess charge is removed and the surface is as close to ground potential as possible. This charge balance may be achieved in electron beam techniques by use of a flux of very low energy ions.



AES spectrum and SEM of ceramic sample acquired with no charge compensation



AES spectrum of ceramic sample acquired with charge compensation (~20 eV Ar⁺ ions)

On MICROLAB 350 from Thermo Electron, the EX05 source provides a flux of low energy ions (generally ~20 eV Ar⁺ ions) which greatly aids the establishment of charge balance.

The spectrum acquired from a ceramic sample, without the charge compensation is dominated by the secondary electron peak, with no chemical information. The SEM is also dominated by charging effects

With charge compensation, the SEM becomes clearer and the AES spectrum now shows chemical information from which SAM images can be obtained.

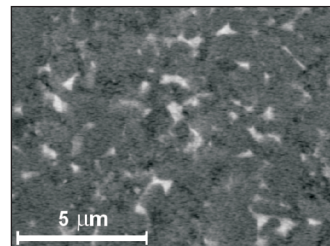


Figure 1: EM of ceramic sample acquired with charge compensation

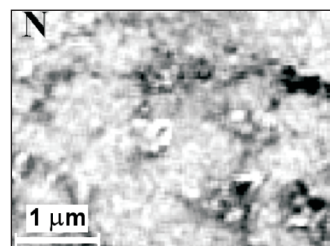


Figure 2: Nitrogen SAM image of ceramic sample acquired with charge compensation

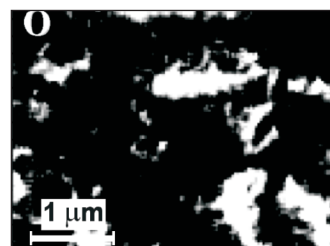


Figure 3: Oxygen SAM image of ceramic sample acquired with charge compensation

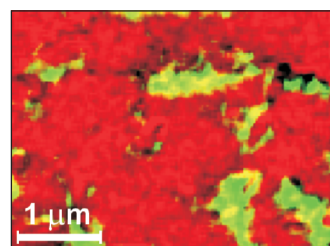


Figure 4: Overlay of SAM images of ceramic sample acquired with charge compensation, red=nitrogen, green=oxygen

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