ANALYTICAL ANSWERS

Focused Ion Beam (FIB) Milling

Focused Ion Beam (FIB) combines high resolution imaging (comparable to SEM) with localized milling by ion beam sputtering for site specific preparation and analysis. It uses a focused beam of ions to mill or etch into the sample. The etch rate can be modified by injection of gases toward the surface. The choice of gas and conditions can either selectively etch or deposit materials in localized patterns with submicron precision.

Applications:

Materials Evaluation

Process Development
Protective coatings
Inclusions
Grain size and boundaries
Micromachining

Failure Analysis

Microelectronics

- Delaminations
- ESD damage
- Step Continuity

Quality Control

Microelectronic circuit editing
Etch depth

Focused Ion Beam Milling can be used as a sample preparation technique for Auger Microanalysis and Scanning or Transmission Electron microscopy.

Principle of Operation:

A gallium source is used to generate ions that interact with the sample. In the Imaging mode the ions are raster scanned across the sample and the ejected charge particle s are collected to form an image. In the milling mode the ion beam is used to cut trenches or craters into the sample to give precise, smooth cuts for subsequent imaging analysis.

When using the gas assisted etching selective milling can be accomplished or selective deposition can take place. In both cases the features generated have submicron precision.

Data Output:

The primary output is a micrograph. The image is viewed on a monitor and recorded electronically.

Sample Constraints:

Samples are typically no bigger than a few centimeters. The camber can accommodate a sample approximately 3 inches in diameter but typically samples are much smaller.