The Information You Need...When You Need It.

Variable Pressure Scanning Electron Microscopy (VPSEM)

Variable Pressure Scanning Electron Microscopy is a technique used to produce high-resolution images with a high depth of field. VPSEM differs from traditional SEM in that the instrument chamber is operated at higher pressures (~10 Pa to 3,000 Pa) which allows for imaging and analysis of insulating samples without the need to apply a conductive coating.

This is convenient for when it is undesirable to coat a sample or the sample is too large for the coating systems.

With VPSEM, we can examine a sample's topography, structure, and its elemental composition under magnifications of ~10X to ~20,000X. Multiple electron and x-ray detectors can be employed to expose even more information about the characteristic of a sample.

How it Works:

We produce a finely focused electron beam and scan it across the sample. When the electron beam hits the sample, it generates secondary electrons and backscattered electrons. Various detectors collect these signals and they are displayed on a computer monitor as well as captured in high-resolution digital images. We can use VPSEM in a various number of modes to provide us with different kinds of information:

- Variable Pressure Secondary Electron Imaging (VPSE) - Shows microscopic and surface features of a sample.
- High Definition Backscattered Electron Imaging Topographic Mode (HDBSE Topo) - Shows sample topography / morphology independent of sample composition.
- High Definition Backscattered Electron Imaging Compositional Mode (HDBSE Compo) - Shows sample composition as a function of relative image gray scale brightness differences.

VP SEM Applications include:

- Biological samples
- Wet (hydrated) biomaterials and products
- Food products
- Plant products
- Polymers
- Textiles
- Drugs / Medications
- Electronics and electronics packaging
- Paints and inks

Instrumentation: ZEISS EVO LS 15

Data Presentation:

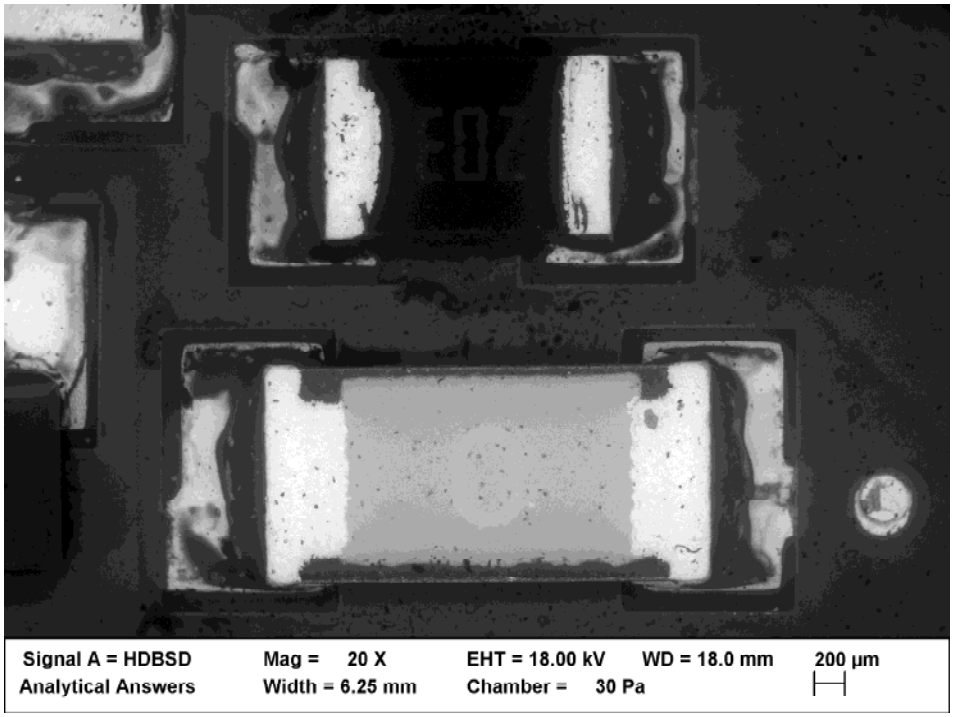
Our high-resolution digital images (up to 3072 x 2304 pixels) are viewed on a computer monitor and typically output as *.TIF on CD.

Sample Constraints:

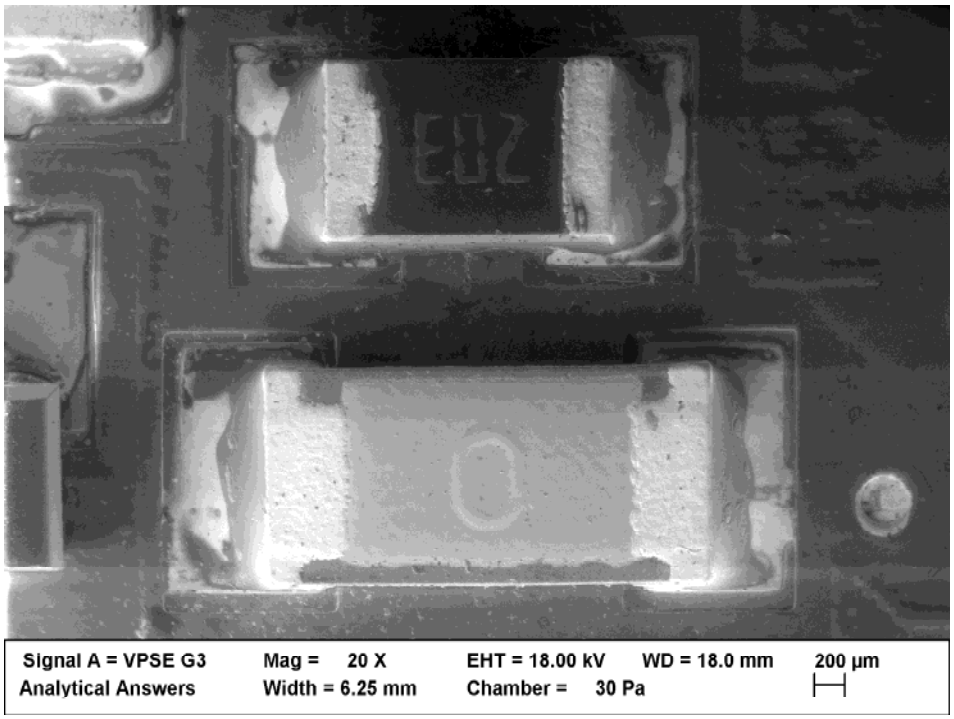
Maximum specimen height = 145 mm, Maximum specimen diameter = 250 mm, Maximum stage movements 125 x 125 mm (X, Y).

Sample Images

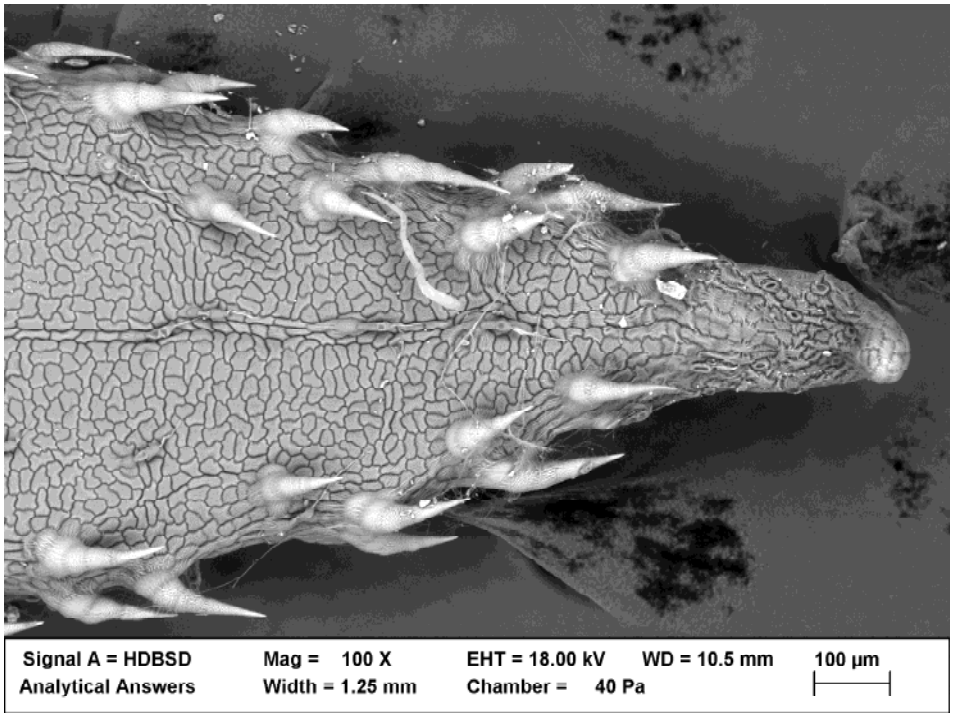
1) M-01 and M-02: Printed Circuit Board (PCB) assembly (no conductive coating applied) 2) M-03 and M-04: Hydrated Leaf (no conductive coating applied)



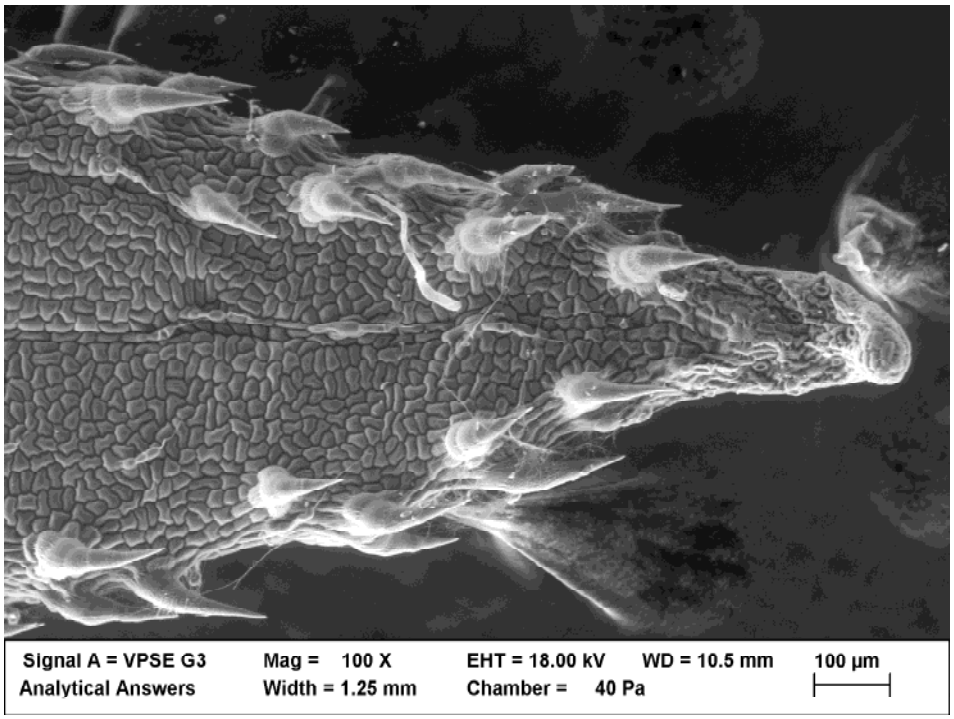
M-01 20X
A VPSEM partial view High Definition Backscattered Electron Imaging Compositional Mode (HDBSE Compo) image of an uncoated (no conductive coating added) printed circuit board is shown with surface mount components.



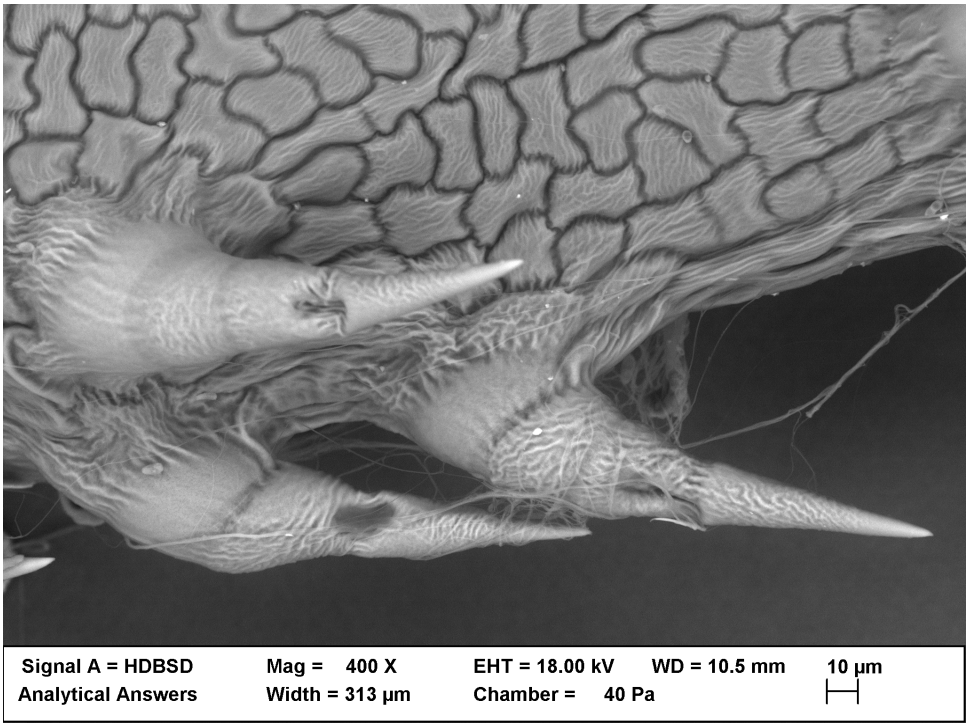
M-02 20X
A VPSEM partial view Variable Pressure Secondary Electron Imaging (VPSE) image of an uncoated (no conductive coating added) printed circuit board is shown with surface mount components. Compare this image to M-01.



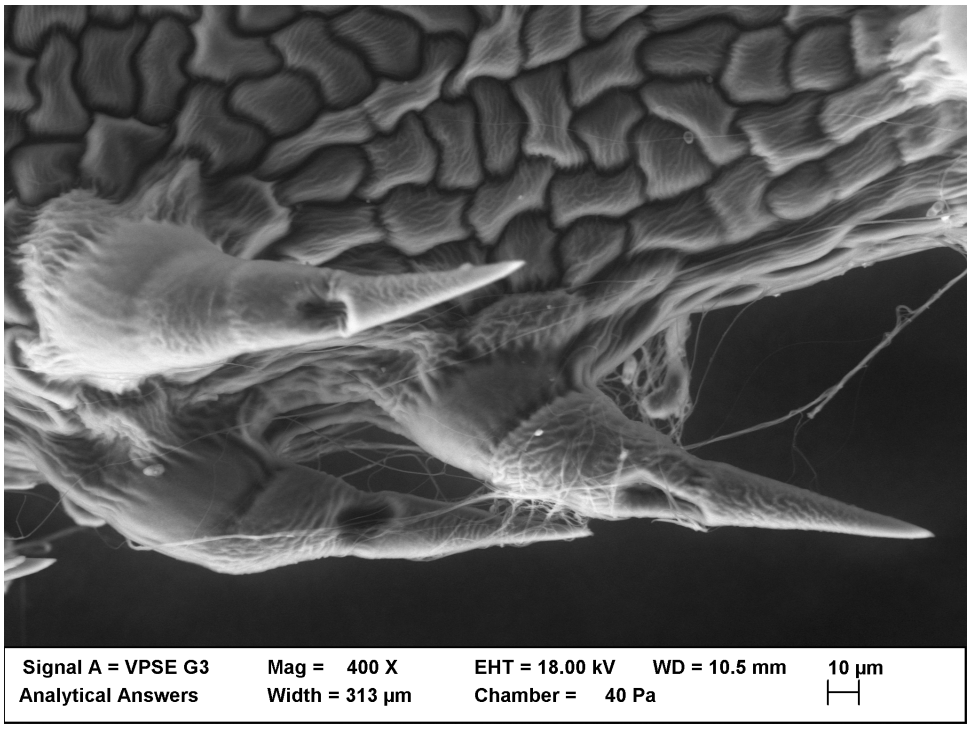
M-03 100X
A VPSEM partial view High Definition Backscattered Electron Imaging Compositional Mode (HDBSE Compo) image of an uncoated (no conductive coating added) hydrated leaf is shown.



M-04 100X
A VPSEM partial view Variable Pressure Secondary Electron Imaging (VPSE) image of an uncoated (no conductive coating added) hydrated leaf is shown. Compare this image to M-03.



M-05 400X
A VPSEM partial view High Definition Backscattered Electron Imaging Compositional Mode (HDBSE Compo) image of an uncoated (no conductive coating added) hydrated leaf is shown.



M-06 400X
A VPSEM partial view Variable Pressure Secondary Electron Imaging (VPSE) image of an uncoated (no conductive coating added) hydrated leaf is shown. Compare this image to M-05.