

Phenom-World

Sample Holders Update



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1. Charge Reduction Sample Holder

Imaging non conductive samples using an electron microscope can cause, unwanted, charging effects.

The Phenom can handle a wide variety of conductive and non conductive samples using the stub holder which is standard available.

The Charge Reduction Holder extends the imaging capabilities on non conductive samples. It significantly reduces charging effects by using a pressure limiting aperture which allows a controlled amount of air into the sample chamber. Due to the higher pressure more gas molecules are ionized after interaction with secondary and backscattered electrons.

The ionized gas molecules interact at the surface of the sample and reduce or even remove the charging effect.

Compared with the standard stub holder, the charge reduction sample holder can make charge free images at a much higher magnification.

1. Charge Reduction Sample Holder

Key benefits

Up to 8 times higher magnification before charging is visible.

The need for sputter coating is reduced dramatically resulting in faster sample preparation.

Non conductive samples can be imaged in their natural state providing valuable back scatter material contrast information.

Additional notes

The source vacuum is not affected by the higher sample vacuum. The source lifetime will be guaranteed as before.

When a sample is imaged using the Charge Reduction Holder, the image noise slightly increases (beam scattering).

System specifications are only guaranteed by using the standard stub sample holder.

1. Charge Reduction Sample Holder

The Charge Reduction Sample Holders can be recognized by:

- A light gray handle
- It is 8mm higher to accommodate the pressure limiting aperture
- It is like the standard holder available in 2 models;
 1. 3D objects or all non flat samples placed on a pin stub
(max size: 25mm diameter; 30mm height)
 2. Metallurgical mount samples
(size: 32mm diameter; 30mm height)

1. Charge Reduction Sample Holder



Metallurgical Charge Reduction Sample Holder

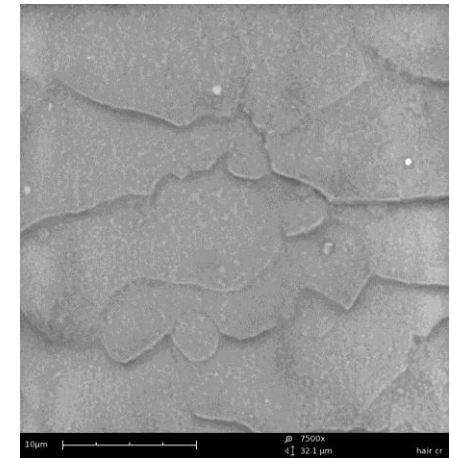
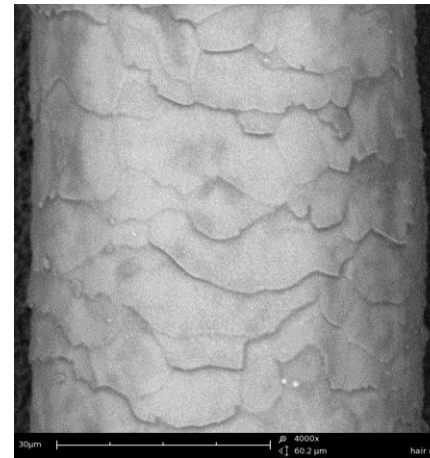
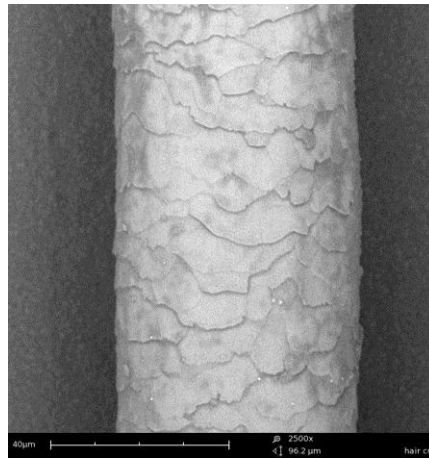
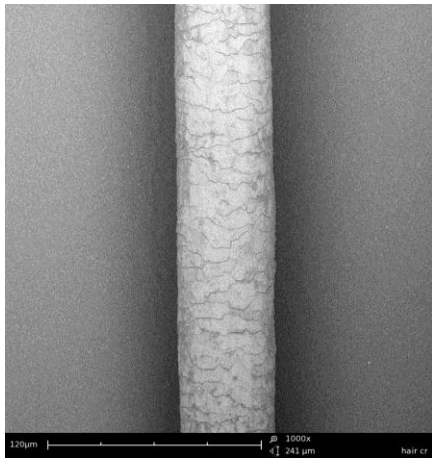
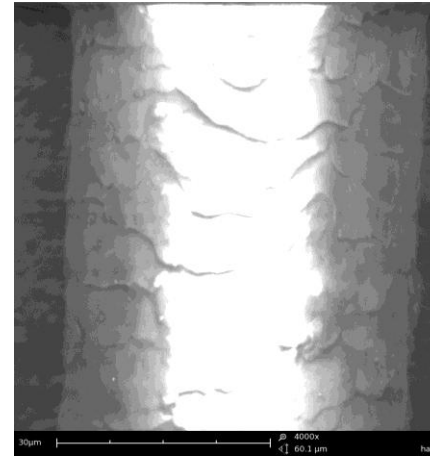
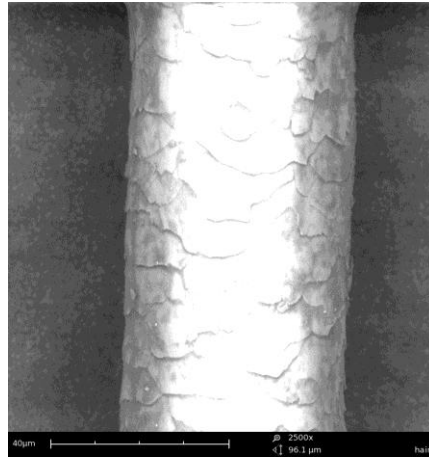
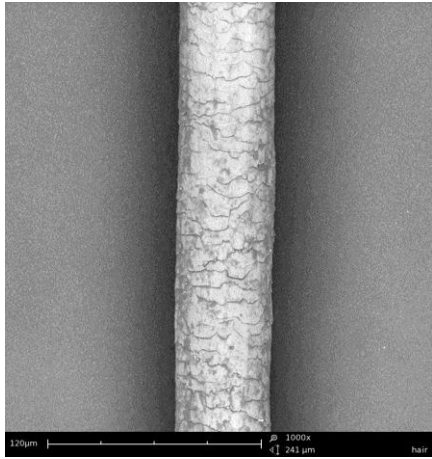


Pin Stub Charge Reduction Sample Holder



1. Charge Reduction Sample Holder

The imaging difference between the Phenom standard holder and the Charge Reduction Sample Holder can be seen in the example images on a (nonconductive) hair below.



2. Micro Tool Sample Holder

The micro manufacturing market contains companies that produce micro tools like drills, end mills, routers, boring bars engraving tools, etc. These precision tools can have a very small diameter with very tight tolerances and are being used in the electronics, medical/dental, automotive, semiconductor and optical industry.

High precision, reproducibility and tight tolerances are the key factors for these manufacturers. Micro tools are often custom made and require high standards.

Scanning electron microscopy is a useful tool in order to reach and maintain these standards due to its high magnification and large depth of focus.

The Phenom Microtool sampleholder makes it possible to image a wide range of axial shaped tools like drilling bits and milling tools. It is the ideal solution for quality control and inspection of axial shaped micro tools for micro tool manufacturers as well as micro tool users.

The Phenom is the only desktop electron microscope that is able to load and image these type of samples in their original state.

The Microtool sample holder can accommodate any axial shaped micro manufacturing parts such as; needles, fibers, (fuel)injectors, pencils etc.

2. Micro Tool Sample Holder

Specification

- Sample diameter : axial shaped parts ranging from 1 to 8 mm
- Length : maximum 100mm
- Tilt : between -5° and $+45^{\circ}$
- Rotation : $\pm 30^{\circ}$

Key benefits

- Easy and fast clamping
- No tooling required
- Lock out spec sample length
- Tilting and rotation allow for easy sample positioning

2. Micro Tool Sample Holder

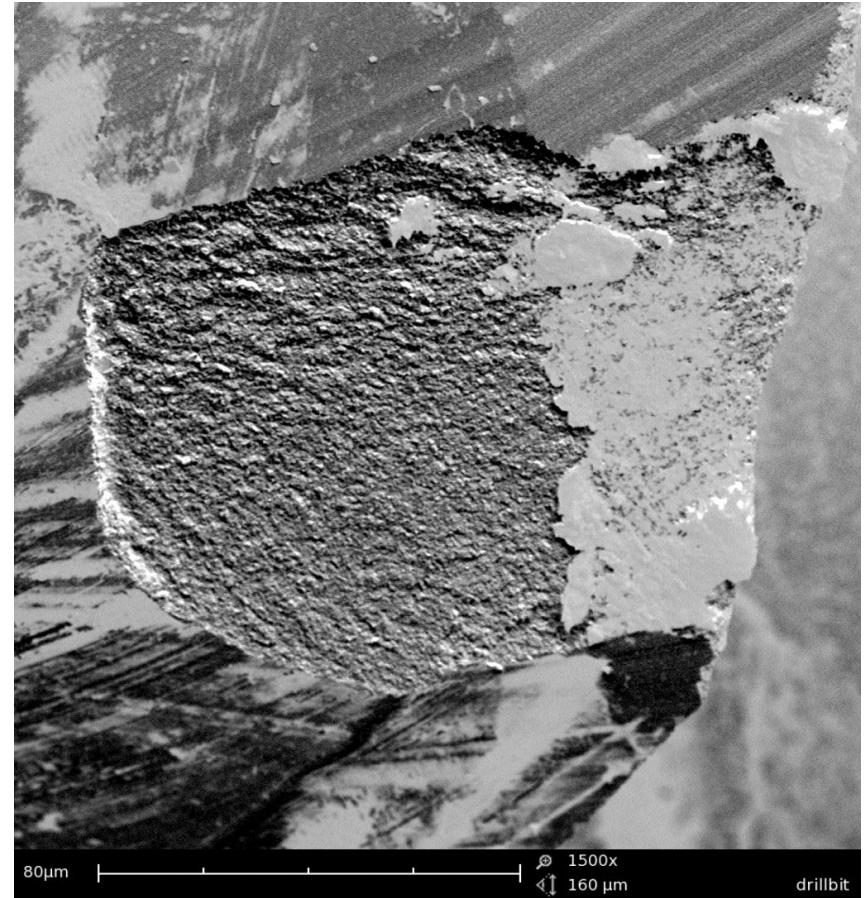
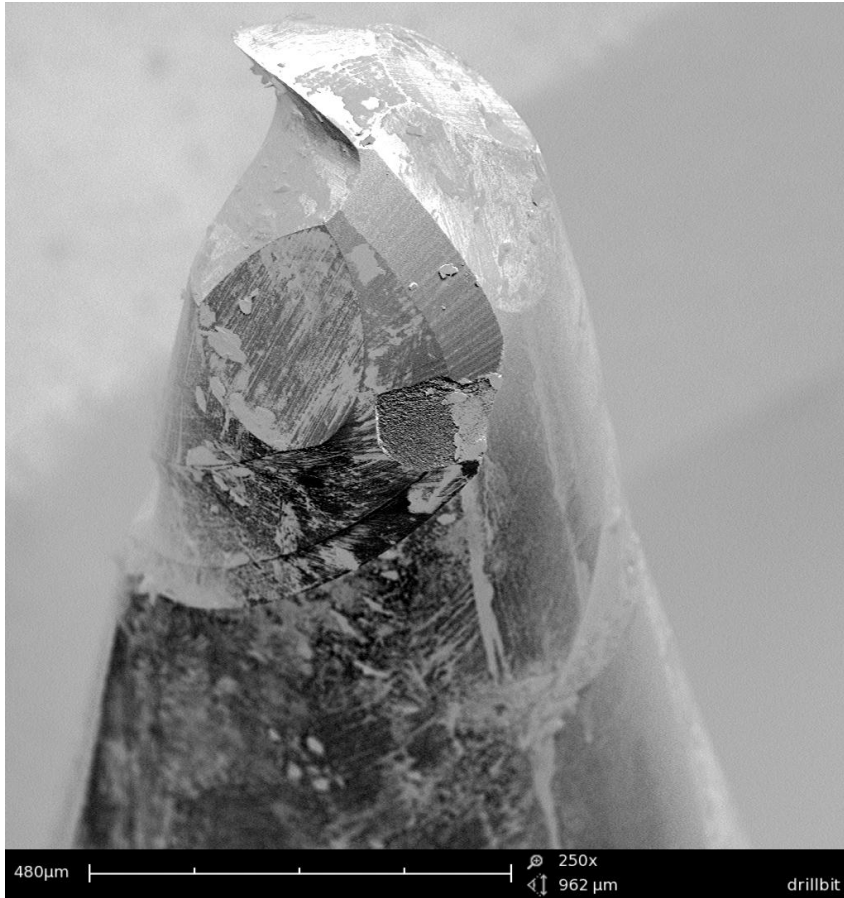


Micro Tool Sample Holder



2. Micro Tool Sample Holder

Defect on a drill bit at low- and higher magnification.



3. Inserts

The Phenom can be used in the semiconductor and electronics industry for inspection of devices such as solar cells, wafers etc. Traditionally samples are prepared by gluing them onto an aluminium stub, removing the sample after imaging causes damage.

The micro-electronics insert is designed to overcome this problem. Its unique clamping mechanism makes glue, or other adhesives, obsolete.

The 16 fingers clamping mechanism holds the sample in position without surface contact with an even spread force.

The micro-electronics insert is designed to be inserted in all the metallurgical sample holders.

Imaging coatings, multi layer semiconductors and fractured surfaces require X-sectional preparation. Typically these samples are prepared in a resin mount type which is a time consuming process.

The x-view insert enables fast loading of these typically thin and long samples. It uses a smart split clamping mechanism that eliminates the need for screws and tools to clamp the sample.

The x-view insert is designed to be inserted in all the metallurgical sample holders.

3. Inserts

Micro-electronics insert

Specifications

- Samples: semiconductor and microelectronic devices
- Clamping size: Between 10 x 10 mm and 19 x 19 mm
- Thickness: Up to 1,5 mm

Key benefits

- No scratching or contaminating the sample
- Instant preparation and loading

3. Inserts

X-view insert

Specifications

- Thickness: Up to 10 mm
- Width: Up to 25 mm
- Height: Up to 15 mm

Key benefits

- Easy clamping without the need for screws or extra tools
- It offers an alternative for resin mount samples

3. Inserts



X-view Insert

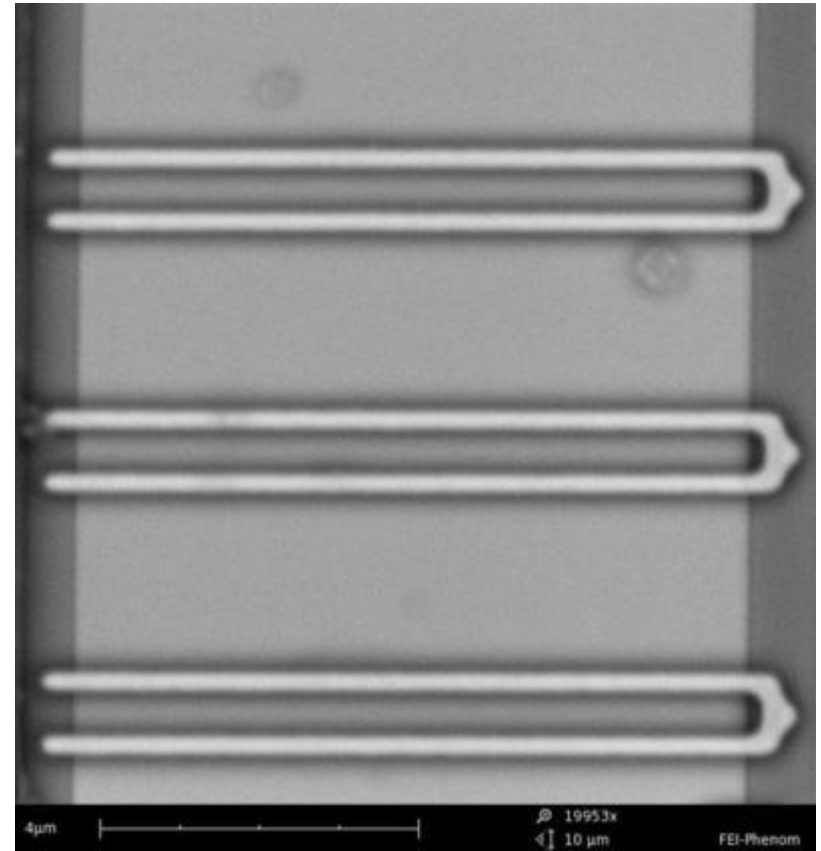
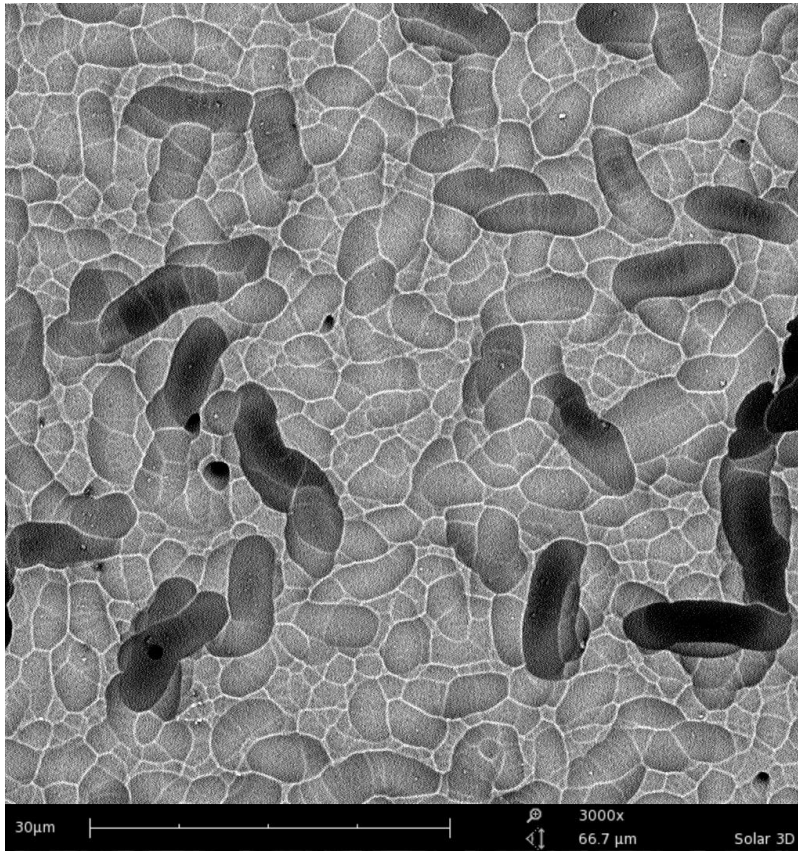


Micro-electronics Insert



3. Inserts

Micro-electronics: Two sample that are imaged in the micro-electronics insert are displayed below. On the left is a solar cell at 3.000 x magnification, on the right is a semiconductor sample at 20.000 x magnification.



3. Inserts

X-view: These example images are made with use of the x-view insert. On the left is a cross section of .. at 390 x magnification, on the right is a .. at 2.400 x magnification.

