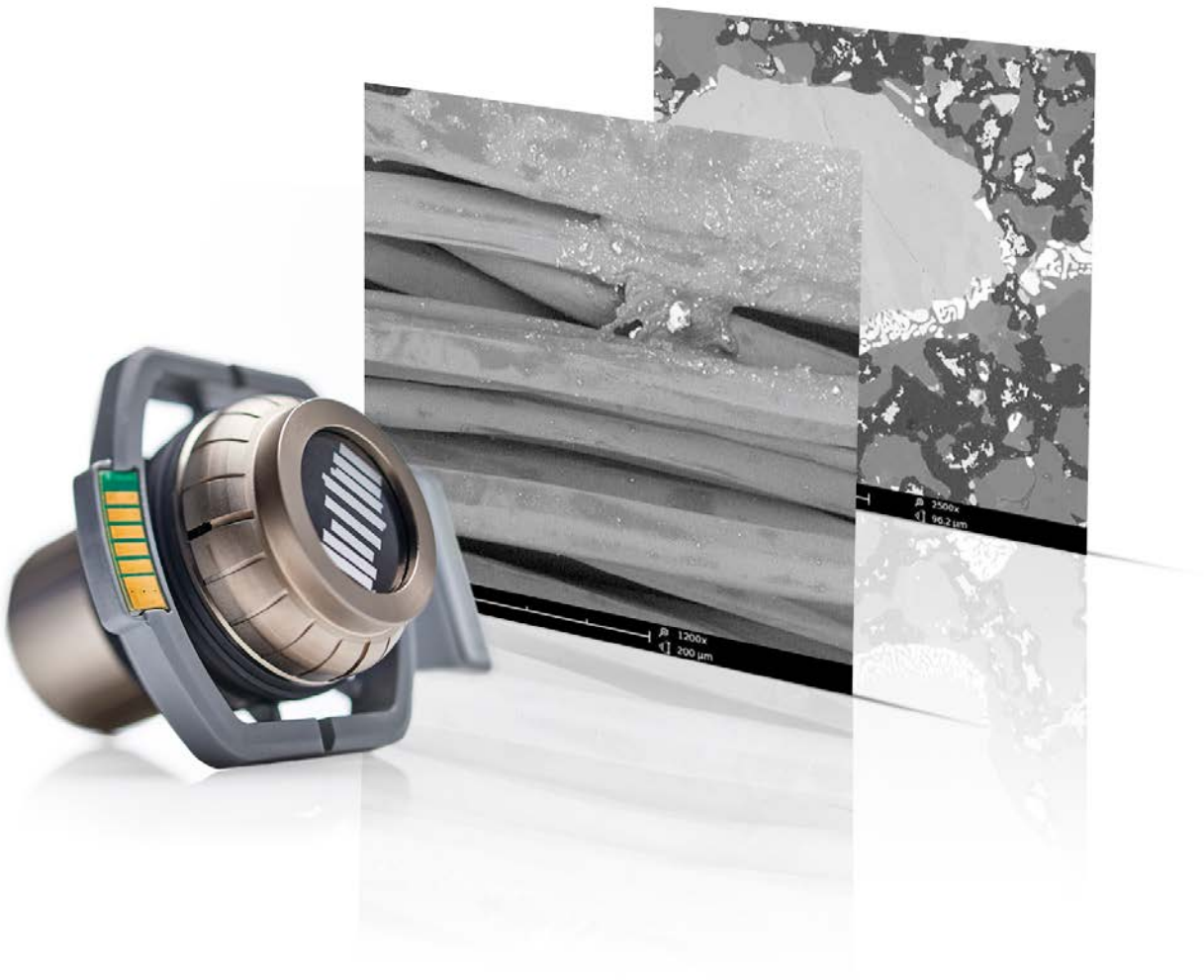
Phenom Charge Reduction Sample Holder

Up to 8 times higher magnification without charging effects



ThermoFisher SCIENTIFIC

Charge reduction sample holder

Metallurgical charge reduction sample holder

Extending imaging capability on non conductive samples

All Phenom desktop scanning electron microscopes (SEM) can make high magnification images from a wide variety of conductive and non-conductive samples using a standard sample holder.

However, compared to conductive samples, non-conductive samples are more difficult to image with an electron microscope. They often need additional sample preparation involving special equipment and more time.

The Thermo Scientific™ Phenom Charge Reduction Sample Holder is designed to eliminate additional sample preparation of non-conductive samples. It allows samples such as paper, polymers, organic materials, ceramics, glass, and coatings to be imaged in their original state.

Additional sample preparation such as sputter coating is costly (equipment) and time consuming, and deposits a layer on top of the sample. Imaging a coated sample with a backscattered electron detector (BSED) results in poor material contrast information, as the coating layer blocks the backscattered signal. The state of a sample after sputter coating is changed permanently, thereby limiting its use for further fabrication or other laboratory techniques.

With the charge reduction sample holder, it is possible to image non-conductive samples in their original state, providing valuable material contrast information. The images above were made using the charge reduction sample holder.

The charge reduction sample holder is available in two models to accommodate different samples:

- 3D objects or all non-flat samples on a pin stub: max. 25 mm diameter and 30 mm height.
- Metallurgical mount samples with: max. 32 mm diameter and 30 mm height.

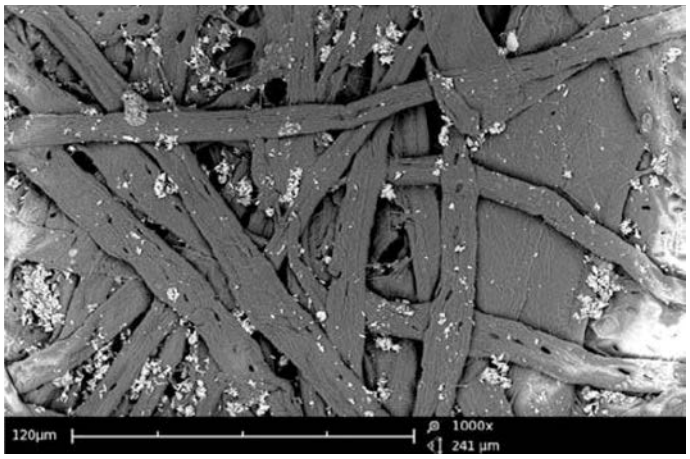


Image of non-conductive paper. The image is taken using the standard sample holder at 1,000x magnification. The bright white areas on both sides of the image is charging. At increased zoom, the charging becomes more localized and more distortion typically occurs until the image is completely obscured, yielding no data.

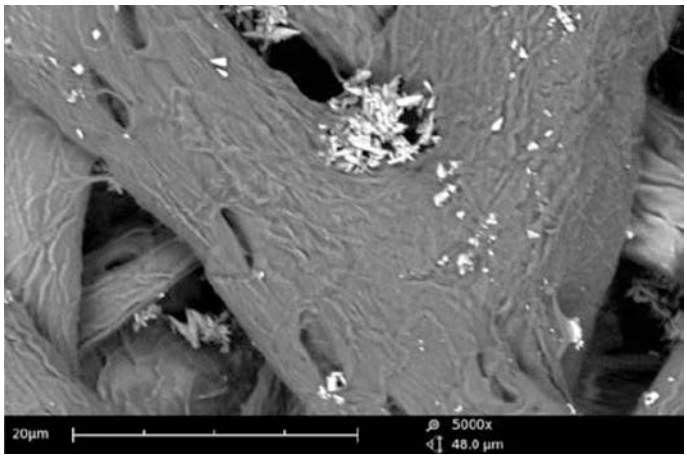
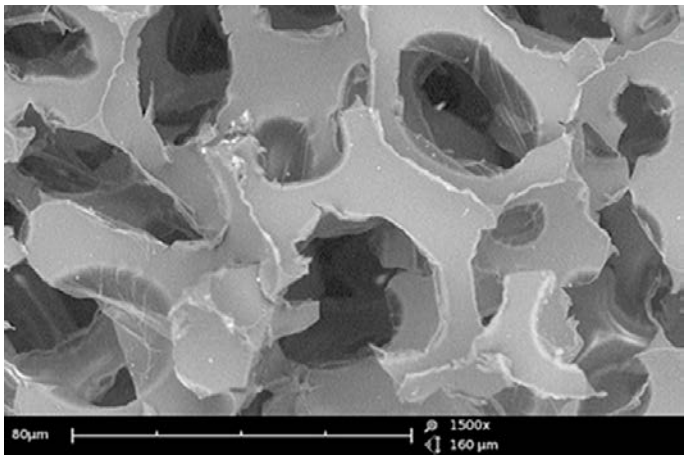


Image of same paper using the charge reduction sample holder. No charging is visible at 5,000x magnification and image details are still clear.

All Phenom desktop SEM systems are designed with a versatile combination of a low accelerating voltage (5 kV), low vacuum (0.1 mBar) and high brightness/long lifetime electron source. This unique combination was chosen to allow the capture of high quality images from conductive and non-conductive samples.

Despite these optimized settings, it is still possible for non-conductive samples to show charging effects. A traditional way of reducing these effects in a scanning electron microscope is to increase the sample vacuum. The charge reduction sample holder contains a pressure limiting aperture which allows a controlled amount of air into the sample chamber to raise the pressure around the sample. The leakage rate is designed for optimal charge reduction while maintaining a high vacuum in the column for stable system operation.

Compared to standard holders, the charge reduction sample holder can be used to obtain significantly higher magnification images from non-conductive materials.



Polymer filter, 1,500x magnification, imaged in its original state

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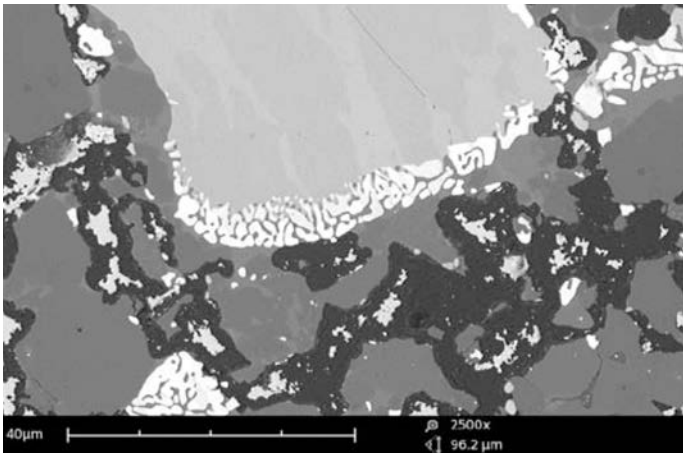
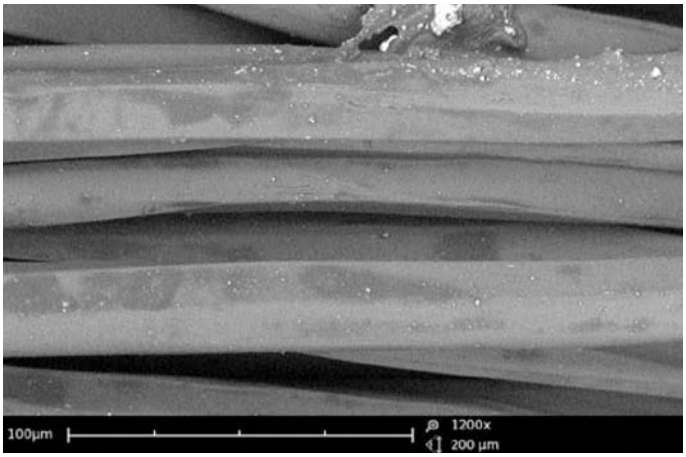
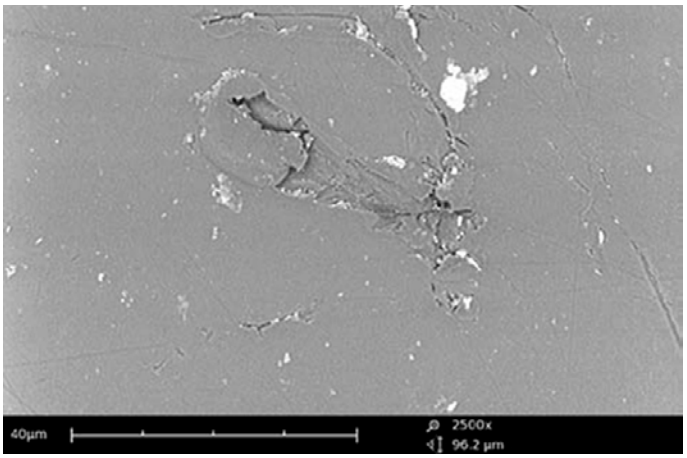


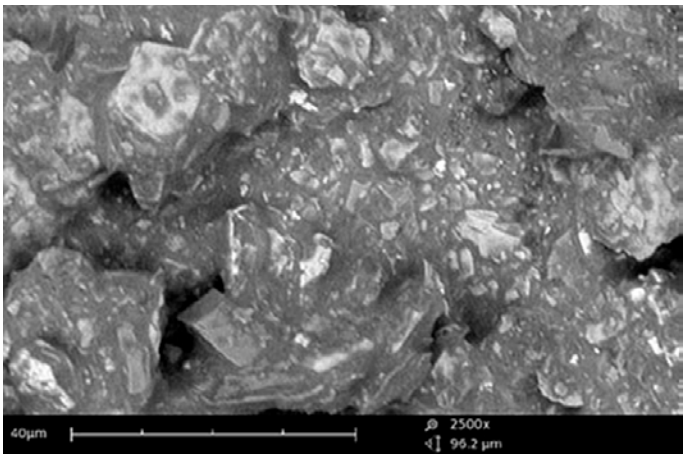
Ceramics at 2,500x magnification



Coated textile fibers at 1,200x magnification



Defect in glass at 2,500x magnification



Rubber band at 2,500x magnification

Find out more at **thermofisher.com/phenomworld**

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