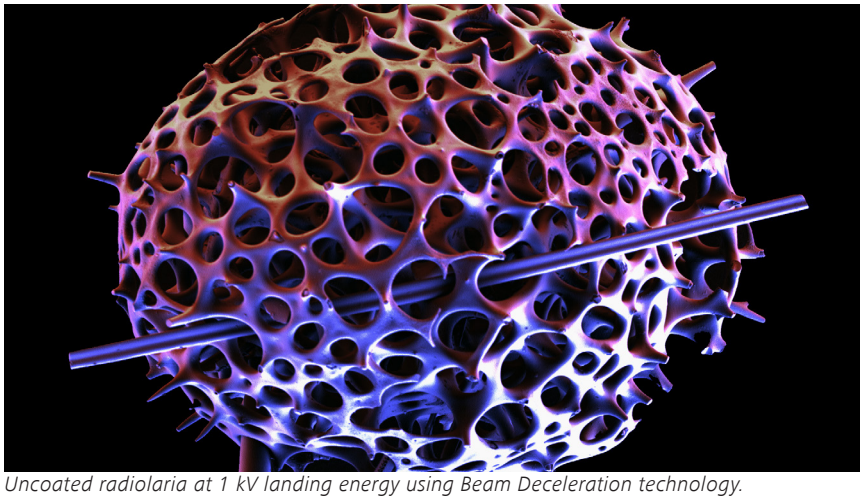
Detailed surface imaging and avoidance of charging artifacts

ZEISS Beam Deceleration for EVO Systems



Uncoated radiolaria at 1 kV landing energy using Beam Deceleration technology.

Upgrade your ZEISS microscope

Upgrade your ZEISS EVO microscope with the Beam Deceleration option and benefit from improved and more detailed surface imaging.

As technical requirements may apply on some systems, please contact us to learn more about the Beam Deceleration and how your processes will benefit from an upgrade:
microscopy@zeiss.com

ZEISS Beam Deceleration is an improved EVO conventional scanning electron microscope (C-SEM) sample bias module which enables Beam Deceleration imaging with enhanced surface contrast and topographical details in combination with a BSD Detector. Due to the challenges to obtain high quality images at low kV through aberration distortion, Beam Deceleration creates a new alternative by keeping the primary beam energy high and also maintain low landing energy interaction to ensure a reduction in beam damage and penetration. After interacting with the surface, secondary electrons (SE) and backscattered electrons (BSE) are produced and gain energy while leaving the surface. This advanced technology enables low kV to be detected and atomic number contrast from a small interaction volume becomes visible.

Highlights

Low interaction volume
Capture enhanced surface details by emitting SE from an area a few nanometers below the surface whilst maintaining a small interaction volume

Improved surface information
Vary the voltage from 0 to 5000 V to select appropriate landing energy and adjust the ratio between topographical and compositional information

Charge neutralization
Avoid charging artifacts through the smaller interaction volume that enables more electrons to be emitted from the surface

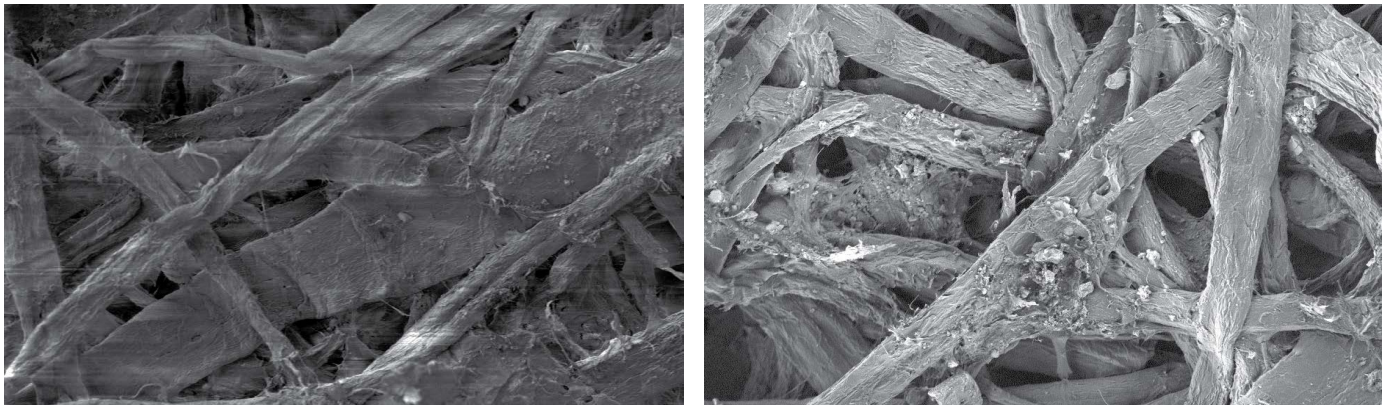
Availability

- EVO series

Seeing beyond

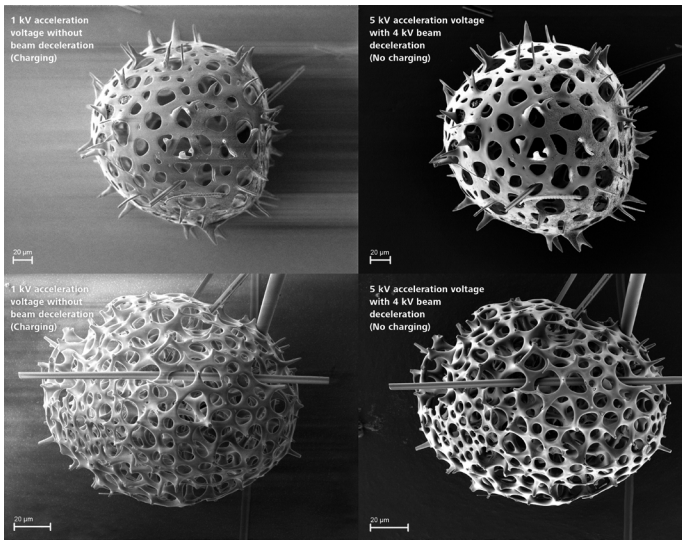
ZEISS Beam Deceleration for EVO Systems

Avoidance of charging artifacts



A) *B)*

Image A) shows paper fibres imaged at 1 kV accelerating voltage without Beam Deceleration at high vacuum. The image is charging up and a good image cannot be obtained. In image B) paper fibres were imaged at 5 kV acceleration voltage and 4 kV Beam Deceleration to give 1 kV landing energy. Charging effects are minimised.



Balance between the arriving charge from the primary beam and the charge emitted from the sample improves the surface detail and contrast using Beam Deceleration.

Application

Low kV imaging benefits greatly from Beam Deceleration. It is difficult to obtain high-quality images at low kV because the primary beam is distorted by aberrations and other physical and electrostatic interactions. By keeping the primary beam energy high, distortions are reduced. Beam Deceleration allows the primary beam energy to be kept high and still benefit from low landing energy interaction. This improves resolution whilst maintaining a small interaction volume. This ability is desirable in life sciences, where low landing energy reduces beam penetration and beam damage.

microscopy@zeiss.com
www.zeiss.com/microscopy