



## Coolstage benefits on ZEISS EVO



We make it visible.

# Coolstage benefits on ZEISS EVO

Author: Carl Zeiss Microscopy

Date: March 2013  
Original publication February 2005

## Introduction

The EVO series of scanning electron microscopes provide imaging solutions for different types of non-conducting specimens. One important application area is the ability to study the interaction of liquid water with materials and to maintain the structure of fauna and flora by preventing dehydration. In order to image liquid water it is useful to cool the specimen to just above 0°C so that the water vapour pressure in the microscope is minimised. A Peltier module integrated into a dovetail mounted cool-stage head achieves this cooling.

The design of EVO Coolstage builds upon in-depth experience with wet specimen analysis to deliver class leading coolstage performance.

The Coolstage can also heat the specimen stub to 50°C to study the melting of low temperature materials.

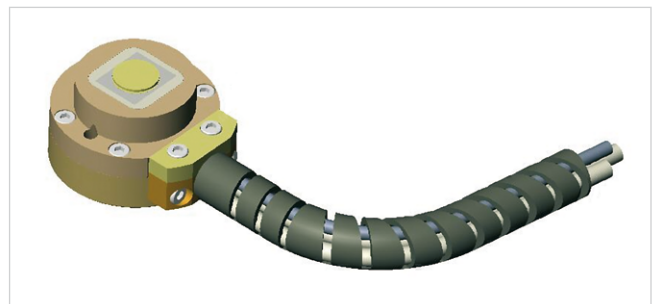
## Applications

### Materials Analysis

- Water action on cement, pharmaceuticals
- Water transport through fibres
- Low melting point materials eg chocolate
- High vapour pressure polymers
- Contact angles
- Formation of ice

### Life sciences

- Plant surfaces and internal structures
- Fauna microstructures
- Water action on seeds
- Slime studies



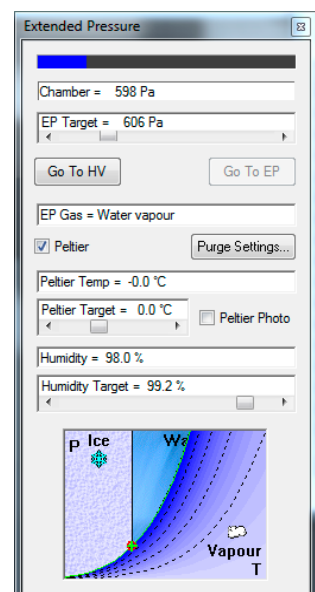
EVO Coolstage

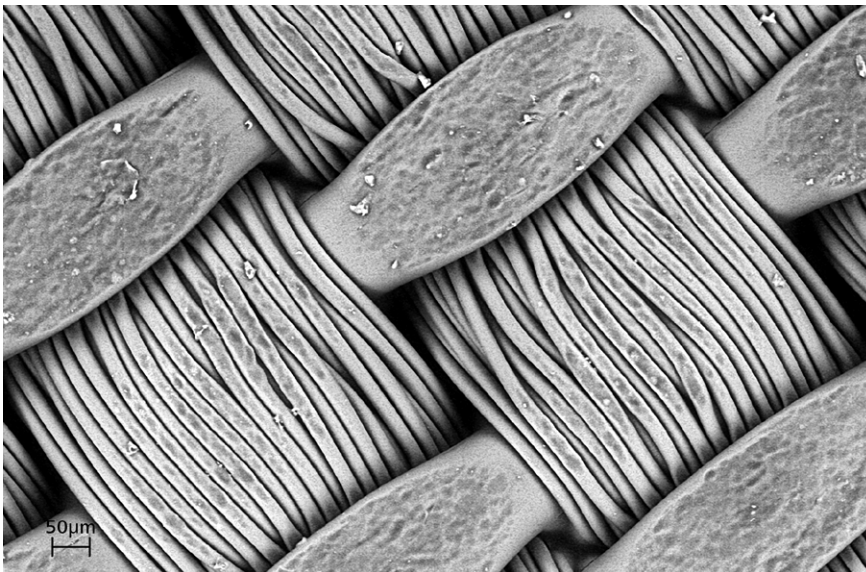
## Instrumentation

The EVO Coolstage unit comprises an independent floor standing unit and a dovetail fitting coolstage head.

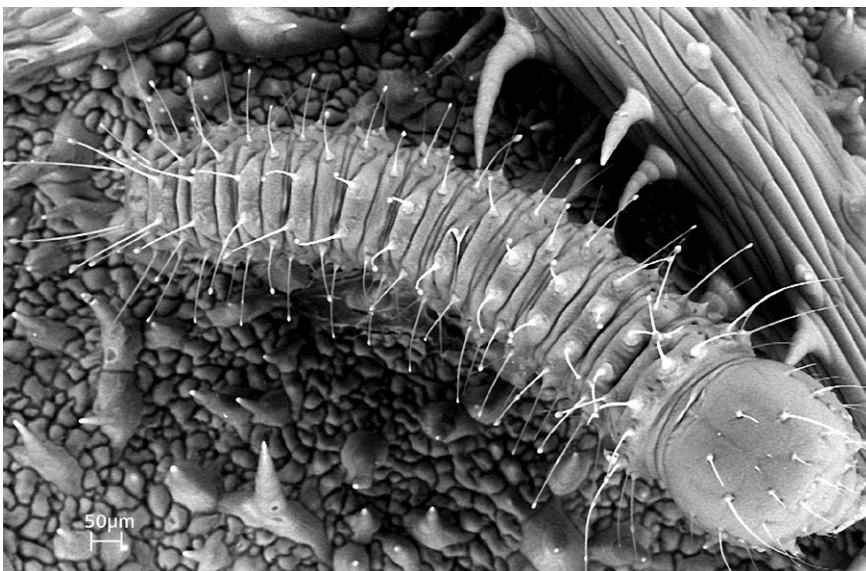
The SmartSEM control scheme provides the user with a graphic based upon the water phase diagram to control humidity at the specimen.

EVO Coolstage is compatible with the installed base of the EVO series and previous 1400 series microscopes.

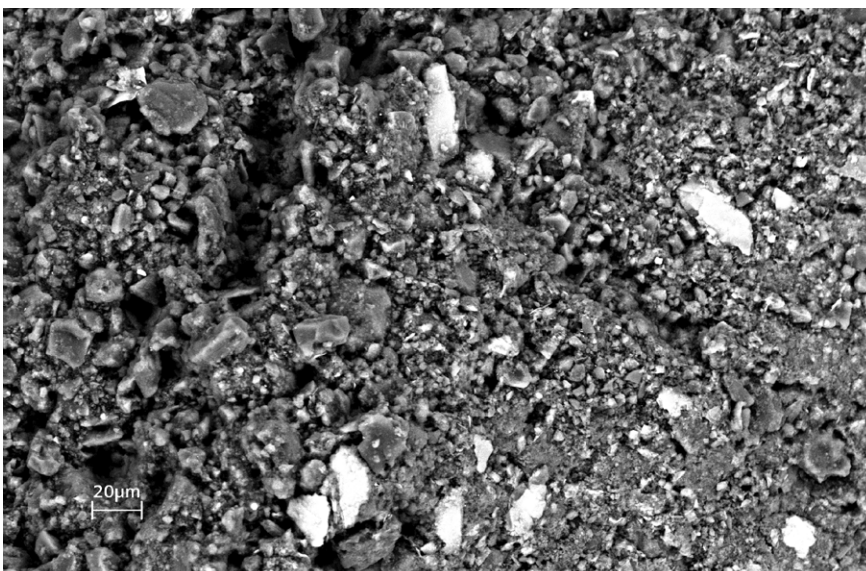




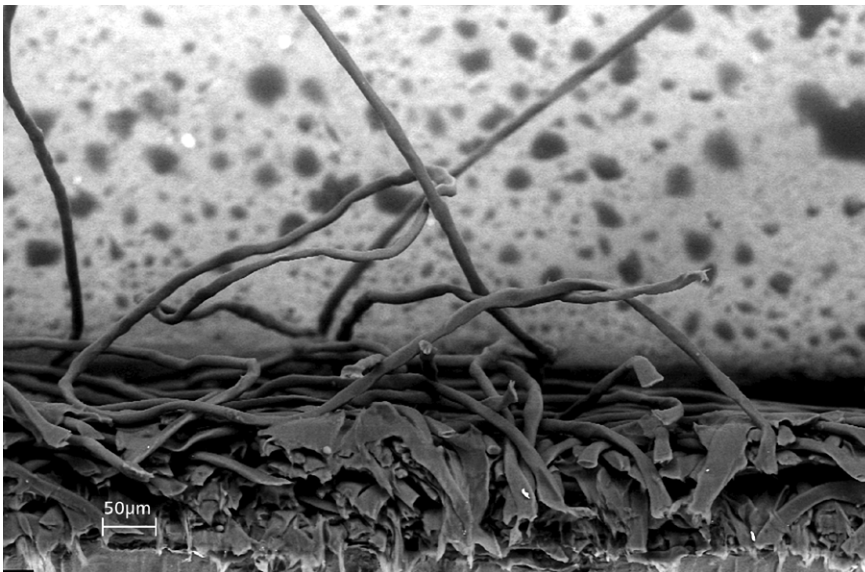
**Figure 1**  
Textile  
(25 kV, 700 Pa, 1 °C, air)



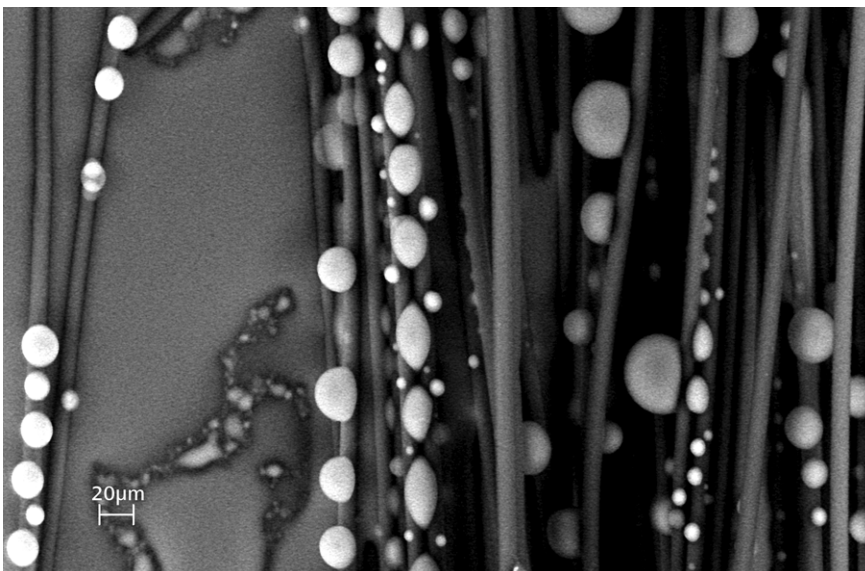
**Figure 2**  
Caterpillar  
(25 kV, 15 Pa, -25 °C, air)



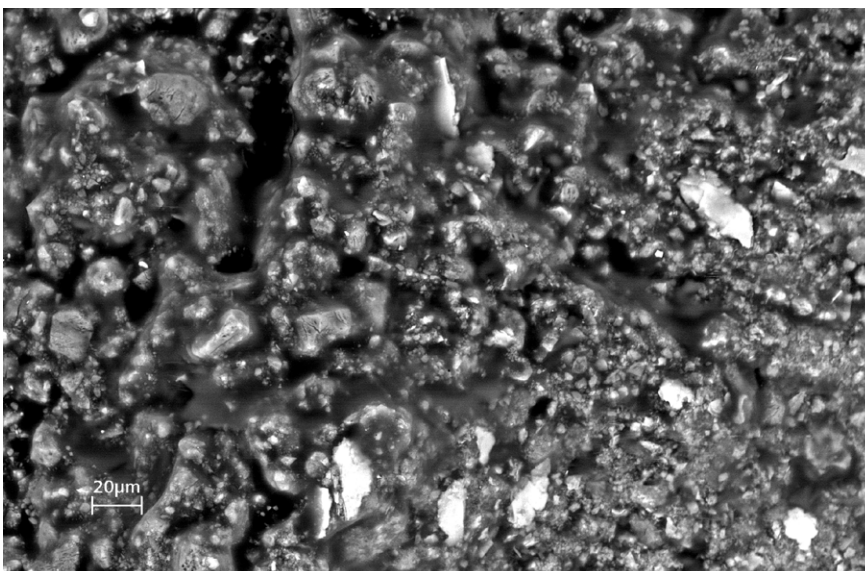
**Figure 3**  
Cool chocolate  
(25 kV, 30 Pa, 0 °C, air)



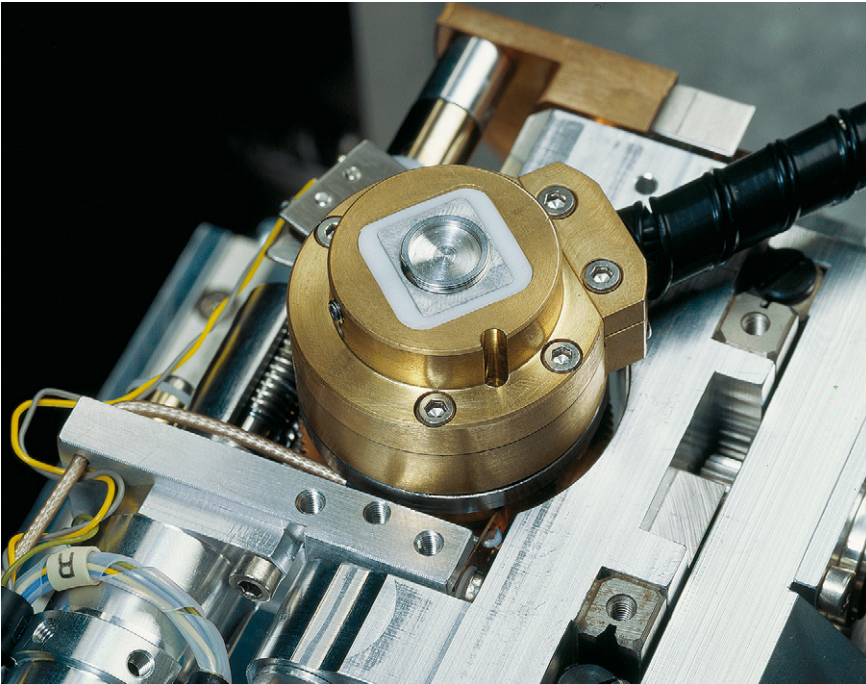
**Figure 4**  
Wet polymer micro filter  
(20 kV, 700 Pa, 1 °C, H<sub>2</sub>O)



**Figure 5**  
Water saturated fibres  
(25 kV, 600 Pa, 2 °C, H<sub>2</sub>O)



**Figure 6**  
Hot chocolate – melting started  
(25 kV, 30 Pa, 25 °C, air)



*EVO Coolstage on cartesian specimen stage*



**Carl Zeiss Microscopy GmbH**  
BioSciences and Materials  
[microscopy@zeiss.com](mailto:microscopy@zeiss.com)  
[www.zeiss.com/microscopy](http://www.zeiss.com/microscopy)



We make it visible.