

# Phenom ProX

The high-performance desktop SEM



## Phenom ProX

The high-performance desktop SEM with BSED, EDS and optional SED

## Fully integrated EDS

Elemental analysis is as easy as imaging with fully integrated EDS

## Never lost navigation

Swift navigation to any region of interest

## Elemental Mapping & Line Scan

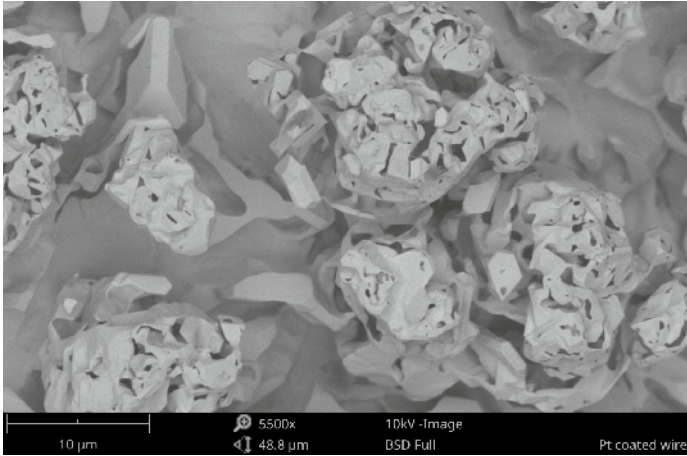
Revealing the distribution of elements within the sample

## Multiple acceleration voltages

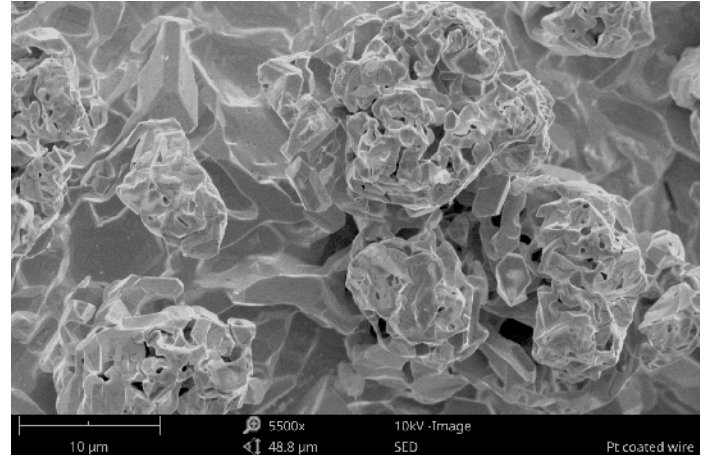
Between 5 kV and 10 kV for high resolution images and 15 kV for great analysis results

## Magnification

Magnification range up to 150,000x



Platinum coated metal grid (BSED)



Platinum coated metal grid (SED)

The Phenom ProX scanning electron microscope (SEM) is based on the 5th generation Phenom desktop SEM platform and is a high-performance SEM for imaging and analysis. With the Phenom ProX desktop SEM, sample structures can be physically examined and their elemental composition determined. Besides point analysis, the optional Elemental Mapping and Line Scan software allows further analysis of the distribution of elements.

### Phenom ProX

The Phenom SEM microscopes are intuitive to use, fast to create results and built to high quality standards. These core principles have been used to develop and create the Phenom ProX spectroscopy system for best-in-class imaging and analysis. Compared to its predecessors, the Generation 5 Phenom ProX SEM has at least a 20% better resolution, and an even better user experience to address a wider range of applications, including samples that are very sensitive to beam damage. As well as viewing high-resolution images of microscopic structures, there is often a need to identify the different chemical elements in a specimen.

This is accomplished in the Phenom ProX with the Element Identification (EID) software package and a specially designed and fully integrated Energy Dispersive Spectrometer (EDS). The Phenom ProX is the most extended solution for fast and user friendly imaging and analysis. This is enhanced by additional sample holders that allow for example sample tilting and cooling for imaging an even greater diversity of samples.

## Imaging Specifications

### Imaging modes

- Light optical Magnification range: 20 – 135x
- Electron optical Magnification range: 80 – 150,000x  
Digital zoom max.12x

### Illumination

- Light optical Bright field / dark field modes
- Electron optical Long-lifetime thermionic source (CeB<sub>6</sub>)  
Low, imaging, spot analysis and mapping mode, beam currents selection
- Acceleration voltages Default: 5 kV, 10 kV and 15 kV  
Advanced mode: adjustable range between 4.8 kV and 15 kV imaging and analysis mode
- Resolution < 10 nm (BSED)  
< 8 nm (SED)

### Detector

- Standard Backscattered electron detector
- Optional Secondary electron detector

### Digital image detection

- Light optical Color navigation camera
- Electron optical High-sensitivity backscattered electron detector (compositional and topographical modes)

### Image formats

JPEG, TIFF, BMP

### Image resolution options

456 x 456, 684 x 684, 1024 x 1024 and 2048 x 2048 pixels

### Data storage

- USB flash drive
- Network
- ProSuite PC

### Sample stage

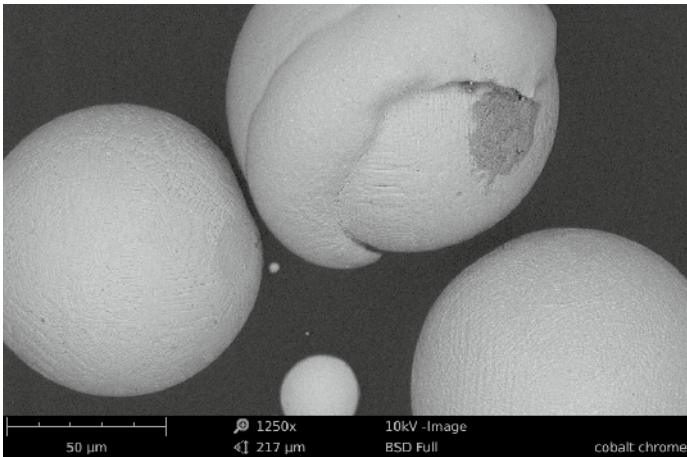
Computer-controlled motorized X and Y

### Sample size

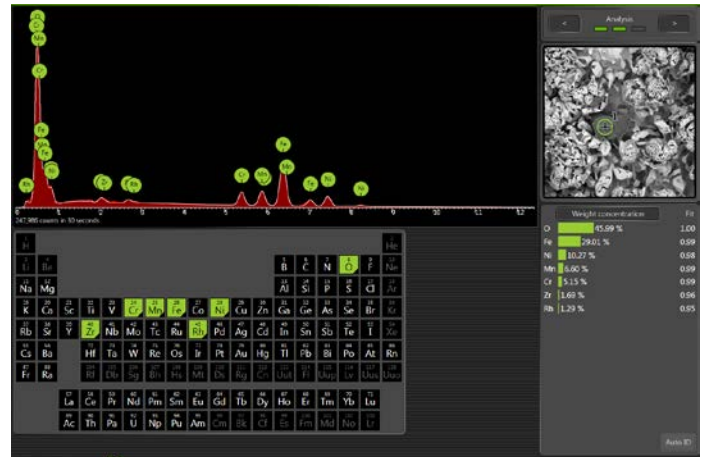
- Up to 32 mm (Ø)
- Up to 100 mm (h)

### Sample loading time

- Light optical < 5 s
- Electron optical < 30 s



Cobalt chrome particles



EDS analysis of cobalt

### Step-by-step data collection

A dedicated software package is included and installed on the ProSuite PC to control the fully integrated EDS detector. Analysis has become as easy as imaging, since there is no need to switch between external software packages or computers. The EDS-technique analyzes X-rays generated by the electrons from the electron beam interacting with the sample. The Phenom CeB<sub>6</sub> electron source generates the highest number of X-rays in its market segment.

The EID software package allows the user to identify elements within the sample via the spot mode analysis. All results are verified using iterative peak stripping deconvolution. The step-by-step guided process within the software helps the user to collect all X-ray results in an organized and structured way. Optionally, this software can be expanded with the Elemental Mapping and Line Scan option.

## EDS Specifications

<b>Detector type</b>	<ul style="list-style-type: none"> <li>• Silicon Drift Detector (SDD)</li> <li>• Thermoelectrically cooled (LN<sub>2</sub> free)</li> </ul>
• Detector active area	25 mm <sup>2</sup>
• X-ray window	Ultra-thin Silicon Nitride (Si <sub>3</sub> N <sub>4</sub> ) window allowing detection of elements B to Am
• Energy resolution	Mn Kα ≤ 132 eV
• Processing capabilities	Multi-channel analyzer with 2048 channels at 10 eV/ch
• Max. input count rate	300,000 cps
• Hardware integration	Fully embedded

<b>Software</b>	<ul style="list-style-type: none"> <li>• Integrated in Phenom ProSuite</li> <li>• Integrated column and stage control</li> <li>• Auto-peak ID</li> <li>• Iterative strip peak deconvolution</li> <li>• Confidence of analysis indicator</li> <li>• Export functions: CSV, JPG, TIFF, ELID, EMSA</li> </ul>
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<b>Report</b>	<ul style="list-style-type: none"> <li>• Docx format</li> </ul>
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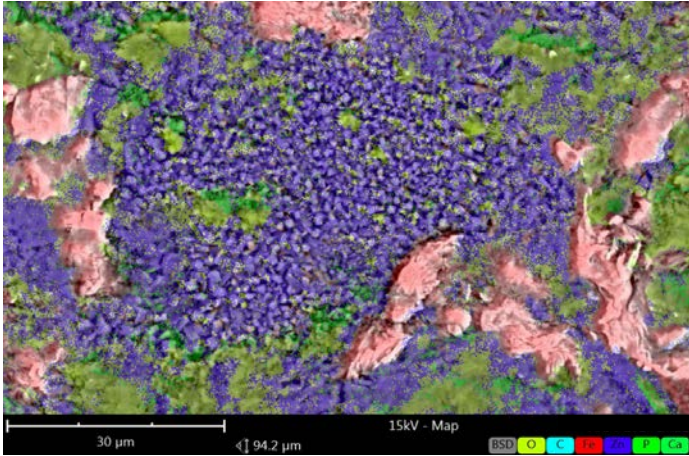
## System Specifications

<b>Dimensions &amp; Weight</b>	
• Imaging module	286(w) x 566(d) x 495(h) mm, 50 kg
• Diaphragm vacuum pump	145(w) x 220(d) x 213(h) mm, 4.5 kg
• Power supply	156(w) x 300(d) x 74(h) mm, 3 kg
• Monitor	375(w) x 203(d) x 395(h) mm, 7.9 kg
• ProSuite	Standard ProSuite System including: 19" monitor with PC and network router mounted 375(w) x 250(d) x 395(h) mm, 9 kg

## Requirements

<b>Ambient conditions</b>	
• Temperature	15°C ~ 30°C (59°F ~ 86°F)
• Humidity	< 80% RH
• Power	Single phase AC 110 - 240 Volt, 50/60 Hz, 300 W (max.)

<b>Recommended table size</b>	150 x 75 cm, load rating of 100 kg
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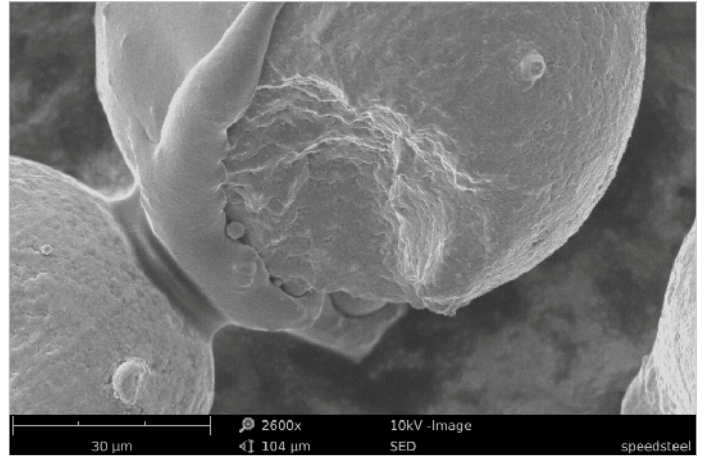


Elemental Mapping of zinc phosphate sample

### Elemental Mapping and Line Scan

The Elemental Mapping functionality visualizes the distribution of elements throughout the sample. The selected elements can be mapped at a user specified pixel resolution and acquisition time. The real time mapping algorithm shows live build up of the selected elements. For a user, it is simply click and go to work with the Elemental Mapping and Line Scan functionality of the Phenom ProX desktop SEM.

The Line Scan functionality shows the quantified element distribution in a line plot. This is especially useful for coatings, paints and other applications with multiple layers. All results of both the Elemental Mapping and Line Scan functionality can be easily exported by using an automated report template.



Speed steel (SED)

### Secondary Electron Detector

The standard detector in the Phenom ProX is a four-segment backscattered electron detector (BSED) that yields sharp images and provides chemical contrast information.

A secondary electron detector (SED) is optionally available on the Phenom ProX. The SED collects low energy electrons from the top surface layer of the sample. It is therefore the perfect choice to reveal detailed sample surface information. The SED can be of great use for applications where topography and morphology are important. This is often the case when studying microstructures, nanostructures or particles.

## Elemental Mapping & Line Scan Specifications

### Elemental Mapping

- Element selection 10 individual user specified maps, plus backscatter image and mix-image
- Selected area Any size, rectangular
- Mapping 16 x 16 - 512 x 512 pixels resolution range
- Pixel dwell time range 10 - 250 ms

### Line Scan

- Line Scan 16 - 512 pixels resolution range
- Points dwell time range 50 - 250 ms
- Total number of lines 12

Report Docx format

## SED Specifications

Detector type Everhart Thornley

Distributore esclusivo per l'Italia:

 **ALFATEST**  
strumentazione scientifica

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