RhySearch
Das Forschungs- und Innovationszentrum Rheintal

SEM

SCANNING ELECTRON MICROSCOPE

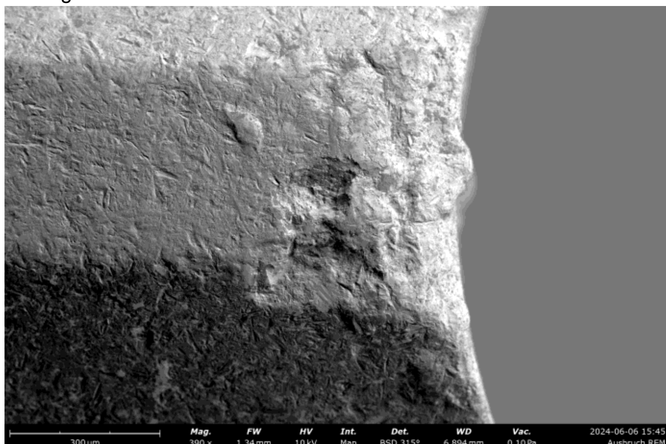
Surface investigation on a (sub-)micrometer scale

A Scanning Electron Microscope (SEM) utilizes a focused beam of high-energy electrons to generate detailed images of a sample surface.

In a first step the electron gun produces a beam of electrons, which is accelerated and focused into a fine spot by using electromagnetic lenses. This focused electron beam scans across the sample in a raster pattern. As the electrons interact with the sample surface, they generate several signals, such as secondary electrons, backscattered electrons and characteristic X-Rays.

Detectors capture these emitted signals. Secondary electrons are used to create high resolution images, while backscattered electrons provide compositional contrast. The emitted X-Rays are characteristic for each specific element. The installed EDX-sensor analyses these X-Rays in a qualitative and quantitative way. These detected signals are processed out to form an image. The intensity of the signals at each point in the raster scan correlates to different shades of gray, producing a detailed representation of the samples surface. EDX-data can be overlaid on the SEM image to map elemental distributions.

Remarkable of our device is, that due to several vacuum-levels conductive and non-conductive samples are measurable without coating.



Microscopic breakouts on a workpiece

Specifications	Sample conditions
Electron optical magnification 160x – 200.000x Lateral resolution <10 nm Three different vacuum levels	Sample height up to 35 mm Sample size up to 100 mm x 100 mm Conductive and non-conductive samples are measurable without coating
Device Phenom XL by Thermo Fischer	

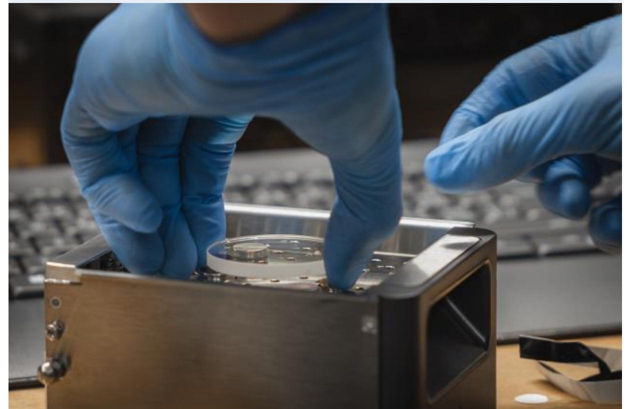


Figure above - Inserting a sample to the holder
Figure below - Analyzing the results of the EDX-Mapping

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