

Laboratory
Services

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Optical imaging

- Macrostation with stand and EOS camera, 60 mm lens
- Binocular microscope (max magnification 115x)
- Optical microscope (max magnification 1880x) dedicated to observing metallographic sections

These 3 instruments are connected to data acquisition and image processing software which enables in-depth images to be taken with infinite field depth (with no blurring), automatic calibration, 2D measurements (length, radius, area, thickness of layers, etc.), which can then be annotated.

Also equipped with particle analysis software which enables particles in the zone under observation to be detected and counted.

Examples: dimensional controls, observation of welding, thickness measurements, metallography, detection of porosity, determination of the structure of a metal.



*Macrostation:
measurements*



*Binocular:
detail of a 5 franc coin*

⇐ *Microscope: porosity*



Metallographic examinations

Metallographic sections (Bakelite or transparent resin)

The samples can be cut, coated and polished to obtain the required area of observation.



Metallographic sections

⇨ *Structure: cast iron*



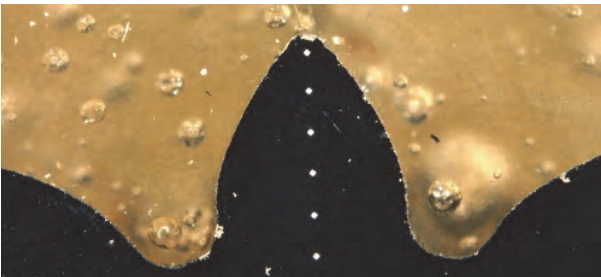
Hardness measurements in two applied load ranges

- Vickers hardness tests, adapted for solid materials.
- Vickers microhardness tests, for thin pieces or for hardness profiles.



Imprint of a hardness test point

⇨ *Microhardness profile*



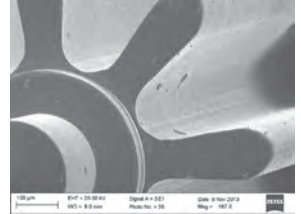
Scanning electron microscope (SEM)

ZEISS EVO MA10 with EDX*

The SEM can work in a high vacuum or under variable pressure, which enables both conductive and non-conductive samples to be analysed.

Surface observation

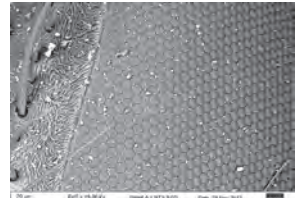
Viewing of the sample provides insightful information on the performance of the material, its geometry, surface defects, wear and contamination.



Axle of a gear

Structure of the material

The section of samples enables microstructures, the build-up of layers, and inclusions to be observed and measured.

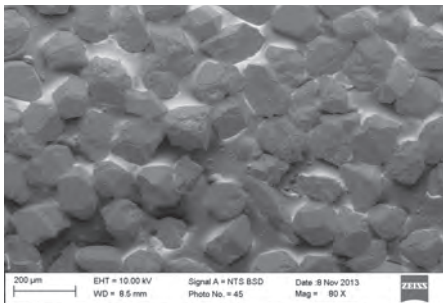


Eye of a fly

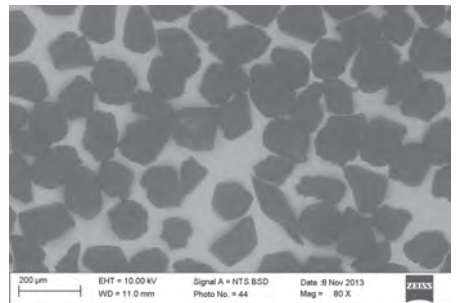
Observation of phases

The samples can be viewed with the backscattered electron detector to form images with contrast that reflects the variations in atomic number. This analysis enables the homogeneity or the different phases of a sample to be viewed. Combined with the EDX probe, the elements contained in each phase can be identified.

Observation of a diamond coating



"Surface condition" mode



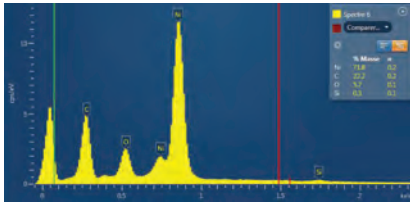
"Composition" mode

Microanalysis

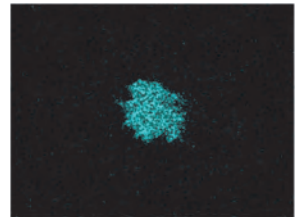
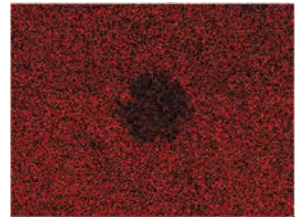
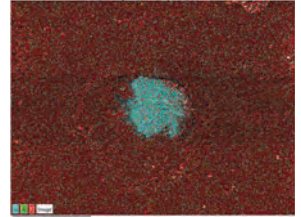
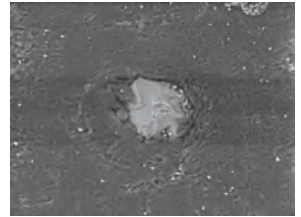
*The EDX probe delivers the chemical composition of the defined surface for analysis:

- Accurately
- Profile line
- Mapping

Examples: Analysis of contamination, the nature of a coating, determining a precise grade.



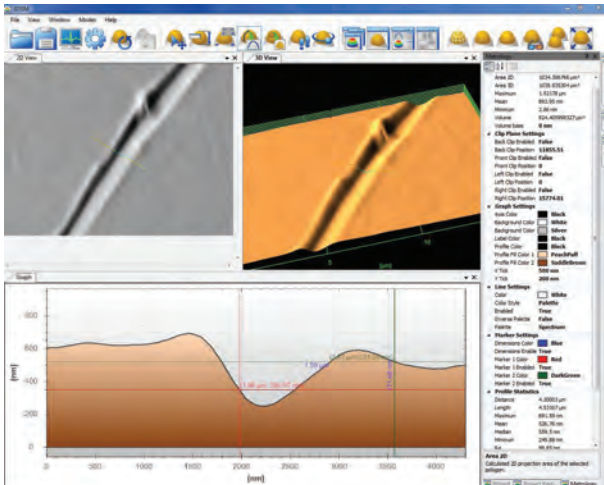
Spectrum for a coating



Observation of a particle of SiO₂ on a plastic coating

3D modelling

The surface observed with the SEM can be modelled to take measurements.

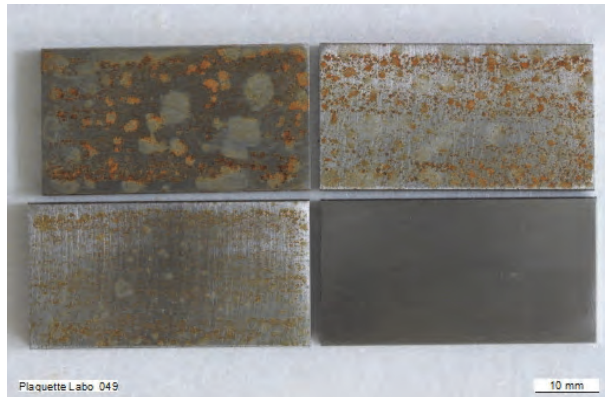


⇐ *Scratch on a watch component*

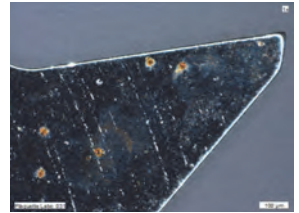
Neutral salt spray corrosion test

As per ASTM B117

This test is carried out on any metal material, with or without a coating, to test its corrosion resistance



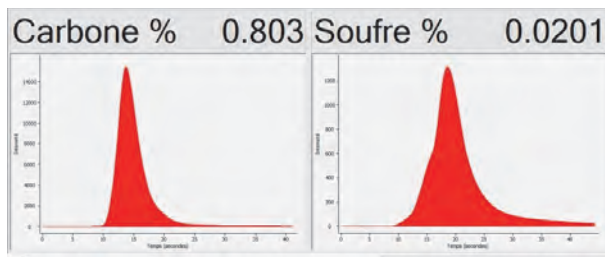
Oxidised test pieces



Localised corrosion

Carbon/sulphur analyser

In inorganic materials: carbon and sulphur content through combustion of the sample.



Crucible

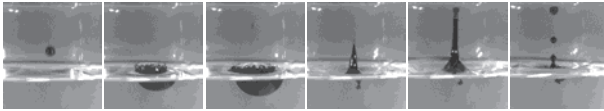
⇐ *Results of an analysis*

Creation of films with high-speed camera

Motion Pro X3, max 64,000 fps

A movement, filmed at high speed (1040 fps at a resolution of 1280x1024 pixels) can be broken down to view details which cannot be observed with the naked eye.

Site visits possible (including lighting kit, tripod, DVD of footage).



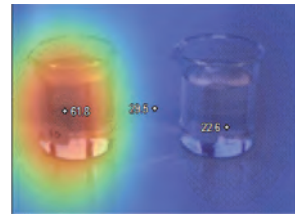
⇐ *Drop of ink falling into water*

Portable infrared camera

Ti45 IR FlexCam®

The camera can be used to obtain thermal images in a temperature range of -20 to 1200°C.

Site visits possible.



Beakers filled with hot and cold water

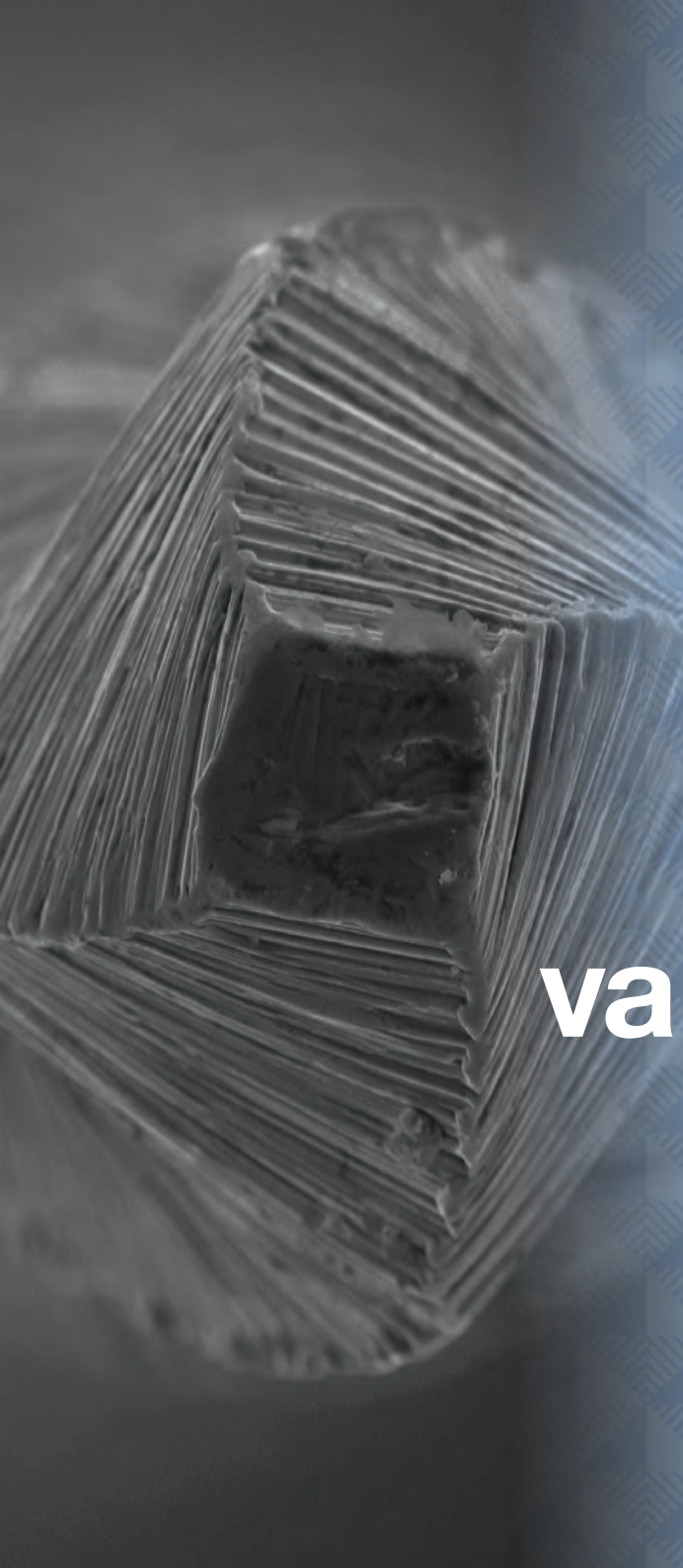
3D microscope

Alicona Infinite Focus (max magnification 500x)

The sample being processed is modelled, making it easy to manipulate. The model created enables 3D measurements to be taken.



⇐ *Detail of a coin*



Subject to modifications - P-UB324.2/GB

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