

# Materials and Failure Analysis

## Scanning Electron Microscopy

**Sulzer Innotec**

Scanning electron microscopy (SEM) is an all-purpose tool for research, development, quality assurance and failure analysis. Components, assemblies and newly developed materials can be inspected and characterised with respect to their material and surface properties.

**How does SEM work?**

A focussed beam of electrons is scanned over the surface of a sample. Electrons reflected from that surface are collected by a sensor, amplified and then used to form an image on a screen.

**Advantages of the Method**

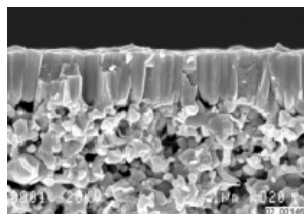
The principal advantage of the scanning electron microscope is its ability to deliver very high resolution combined with a great depth of focus. Magnification of up to approx. x 50,000 can be achieved. In addition to the exact representation of the surface topography, local differences in sample composition can also be visualised. By using the EDX, elements with atomic mass greater than 6 (including O, C and N) can be qualitatively and semi-quantitatively profiled



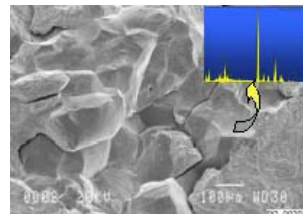
*Our Jeol JSM-IC 848A Microscope  
The large sample chamber takes samples and components up to 200 diameter and 50mm height. The microscope is equipped with a state-of-the-art EDX for chemical analysis*

**Examples of applications**

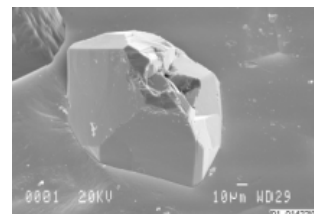
- Characterisation of materials and surfaces
- Inspection of fracture surfaces and failure analysis
- Quality control of components and assemblies
- Determination of elemental composition (excluding H, Li and Be) on very small samples



*Complex microstructure of a ceramic coating*



*Intercrystalline fracture in a turbine blade wheel including a local EDX elemental analysis*



*Morphology of grinding media in a grinding plate after intensive use*

**Delivery**

SEM investigations can normally be conducted within 1 – 3 working days. Customers are welcome to be present

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