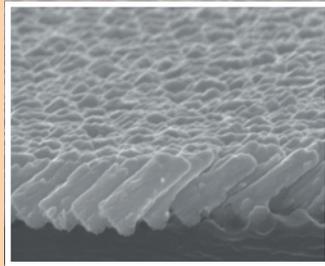


# SCANNING ELECTRON MICROSCOPY

The Scanning Electron Microscope (SEM) produces very high resolution images with a large depth of field of the surface of a sample.

Imaging is achieved by the focusing of an electron beam through a series of condenser and objective lenses to a spot which is then rastered across the sample surface producing high magnification surface images. Additionally mono- and multi-layered samples can be x-sectioned which provides data on film thickness and uniformity.



SEM image of a nanostructured Silver film which is used as a sensor.

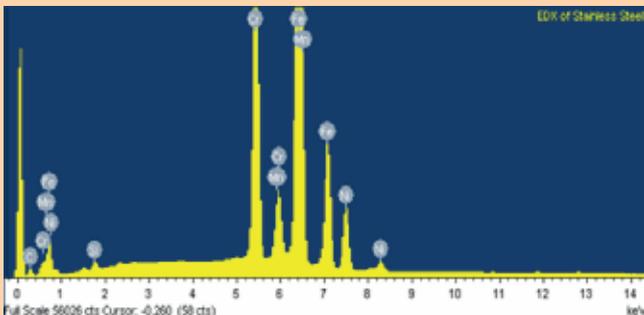
The SEM is also fitted with a Backscattered Electron Detector. BSE imaging can be utilised to gain important compositional information in multi-phase samples. Compositional differences are evident by means of atomic contrast, with elements of a higher atomic number being backscattered more strongly than lighter elements.

## ENERGY DISPERSIVE X-RAY ANALYSIS (EDX)

The SEM is also fitted with an x-ray detector; this analytical technique is used for elemental analysis of a sample.

X-rays that are characteristic of a particular element are produced by the excitation of its ground state by the high energy electron beam produced by the SEM.

Data can be collected in the form of spectra, which gives chemical composition from a specified site and also in the form of an x-ray map, which shows the distribution of an element throughout a sample.



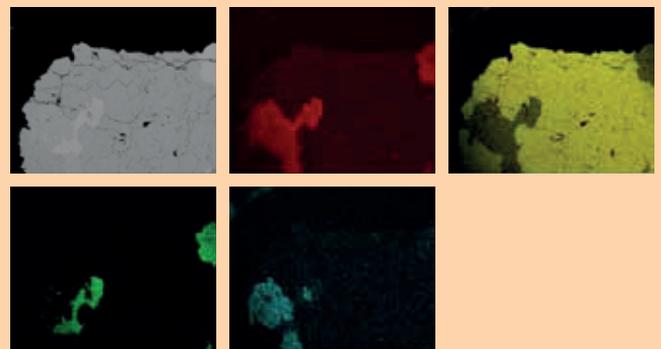
EDX spectrum of Stainless Steel

## LAB SERVICES

We aim to provide a service that identifies failure mechanisms which impact production and productivity. Surface analysis techniques provide invaluable high resolution structural detail of a sample surface together with compositional analysis using EDX which can highlight the presence of contaminants that may impact product viability and quality assurance.

We have consulted with manufacturers in the following industries with success in identifying failure mechanisms impacting manufacturing and reducing customer returns:

- GAS DETECTION SYSTEMS
- AEROSPACE ENGINES
- OPTO-ELECTRONIC NIGHT VISION SYSTEMS
- HIGH PERFORMANCE CABLING
- BEVERAGES
- SEMICONDUCTOR MICRO-CHIPS
- VASCULAR PRODUCTS
- LASERS
- BLOOD PROCESSING SYSTEMS
- PRINTING
- ADHESIVES
- WATER TREATMENT SYSTEMS



EDX MAPS: showing Elemental distribution within a sample

## CONTACT US

Professor Des Gibson  
Director, Institute of Thin Films, Sensors & Imaging  
University of the West of Scotland  
Paisley PA1 2BE, United Kingdom  
Tel: 44 (0) 141 848 3610  
Email: des.gibson@uws.ac.uk

Lorraine Dymond  
Enterprise & Employer Engagement  
University of the West of Scotland  
Paisley PA1 2BE, United Kingdom  
Tel: 44 (0) 141 848 3918  
Email: lorraine.dymond@uws.ac.uk

**UWS** UNIVERSITY OF THE  
WEST of SCOTLAND

Institute of Thin Films,  
Sensors and Imaging