



SEMINAR

An Introduction to Microstructural Characterisation using the Oxford Instruments HKL Electron Backscattered Diffraction System

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Oxford Instruments Nanoanalysis and Oxford Instruments HKL

Thursday 3 July, 2.00 – 3.00pm
Science Lecture Theatre S11, Bldg 25

Abstract

Electron microscopy and x-ray microanalysis are becoming routine techniques in the study of materials; however it has been shown that the microstructure of polycrystalline materials can also play an extremely important role in determining the mechanical, electrical and chemical properties of a material.

Electron backscattered diffraction or EBSD is an SEM based technique which provides crystal orientation information at the micron and sub-micron scale. Unlike x-ray diffraction which can also provide textural analysis, EBSD allows direct measurement of individual grain orientations and the relationships between grains e.g. grain boundary misorientations and the location of special grain boundaries.

The combination of EBSD and EDS also opens up new possibilities including the ability to distinguish multi-phase materials even when the phases are chemically or crystallographically similar.

EBSD is used in a wide range of scientific research disciplines across both materials science and geological sciences. Some applications include:

- Texture measurement in sheet materials in the steel and aluminium industry for quality control applications.
- Study of texture in relation to electrical and magnetic properties.
- Measurement of grain boundary misorientations and the relation of grain boundary types to phenomena such as segregation, corrosion, precipitation, fatigue and fracture resistance.
- Study of fabric in geological materials.
- Thin films, in particular growth of epitaxial layers with applications in solar cells, thin film transistors, non volatile memories, ferroelectric films, and light emitting and laser diodes.
- High temperature superconductors, including the influence of texture and grain boundary type on superconducting properties.

In this presentation we will give an overview of the technique illustrated with some examples of the applications described above.

The Monash Centre for Electron Microscopy has recently purchased an Oxford Instruments HKL Electron Backscattered Diffraction system and following the presentation there will be a brief tour of the JEOL 7001F lab where the instrument is located.

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Visitors are most welcome: Please note that there is a designated Visitors Car Park (N1) clearly ground-marked by white paint and tickets, at a cost of \$1.4/hour for up to 3 hours, available from a dispensing machine. This high-rise carpark is located on the following Clayton Campus Map, Ref. B2.

[Printable version of the Clayton campus map \(pdf 833 kb\)](#) (Please right click to open link)