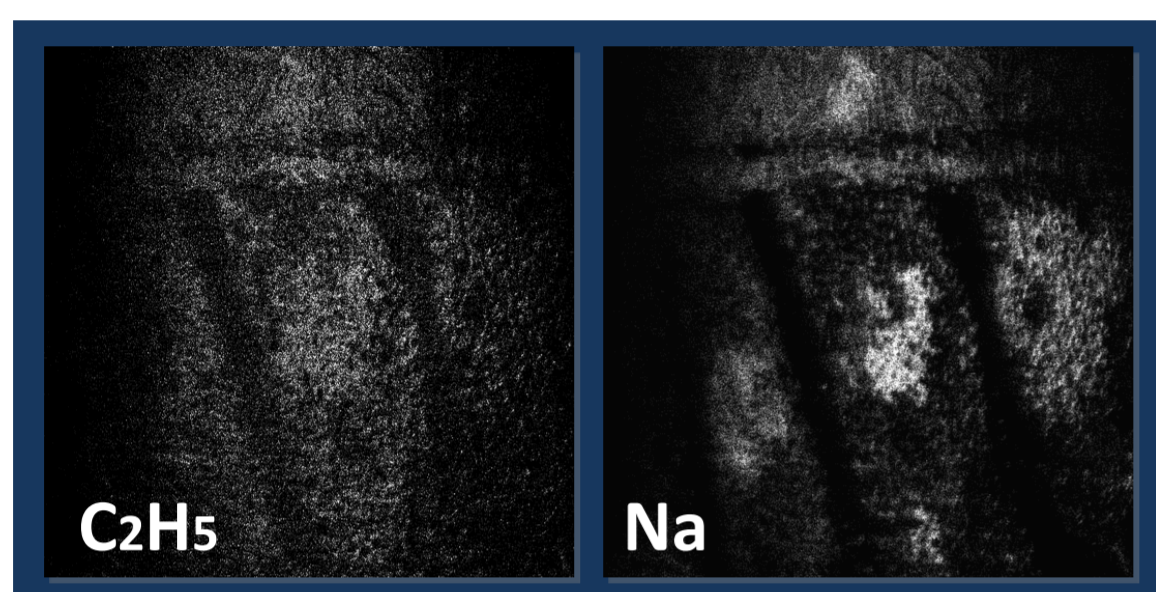


# ETC texture, mapping and image analysis

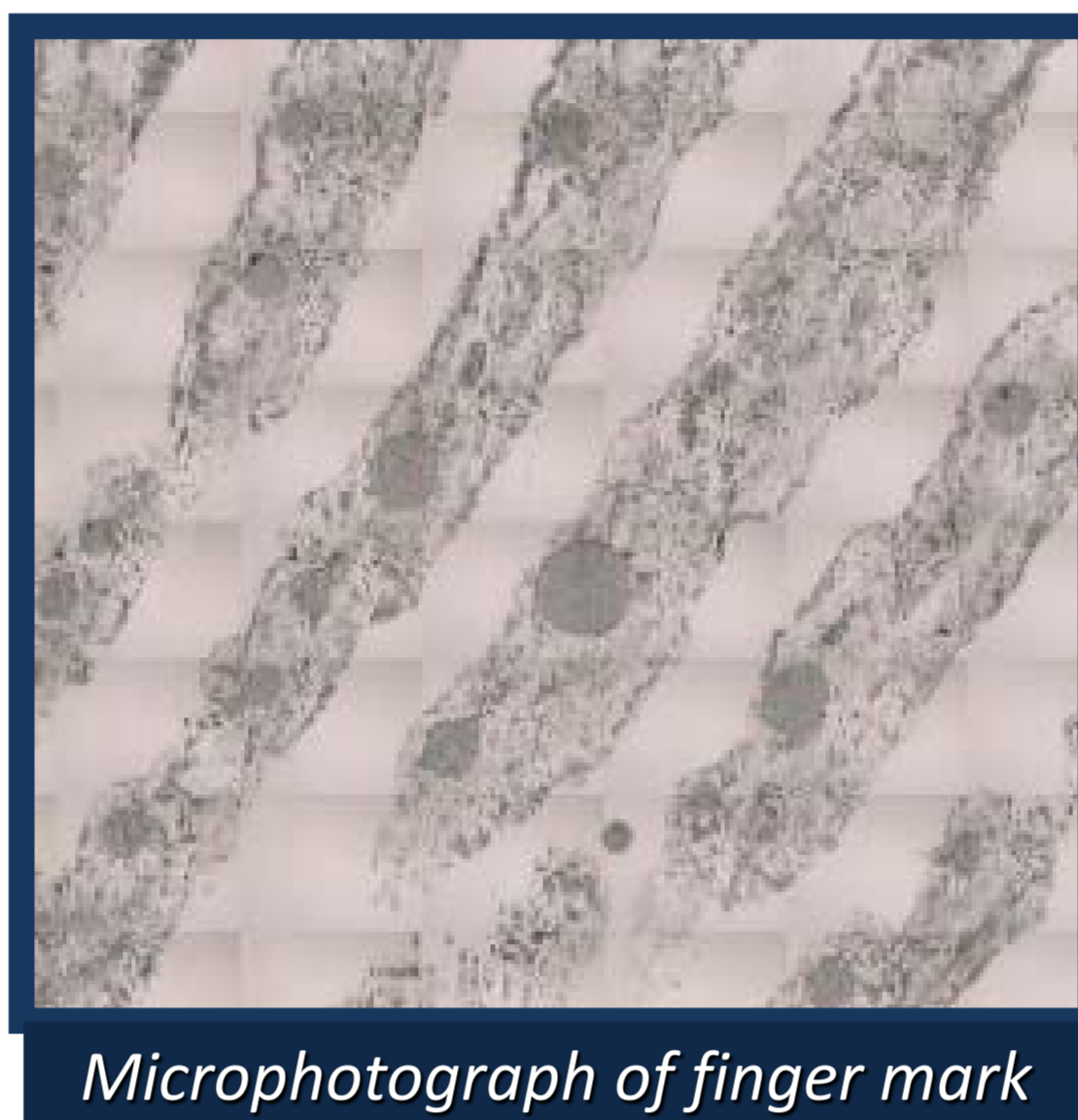
<http://www.brunel.ac.uk/etc>

## Secondary Ion Mass Spectrometry (SIMS)

The ETC instrument suite includes a Kore SurfaceSeer Time of Flight Secondary Ion Mass Spectrometer (ToF SIMS) with a gallium primary LMIG source. This SIMS is the most sensitive of all the commonly-employed surface analytical techniques, able to detect atoms, clusters of atoms and molecular fragments from the top 2 nanometres of a surface.



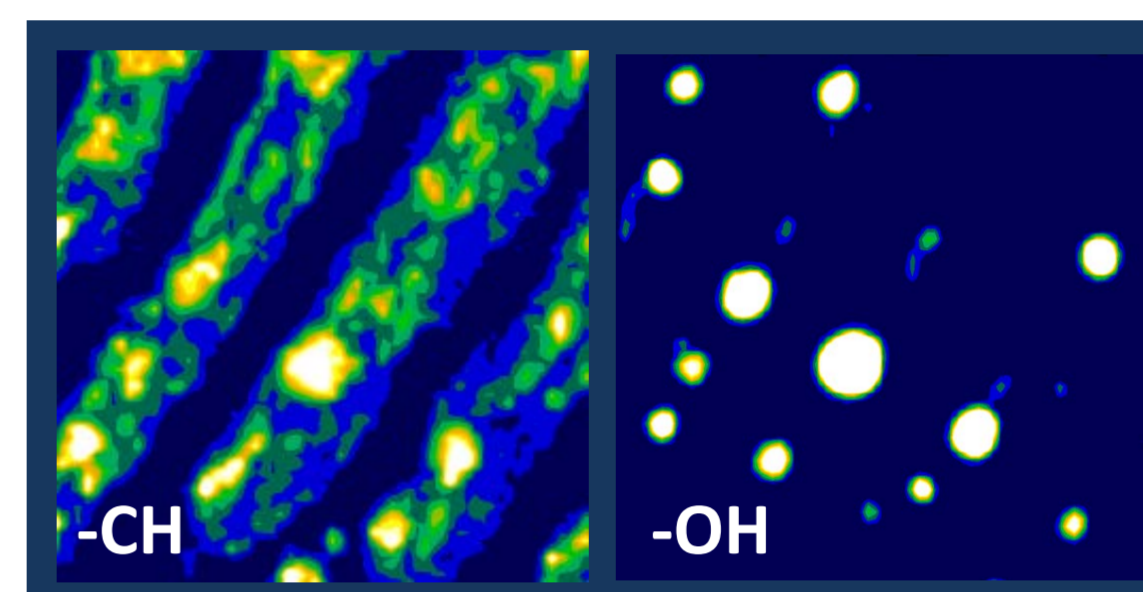
Images show ion (left) and molecular (right) maps of fingerprints deposited on paper and silicon wafer respectively (N. Attard-Montalto).



Microphotograph of finger mark

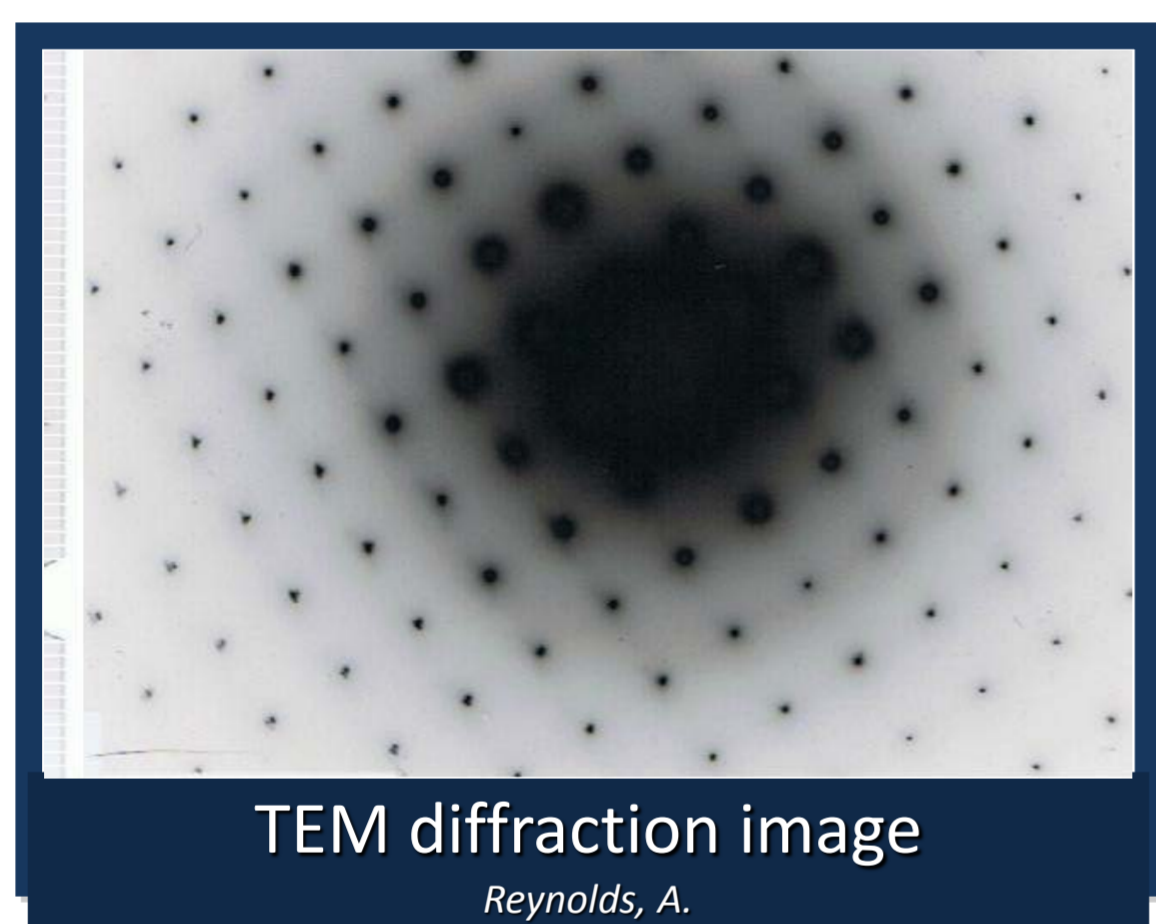
## Fourier Transform Infrared Spectroscopy (FTIR)

Our Perkin Elmer Spectrum One FTIR is also equipped with a Perkin Elmer Spotlight Imaging FTIR microscope, which is able to identify functional groups, protonation states and monitor any changes due to new interactions. FTIR is a non-destructive, relatively fast technique and usually requires very small sample quantities.

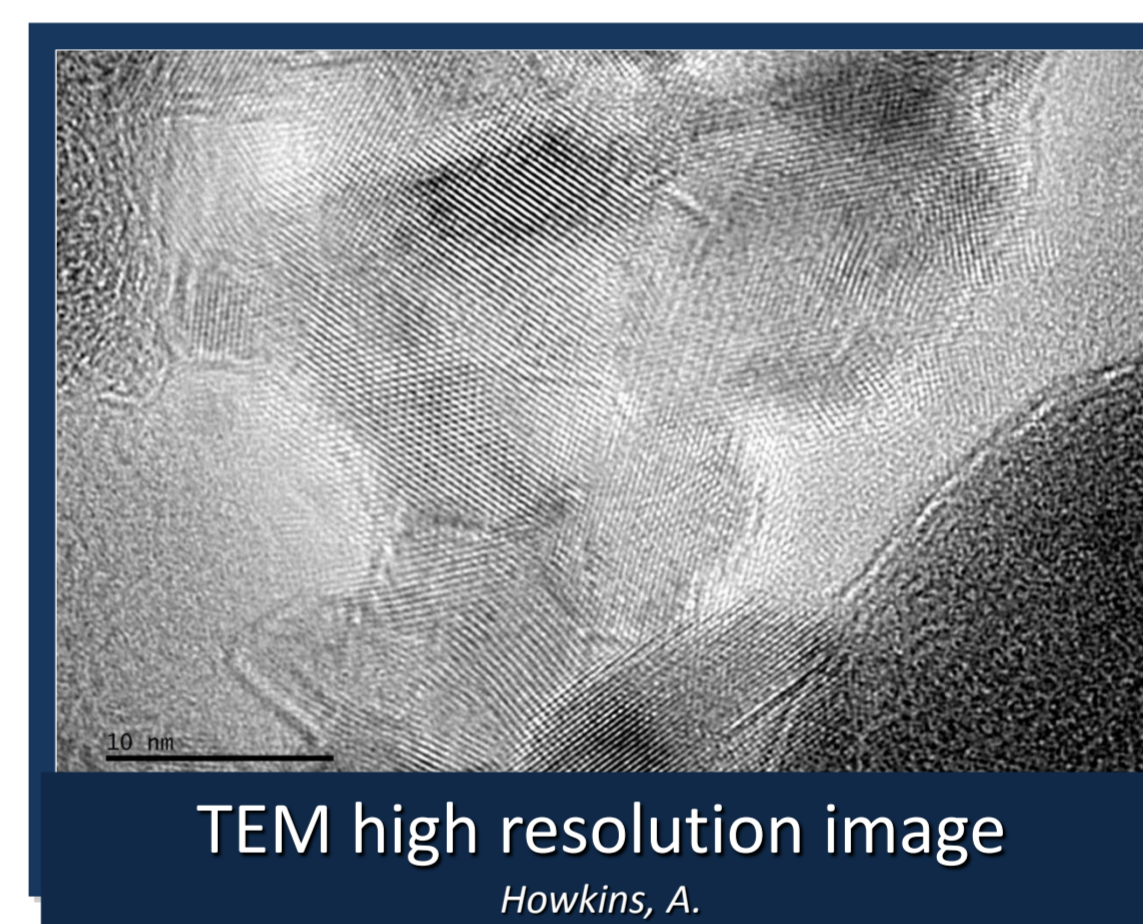


## Transmission Electron Microscopy (TEM)

The JEOL2100 FEG TEM offers high resolution imaging and electron diffraction. The system is also able to perform X-ray analysis, electron energy filtering, electron energy loss spectrometry, cathodoluminescence and tomography.



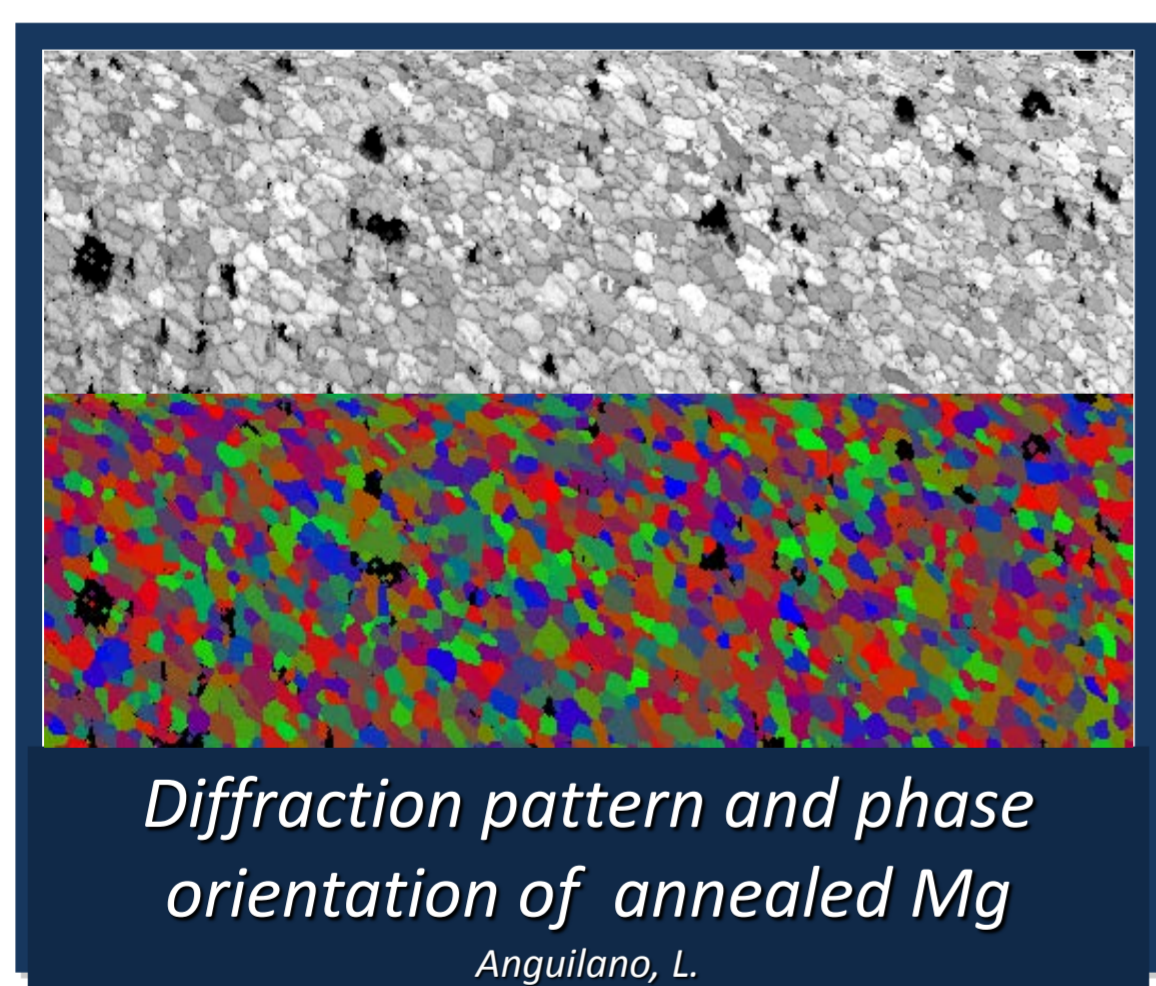
TEM diffraction image  
Reynolds, A.



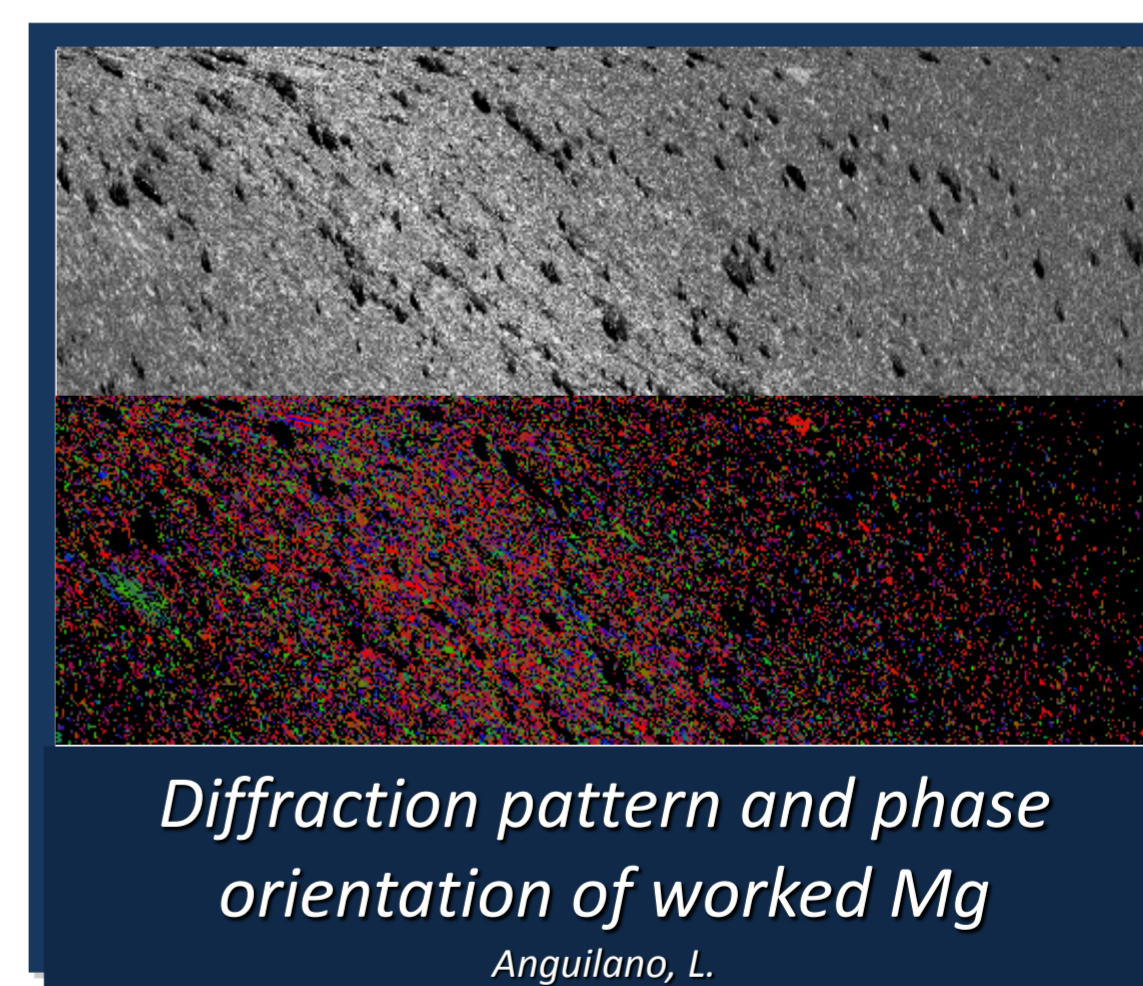
TEM high resolution image  
Howkins, A.

## SEM: Chemical and EBSD mapping

ETC's FEG-SEM Zeiss Supra is equipped with an Oxford Instruments EDX spectrometer that allows chemical mapping of selected areas. Furthermore, it is equipped with an electron diffraction back-scattering detector allowing phase mapping and texture interpretation.



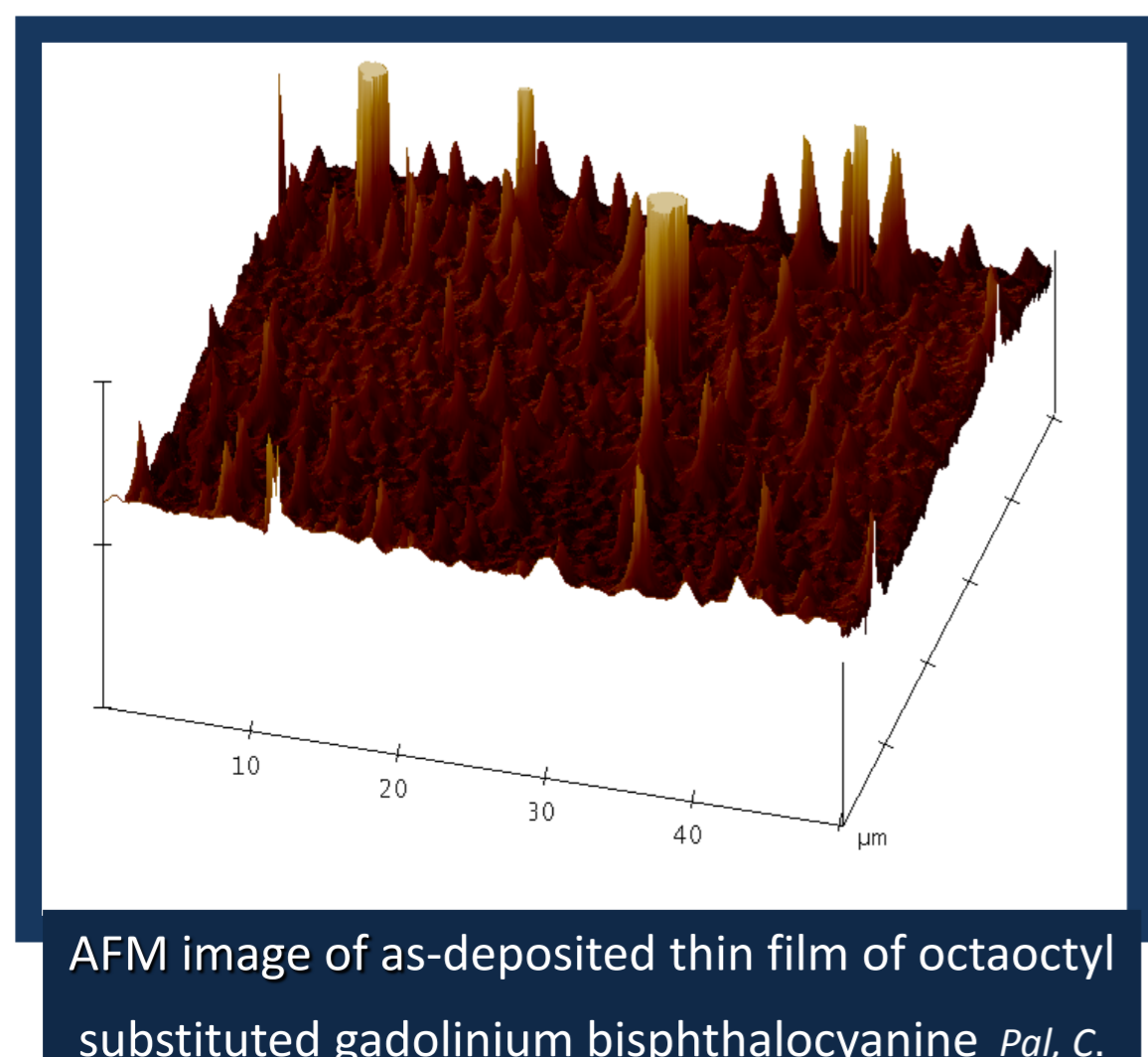
Diffraction pattern and phase orientation of annealed Mg  
Anguilano, L.



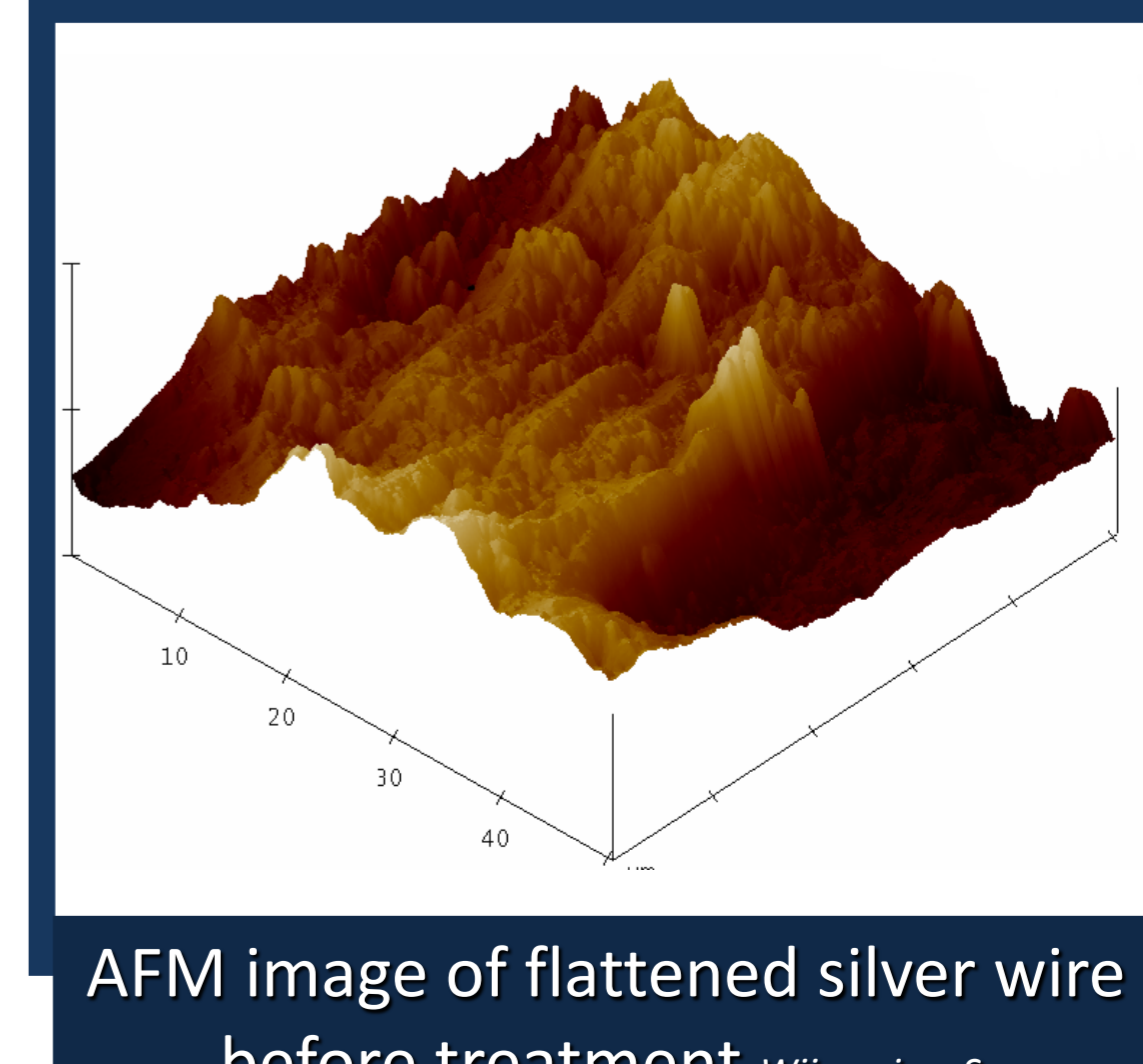
Diffraction pattern and phase orientation of worked Mg  
Anguilano, L.

## Atomic force Microscopy (AFM)

Atomic force microscopy (AFM) enables 3-D imaging of surfaces, measuring height variations with a sub nanometre resolution. Additional quantification comes from calculation of surface texture parameters such as average roughness, skewness and kurtosis. Applications of AFM and related scanning probe techniques at ETC range from thin film analysis, metal processing and forensics research.



AFM image of as-deposited thin film of octaethyl substituted gadolinium bisphthalocyanine Pal, C.



AFM image of flattened silver wire before treatment Wijesuriya, S.