Measuring devices used in environmental sciences

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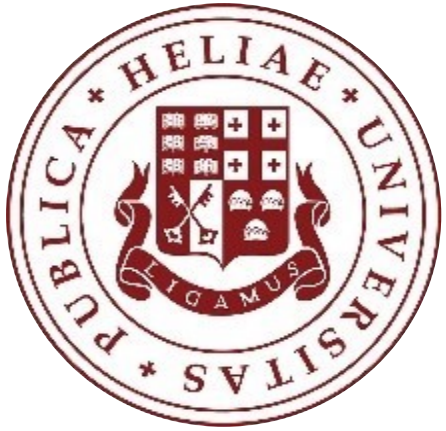


Content

Principles of operation of Scanning Electron Microscope (SEM) and Transmission Electron Microscope (TEM).

Principles of operation of Energy dispersive x-ray spectroscopy (EDX).

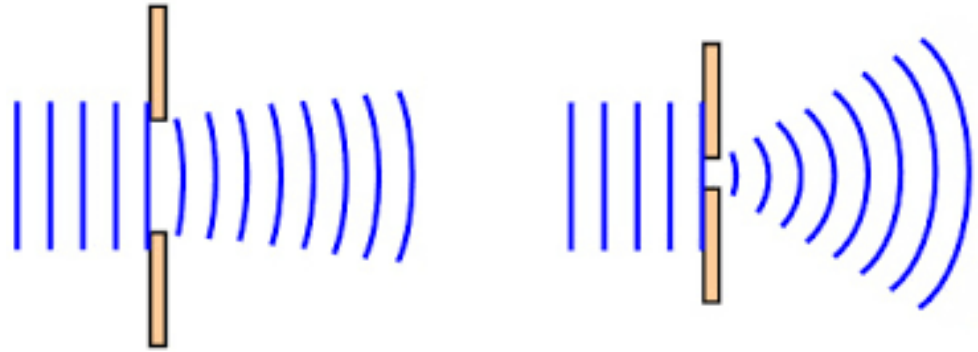
Principles of operation of X-ray structure analyzer (XRD).

Principles of operation of optical and infrared spectrometers.

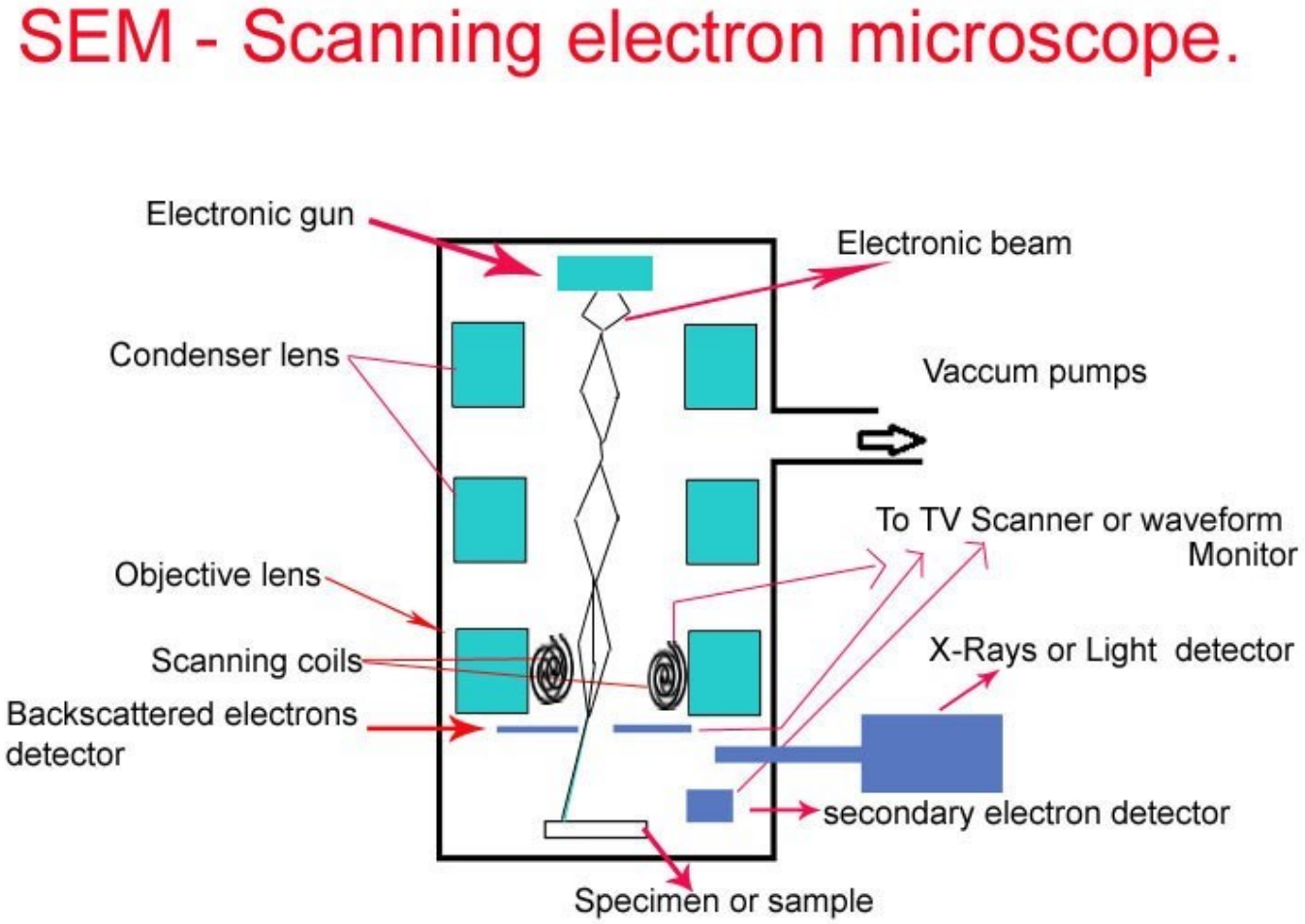
Measurement device control using LabVIEW software.

Data analysis using Microcal Origin software.

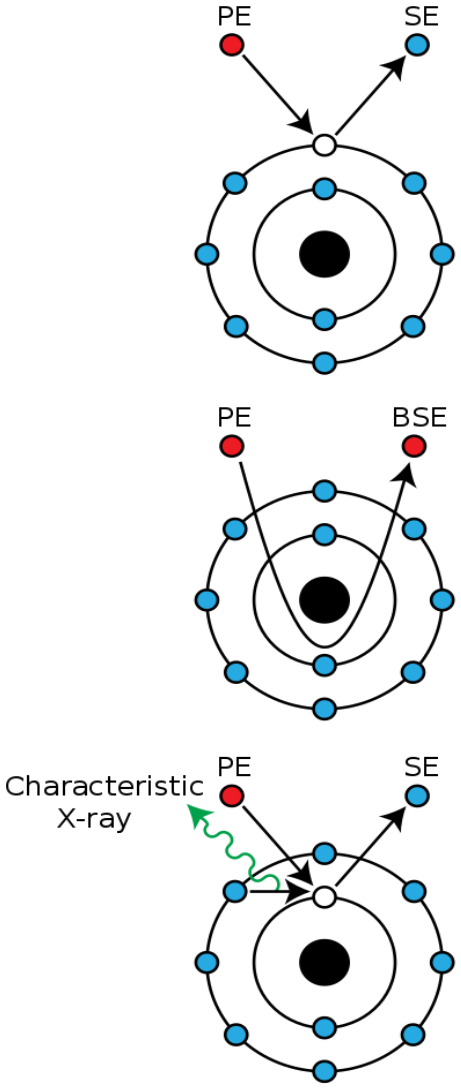
Optical microscopy and light diffraction

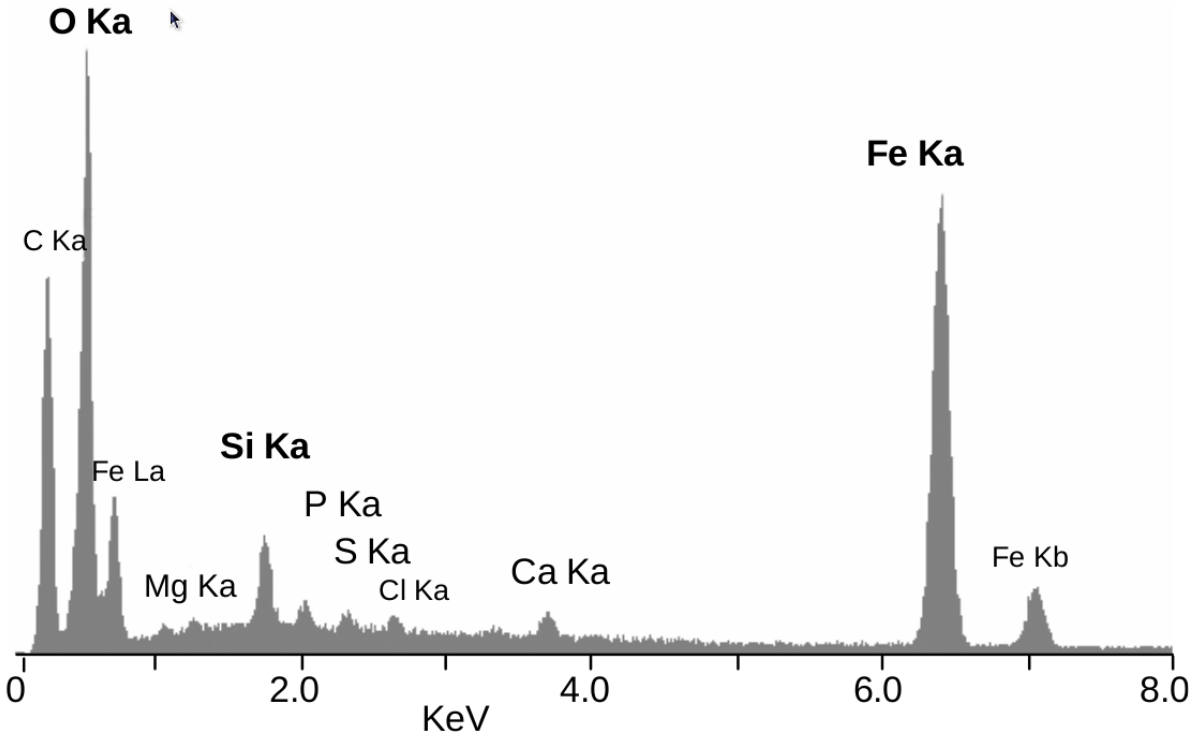


Scanning Electron Microscopy (SEM) with Energy Dispersive X-Ray



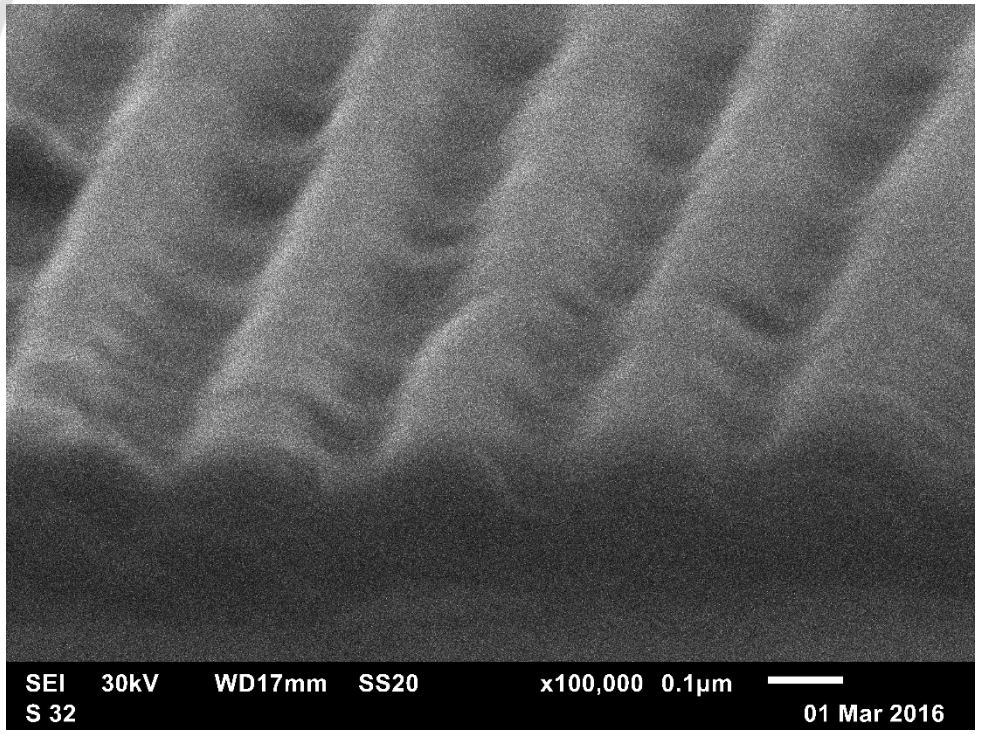
Energy dispersive X-ray spectroscopy (EDX)



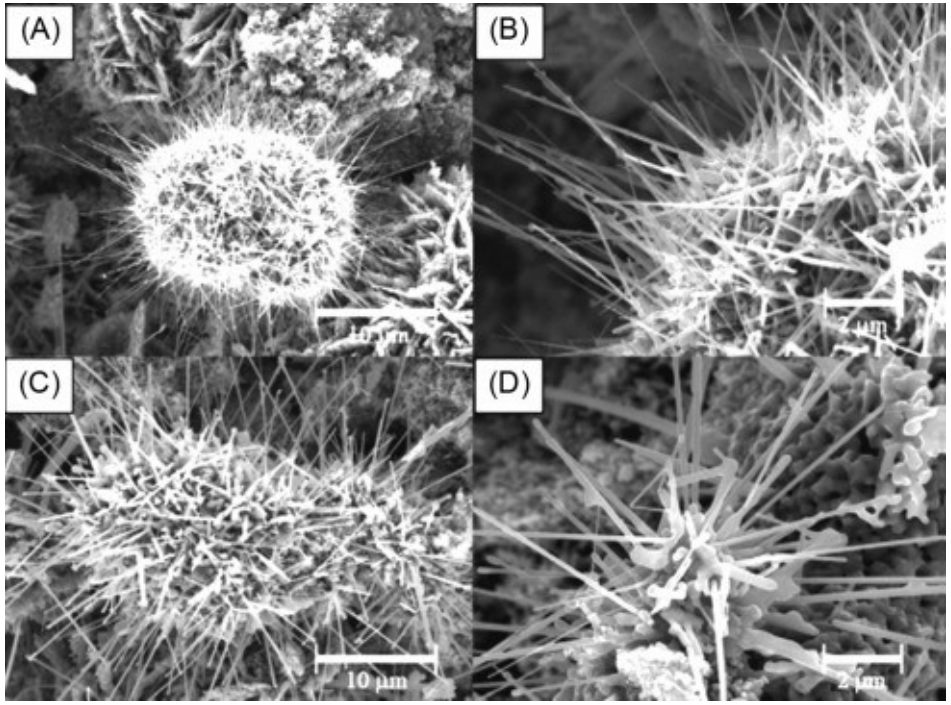


Scanning Electron Microscope

SEM images



SEM image of Si nanograting



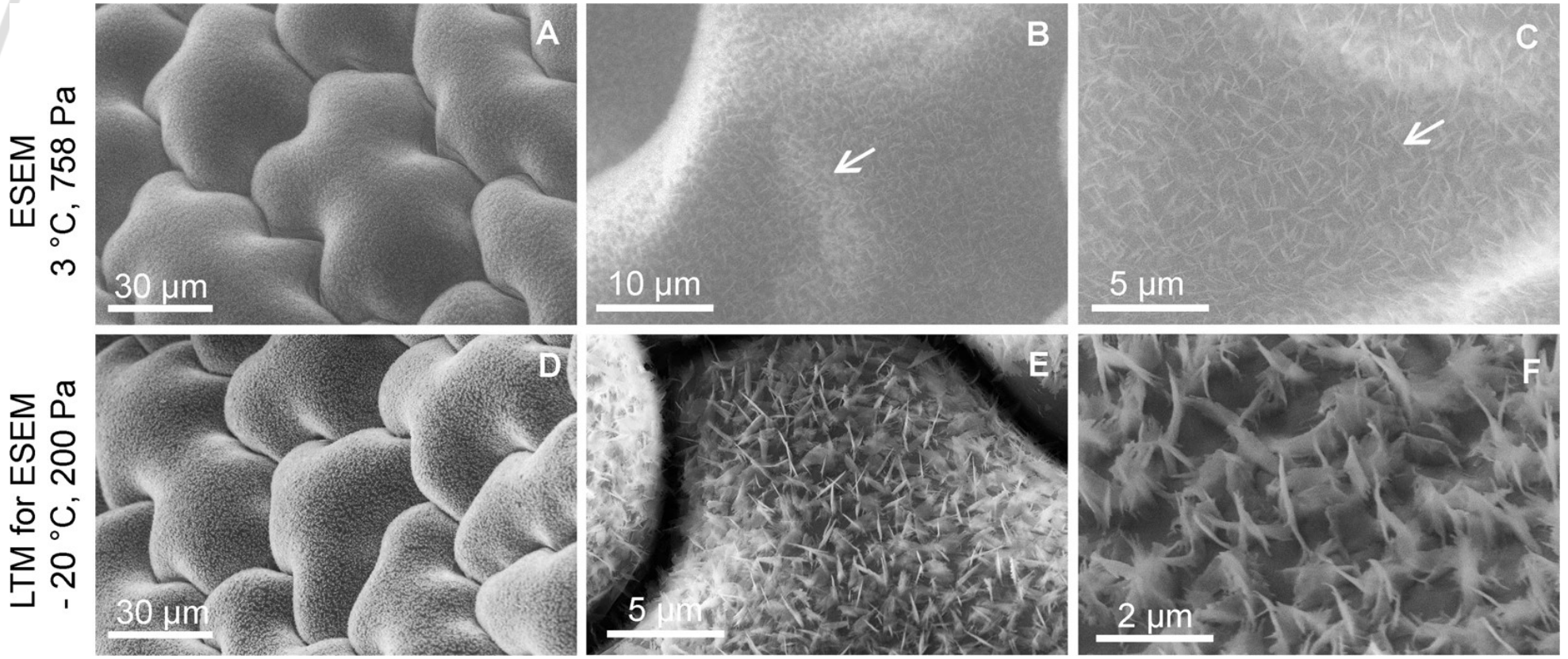
SEM images of ZnO nanowires with different magnification

Environmental (ESEM)

Atmosphere gases pumped
Out but water pressure
is maintained.
Humidity =100%

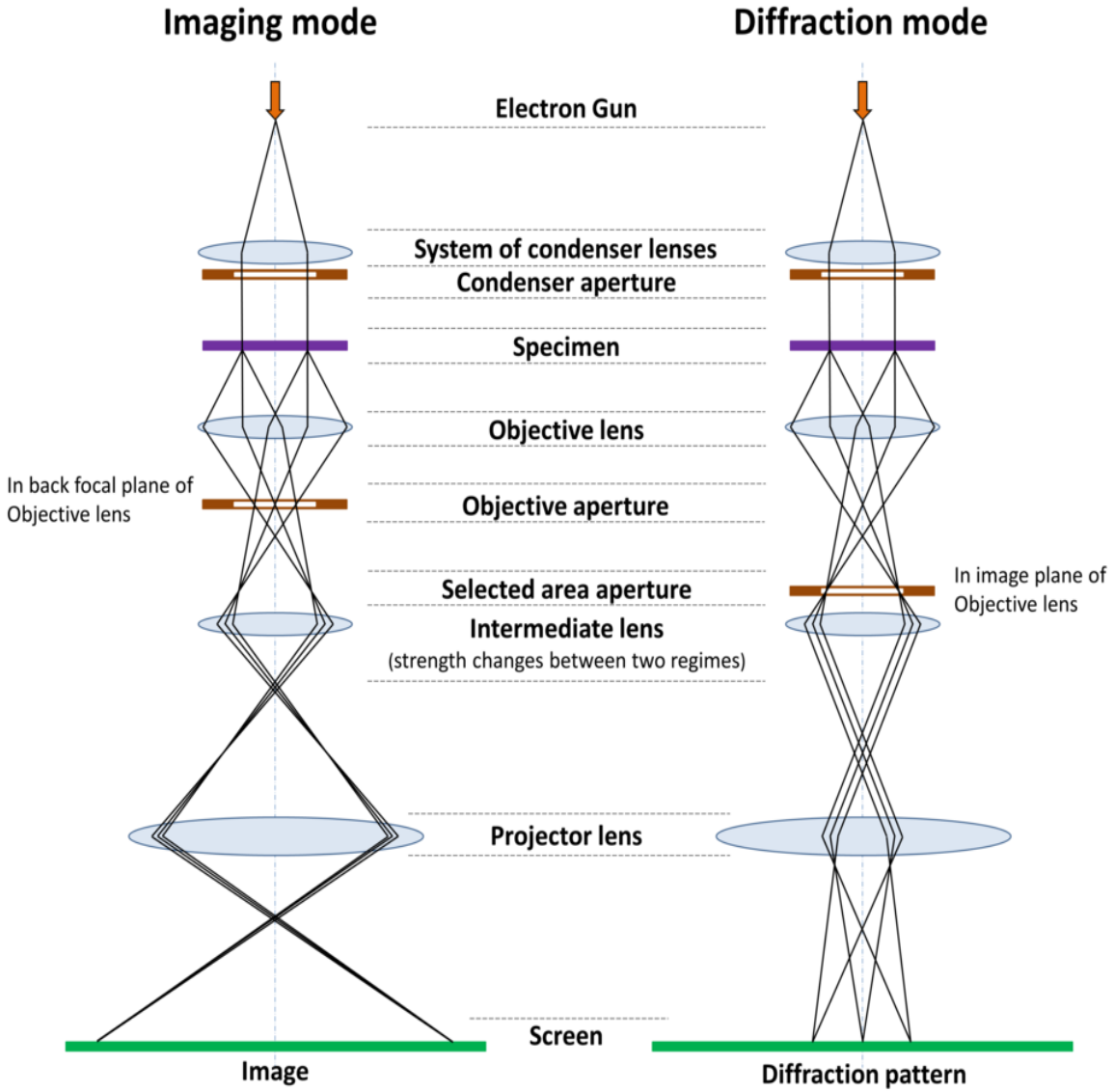
Samples cooled down to
Cryogenic temperatures.

ESEM Images



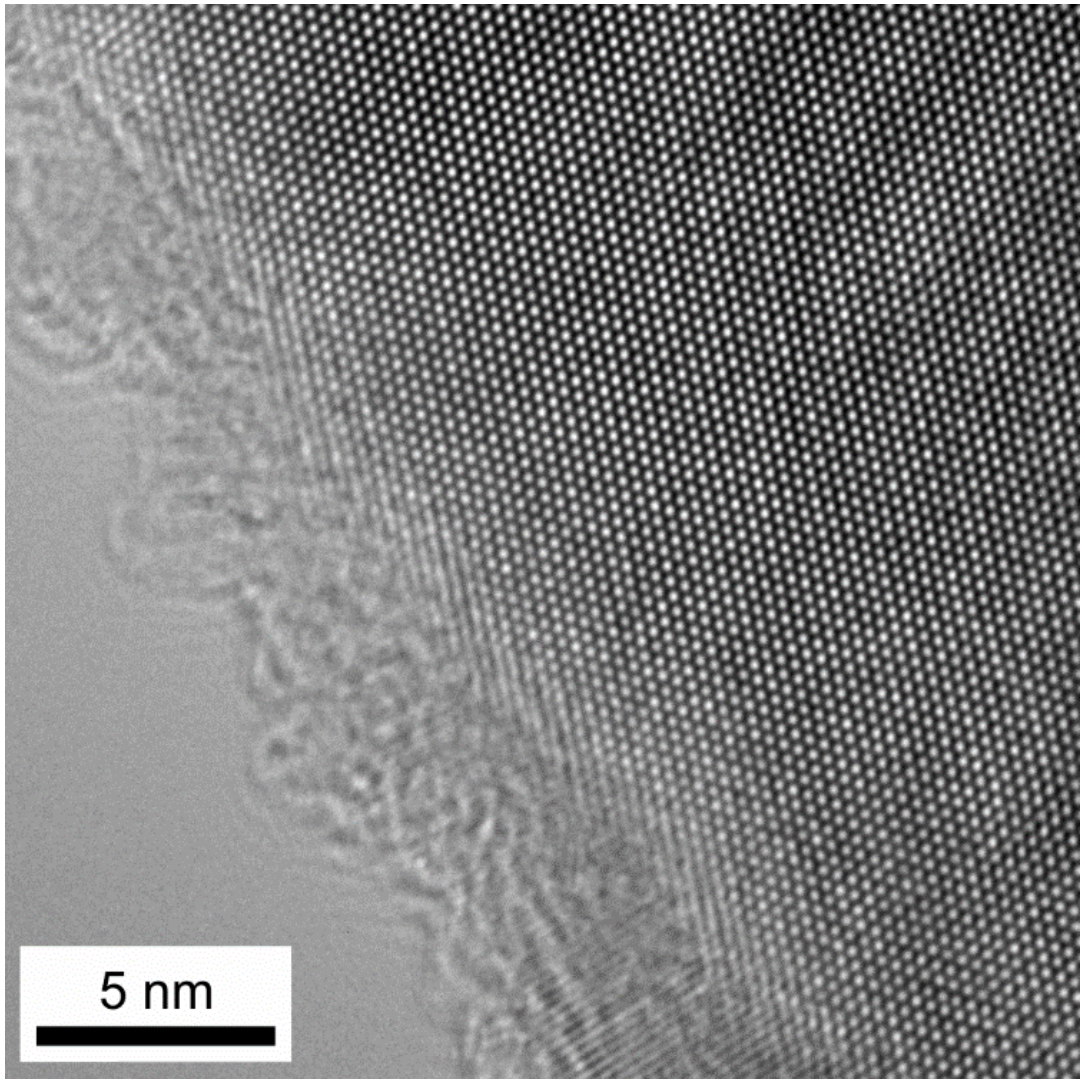
Wax microstructure on the surface of an *Oxalis acetosella* leaf observed in its fully hydrated state

Transmission Electron Microscope (TEM)

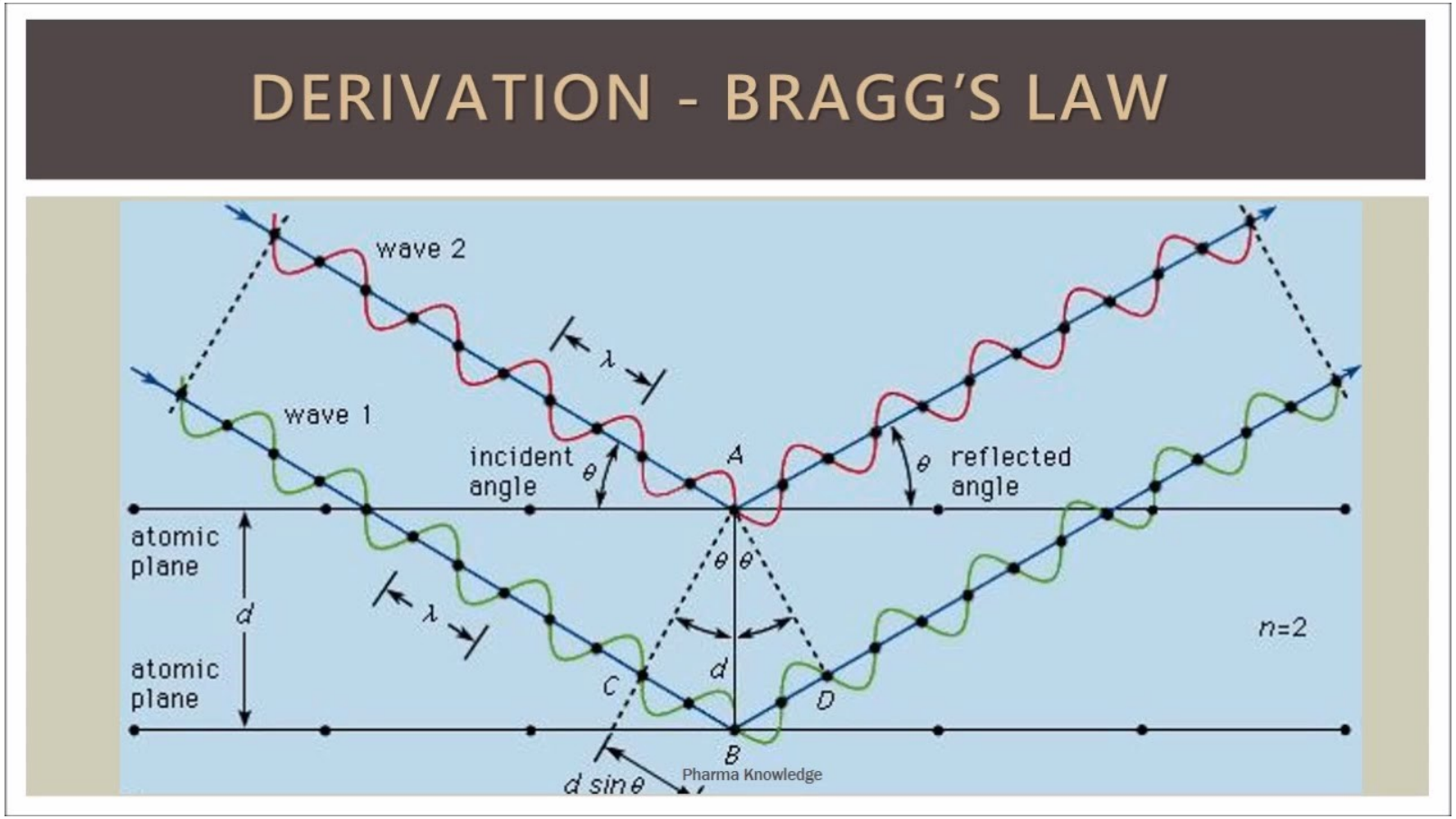


Transmission Electron Microscope (TEM)

TEM image of Magnesium

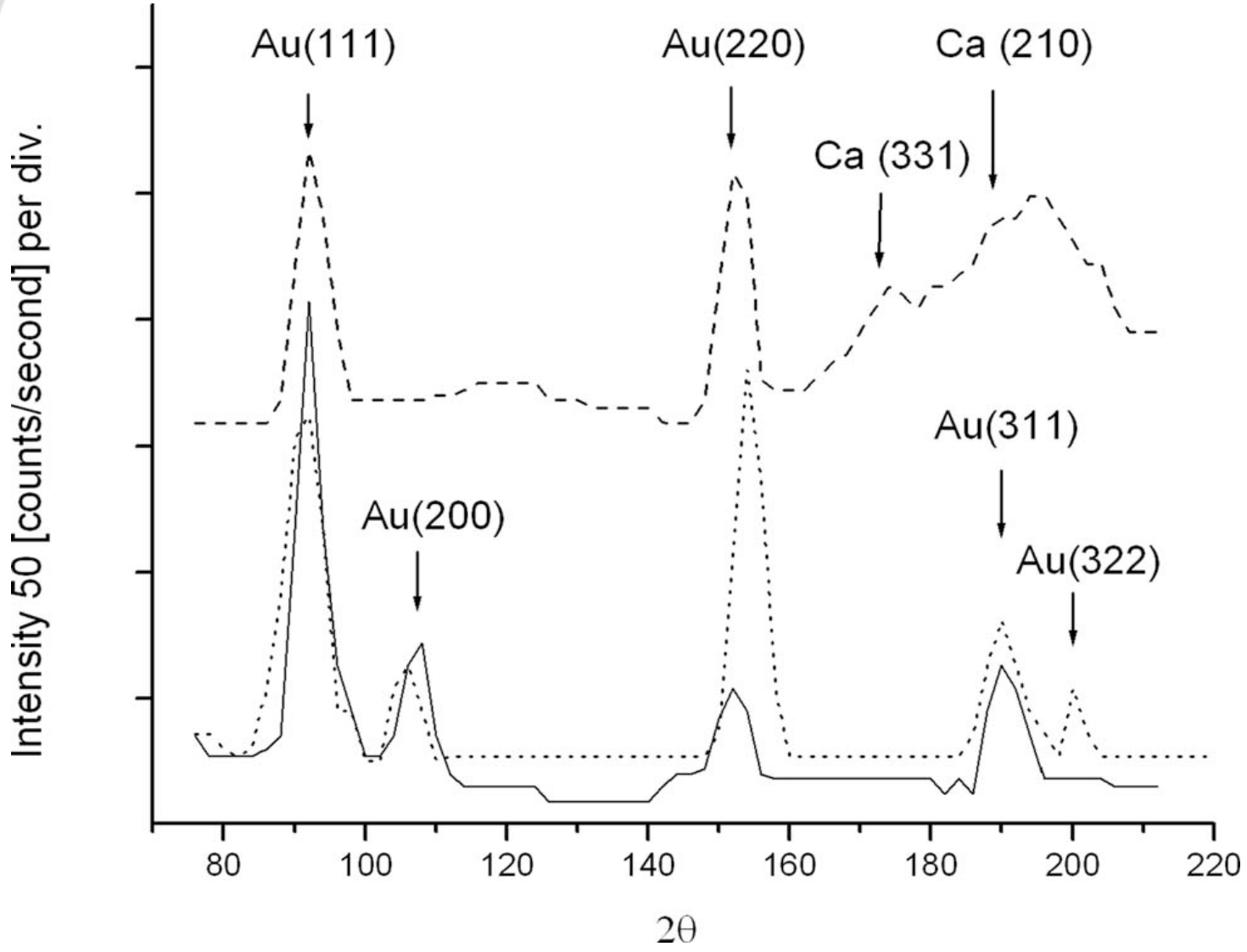


X-ray diffraction analysis

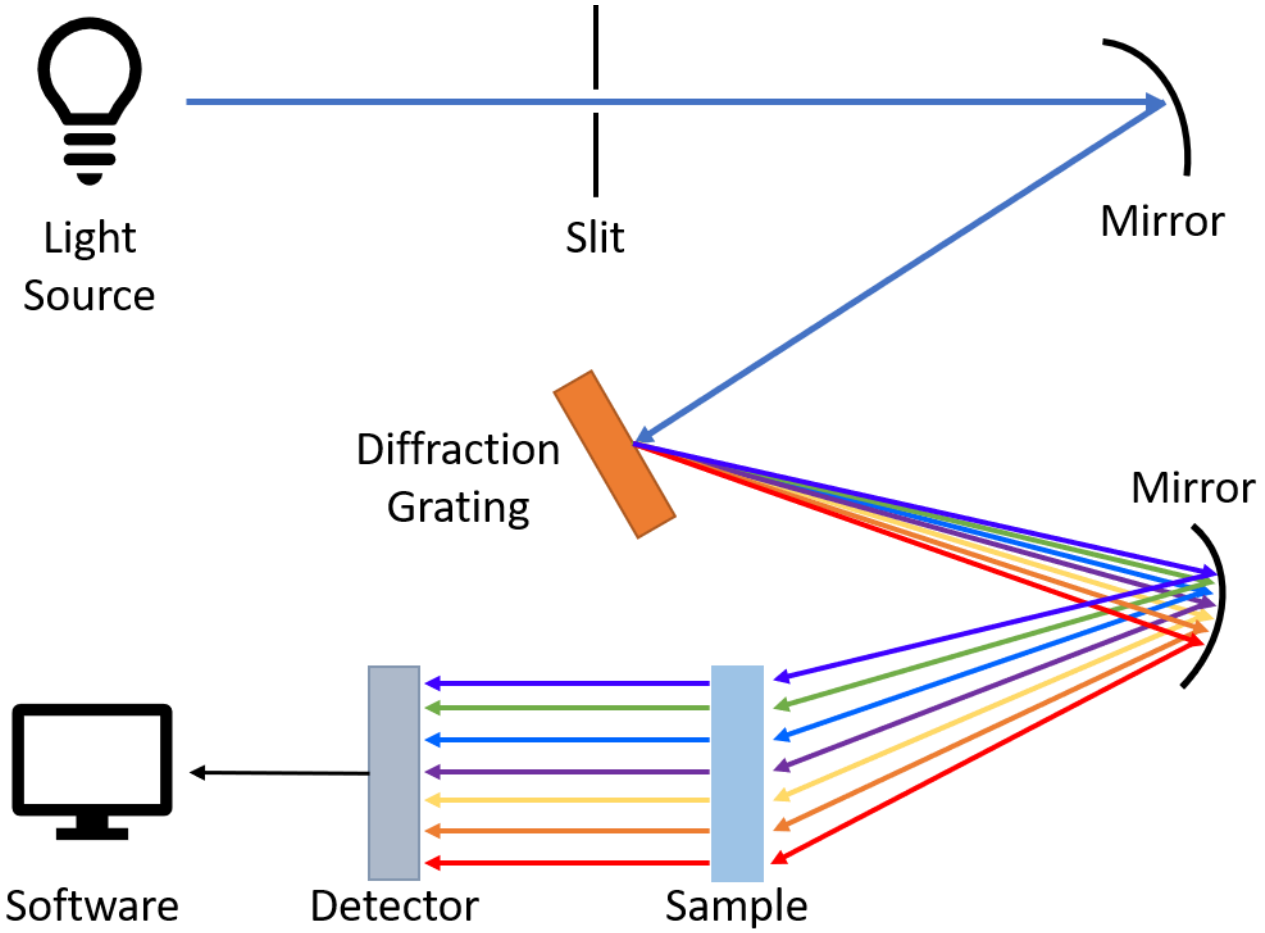


X-ray diffraction spectrometer

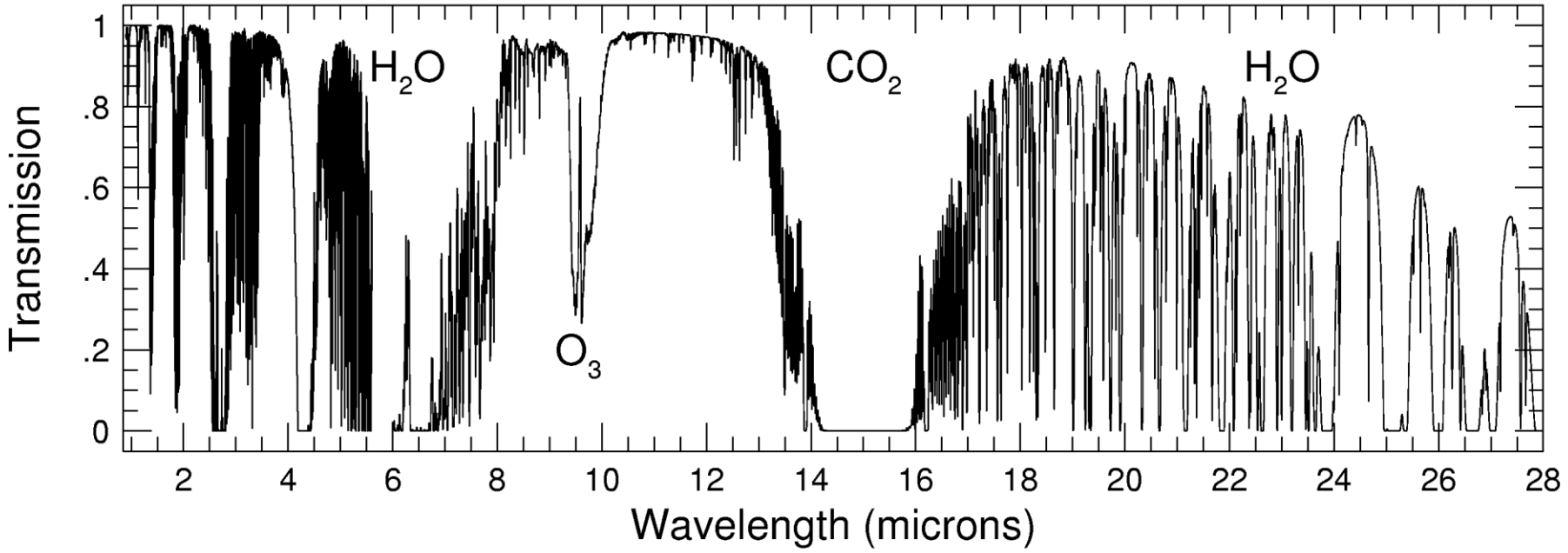
X-ray structural analysis of amorphous gold films



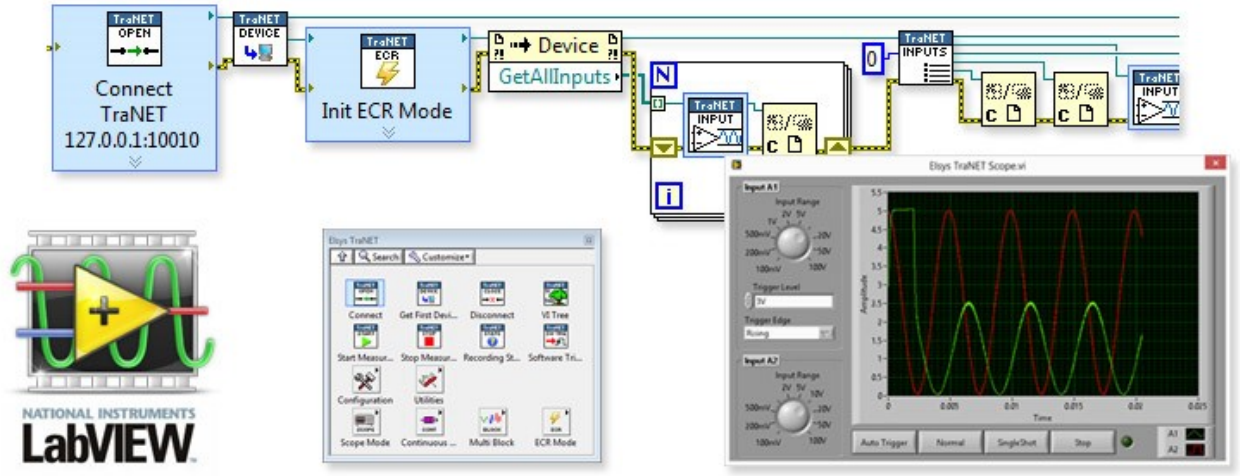
Optical and infrared spectroscopy

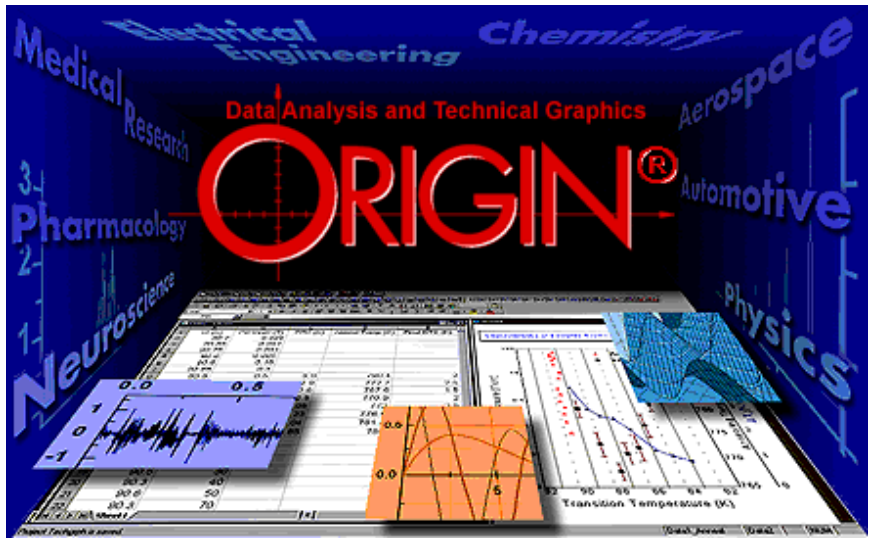


Transmission of electromagnetic waves through atmosphere

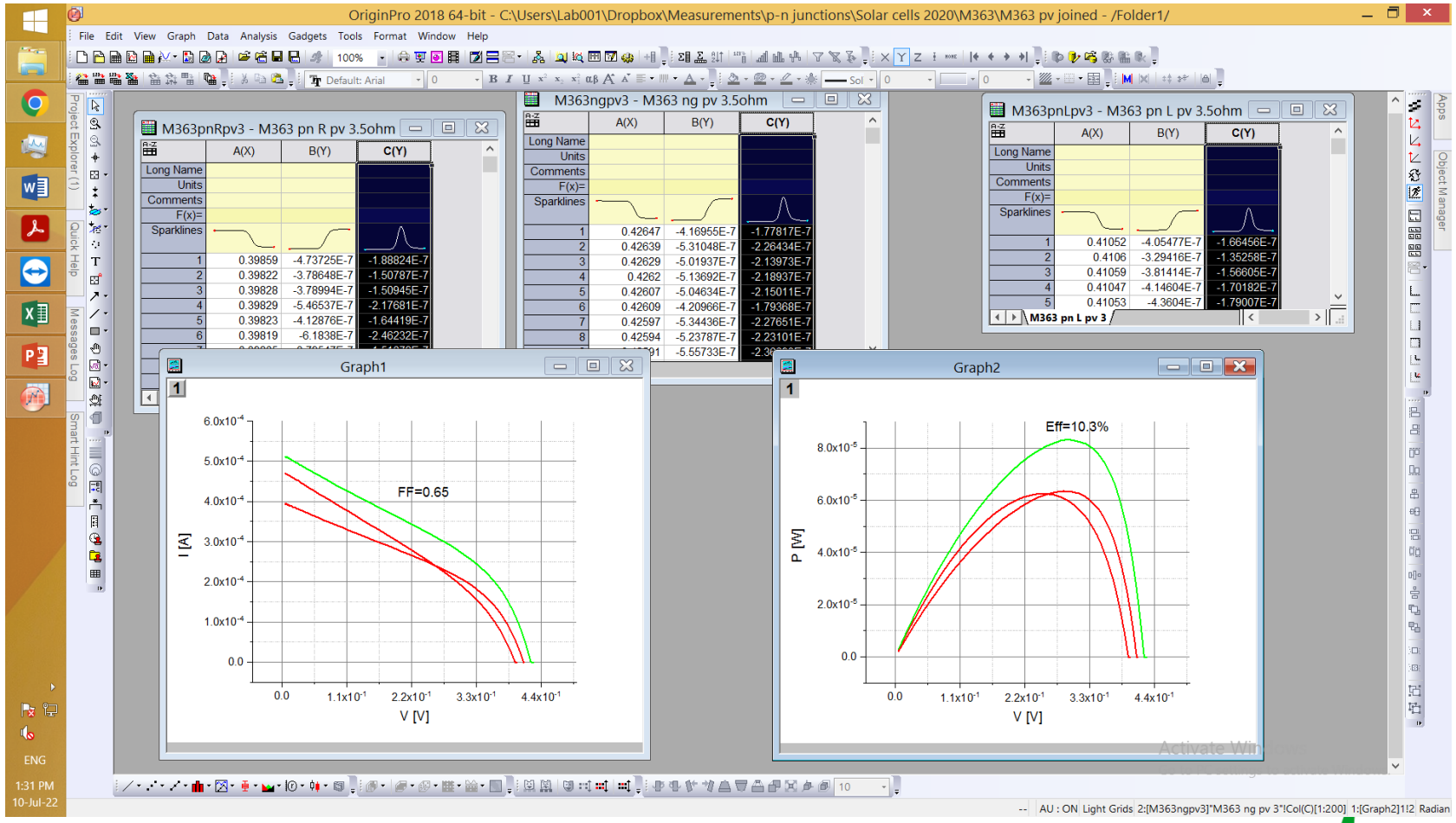


National Instruments LabVIEW and Microcal Origin software





Solar cell characterization in Microcal Origin



Than You for attention!