

# Raman Spectroscopy

## SEM-Raman

### Overview

InVia Raman confocal spectrometer offers spectral, depth profiling and mapping acquisitions to provide high resolution chemical and molecular information on a wide variety of sample types. SEM-Raman interfacing (SEM-SCA) enables simultaneous chemical characterisation coupled with high resolution imaging of organic nanostructures. JSM-6510 SEM operates in low and high-vacuum modes to facilitate the investigation of uncoated non-conducting samples.

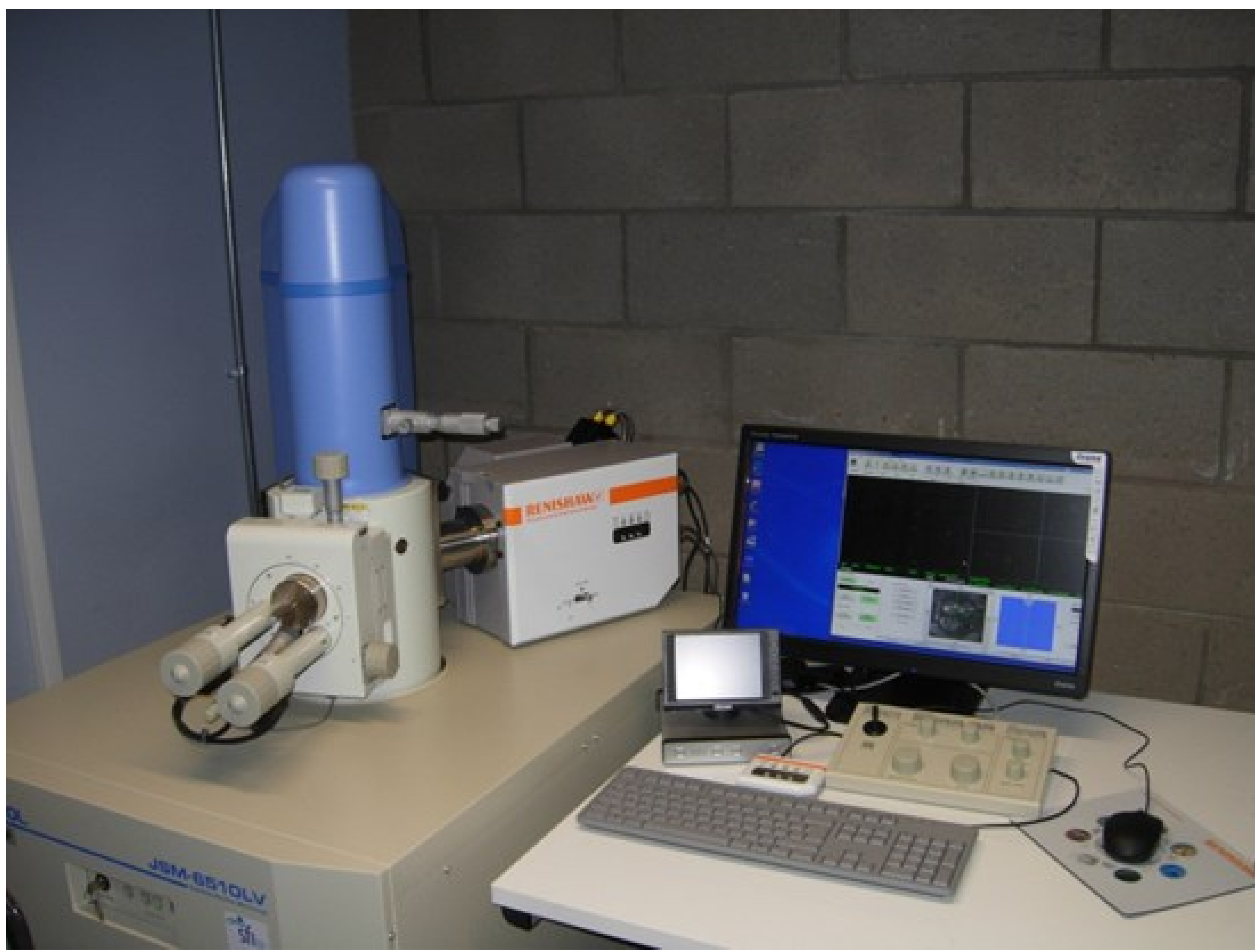


Fig.1: Renishaw InVia Raman Spectrophotometer (B) interfaced with JEOL Scanning Electron Microscope (A).

### Renishaw InVia Raman spectrophotometer specifications:

- Dual excitation sources (532 nm and 785 nm lasers)
- An optical microscope (Leica) with high quality objective lenses
- A motorised spectrometer lenses which automatically align for each configuration
- Grating stage with dual gratings (1800 lines  $\text{mm}^{-1}$  for 532 nm and 1200 lines  $\text{mm}^{-1}$  for 785 nm)
- A thermoelectrically cooled ( $-70\text{ }^{\circ}\text{C}$ ) CCD detector
- Spot size of  $< 2\text{ }\mu\text{m}$  for 50x objective lens
- Spatial resolution  $< 1\text{ }\mu\text{m}$
- Laser line specific Rayleigh filters with a dual filter arrangement to optimise sensitivity
- Raman shift range of  $100 - 4000\text{ cm}^{-1}$
- A Raman probe and SEM interface for coupling the InVia spectrophotometer to an SEM

### JSM-6510LV Scanning Electron Microscope specifications:

- Operating voltage of 0.1-30 kV.
- Resolution: High-vacuum mode: 30 kV 3.0 nm (SEI, 8 mm WD)  
3 kV 8.0 nm (SEI, 6 mm WD)  
1 kV 15 nm (SEI, 6 mm WD)
- Magnification of 5x – 300,000x
- Pressure range in the specimen chamber: 10 to 270 Pa
- Image Signals:
  - High-vacuum mode: secondary electron and backscattered electron imaging
  - Low-vacuum mode: backscattered electron imaging, Multi-element solid state BSE detector standard on LV models
- Working distances 1.5-40 mm with tilt  $-5 - 70$  degrees
- BSE Detector with 3 nm resolution
- Stage navigation system