Renishaw inVia Reflex

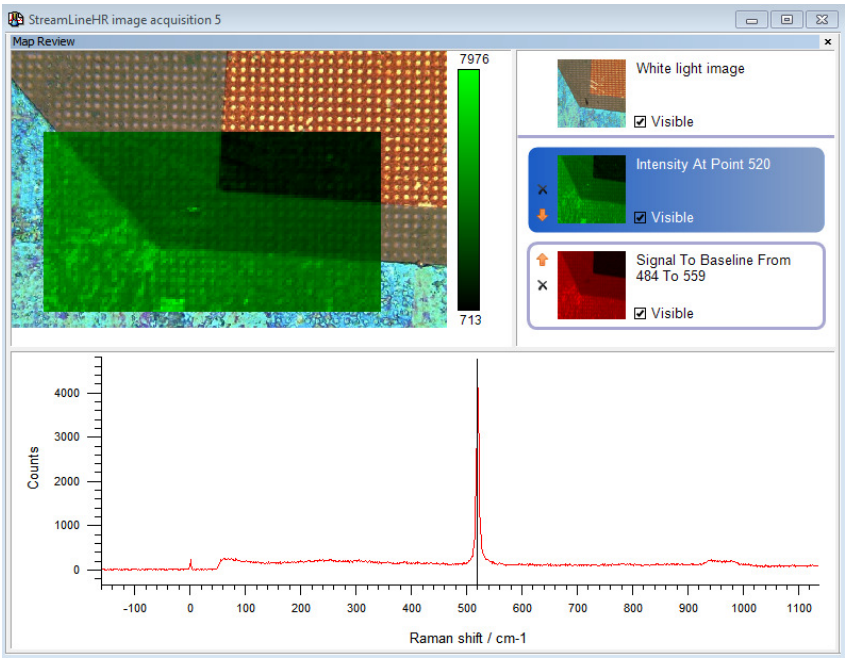
Micro-Raman Spectrometer

Location: Science and Engineering South, 116B

Description

The Renishaw inVia Reflex Raman, installed in June 2016, has green 532nm/50mW diode pumped solid state laser and red 633nm/17.5mW HeNe laser and has auto switch and alignment of the lasers. The Microscope is a research grade Leica DM2700M microscope with better than 2.5um depth resolution using a 100x objective with 0.35mm working distance for maximum confocal performance, a 50x objective with 0.5mm working distance, a 20x objective with 1.15mm working distance and a 5x objective with 14mm working distance. It has an automated stage with trackball and software control, to allow scatter, line and area mapping as well as confocal depth profiling with step sizes of 100nm (X/Y) and 16nm (Z). A Linkum Scientific Instruments THMS600 heating/cooling stage is available which will work from -196°C to 600°C using a long working distance (8.2mm) 50x objective, which can also be used for liquid specimens. The inVia spectrometer is a high efficiency 250mm focal length spectrometer and all optics, gratings and filters, including the neutral density filter are motorized and under software control.

The Reflex configuration increases the spectrometer automation for improved ease of use. This includes auto switch and alignment of lasers, self-validation using an internal Si reference sample, Built-in wavelength and intensity calibration using neon and white light sources and simultaneous laser and white light sample illumination using an internal CMOS color video camera.



< Stream-line HR map of Si line at 520.5cm-1 across a MEMS TEM chip

Most of the light scattered from the specimen has the same frequency as the laser, however a tiny fraction experiences a frequency shift, which is characteristic of the chemical bonds or molecules present in the material. The Raman spectrum acquired using this instrument can give information on chemical composition, state, aggregation and even factors such as stress, orientation and temperature.

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Technical Specifications

- spatial resolution 1um
- Spectral Resolution 0.5-1.0cm^{-1} (dependent on grating and laser)
- Diode pumped solid state laser (532nm - green)
- HeNe laser (633nm - red)
- Linkum Scientific Instruments THMS600 heating/cooling stage (-196^{o}C to 600^{o}C)
- x5/1.4mm focal length, x20/1.15mm, x50/0.3mm, x100/0.22mm conventional objectives and x50/8.5mm long focal length objective for rough, uneven samples, liquids or the heating/cooling stages.