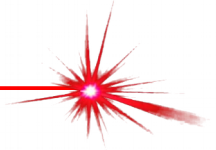


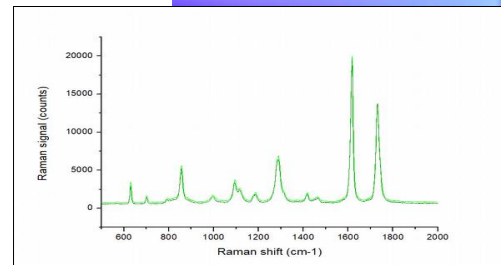
## HR Scanning MicroRaman



**Raman spectroscopy** is the study of the interaction of electromagnetic radiation with matter, and it relies on inelastic scattering (also known as Raman scattering), of a monochromatic light ranging from the UV into the NIR. The laser light interacts with molecular vibrations, photons or other excitations in the system, resulting in the energy of the laser photons being shifted up or down. The shift in energy gives information about the vibrational modes in the system.

Raman is one of the most widely applicable technique for material characterization. Basically, every compound has its own unique Raman spectrum, providing a virtual fingerprint for identification. The majority of compounds have vibrational frequencies between 500 and 1800  $\text{cm}^{-1}$  and, while simple bonds have very specific Raman shift, molecules made up of these bonds interact to produce spectra with unique fingerprints below  $\sim 1800 \text{ cm}^{-1}$  and up to  $3000 \text{ cm}^{-1}$ .

The Raman microscopy enables detailed molecular spectroscopy analysis and chemical identification within the interior of a sample. It enables non-contact analysis and provides richly detailed spectra with no sample preparation. Moreover, when complex samples should be analysed, the mapping capability allows the identification of different chemicals over the sample surface with very high resolution.



The APE Scanning MicroRaman system is easy to use and reliable for routine Raman microscopy applications, ideal for various academic, research, and industrial laboratory applications.

The typical applications are microscopic material characterization, pharmaceutical analysis, forensic identification, medical and academic research.

The APE Scanning MicroRaman system is designed for wide spectral range and high resolution. Raman systems is available with a choice of a 532 nm or 785 nm excitation laser. Depending on the nature of the sample, it is possible to choose 532 nm excitation for its high sensitivity, or 785 nm wavelength for Raman with minimal fluorescence interference.

The system is provided with an in-built optical set-up allowing the use in Raman reflection mode.

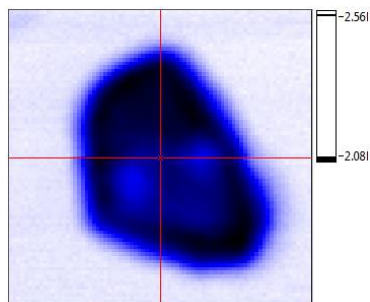
The motorized XY stage allows the acquisition of hyperspectral images with high spatial resolution; the silent stepper motors provide smooth sample movement with step size of as little as 100 nm.

The microscope can be equipped with an additional motorized Z axis to allow software-controlled laser focusing.

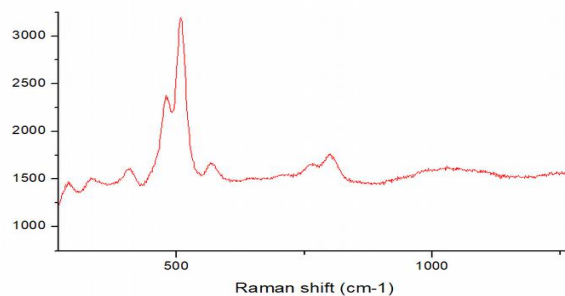


## Key features:

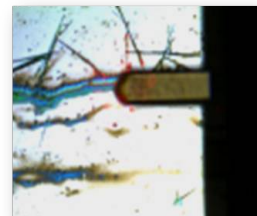
- High Versatility for a large number of applications and samples
- Ease of Use
- Wide Raman shift coverage
- Optimized optical access enables the capture of weak Raman signals even on challenging samples
- Direct optical coupling or optical fiber coupling
- Fiber optic interface for convenient sampling
- Fast and easy sample visualization and spectrum acquisition
- Powerful built-in software for simple and complete data acquisition and processing
- Customizable configurations on customer requests



Raman Mapping of quartz sand grain



Raman spectrum of quartz sand grain acquired at one of the blue spots of the map



### Microscope with built-in scanning stage:

- Infinite-corrected optical system with trinocular for direct and digital sample visualization.
- Integrated optical microscope includes:
  - Objective turret with a set of 3-5 objectives;
  - Color camera with direct coupling for sample monitor and documentation. Digital zoom and image capture capabilities.
- Compact, precise and silent motorized XY stage for high resolution Raman sample mapping

### Spectrometer:

- Large focal length for higher spectral resolution
- Raman range: 50  $\text{cm}^{-1}$  – 4000  $\text{cm}^{-1}$  for UV - Visible and NIR
- Spectral resolution: 0.3  $\text{cm}^{-1}$  – 3  $\text{cm}^{-1}$  (depending on wavelength)

### Lasers:

- 532 nm with >50 mW at laser port
- 785 nm with >300 mW at laser port
- Other wavelengths on demand

### Detector:

- Detector Type: back illuminated CCD (TEC cooled  $-80^{\circ}\text{C}$ )
- Pixel size : 20  $\mu\text{m}$  or less
- Enhanced sensitivity in the UV and NIR (200-1050 nm)
- Dual speed readout, 16 bit, 2MHz and 100 kHz

### Scanning stage:

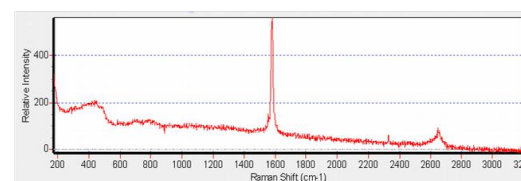
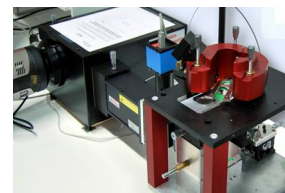
- Motorized optical scanning stage up to 100 nm step size
- Optional piezo stage with resolution below 10nm

### Software:

The included software provides many functions: it allows single point measurement, line scan, coarse and fine mapping of the sample, and more.

It offers a wide range of features designed to allow complex measurements and calculations to be done at the click of a button. It features multiple data formats and the capability to control scanning parameters such as integration time and laser output power. Include powerful built-in math engine for real time and post-acquisition analysis.

**Power Input:** 110 - 240VAC, 50 – 60Hz



Raman Spectrum of Graphene nanoribbons on silicon