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High performance Raman spectroscopy, wherever you need it



Virsa™ Raman analyser

A versatile, transportable system for research-grade analysis

The Virsa™ Raman analyser is a transportable Raman system with fibre-optic-coupled probes. It is suitable for both micro and macro Raman analyses. The Virsa system enables you to analyse samples in their native environment. You can measure large or immovable samples that you cannot place under a microscope, or those contained within vessels.

The Virsa Raman analyser provides laboratory-grade performance, high sensitivity, and excellent spectral and spatial resolution, making it ideal for studying challenging samples. It acts as a perfect bridge between research/ laboratory Raman measurements and in-field applications.



> **The high performance of the Virsa system enables you to collect Raman spectra from challenging samples, in their native environment, opening up a range of new applications.**

Powerful and flexible - excels at analysing even the most complex and challenging samples

Raman spectroscopy is a well-established technique for characterising materials. Most Raman systems are optimised for either making macroscopic (bulk) measurements on homogeneous samples, or microscopic measurements on smaller samples. Looking at complex larger objects with microscopic resolution and high sensitivity is a particular challenge.

The Virsa analyser supports both bulk and microscopic measurements. Using specially designed microscope-resolution fibre-optic probes you can see fine chemical detail and analyse heterogeneous samples that would be impossible to analyse with a bulk sampling probe. It supports multiple laser wavelengths so you can avoid fluorescence problems that might mask your Raman spectra, enabling you to analyse complex and challenging samples.

Multiple probes can be used with the Virsa analyser, such as those of different excitation wavelengths, bulk analysis, microscopic analysis and immersion probes. This gives you great flexibility, and allows you to use the Virsa Raman analyser to study a wide range of samples.

The Virsa Raman analyser is a a highly-stable high-performance system. It is equipped with Renishaw's own high-precision encoders giving you accurate, precise results and the utmost confidence in your data.



Using twin probes, mounted on an SB200 stage base, to perform a dual-wavelength study on a painting. The patented LiveTrack™ technology maintains focus over the rough painted surface so it is quick and easy to make measurements.

Unlock the potential of Raman spectroscopy

The Virsa Raman analyser has a high precision motorised grating that allows it to conduct extended scanning, enabling high spectral resolution measurements to be conducted over the whole spectral range. It is controlled and calibrated using Renishaw's market leading optical encoders and is ideal for measurements requiring large spectral ranges, such as photoluminescent samples or organic compounds.

The Virsa Raman analyser doesn't limit you by having a single fixed fibre-optic probe. It supports a whole range of different probes, and you can have multiple probes connected at the same time. For example, you can quickly switch from measurements with a liquid immersion probe to those with a high resolution microscope probe.

Renishaw probe features

- Each probe supports one wavelength, but multiple probes can be stacked, sharing a common objective lens. This enables you to study a broader range of samples with automated switching between excitation wavelengths to avoid background fluorescence. You can measure the same sample region without having to conduct any manual adjustments or alignment.
- The probes can be fitted with an objective turret so you can switch magnifications and working distances without having to move or swap probes.
- The probe can be equipped with a high-resolution video viewer that enables you to find and collect Raman data from specific regions of interest. This views the sample through the same objective lens that is used to gather the data for Raman analysis.
- The LiveTrack focus tracking option, used with the SB200 stage, keeps the probe in focus with the sample, both during Raman measurements and when viewing the sample.



Many additional probes can be used with the Virsa Raman analyser, such as immersion probes for analysing liquids, high-temperature high-pressure probes for monitoring reaction processes, and biological probes for analysing biological systems and, potentially, *in vivo* or clinical use.



LiveTrack technology

The Virsa Raman analyser is available with Renishaw's LiveTrack focus tracking technology which automatically keeps probes in focus, enabling you to analyse large, uneven, or moving samples.

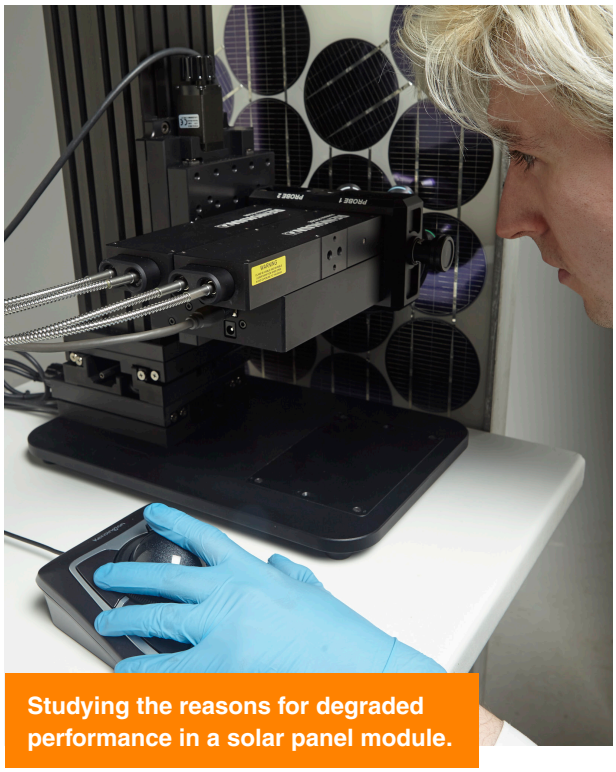


Analysis of coating coverage and uniformity on a turbine blade.

Precision analysis at your fingertips

The SB200 stage base is a computer-controlled high-precision three-axis stage for positioning the Raman probe relative to the sample. It allows you to position the point of analysis to micrometre precision and enables automated Raman mapping of samples, so you can analyse heterogeneous samples with ease.

For sampling flexibility, probes can be mounted horizontally or facing up or down. Optional LiveTrack focus tracking enables you to quickly and easily study samples with complex or uneven surfaces, for both spot measurements and Raman mapping.



Studying the reasons for degraded performance in a solar panel module.

Powerful WiRE™ software

Renishaw's Windows®-based Raman Environment (WiRE™) software controls the acquisition of Raman data and gives you comprehensive data processing and analysis options.

Improve efficiency by using the WiRE software to queue multiple measurements. It is easy to take a series of spectra where you change exposure time or laser power, use a different excitation wavelength, or make measurements at different positions on the sample.

Renishaw has developed its WiRE software over twenty years for its world-leading laboratory-based systems. This functionality is now available on the Virsa Raman analyser.

Monitoring reactions

The Monitor™ software module performs complex spectral analysis, giving simple readouts of concentrations and trends during processes and experiments. You can easily monitor changes and reactions in real time and pass them to third party applications.



Analysing contaminants on a photolithography plate.

Analyse diverse samples

The Virsa analyser can be applied to a diverse range of sample types and application areas.

Reactions and phase changes

The Virsa analyser is ideal for studying active experiments and processes. It has a wide range of probes for use with reaction chambers and heating/cooling stages. You can track phase changes and reactions in real time with the Monitor software module.

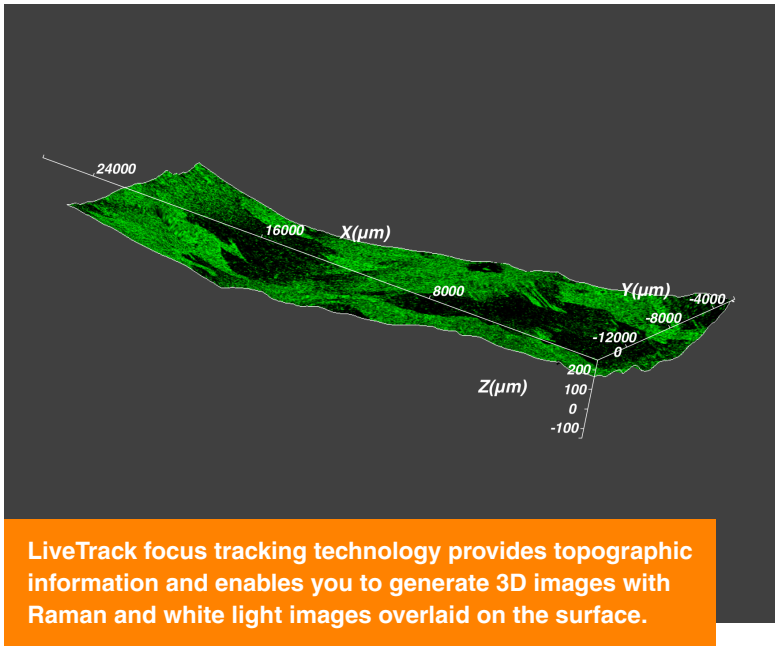
LiveTrack technology ensures the Virsa analyser's probe is at the optimum focus, even if the sample is swelling or contracting during phase changes. For example, you can measure the melting of a polymer very easily, without having to continually focus the probe by hand.



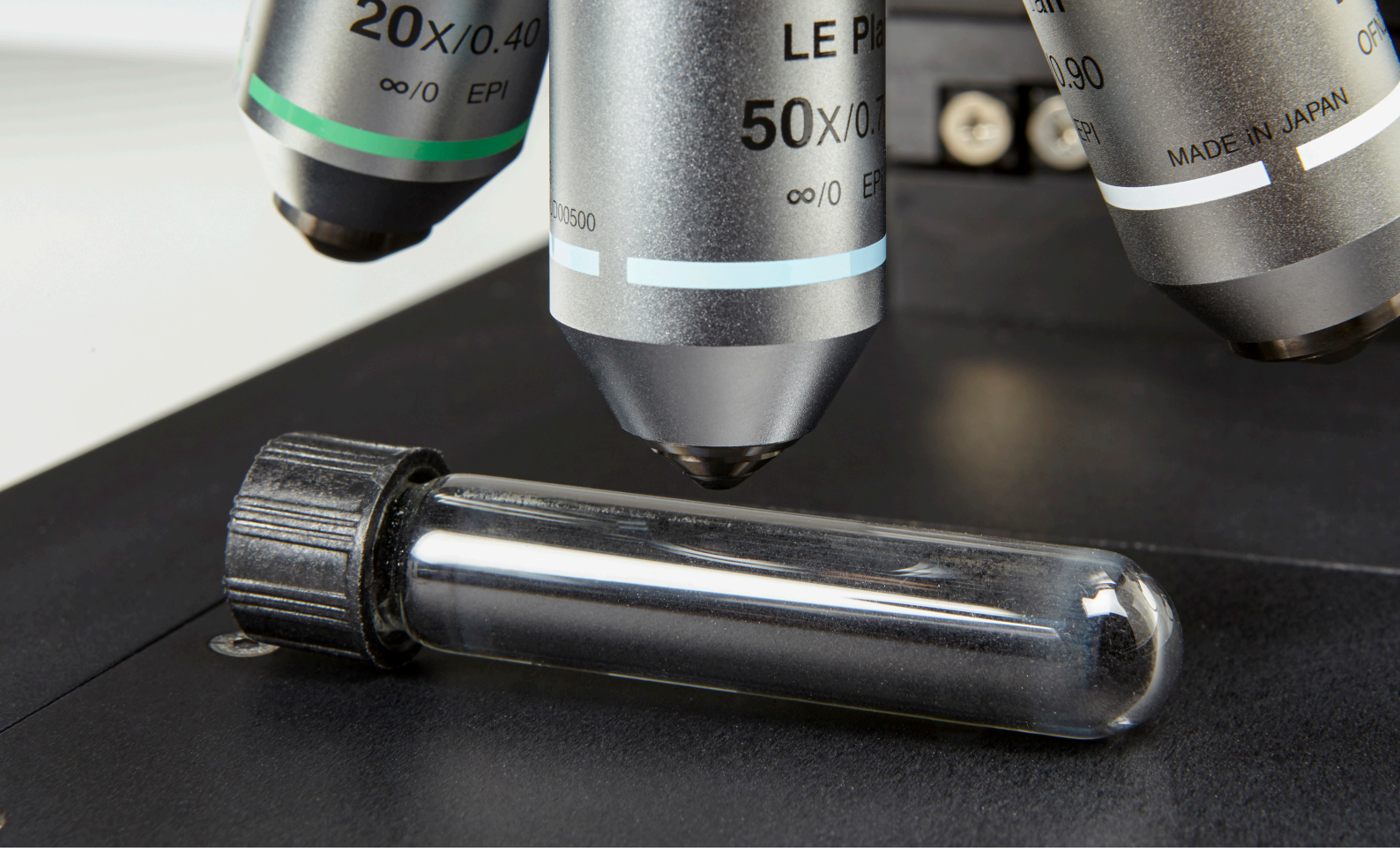
Production processes

Many advanced materials, such as graphene, are produced using roll-to-roll methods. In graphene's case, Raman spectroscopy is an ideal tool for analysis. However, it is challenging to monitor production because of the underlying copper foil substrate. Raman probes need high-numerical-aperture lenses to efficiently collect the weak signals but, to be efficient, they need to be accurately focused on the moving copper foil. This is difficult because the foil is not flat, and the environment is not vibration free.

The Virsa analyser overcomes these problems because its probes are highly efficient and can use high-numerical aperture lenses with Livetrack focus tracking, to maintain a perfect focus.



LiveTrack focus tracking technology provides topographic information and enables you to generate 3D images with Raman and white light images overlaid on the surface.



Technical highlights: Virsa analyser

Excitation wavelengths	532 nm, 660 nm and / or 785 nm
Laser power	50 mW (532 nm)
	50 mW (660 nm)
	120 mW (785 nm)
Spectral range (Raman)	50 cm^{-1} to 4000 cm^{-1} (532 nm)
	100 cm^{-1} to 4000 cm^{-1} (660 nm)
	50 cm^{-1} to 3200 cm^{-1} (785 nm)
Spectral resolution	< 2.5 cm^{-1}
Spectral dispersion	< 1.5 cm^{-1} / pixel (532 nm)
	< 2 cm^{-1} / pixel (660 nm)
	< 1 cm^{-1} / pixel (785 nm)
Dimensions	H 178 mm × W 436 mm × D 541 mm
Mass	15.3 kg single laser, 17.5 kg dual laser
Data collection speed	> 1500 spectra / s
Detector pixels	1024 × 256
Detector pixel size	26 µm × 26 µm
Detector operating temperature	-70 °C
Detector cooling	Thermo-electric
Dark noise	0.03 e^{-} $pixel^{-1}$ s^{-1}
Number of concurrent probes supported	4

When performance really matters, choose Renishaw

We launched our first Raman spectroscopy product in 1992, and have been continuously developing Raman instrumentation ever since. Decades of experience ensure that our products can be trusted to deliver the results you need.

Our Raman systems are built with parts manufactured in-house. These are put through extensive and rigorous testing to ensure they are highly stable and reliable.

To find out more about the Virsa analyser, please contact your local representative or visit **www.renishaw.com/virsa**

Technical highlights: Fibre-optic probe (VRP21C - 532 nm)

Spatial resolution, lateral	< 1 µm
Spatial resolution, axial	< 2 µm
Cable length	5 m
Dimensions (excluding objective lens)	H 57 mm × W 283 mm × D 32 mm

System

Power needed	110 V AC to 240 V AC, 50 Hz to 60 Hz, 160 W
Laser class	3B
Operating humidity	0% RH to 80% RH (non-condensing)
Operating temperature	5 °C to 40 °C
Standards	CE marked
Warranty	12 months standard; extended warranty and service packages available
Fibre-optic coupling	FC/PC
Connection to computer	USB 3.0
Computer operating system	Microsoft® Windows 10

Laser safety

Class 3B laser product - Standard system for operation with laser wavelengths from 405 nm to 830 nm



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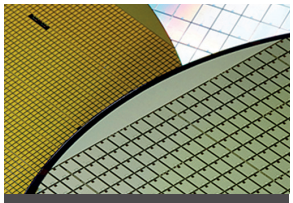
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