

# Analyse 2D materials with the inVia™ Qontor® confocal Raman microscope

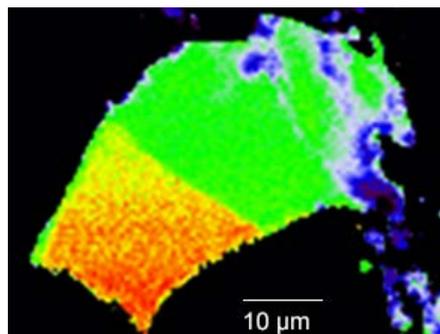
## Materials science

Raman spectroscopy is the ideal characterisation technique for investigating 2D materials

With so many unique properties, working with 2D materials can be challenging. Whether it is large regions, uneven samples, or small discrete flakes, Renishaw's inVia Qontor confocal Raman microscope gives you reliable results, quickly and easily.

The inVia Qontor is highly sensitive; its high spectral resolution and high spatial resolution make it ideal for analysing 2D materials.

- Analyse 2D materials on uneven, rough or curved substrates
- Distinguish 2D materials by identifying their distinct spectral features
- Easy identification of the number of layers
- Spot disorder and damage
- Detect and quantify strain
- Measure electrical properties, doping levels and thermal conductivity
- Image low wavenumber Raman bands



Raman image highlighting the variation in band position of the LWN band of MoS<sub>2</sub>. This band shifts downwards with decreasing MoS<sub>2</sub> layer number. Thick material is shown in red/yellow with increasingly thinner material shown in green and blue.

The ultimate system for the analysis of 2D materials

### Image low wavenumber (LWN) Raman bands

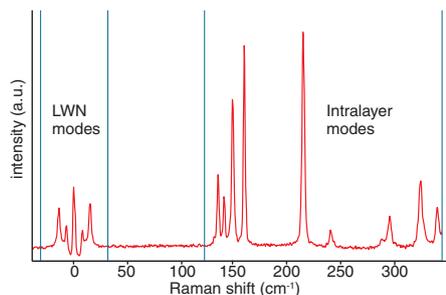
Eclipse, Renishaw's ultra-low frequency Raman filters, have high optical efficiency and make imaging low wavenumber Raman bands easy.

### Analyse at the nanometre-scale

Renishaw can integrate the inVia Qontor with a scanning probe microscope (such as an atomic force microscope). This adds inVia's chemical analysis capabilities to the high spatial resolution topography and property information acquired by SPMs/AFMs.

### Rapidly analyse large areas, without damage

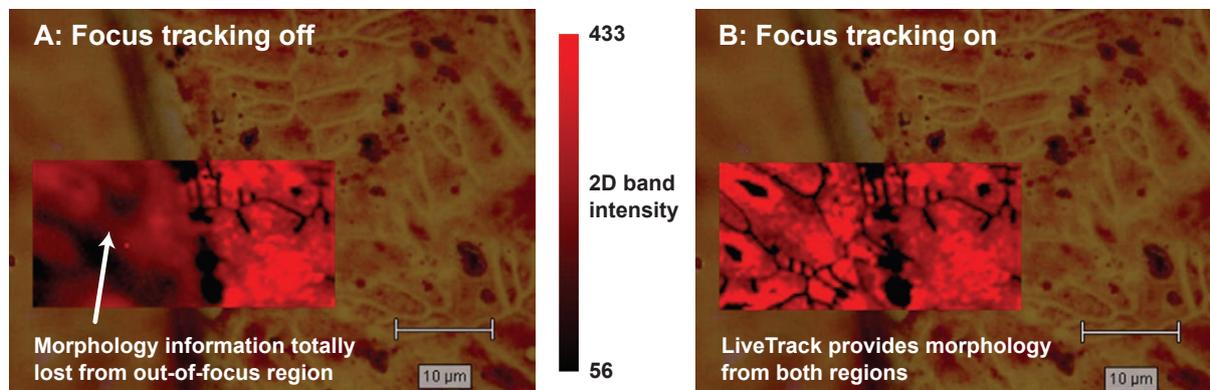
Whether you are interested in single point measurements or in mapping large areas, the inVia Qontor's high sensitivity and rapid mapping techniques—StreamLine™, StreamHR™, and Slalom™—make the analysis of large areas fast and easy. Its high optical efficiency allows the use of low laser powers, so you can analyse your 2D materials without damage.



Raman spectrum of 4 layers of rhenium disulphide (ReS<sub>2</sub>), illustrating intralayer and low wavenumber modes

### Analyse material on uneven, curved, or rough surfaces

Renishaw's LiveTrack™ focus-tracking technology, available on the inVia Qontor, makes it easy to study uneven samples, such as graphene on foil substrates. It maintains sample focus, even when mapping large areas that are not flat.



Raman images, over white light images, from a graphene on copper sample.

Image A does not use focus tracking and loses Raman data from half of the Raman image. Image B uses focus tracking and has data from the whole Raman image. The change in focus is caused by a 3 µm step at a copper grain boundary. Laser 532 nm, laser power 25 mW.

Renishaw is a world leader in industrial metrology. Our Raman systems are designed to maximise research capabilities, improve manufacturing efficiency and raise product quality.

#### inVia. The ideal Raman 2D material analysis tool

- Research grade Raman microscope
- LiveTrack for analysing uneven, rough or curved sample surfaces
- StreamLine imaging technology for high speed mapping
- StreamLine Slalom for a quick overview of the samples
- High confocality StreamHR imaging to scrutinise small details
- Flexibility to switch between high and standard confocal imaging
- Eclipse filters for imaging of low wavenumber Raman bands
- Queue up measurements to maximise data collection
- Custom solutions can be developed to meet your exact requirements



The Renishaw inVia Qontor confocal Raman microscope

## Renishaw. The Raman innovators

Renishaw manufactures a wide range of high performance optical spectroscopy products, including confocal Raman microscopes with high speed chemical imaging technology, compact process monitoring Raman spectrometers, structural and chemical analysers for scanning electron microscopes, solid state lasers for spectroscopy and state-of-the-art cooled CCD detectors, for both end-user and OEM applications.

Offering the highest levels of flexibility, sensitivity and reliability, across a diverse range of fields and applications, the instruments can be tailored to your needs, so you can tackle even the most challenging analytical problems with confidence.

A worldwide network of subsidiary companies and distributors provides exceptional service and support for its customers.

Please visit [www.renishaw.com/carbon](http://www.renishaw.com/carbon) for more information.