

Spectroscopy Innovations 16

Spectroscopy Innovations is a newsletter published by Renishaw plc.

It brings you the latest information about new Raman products, new applications, and forthcoming events.

PITTCON™ CONFERENCE & EXPO 2013 PHILADELPHIA MARCH 17-21



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Renishaw reveals new products at Pittcon 2013

This issue of Spectroscopy Innovations highlights exciting new products that Renishaw will be launching at Pittcon 2013.

We'll be demonstrating our new WiRE 4 software; this provides end-users with the ability to collect, analyse, and review massive Raman datasets in high resolution. In addition, we'll be introducing our new Eclipse filters, which make low wavenumber analysis fast and easy. Read inside to find out more!

inVia Raman microscope used in breakthrough research

A Renishaw inVia Raman microscope has been used in new research that addresses one of the major hindrances to the wider exploitation of graphene: the difficulty in growing large defect-free films.

An international team—led by Oxford University scientists Professor Nicole Grobert and Adrian Murdock—in collaboration with Renishaw plc and researchers from the Forschungszentrum Juelich (Germany) and University of Ioannina (Greece), used a Renishaw inVia Raman microscope to examine film thickness, strain and defects in graphene films.

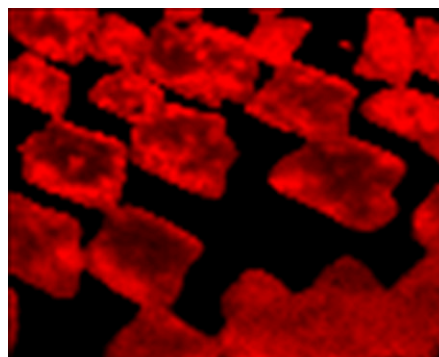
The work, titled 'Controlling the Orientation, Edge Geometry and Thickness of Chemical Vapour Deposition Graphene', was published in the journal ACS Nano (doi: 10.1021/nn3049297).

Collaboration team member Dr Tim Batten, Raman applications specialist at Renishaw, said: "The inVia Raman spectrometer is a very powerful tool for investigating the properties of graphene. This work gives a much better understanding of CVD graphene growth, which will be important for manufacturing graphene on an industrial scale."



Please contact me with details of any exciting work you are doing with your Renishaw Raman system, for publication in future newsletters.

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Raman map of the 2D graphene band width for a CVD graphene sample. This image illustrates the variation in the number of graphene layers over the sample region, with bright red regions consisting of thicker material than darker red regions.

Raman data: bigger, better, in high definition!

Detailed chemical images

Now, with Renishaw's new WiRE 4 software, you can produce high definition chemical images from very large Raman datasets.

Superior image quality

The technology behind WiRE 4 enables the production of images that are crisp and clear both on-screen and once printed.

No processing, no interpolation, no pixellation.

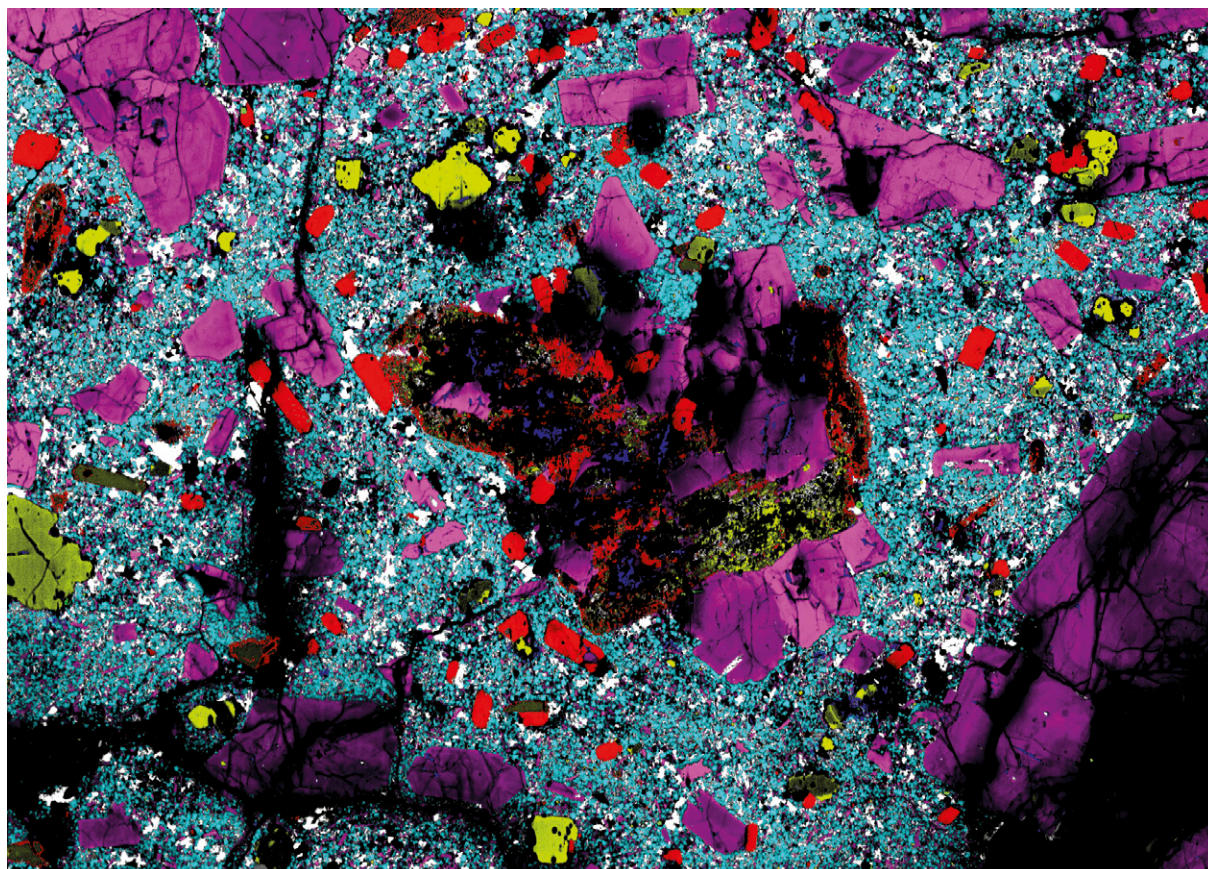
Increased accuracy and confidence

You can collect and work with larger Raman data files more efficiently than ever before, seeing greater detail and generating richer images for your reports and scientific papers.

The information gained with WiRE 4 provides you with a complete understanding of your sample because it enables domains to be both quantified and perfectly described at the same time. You will consistently gain more accurate and representative information from your sample, giving you a new level of confidence in your results.

Take quality and precision to a whole new level with WiRE 4

Whether you are an existing owner or user of an inVia Raman microscope, or would like to find out more, contact your local Renishaw representative for further information about the different options available today.



3 megapixel Raman image!

Raman image of a volcanic rock section from Mount St. Helens, showing different mineral constituents (3.8 mm × 2.7 mm, at 1.9 μm resolution, comprising 3 million spectra). Rock section courtesy of Dr Claire Horwell and David Damby, University of Durham, UK.

Eclipse filters for inVia

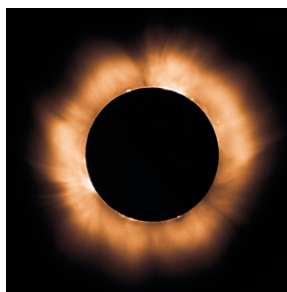
New low wavenumber performance

Study low wavenumber Raman features quickly and easily with Renishaw's Eclipse filters for the inVia Raman microscope; block the laser, not your Raman bands.

Most materials can be successfully analysed by studying the Raman bands in the 'fingerprint' region (200 cm^{-1} to 1800 cm^{-1}).

However Raman analysis at much lower Raman shifts (below 200 cm^{-1}) can reveal very valuable information for vibrations such as:

- shear modes
- lattice modes
- acoustic modes
- breathing modes
- folding modes
- rotational modes
- heavy atom vibrations

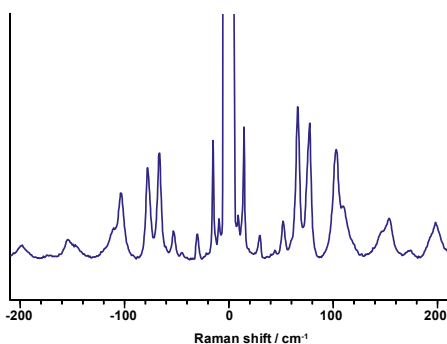


Solar eclipse.
Photograph courtesy of
Luc Viatour, www.Lucnix.be

Eclipse performance

Eclipse filters make low wavenumber Raman analysis easy:

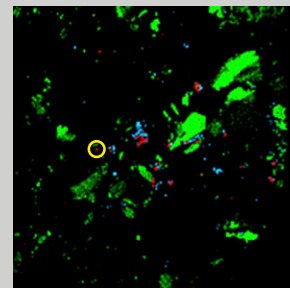
- performance down to 5 cm^{-1} (typical - excitation specific)
- high signal levels because of high transmission efficiency for Raman-scattered light
- low noise levels from strong blocking of the Rayleigh-scattered light
- suitable for photoluminescence measurements, in addition to Raman measurements (broad bandpass)
- study both Stokes and anti-Stokes scattering; notch, rather than edge filter technology
- longevity; robust glass-based filter technology
- trouble-free use, from highly stable Renishaw mechanical mounts
- easy switching between filters with Renishaw's encoded multi-filter motorised mount



Stokes/anti-Stokes Raman bands of L-cystine (a standard sample for testing low wavenumber performance), showing bands at both 9 cm^{-1} and 15 cm^{-1} .

Application tip

Revealing the invisible



Some materials are very difficult—or even impossible—to spot when viewed using conventional white-light microscopy. Graphene is a good example; it is transparent unless prepared on a special substrate.

Rather than struggling with the white light view, use StreamLine fast imaging to quickly survey a large area, at low spatial resolution, to locate areas of interest. Use the Slalom option to ensure 100% coverage, so that you don't miss anything.

The features visible on the generated Raman image can then be used to configure additional measurements—at higher resolution—using either StreamLine or StreamLineHR.

Contact your local Renishaw representative for further information about Renishaw's fast imaging options.

Contact Renishaw for more information about how Eclipse—and other Renishaw filters—can help you analyse your samples.

Inside Raman UK seminar 2012



Last September, we continued our successful series of Inside Raman seminars. Scientists from a diverse range of disciplines gathered near Oxford to enjoy two full days of talks, demonstrations, and data clinics, with excellent networking opportunities

Prominent scientists presented their Raman research, covering diverse topics including: microbiochemical analysis of carious dentine; lymph node diagnostics; chemometric analysis; graphene; Raman-AFM/TERS.

Day 1 closed with a drinks reception to celebrate 20 years of Renishaw Raman. Our host Prof. Tony Parker from the STFC, Rutherford Appleton Laboratory, said, "This year sees my 25th year at RAL, doing Raman research, so hosting Renishaw's conference—that brings together the Raman community to discuss the latest results, learn from workshops and celebrate their 20 years of delivering front-end instrumentation—has been fantastic."

If you are interested in learning about, or extending your understanding of, Raman spectroscopy, join us at the next Inside Raman, which will be held in 2014.

Raman Revealed training workshops

Launched in December 2012, Renishaw's first Raman Revealed workshop provided two days of hands-on training for 17 inVia users. This course was so popular, we are now making it a twice-yearly event that runs over three days.

Held at our New Mills site, in Gloucestershire, UK, Raman Revealed offers a fantastic training opportunity to anyone looking to better apply the capabilities of the inVia and WiRE to their research/analytical work. So if you are a new or intermediate user of an inVia, and would like to increase your understanding of the right techniques, tools, experimental process and lasers to use for your analysis, register for the 2013 workshop today at

www.renishaw.com/rr2013

Exhibitions and conferences

Every year Renishaw attends a range of 'premier' events worldwide. Please come and talk to your local Renishaw representative at one of the following events.

Americas		
Pittcon 2013	Philadelphia, PA	17 to 21 Mar 2013
MRS Spring 2013	San Francisco, CA	01 to 05 Apr 2013
M&M 2013	Indianapolis, IN	04 to 08 Aug 2013
SciX 2013	Milwaukee, WI	29 Sep to 04 Oct 2013
ISTFA 2013	San Jose, CA	03 to 07 Nov 2013
MRS Fall 2013	Boston, MA	01 to 06 Dec 2013
Asia Pacific		
ICAVS 7	Kobe, Japan	25 to 30 Aug 2013
Jasis 2013	Chiba, Japan	04 to 06 Sep 2013
Europe		
11 th Analitika	Moscow, Russia	16 to 19 Apr 2013
ImagineNano	Bilbao, Spain	23 to 26 Apr 2013
Raman Revealed	Gloucestershire, UK	14 to 16 May 2013
Forum LABO & BIOTECH	Paris, France	04 to 07 Jun 2013
ECSBM 15	Oxford, UK	25 to 30 Aug 2013
RAA 2013	Ljubljana, Slovenia	02 to 06 Sep 2013
DMG Tagung	Tübingen, Germany	16 to 19 Sep 2013
Raman Revealed	Gloucestershire, UK	01 to 03 Oct 2013
XXIV ICORS	Jena, Germany	10 to 15 Aug 2014

For details of all forthcoming conferences and exhibitions, please visit www.renishaw.com/ramanevents



Hands-on training at Raman Revealed UK 2012.