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Product note from the Spectroscopy Products Division

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Renishaw Raman-AFM/TERS solutions

Powerful combination

Combined Raman/AFM (atomic force microscope) systems are excellent for characterising the properties of materials at sub-micrometre, and potentially nanometre, scales.

Renishaw's inVia Raman microscope is the perfect partner for a wide range of AFMs, and other scanning probe microscopes (SPMs), as it offers users efficient, flexible, reliable, high performance operation.

Renishaw's combined Raman/AFM systems consist of:

- an inVia Raman microscope
- an AFM/SPM
- direct optical coupling between the inVia and the AFM/SPM

Extreme flexibility

Increase your options with a combined inVia-AFM system.

inVia Raman systems can be coupled to AFMs on upright and inverted microscopes, and to free standing AFMs (using an objective-lens-equipped transfer tube). This ensures compatibility with the widest range of AFMs, giving you the largest choice of possible AFM systems; you choose the best AFM for your needs.

Coupling to an AFM does not restrict any of the intrinsic capabilities of the inVia Raman microscope; you can still benefit from inVia's extensive standalone functionality, such as excitation wavelength, spectral resolution, and ultra-fast StreamLine chemical imaging.

Renishaw's flexible method of combining inVia to AFMs means you can still use both instruments independently, without any compromise in performance.

Proven TERS solutions

Tip-enhanced Raman scattering (TERS) provides chemical imaging at the nanometre scale, enabling you to take your research to a whole new level. Renishaw has been offering a range of TERS-ready solutions for over ten years, allowing TERS data to be collected from a wide variety of sample types.

Maximum efficiency

With inVia-AFM systems, save time and get your data rapidly.

inVia-AFM systems are so convenient you can get both AFM and Raman measurements without moving the sample from instrument to instrument, thereby saving operator time.

For maximum efficiency, Renishaw's direct coupling methods use mirrors, rather than fibre optics. This ensures high quality data can be acquired in the minimum time.

Simple to operate

Combined Raman-AFM systems have traditionally been challenging to use; inVia changes this.

Whether using an upright microscope, inverted microscope, or free standing configuration, alignment is simple because you can clearly see the AFM tip and the Raman laser spot.

inVia + Bruker Nano Surfaces Innova

inVia + NT-MDT Ntegra

inVia + Bruker Nano Surfaces Bioscope Catalyst

inVia + Nanonics MV2000

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Confidence in your results

Raman-AFM is all about stability; coupling with inVia guarantees good results.

Renishaw was the first Raman supplier to realise the power of combining Raman spectroscopy and AFM/SPM, supplying its first combined Raman/AFM system in 1999 to Chalmers University of Technology, Sweden. These pioneering instruments led to the award of the prestigious Photonics Circle of Excellence in 2002.

Supported AFMs and SPMs

Renishaw's inVia Raman microscope can be combined with AFMs and SPMs from all the major vendors, including Bruker Nano Surfaces, Nanonics, NT-MDT, and many others.

Please contact us for an up-to-date listing of the models that can be coupled with inVia, or if you have a preference for a particular model of AFM/SPM.

"Direct optical coupling of NTEGRA with inVia system provides reliability and stability for the challenging research with TERS. This, combined with the relative ease of use of the inVia system and the expertise of Renishaw, promotes our confidence in performing these experiments".

Prof Sergei Kazarian, Imperial College London, UK.

Simple upgrade paths

If you have an existing AFM we can help you to determine the most appropriate way to add inVia's powerful chemical imaging capabilities to your system.

"flawless"

Dr Harold Chong, University of Southampton's Nano Research Group, describing the integration between inVia Raman microscope and Nanonics MV4000 multiprobe AFM and CryoView CV2000

Operating modes

Combined inVia AFM systems offer not only AFM with far-field Raman, but also AFM with tip-enhanced Raman scattering (TERS).

AFM with far-field Raman	Offers users high spatial resolution scanning probe data, combined with far-field resolution Raman data. Raman data can be recorded and correlated with high spatial resolution topographic, electrical, thermal and near-field optical data.
AFM with TERS	Offers users high spatial resolution data for both scanning probe and Raman.

Application areas

inVia-AFM systems are used in a broad range of application areas, including:

- Life sciences
- Semiconductors
- Polymers
- Composite materials
- Data storage
- Pharmaceuticals
- Novel materials for electronics, display and solar technology
- Quantum dots and nanowires
- Carbon nanotubes and graphene

Safety

inVia-AFM systems are typically Class 3B laser systems and, for combined operation, require appropriate operating environments.

We would like to thank prof. Stefan Jurga, The NanoBioMedical Center, Adam Mickiewicz University, Poznan, Poland, for permission to use the image of the inVia + Bruker Nano Surfaces Bioscope Catalyst.