

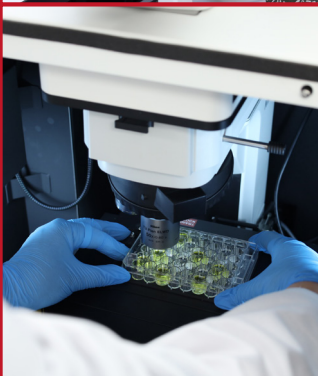


EDINBURGH
INSTRUMENTS

RMS1000

Multimodal Confocal Microscope

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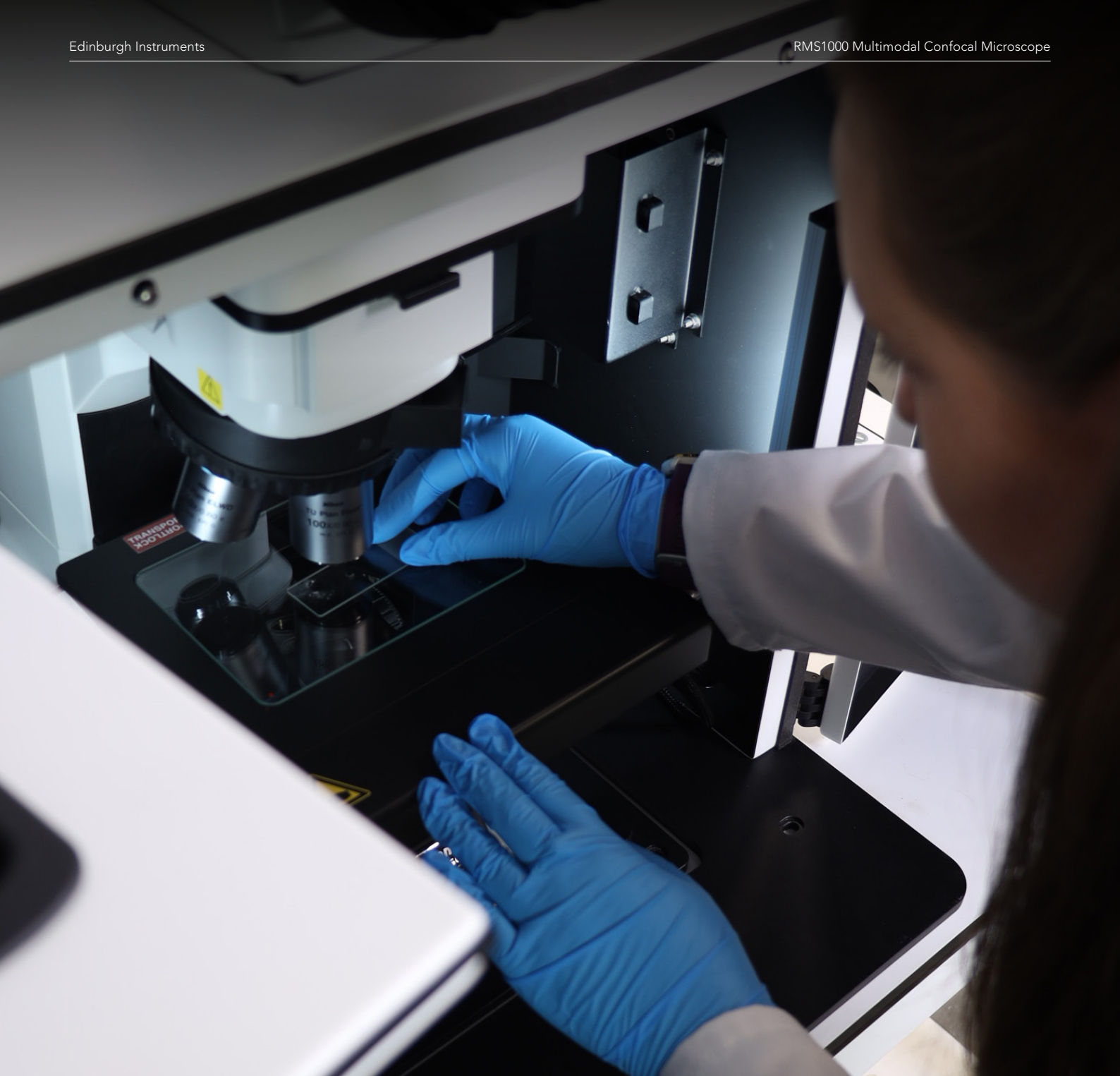
RMS1000 Multimodal Confocal Microscope

More than just a Raman system, the RMS1000 is a premium research tool built for versatility. It brings advanced techniques like RaFLIM® (Raman and Fluorescence Lifetime Imaging), SHG, and other multimodal capabilities together in one platform. All functions are controlled with a single, intuitive software package, allowing you to achieve precise and comprehensive analysis without complexity.

Across multiple scientific disciplines, the RMS1000 is a modern open architecture, research-grade instrument designed to evolve with your research.

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Key Features



Raman and Beyond

A complete multimodal imaging solution with techniques beyond Raman, such as FLIM and SHG.



5 Internal Lasers

Up to 5 integrated lasers (405 nm – 1064 nm) for seamless flexibility and wavelength switching.



Dedicated External Laser Pathways

Direct coupling and integration of larger footprint lasers, including UV and pulsed options.



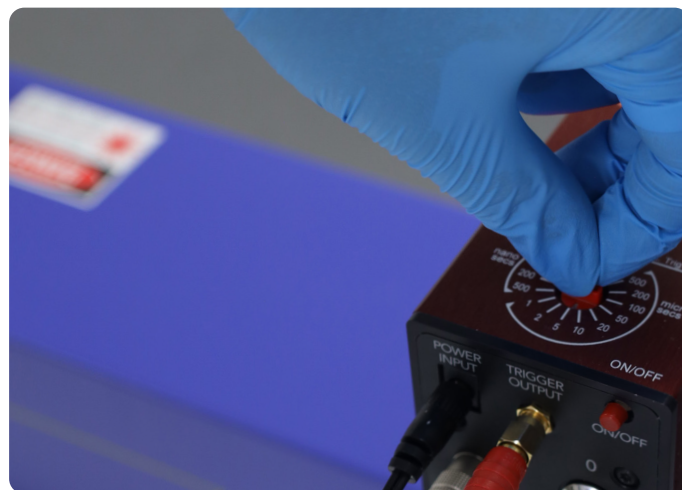
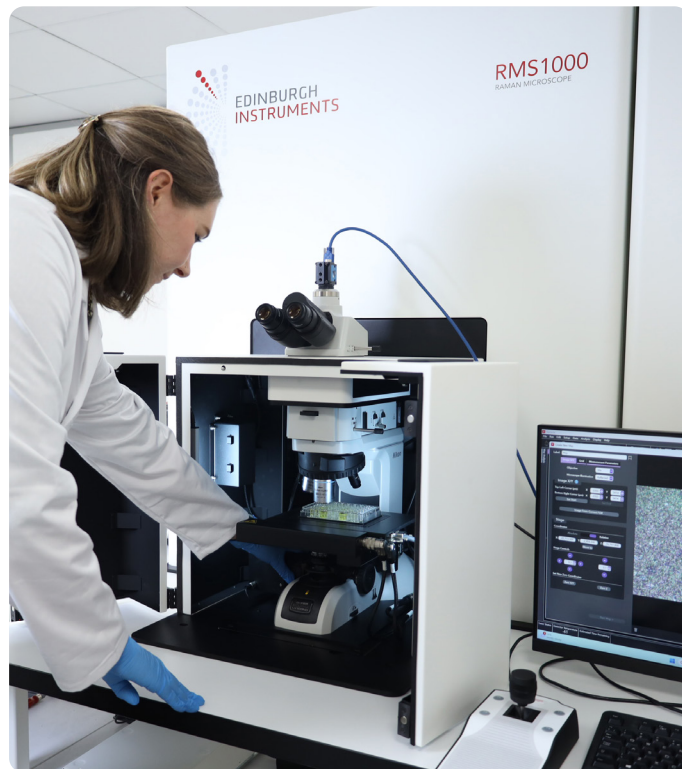
Dual Spectrograph

2 spectrograph options for the ultimate balance of throughput and spectral resolution.



Multi-detectors

Up to 4 detectors including CCDs, EMCCDs, InGaAs, and PMTs for all techniques and applications.



“The optomechanical design of the RMS1000 is open and intuitive, enabling us to easily adjust and customise it to meet our different research groups’ needs efficiently”



Truly Confocal

Industry-leading pinhole flexibility for ultimate application optimisations and image definition.



Ramacle®

Powerhouse software designed to operate the instrument no matter what the technique.



Flexibility in Microscopy

Tailored to You: Upright, inverted, and wafer microscope integration.



Future Proof

Designed to grow, upgrade, and evolve with your research needs.

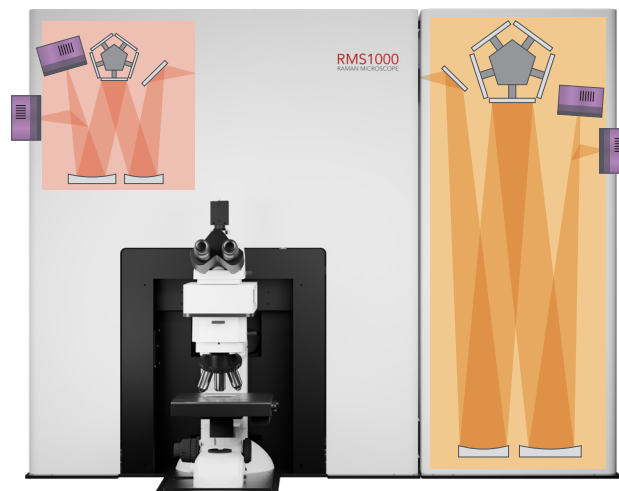


Your Research. Our Technology.

We build custom solutions designed to evolve with your work. The RMS1000 can go beyond Raman with multimodal add-ons, customisable lasers and dual microscope integration options available at the time of purchase or later as your research progresses.

Raman and Beyond: Multimodal Confocal Spectroscopy

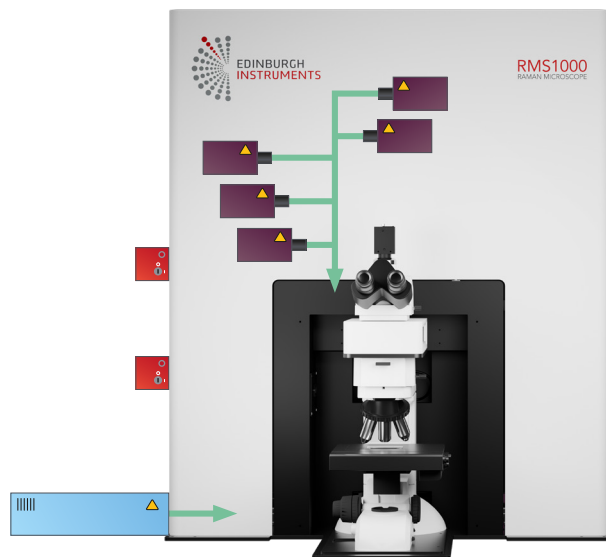
- + Integrated techniques-Raman, PL, FLIM, PLIM, SHG, and 2PEF-are delivered within a single hardware system and controlled through a unified software platform.
- + Perform comprehensive characterisation by correlating Raman analysis with advanced imaging techniques.



High-Throughput to High-Resolution: The Spectrograph Advantage

- + Market-leading free-space coupled spectrographs, fully computer-controlled and configurable to your research.
- + Standard Spectrograph: Compact, high-throughput, ideal for most applications.
- + Long Focal Length Spectrograph: Exceptional resolution and stray light rejection, perfect for UV work.

- Standard spectrograph
- Cameras, array detectors, other detectors
- Long focal length spectrograph



Laser Integration:

A Seamless Path to Any Wavelength

- + Up to five internal and multiple external lasers to achieve unparalleled wavelength range and maximum application coverage.
- + Full system automation with software control over all laser and hardware settings, eliminating the need for manual adjustments.

- Integrated Raman lasers
- Pulsed lasers
- External lasers

Flexibility in Microscopy:

Total Sample Versatility

- + Adaptable configuration options support upright, inverted, and wafer microscopes, ensuring maximum compatibility across all materials and life science research.
- + Supports the addition of accessories such as environmental stages, incubators, and in-situ electrochemical cells.





Ramacle® Software: Your RMS1000 Command Centre

Step into a seamlessly integrated Raman experience with Ramacle software. This comprehensive package acts as your central command hub, providing intuitive control over every instrument function while effortlessly managing your valuable data.

From experiment setup to final analysis, Ramacle streamlines your workflow, allowing you to focus on discovery.

+ Intuitive Control

Take command of all RMS1000 functions with a streamlined, intuitive interface.

+ Publication-Ready Data

Generate publication-quality data effortlessly with a user-friendly interface and optimised output.

+ Live Monitoring & Optimisation

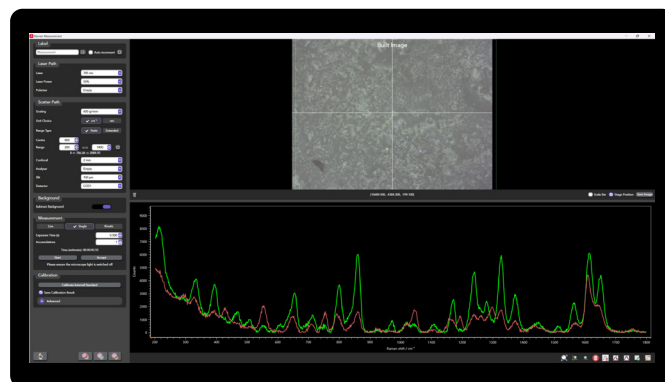
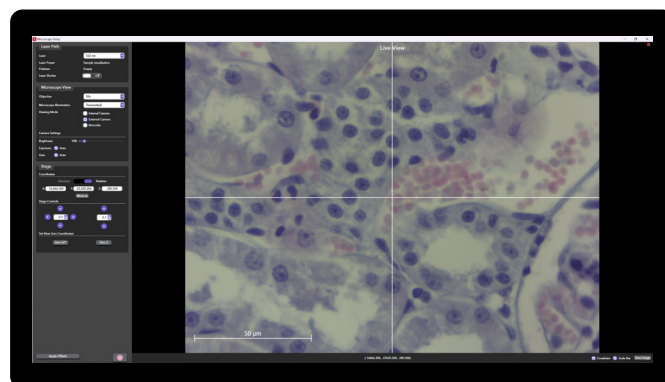
Observe and refine your experiments in real-time. Visualise your sample and adjust parameters live for ultimate control.

+ Maintain Complete Data Integrity

Capture comprehensive measurement and instrument details for every dataset.

+ Effortlessly Integrate Data

Streamline analysis in Ramacle and across platforms with straightforward import/export.





Standard with Ramacle:

Powerful Tools at Your Fingertips

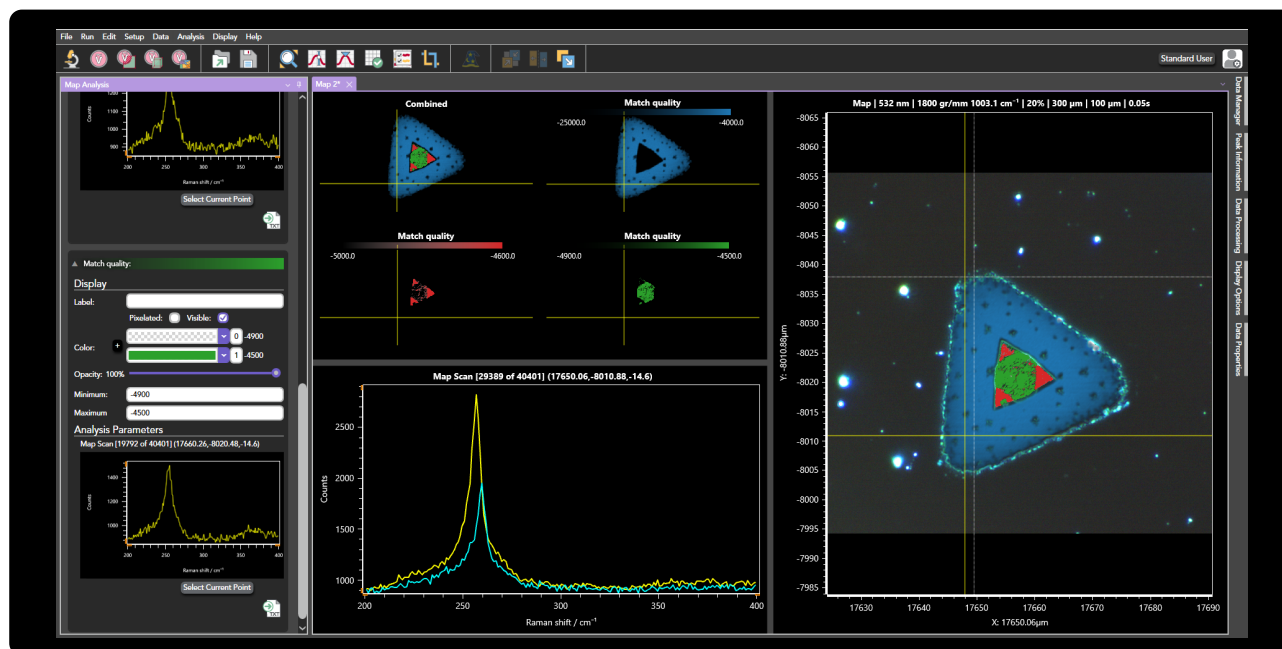
- + Flexible laser and scatter pathway selection for optimised experiments.
- + Real-time sample and laser visualisation.
- + Multiple acquisition modes: Single, accumulate, kinetic.
- + Self-calibrating for reliable data.
- + Streamlined analysis with integrated data processing.
- + Standard SCII/CSV: effortless cross-platform data sharing.
- + Mapping Suite: 1D, 2D, 3D, FastMAP, SurfMAP, and MultiMAP.



Expand Your Capabilities:

Optional Software Upgrades

- + Advanced Mapping Suite: RaFLIM, ParticleMAP, WaferMAP.
- + Fluorescence lifetime analysis.
- + Polariser and analyser section and control, including option for 360° control.
- + Integrated temperature control for in-situ analysis.
- + Rapid spectral ID with KnowItAll® library.
- + Multiwell plate ready for high-throughput screening.
- + Custom automation & advanced analysis via Python.



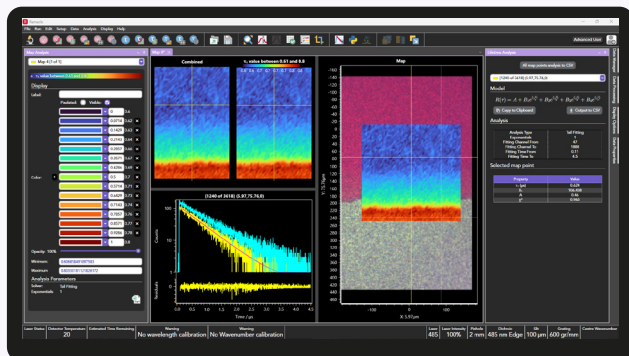
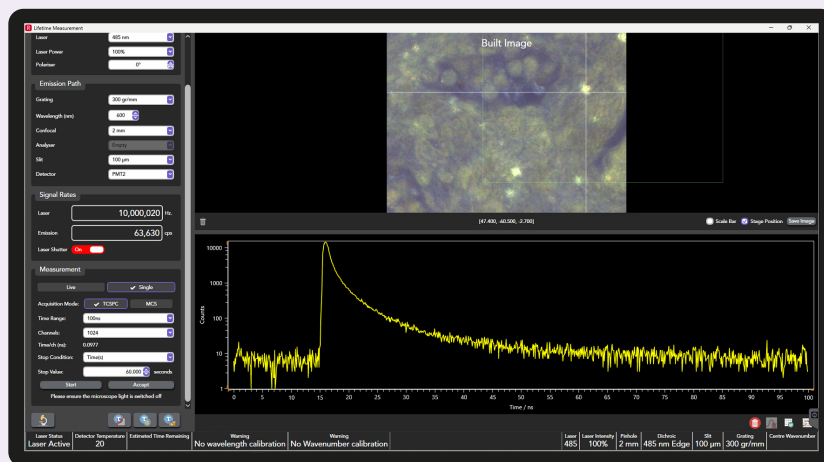


Ramacle® Software

Raman and Beyond: Fluorescence In Action

RaFLIM, Raman and Fluorescence in One

- + We built on our expertise in fluorescence lifetime instrumentation to seamlessly integrate FLIM and PLIM into the Ramacle software.
- + Perform complete sample characterisation using a single, intuitive platform.

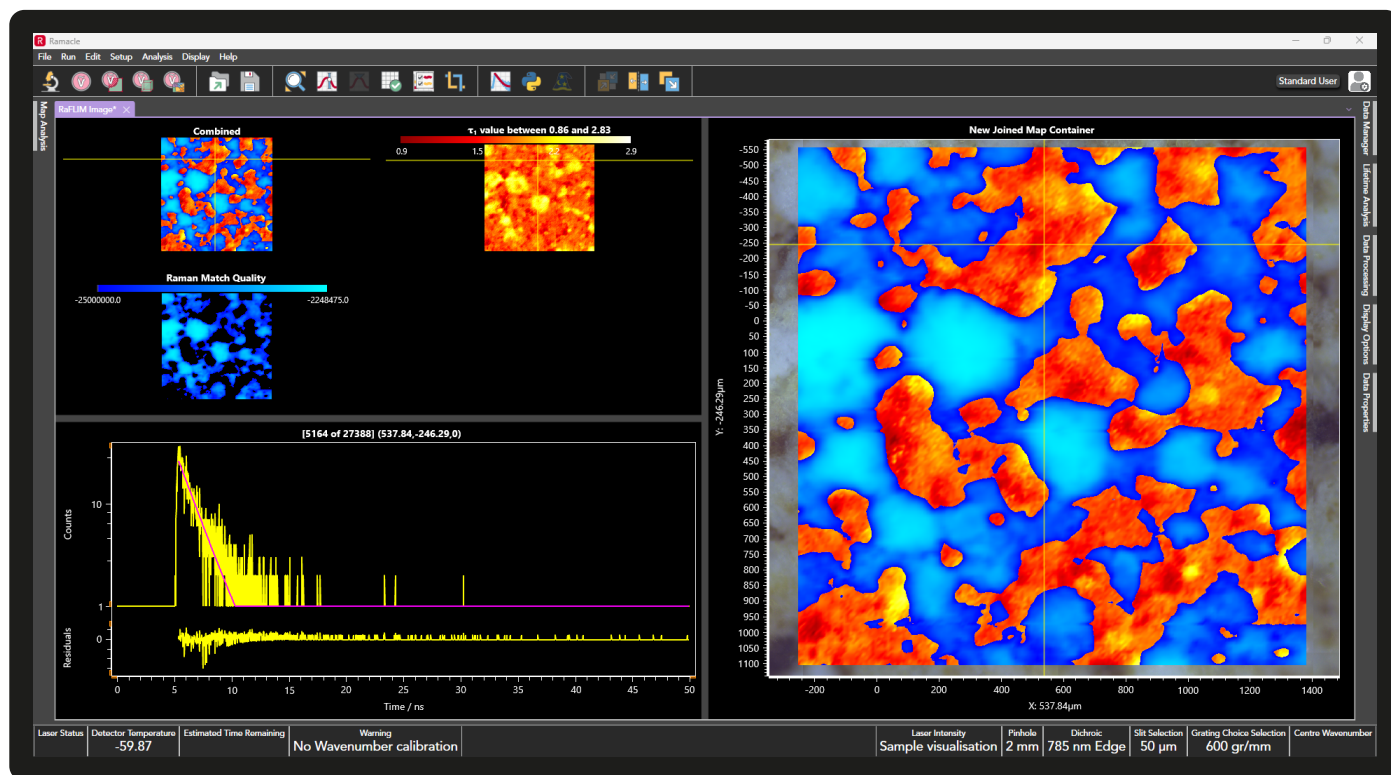
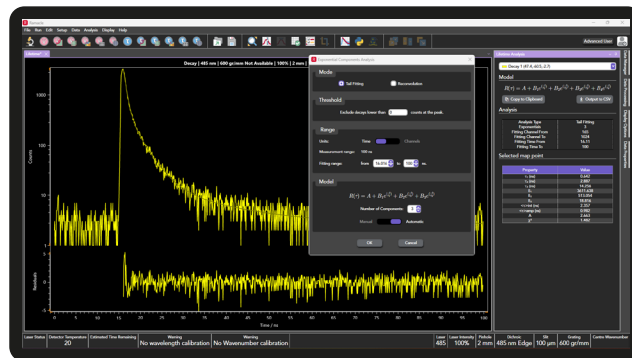


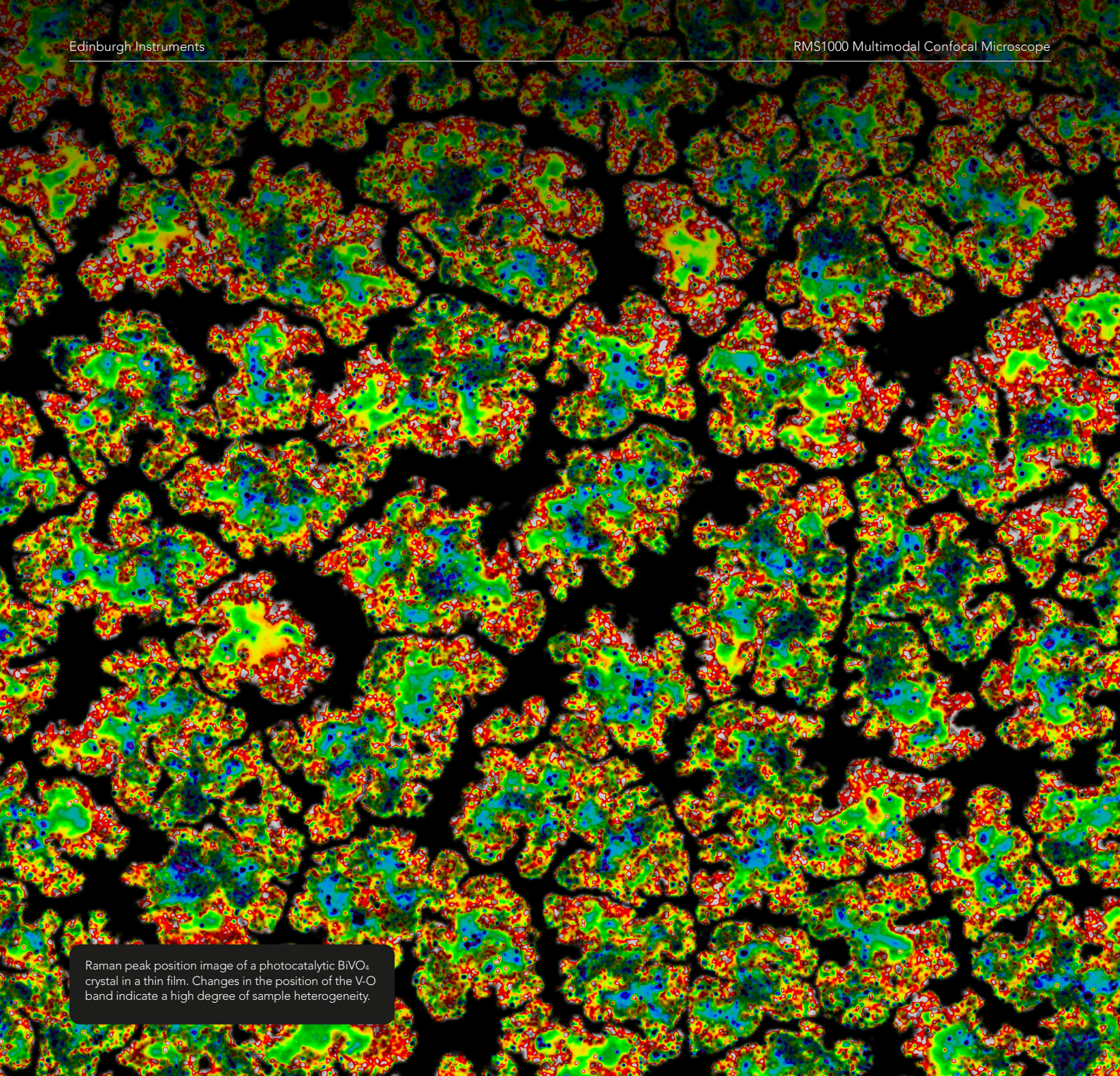
Lifetime Integration

- + Ramacle provides powerful tools for both data acquisition and analysis.
- + Optimised time-correlated single photon counting (TCSPC) and Multichannel Scaling (MCS) modes for fluorescence and phosphorescence lifetime acquisition.
- + The software includes average lifetime and lifetime fitting analysis, enabling you to extract valuable quantitative data from your measurements.
- + You can overlay spectral and lifetime maps for a cohesive display of fully correlated data.

Automated Workflows

- Ramacle streamlines your experiments with automated functions.
- This automation allows you to easily switch from spectral mode to lifetime mode while retaining all mapping coordinates and step sizes, ensuring a smooth and uninterrupted workflow.
- Comprehensive imaging package for truly correlative 1D, 2D, 3D, and surface RaFLIM maps.



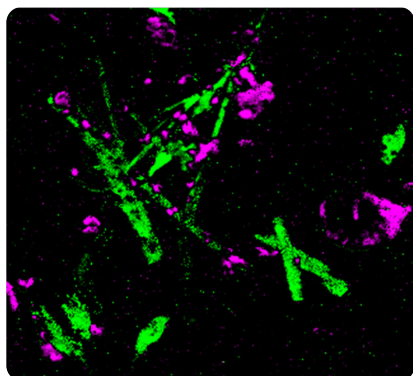


Raman peak position image of a photocatalytic BiVO₄ crystal in a thin film. Changes in the position of the V-O band indicate a high degree of sample heterogeneity.

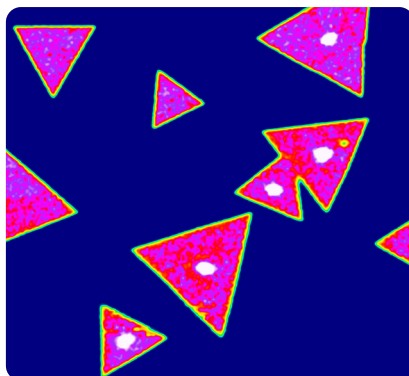


Raman Mapping

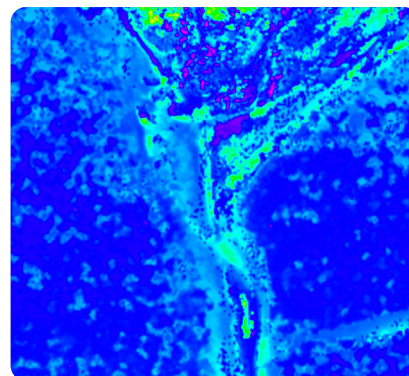
Confocal imaging in 2D, 3D, and surface to map component distribution, defects, interfaces.



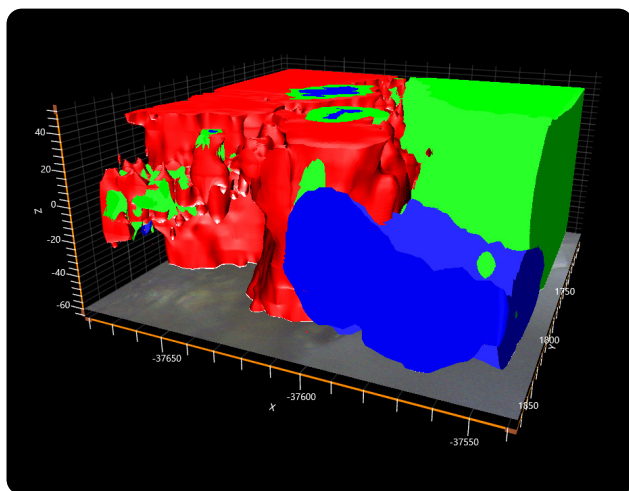
PCA Raman imaging of a pharmaceutical crystalline mixture for polymorphic discrimination



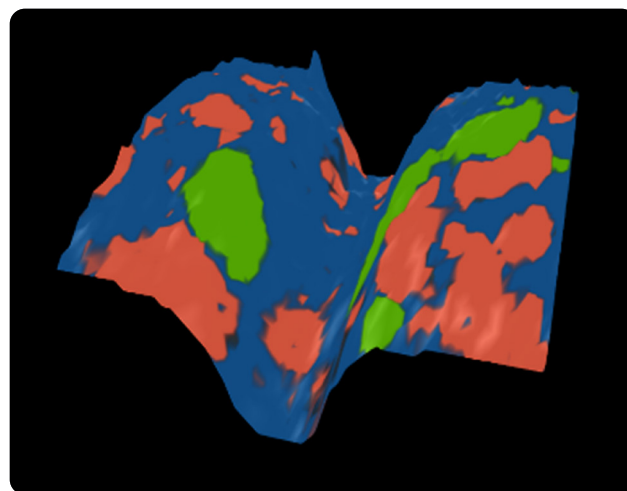
2D layer number imaging of MoS₂ crystals crucial for controlling its electronic and optical properties



Imaging of the phonon peak width in a silicon wafer indicates variations in crystal size



3D Raman image of a geological sample showing feldspar (blue), quartz (green), and anatase (red)

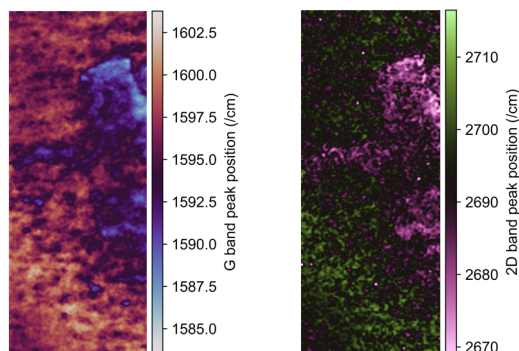


Raman SurfMAP for distribution analysis of API's in a pharmaceutical tablet

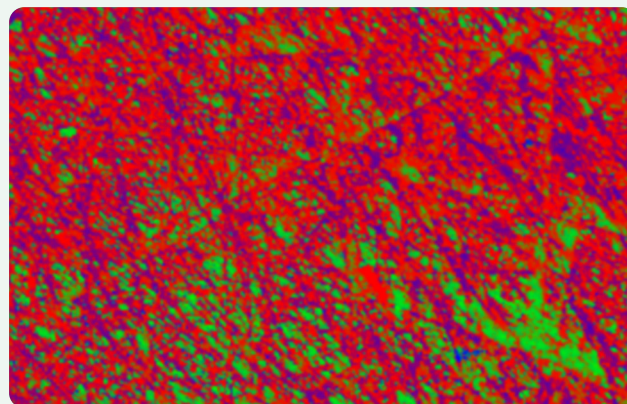


Raman Mapping

Broad applications, real impact: From semiconductors and 2D materials to pharmaceuticals, forensics, life sciences, and geology, Raman microscopy delivers chemical insight wherever molecular detail matters.

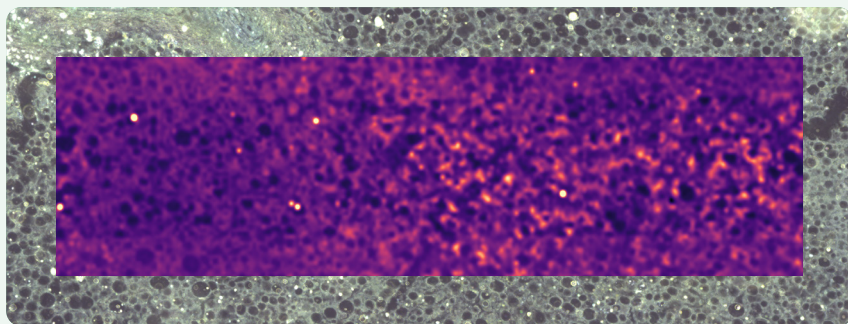


Peak position imaging of the G (left) and 2D (right) bands in strained monolayer graphene. The decrease in the peak position of both bands indicates tensile strain in the material

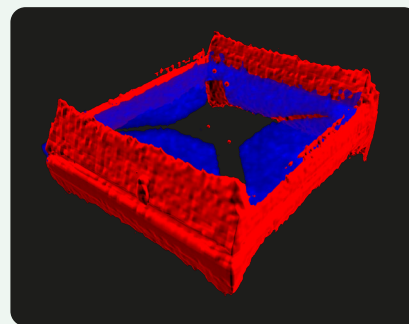


Non-negative least squares image of anatase (red), rGO (blue), and rutile (green) on a TiO_2/rGO -based lithium-metal battery electrode

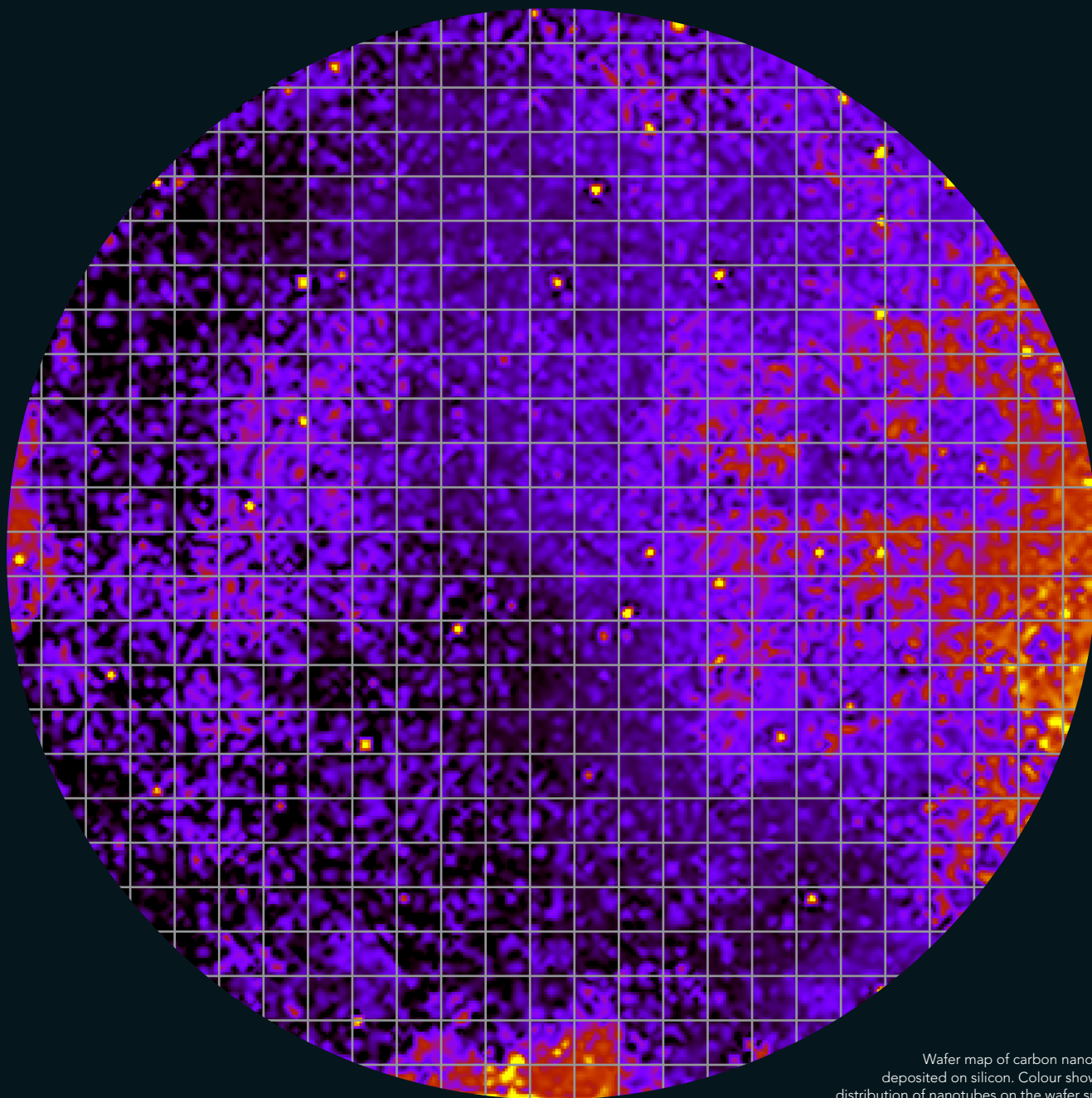
Flexible Raman laser selection ensures complete sample coverage.



Raman bio-imaging of liver cells, reveals the spatial distribution and relative concentrations of key cellular components, such as lipids, proteins, nucleic acids, and carbohydrates



3D confocal Raman image of a NIR GaAlAs LED chip showing the n-epitaxial layer (blue) and active/p-layers (red)

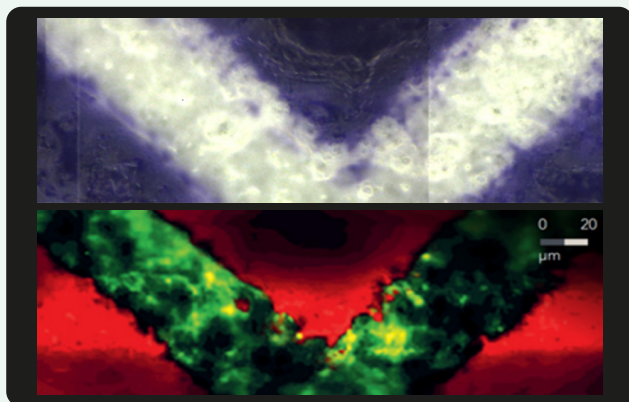


Wafer map of carbon nanotubes deposited on silicon. Colour shows the distribution of nanotubes on the wafer surface

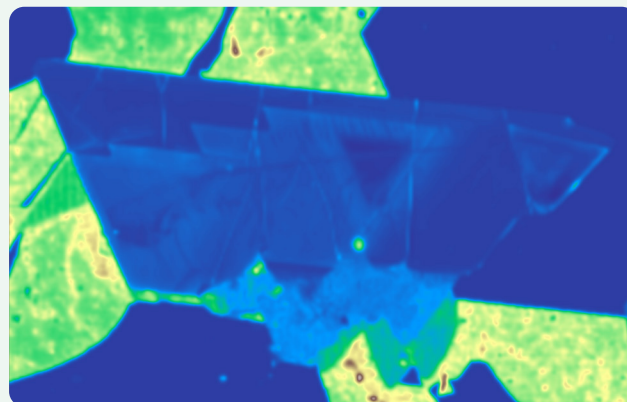


Raman and Beyond

Photoluminescence for band-gap, defect, impurity states, emission spectra.
Useful in semiconductors, 2D materials, nanostructures.

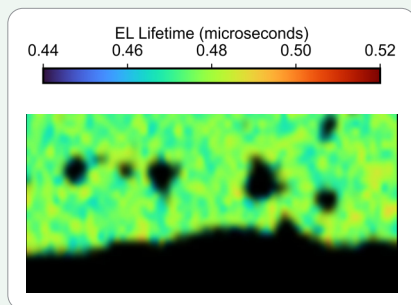
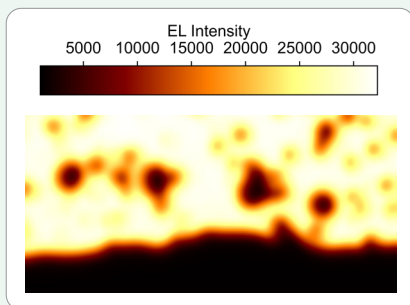


PL mapping to identify two inks in a bank note, used to develop new security and identify simpler inks used by counterfeiters

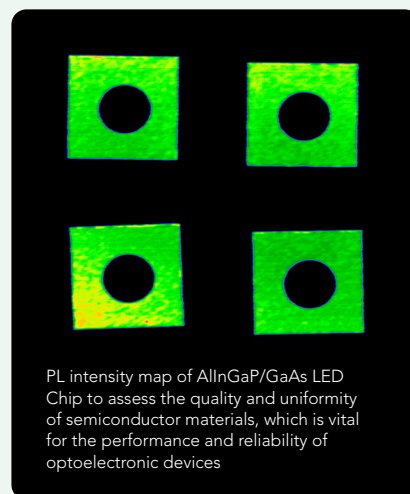


Multivariate PL image of WS₂ showing layer number: monolayer (green/yellow), defect states (brown), and strained regions (light blue)

Electroluminescence directly probes how devices like LEDs, OLEDs, solar cells, photodetectors are performing under real operating conditions.

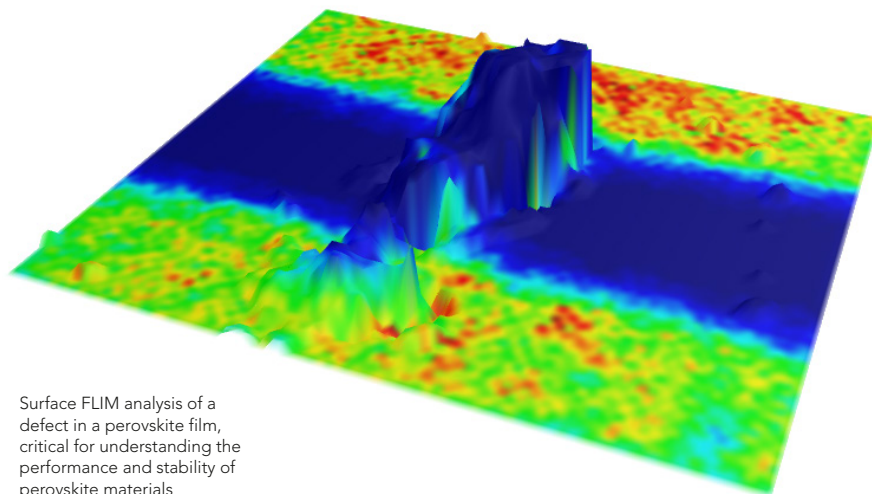
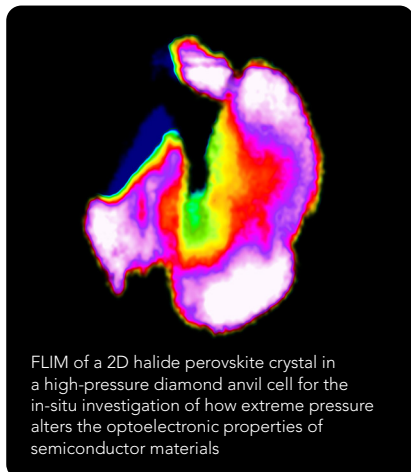
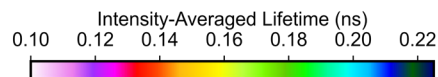


Steady state (left) and time-resolved (right) EL imaging of a phosphorescent OLED, showing the emission intensity and wavelength, and recombination pathways, respectively



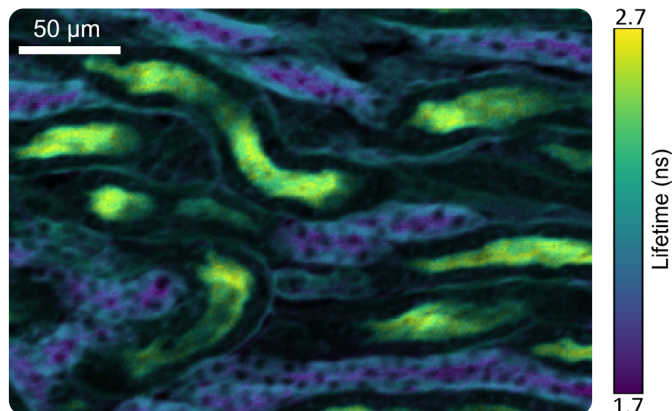
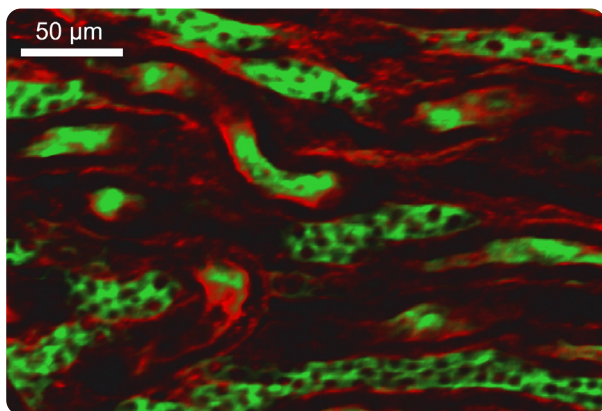
PL intensity map of AlInGaP/GaAs LED Chip to assess the quality and uniformity of semiconductor materials, which is vital for the performance and reliability of optoelectronic devices

Lifetime imaging (FLIM / PLIM) to distinguish micro-environment, molecular interactions, quenching & energy transfer.

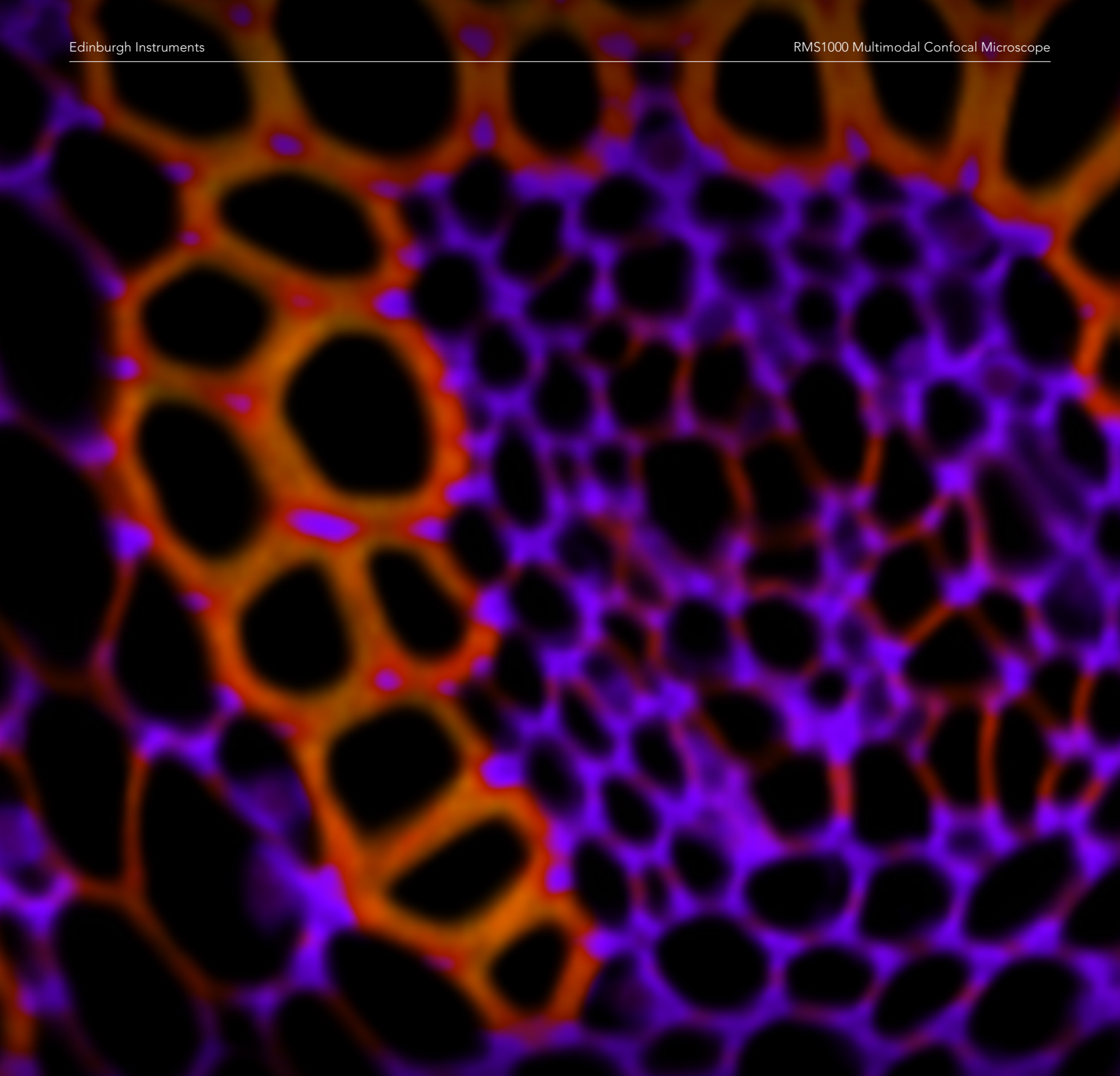


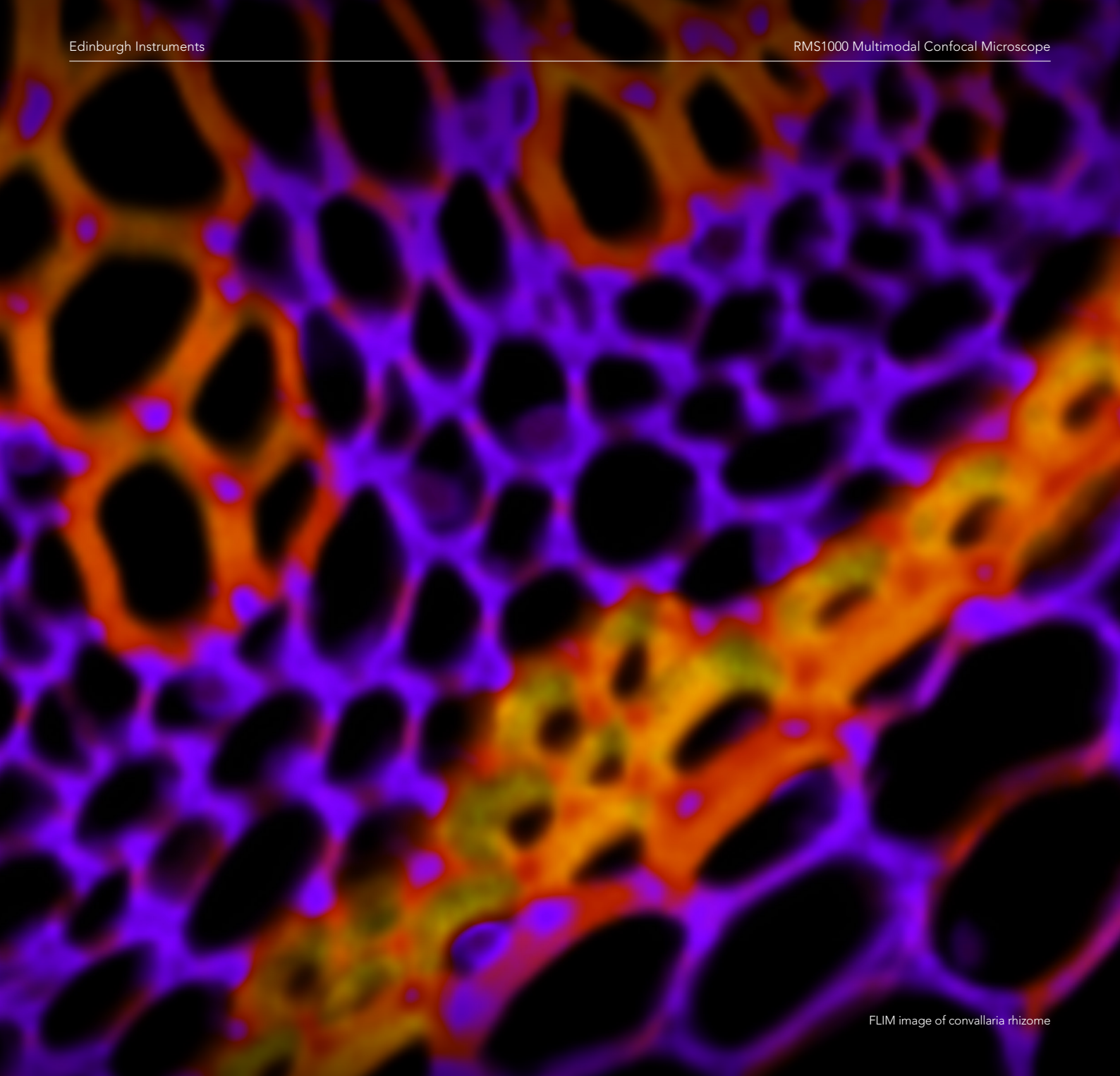
Surface FLIM analysis of a defect in a perovskite film, critical for understanding the performance and stability of perovskite materials

Multiphoton fluorescence (2PEF etc.) for deep tissue imaging, reduced photodamage, better sectioning.



Two photon intensity (left) and lifetime (right) imaging of a mouse kidney section stained with green fluorescent Alexa Fluor® 488 and red-orange fluorescent Alexa Fluor® 568



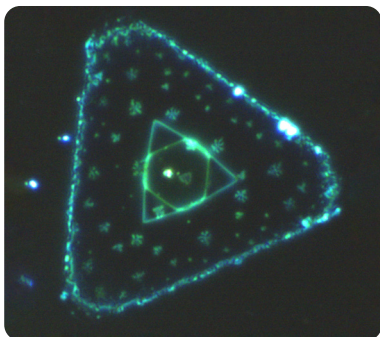


FLIM image of convallaria rhizome

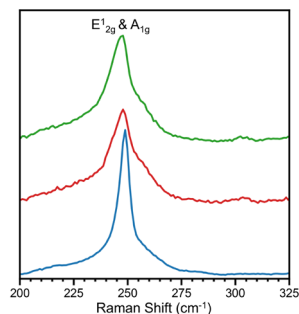
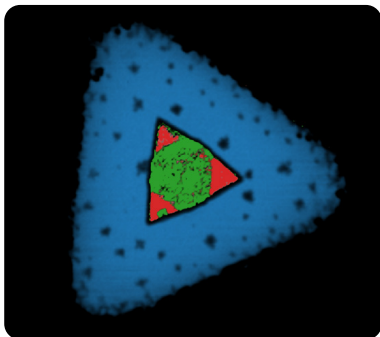


Multimodal Microscopy

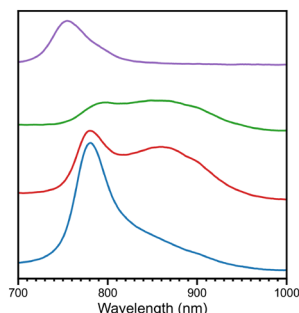
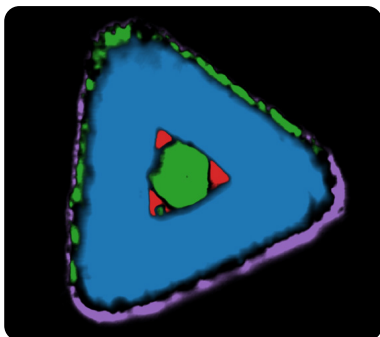
Darkfield Microscopy | Raman | Photoluminescence | Second Harmonic Generation

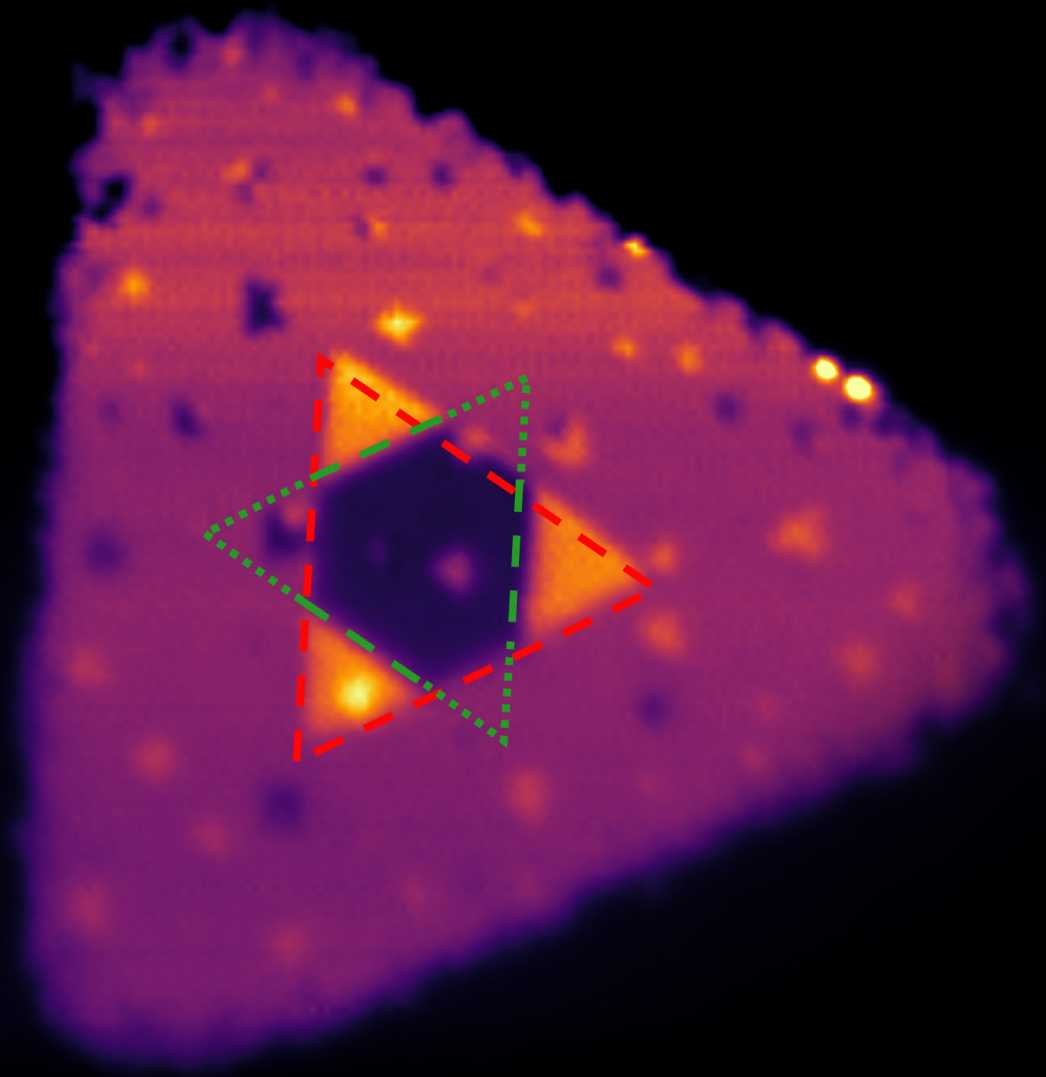


- + The RMS1000 can easily be configured to carry out all imaging techniques on the same sample area providing a full suite of complementary information.
- + Example shown is a WSe_2 crystal. The darkfield (DF) image reveals areas of different heights, likely due to different WSe_2 layer numbers.



- + Spectral matching revealing three distinct Raman spectral areas, and four distinct PL spectral areas.
- + Raman & PL reveal areas of monolayer, bilayer, and trilayer.
- + SHG intensity mapping reveals the orientation of the crystal layers.

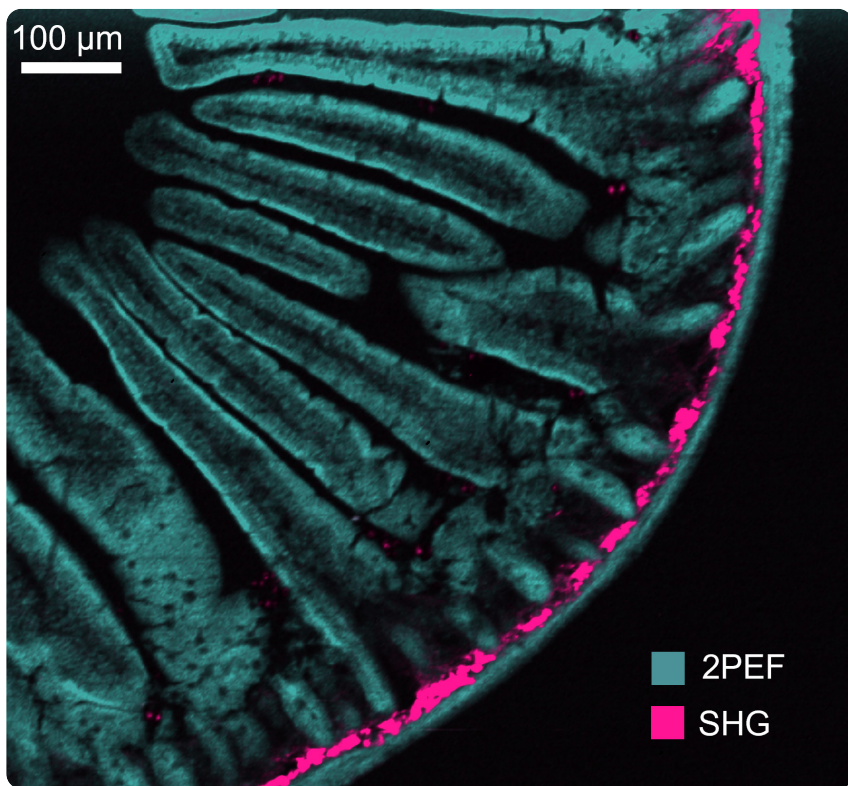






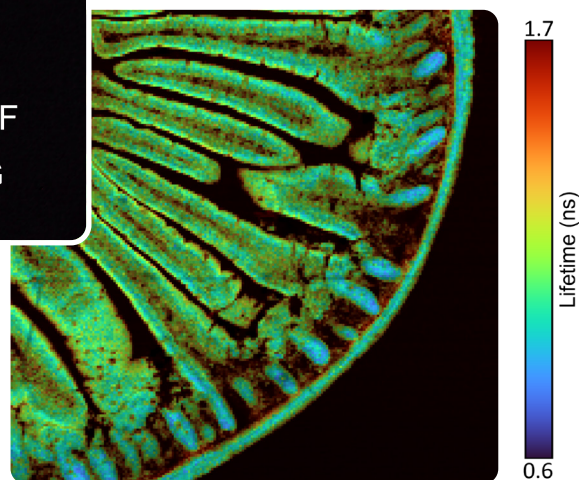
Multimodal Microscopy

Second Harmonic Generation | Two-Photon Excited Fluorescence



+ Sample: Mouse intestine stained with Alexa Fluor® 568.

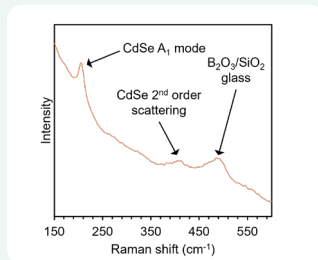
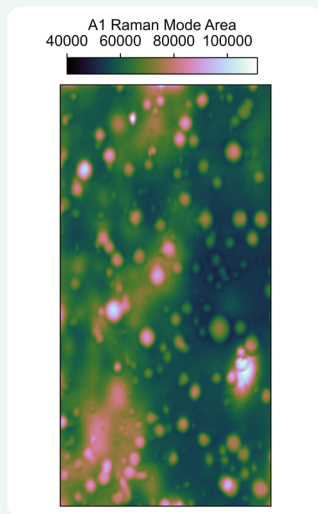
+ 2PEF lifetime image measured using femtosecond laser and hybrid PMT detector.



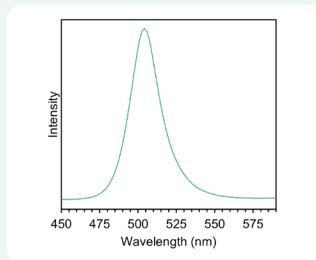
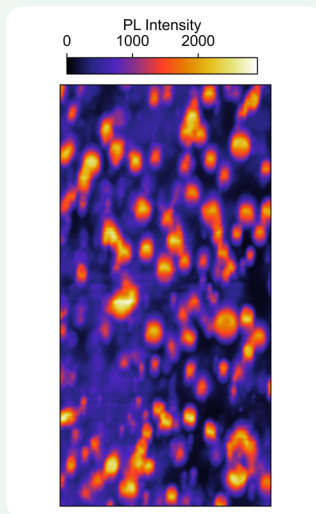
- + Two-photon excited fluorescence (2PEF) and SHG are complementary multiphoton imaging techniques for studying biological samples.
- + Steady state 2PEF and SHG can be collected simultaneously using a femtosecond laser and CCD.

Raman | Photoluminescence | Phosphorescence Lifetime

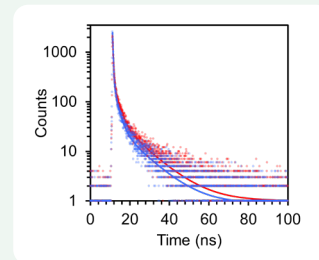
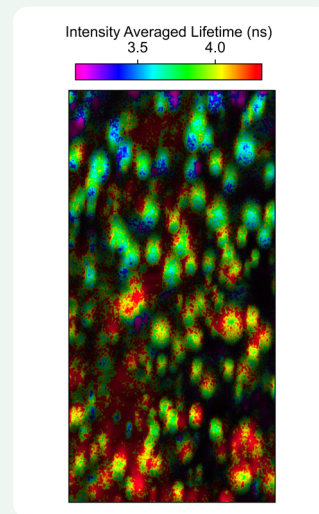
- + Sample: Photovoltaic glass containing CdSe QDs. The combination of techniques provides unique structure-performance correlation insights.



- + Raman, measured using a 532 nm CW laser and collected using a CCD.
- + Shifts and broadening in phonon modes spatially track local structural variations, lattice strain, or defect distributions.



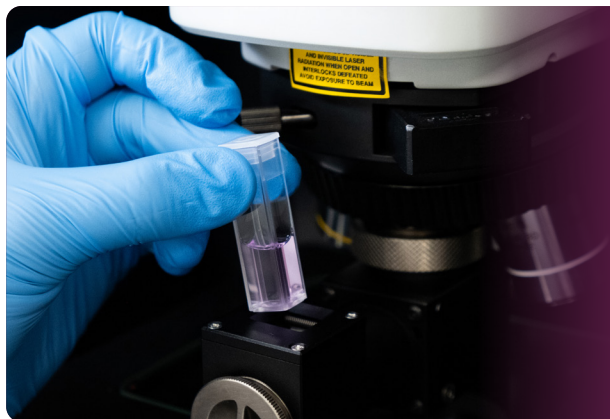
- + Steady state PL, measured using a 405 nm CW laser and collected using a CCD.
- + Provides information about the bandgap of the QDs (ca. 500 nm).



- + Time-resolved PL, measured using a 405 nm pulser laser and collected using a hybrid photodetector.
- + Indicates the charge carrier dynamics.



Accessories

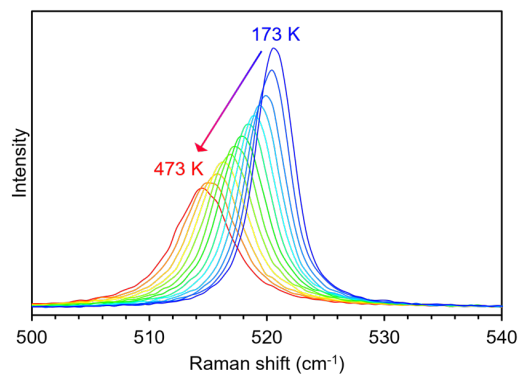


RMS1000 Cuvette Holder: Simplify Liquid Analysis

- + Quickly perform reliable liquid Raman measurements.
- + Analyse a variety of liquid samples using standard or micro quartz/plastic cuvettes.
- + Ensure focused, interference-free results with an integrated 10x objective.

Temperature Stages: Automate Thermal Analysis

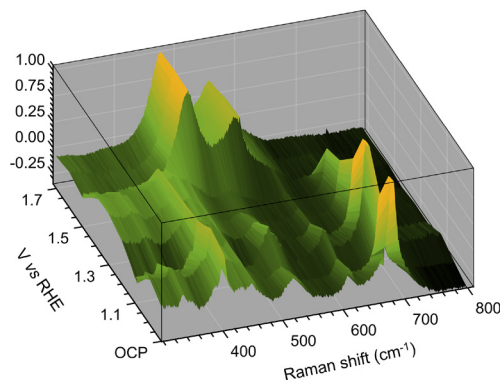
- + Integrate a range of heating and cooling stages for automated temperature-dependent studies directly within Ramacle® software.



Raman spectra recorded from an n-doped Si chip between 173 K and 473 K in 25 K steps provides information about thermal expansion and the Fermi energy

Electrochemistry Stages: Real-Time Reaction Insights

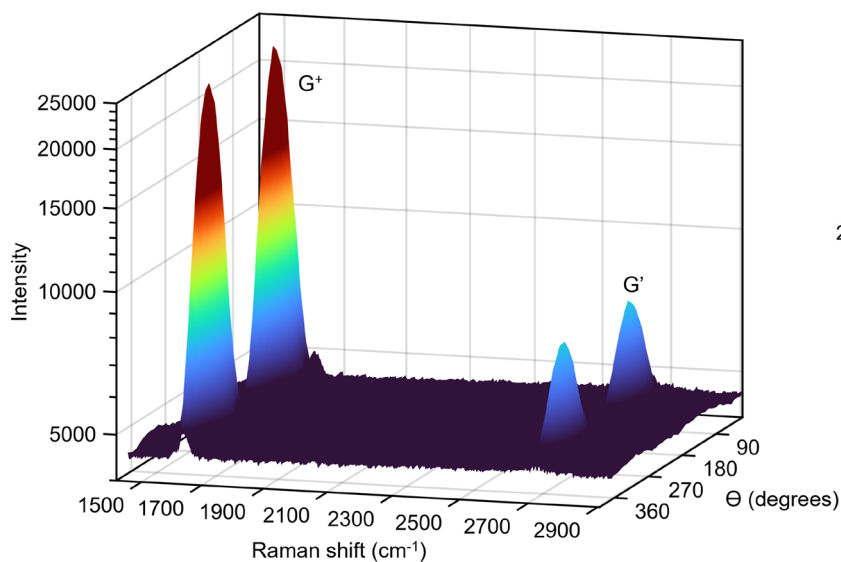
- + The RMS1000 supports diverse electrochemistry and battery cycling cells, ensuring optimal analysis with long working distance objectives.



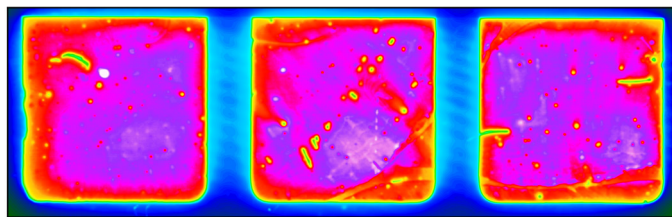
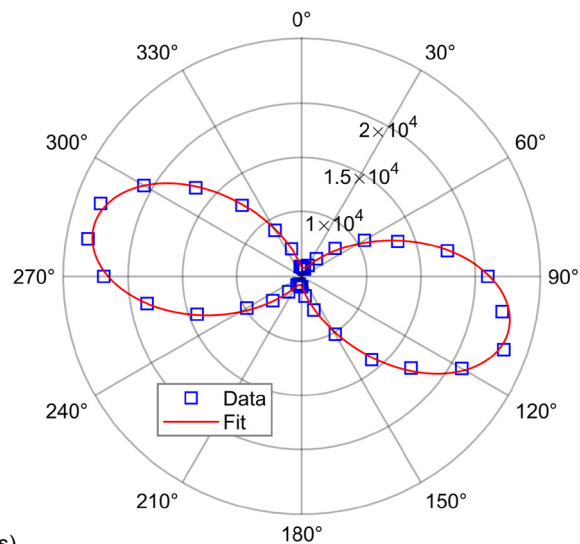
Detection of the compositional change in an oxygen evolution reaction electrocatalyst from NiFeP_x to NiFeOH at the voltage required for water splitting using *operando* Raman

Polarisation Kit

- Fully software-controlled 2 position waveplates and analysers for polarisation-dependent Raman.
- 360° polarisation kit for continuous control of waveplate and analyser for Raman, PL, and SHG.



Angle-resolved polarised Raman microscopy reveals the alignment and orientation of an organised carbon nanotube architecture through the mapping of the polarised G⁺ band intensity



Photocurrent image of an organic solar cell, acquired simultaneously alongside a Raman image of the material using a 532 nm laser

Photocurrent

- Visualise defects with photocurrent imaging, enabled by an external interface and trigger module.
- Correlate with simultaneous Raman/PL data within Ramacle.



Specifications

Lasers

Up to 5 integrated narrow-band lasers: 532 nm, 638 nm, 785 nm typically used

Additional lasers from UV to NIR are available.

External CW and pulsed lasers can be integrated

2 user-exchangeable positions for EI pulsed laser sources

Laser selection is fully computer-controlled

Associated laser rejection filters included, fully computer-controlled

Spectrographs

Wavelength Range	200 nm - 2,200 nm
Gratings	5-position grating turrets
Slits	Continuously adjustable, fully computer-controlled

Spectral Resolution

From <0.1 cm⁻¹ (depending on grating, laser and CCD selection)

Spatial Resolution

XY (lateral), Z (axial)	0.25 μm, <1 μm (depending on laser and microscope objective)
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Spectral Range

5 cm⁻¹ * - 30,000 cm⁻¹ (* with low wavenumber attachment)

Confocal Imaging

Adjustable confocal pinhole, fully computer-controlled

Detectors	Standard Spectral Detector	Front illuminated CCD optimisation in the NIR Back illuminated CCD for enhanced sensitivity and spectral range
	High-Speed Spectral Detector	Front illuminated EMCCD for optimisation in the NIR Back illuminated EMCCD for enhanced sensitivity and spectral range
	NIR Spectral Detector	InGaAs array for measurements of Raman and PL >1000 nm
	Lifetime Detector	High-speed hybrid photodetector, optimised for imaging
	NIR Lifetime Detector	PMT optimised for measurements >950 nm
Software	Ramacle®	Comprehensive all-in-one, intuitive software package
	Optional	Chemometric, spectral library packages
Laser Safety	Without Laser Enclosure	Class 3B (depending on external laser source)
	With Laser Enclosure	Class 1
Dimensions	W x D x H	From 975 mm x 610 mm x 1170 mm
	Weight	From 114 kg



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