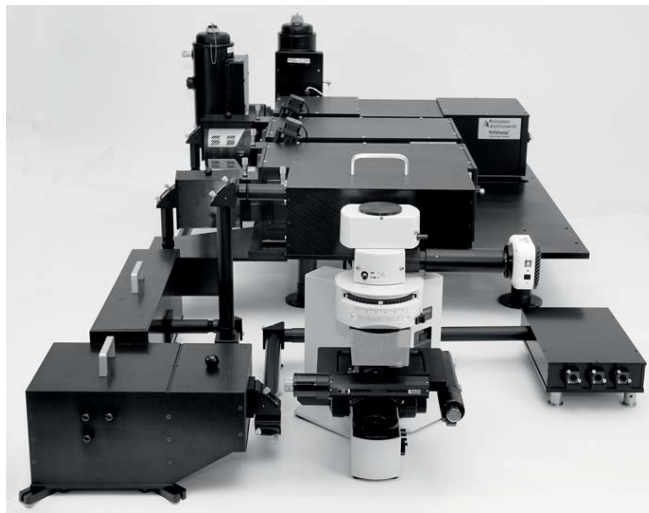


TriVista CRS

Confocal Raman Microscopes



System Features

- Advanced modular design with all versatile Raman technologies
- All things automated from laser/optics selections, alignment/calibration, XYZ scanning to data mapping
- Lasers:
 - Deep UV and NIR wavelength range
 - up to 4 integrated multi-line lasers plus port for large external lasers
 - Dual beam path for UV and VIS/NIR lasers
- Spectrograph:
 - 500 mm or 750 mm focal length spectrograph
 - High spectral resolution, i.e., FWHM < 0.1 cm^{-1} @ 633 nm
 - High frequency range up to 9000 cm^{-1} (@532 nm), useful for photoluminescence for additional benefit
 - Low frequency range down to +/- 10 cm^{-1} with ultra-narrow band notch filters
- Spectroscopy Detectors:
 - Wide range of spectroscopy detection selection: Peltier and liquid nitrogen cooled detectors
 - CCD detectors; InGaAs array detectors; EMCCs; PMTs
- Microscopes:
 - Confocal microscopes with sub-micron spatial resolution
 - Upright or inverted, or dual upright/inverted microscopes
 - Wide choice of UV, VIS, and NIR objectives
 - Built-in polarizers with automated selection
- Sample Stages:
 - Stepper motor XYZ stages with resolution less than 50 nm
 - Piezo XYZ stages with resolution less than 1 nm
 - Heating/cooling stages and Helium temperature cryostats
- Plus option:
 - Combined AFM
- Software:
 - Automated hardware control at finger-tip for easy operation
 - Stokes Raman/Anti-Stokes Raman/Polarized Raman spectrum collection
 - Step-by-step and fast Raman mapping choices
 - Data preprocessing routines and spectral library module
 - AFM control

W2 Innovations, Inc.

364 Brighton Street, Belmont, MA 02478 USA Tel: (+1) 617.216.3606 info@w2innovations.com

www.w2innovations.com

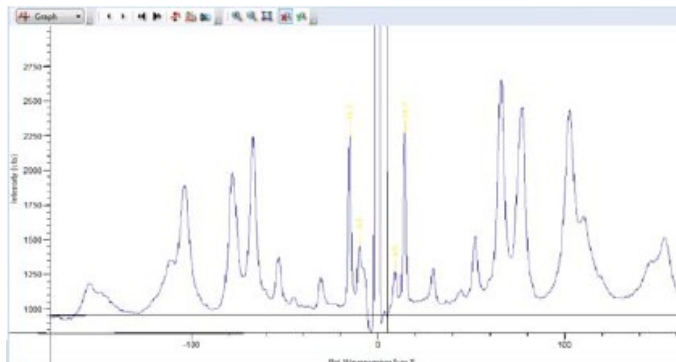
TriVista CSR

Confocal Raman Microscopes

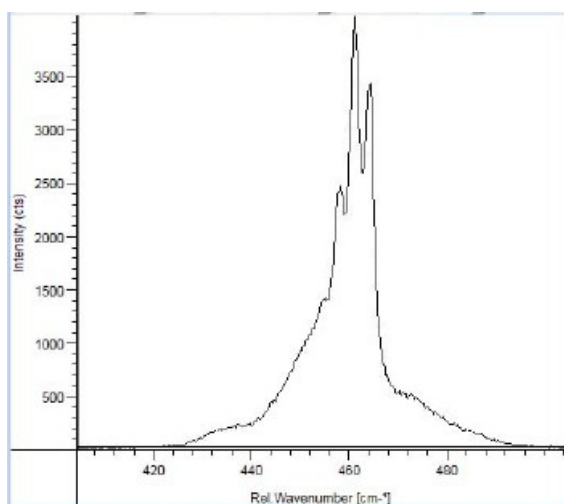
Lasers and Filters

- Choices of deep UV to NIR lasers
- Up to 4 integrated multi-line lasers
- Additional port for external lasers
- Separated beam path for UV and VIS/NIR lasers
- Motorized laser selection
- Auto alignment and calibration
- Edge filters from UV to NIR
- Ultra-narrow band notch filters for 488, 514, 532, 633, 785, and 1064 nm lasers

Stokes/Anti-Stokes spectrum from L-Cystine, Taken with Ultra Narrow Band Notch Filters



Exceptional Resolution shown CCL₄ Spectrum



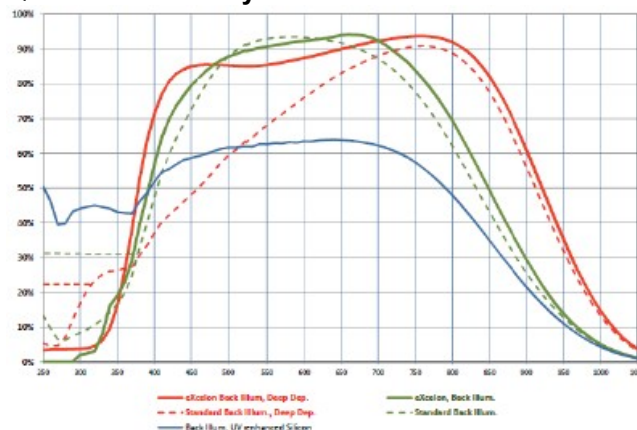
Imaging corrected Spectrographs

- Long 500 or 750 nm focal length for high resolution
- Image corrected optics with superior imaging quality for high resolution and multi-track applications
- Dual entrance and dual exit ports
- Interchangeable 3 Grating Turrets with 3 gratings
- Motorized slits with 0 - 3 mm width
- Optional silver or gold coated mirrors
- Choice of more than 100 gratings available for the optimal spectral range, throughput, and dispersion
- Stepping motor scanning system with microprocessor control providing superior precision and repeatability of wavelength positioning

Spectroscopy Detectors

- Deep Peltier cooled detectors (down to -75 °C)
- Liquid nitrogen cooled detectors
- InGaAs array detectors
- EMCCDs for fastest Raman mapping
- Back illuminated eXcelon CCD detectors with lowest etaloning
- Photon Counting PMT systems

Quantum Efficiency Curves of Different CCD Detectors



W2 Innovations, Inc.

364 Brighton Street, Belmont, MA 02478 USA Tel: (+1) 617.216.3606 info@w2innovations.com

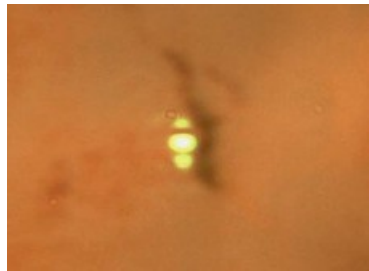
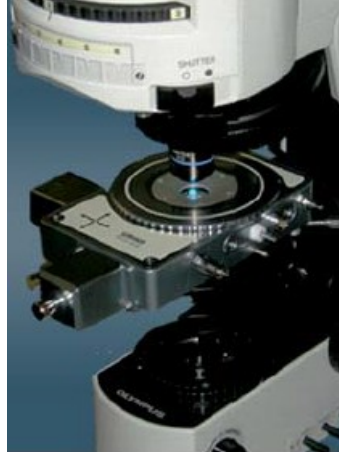
www.w2innovations.com

TriVista CSR

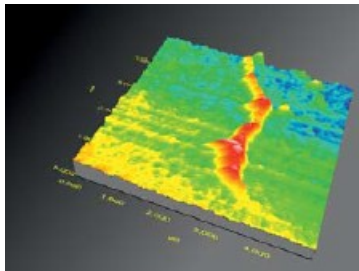
Confocal Raman Microscopes

Microscope Features

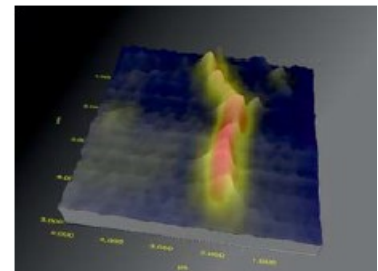
- Upright Olympus microscopes BX51WI
- Inverted Olympus microscopes IX71
- Dual (both upright and inverted) microscope
- Wide range of UV, VIS, and NIR objectives
- Long working distance objectives
- Motorized XYZ stages with resolution <50 nm
- Piezo XYZ stages with resolution <1 nm
- Heating stages up to 1500 °C
- Heating/cooling stages from -196 to 600 °C
- Helium temperature cryostats
- Combined Raman and AFM with Nanoics and JPK Instruments AFM systems
- Laser safety Class I option



Microscope Image



AFM Image of Carbon Nanotube

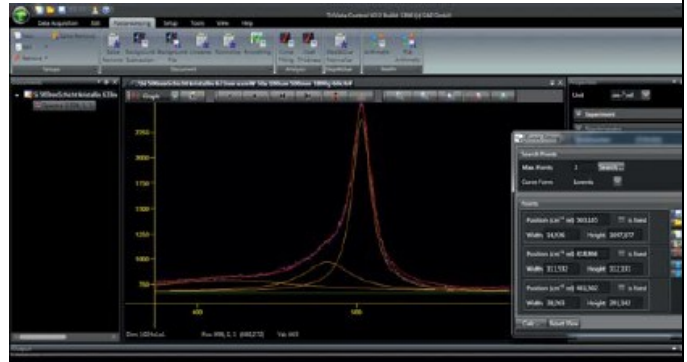


AFM plus Raman Image

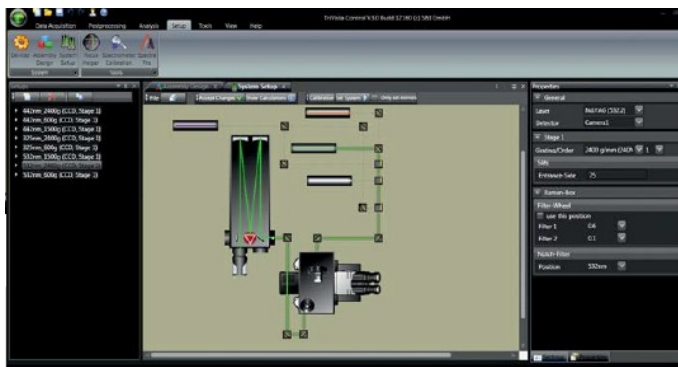
Software Features

- Spectrograph setup
- Auto alignment for laser input and Raman signal
- Wavelength and intensity calibration
- Temperature control for heating, cooling stages and cryostats
- Raman mapping with auto focus
- Step-by-step and fast Raman mapping
- Various post-processing routines
- Fluorescence and background subtraction
- Spectral library module
- Choices of data import and export formats

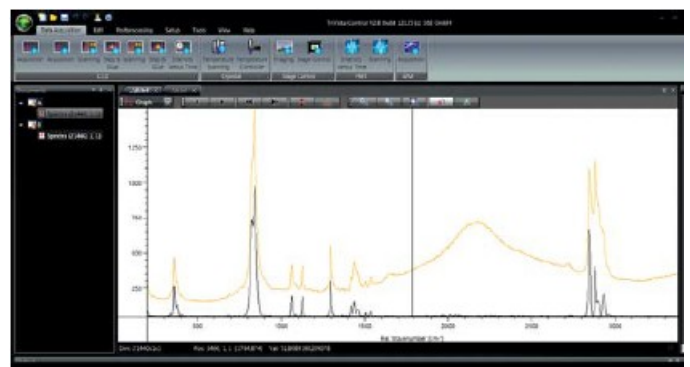
Curve Fit and Deconvolution



Hardware Setups and Laser Selection



Fluorescence and Background Subtraction



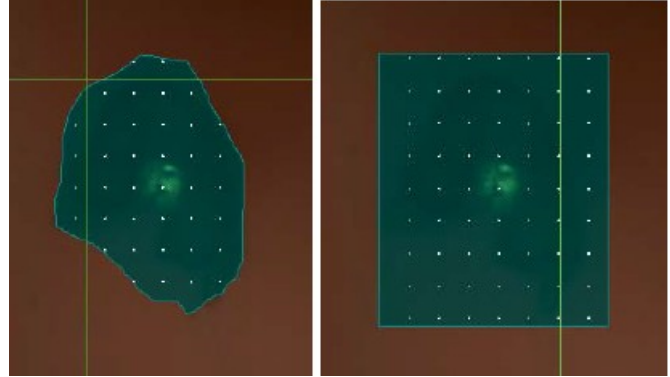
TriVista CSR

Confocal Raman Microscopes

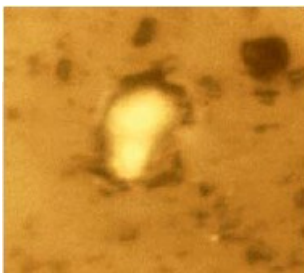
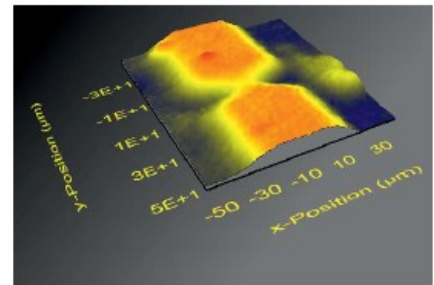
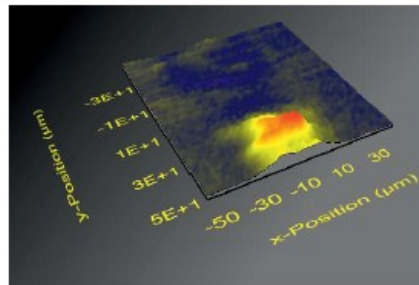
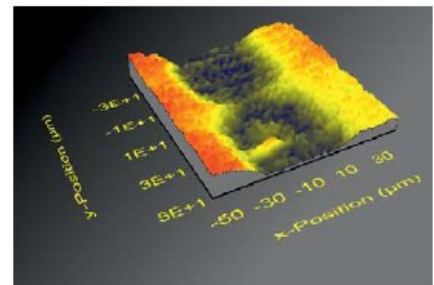
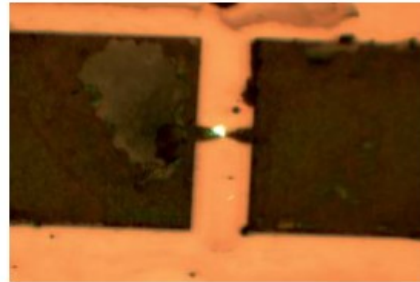
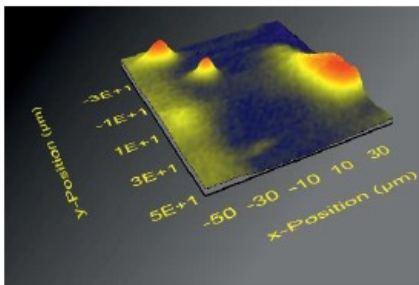
Sample Mapping Features

- Line mapping in X, Y and Z dimensions
- XY mapping with autofocus
- XYZ mapping
- Point-by-point mapping
- Fast mapping
- Fast mapping with line focus
- Rectangular and free-hand mapping area selections
- Enhanced mapping analysis and display routines

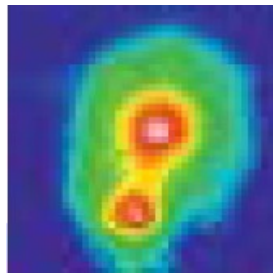
Mapping area selection



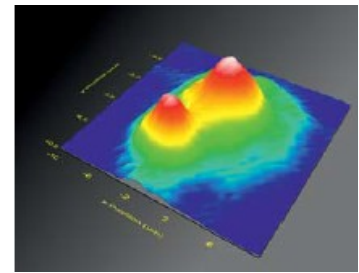
3D Raman images from different components on one sample



Microscope Image



2D Raman Image from an Enclosure



3D Raman Image

W2 Innovations, Inc.

364 Brighton Street, Belmont, MA 02478 USA Tel: (+1) 617.216.3606 info@w2innovations.com

www.w2innovations.com

W2 Innovations (W2I) represents Spectroscopy & Imaging (S&I) GmbH in Germany for its Super High Resolution Confocal Raman Systems in North America and Asia.