



● **RAM II** FT-Raman Module

The RAM II module sets the highest performance and versatility standards for FT-Raman spectroscopy.

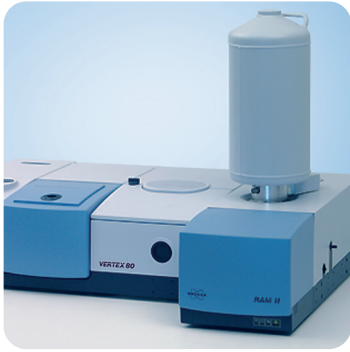
Key Features

- FT-Raman module for INVENIO and VERTEX Series FTIR spectrometers
- Automatic Accessory Recognition (AAR) and Automatic Component Recognition (ACR)
- Can be upgraded with FT-Raman and dispersive Raman microscope
- Stokes shift down to 50 cm^{-1}
- Second excitation line available
- Full line of internal and external accessories
- 21 CFR Part 11 compliance and validation

Bruker Optics added FT-Raman capabilities to its product line shortly after the technique was first reported in late 1980s. Since then, continual hardware and software improvements, as well as the development of various sampling accessories, helped Bruker Optics maintain the tradition of innovation and excellence in this scientific instrumentation technique.

High Performance

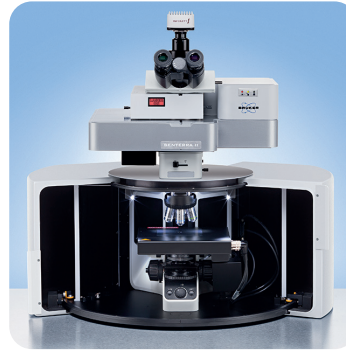
The RAM II module is the first dual-channel FT-Raman module. It is an add-on module that can be coupled to Bruker's INVENIO and VERTEX Series multi range FTIR spectrometers, utilizing the spectrometer's one input and one output port. It combines fast and easy sample handling and maximum suppression of disturbing fluorescence, expected from FT-Raman. Switching between the infrared and Raman is fully software controlled.



FT-Raman module RAM II connected to the VERTEX 80 FTIR spectrometer.



HTS/Raman High Throughput Accessory for automated FT-Raman measurements using wellplates.



RamanScopeIII FT-Raman microscope accessory for Bruker FT-Raman spectrometers

The RAM II module is equipped with standard 1064 nm excitation for utmost suppression of fluorescence. The module can be configured with a dual channel option for additional excitation line.

Sensitivity

Bruker's proprietary ultra-high sensitivity Ge detector with 5 days hold time of refrigerant, enhanced collection optics and the new dynamic 24 bit electronics provide unsurpassed sensitivity performance and long term stability.

Sampling Flexibility

RAM II's large sample compartment can house an extensive range of pre-aligned sampling accessories, designed to accommodate all types of sample formats; from powders to liquids in vials. Bruker Optics offers various accessories to enhance the performance of FT-Raman analysis.

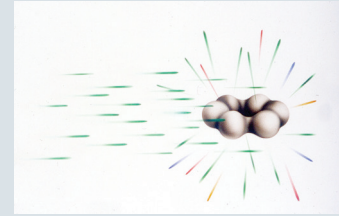
Laser safety classification: LASER CLASS 1
Depending on accessories adapted the classification of the FT-Raman module RAMII may equal the classification of the exciting laser and exceed class 1.

Technologies used are protected by one or more of the following patents:
US 7034944; DE 19940981

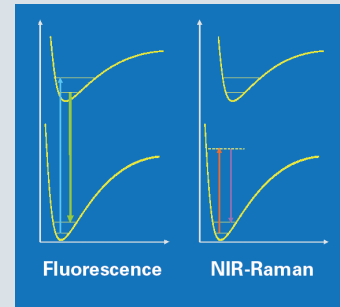
The Raman Effect

The Raman effect is based on the inelastic scattering of monochromatic light with matter. As the complementary vibrational technique of IR spectroscopy Raman provides detailed molecular structure information. Due to its non-destructive characteristic, Raman spectroscopy is ideally suited for in-situ analysis of macro and micro samples ranging from materials research to quality control. The Raman spectrum reveals valuable information about crystallinity, polymorphism and phase transitions. Raman spectroscopy combines high information content, no sample preparation and the use of fiber optic probes for remote sampling.

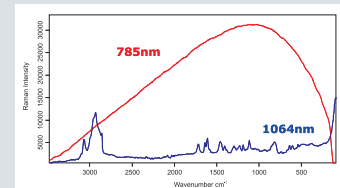
The Raman Effect



The Raman effect is based on an inelastic scattering of the monochromatic light.



Virtual suppression of fluorescence by long wavelength excitation in the NIR spectral range.



Comparison of Raman spectra of dental cement measured with a 785 nm excitation laser (red curve) as well as with the standard excitation line used for FT-Raman spectroscopy – 1064 nm (blue curve).
The measurement with 785 nm excitation line is completely masked by fluorescence!

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• **Raman Spectrometers** for QA/QC and R&D Applications

Bruker offers dedicated analytical research and quality control solutions based on Raman spectroscopy.

- Fast, precise and non-destructive micro and macro analysis
- Powerful and easy to use software for data acquisition and processing
- High throughput screening
- Confocal Raman microscopy

The wavelength shift caused by inelastic scattering of monochromatic light on matter is called the Raman effect. It is specific to the molecules that cause it and can therefore be used in spectroscopic analysis. Its non-destructive and in-situ characteristic make Raman spectroscopy a powerful analytic tool. Raman is suitable for extracting important molecular information from solid and liquid samples, which provides information about the identity, quantity, structure or conformation of substances.

Bruker introduced its Fourier transform (FT) Raman product line shortly after the technique was first reported in late 1980s. Since then, continual hardware and software improvements maintain Bruker's tradition of innovation and excellence for Raman spectroscopy. More recently, Bruker started utilizing dispersive Raman technology by combining years of experience to bring innovative solutions to the market.

Today, Bruker offers multiple dispersive and Fourier transform (FT) Raman spectrometers for analytical, research and QC applications.



SENTERRA II

- Dispersive Raman microscope
- Highest degree of automation
- SureCAL™ Automated Calibration

SENTERRA II

The SENTERRA II defines a new level of spectroscopic performance and user friendliness in the class of compact Raman microscopes. SENTERRA II is designed to deliver excellent sensitivity combined with high resolution and state-of-the-art imaging performance.

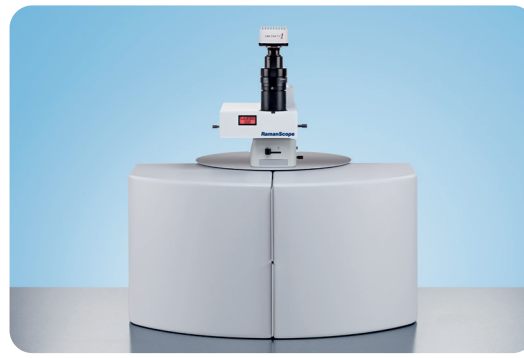
Automation, workflow and operation have been optimized to perfectly prepare the SENTERRA II for daily routine analysis in research and quality control laboratories. Unmatched permanent stability of the wavenumber axis guarantees precise and accurate results every time. Therefore, the SENTERRA II is the platform of choice for conducting the most challenging research.

RamanScopeIII

The RamanScopeIII has been developed taking advantages of the recent improvements in optical microscopy and Bruker's over 25 years of experience in FT-Raman microscopy. It is a powerful, compact, benchtop FT-Raman microscope for non-destructive microanalysis. The RamanScopeIII can be combined with SENTERRA II on a 'hybrid' platform.

The 'hybrid' platform enables the use of both FT-Raman microscopy at 1064nm and dispersive Raman microscopy in the visible.

Technologies used are protected by one or more of the following patents:
US 6141095; US 7102746



RamanScopeIII

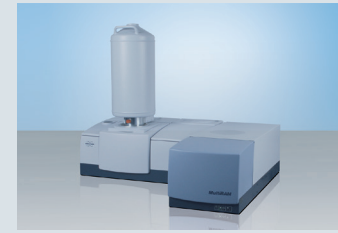
- FT-Raman microscope
- 'Hybrid' technology
- Minimized fluorescence

MultiRAM

Bruker's MultiRAM is a stand-alone high performance Fourier transform Raman spectrometer. When sample fluorescence is a problem, FT-Raman analysis with near infrared excitation at 1064 nm is the solution. As sample fluorescence can be orders of magnitude more intense than Raman scattering, the presence of fluorescence often precludes the observation of Raman scattering. The MultiRAM has a large sample compartment to utilize an extensive range of pre-aligned sampling accessories featuring Bruker's automatic accessory recognition. The new Raman video stage makes Raman analysis a breeze. The MultiRAM can accommodate a second laser and detection system for use with 785nm.

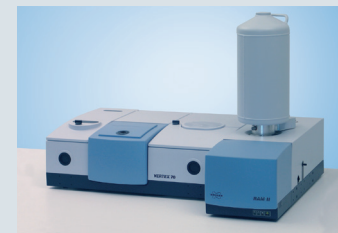
RAM II

The FT-Raman module RAM II is the first dual channel FT-Raman accessory for combined FTIR/FT-Raman spectrometers. The module is designed for researchers who are used to the flexibility of switching between different Raman laser wavelengths and do not like to miss the complementary information from the FTIR. The RAM II module is equipped with standard 1064nm excitation for utmost suppression of fluorescence and optionally with a second excitation line at 785nm.



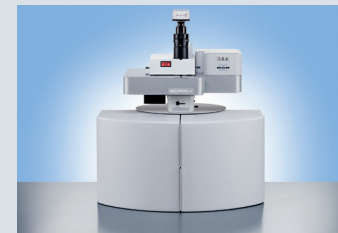
MultiRAM

- Stand-alone FT-Raman Spectrometer
- Can be coupled to FT-Raman Scope III
- Stokes shift to 50 cm



RAM II

- FT-Raman module that can be coupled to FTIR spectrometers
- 24-bit dynamic range ADC



"Hybrid" Raman Microscopy

- Combined platform of FT and dispersive microscopy
- Up to 4 excitation lasers including 1064nm

Bruker Optics is ISO 9001 and ISO 13485 certified.

Class 1 with safety enclosure, exceeds class 1 without safety enclosure.

www.bruker.com/optics

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