



INVENIO® R

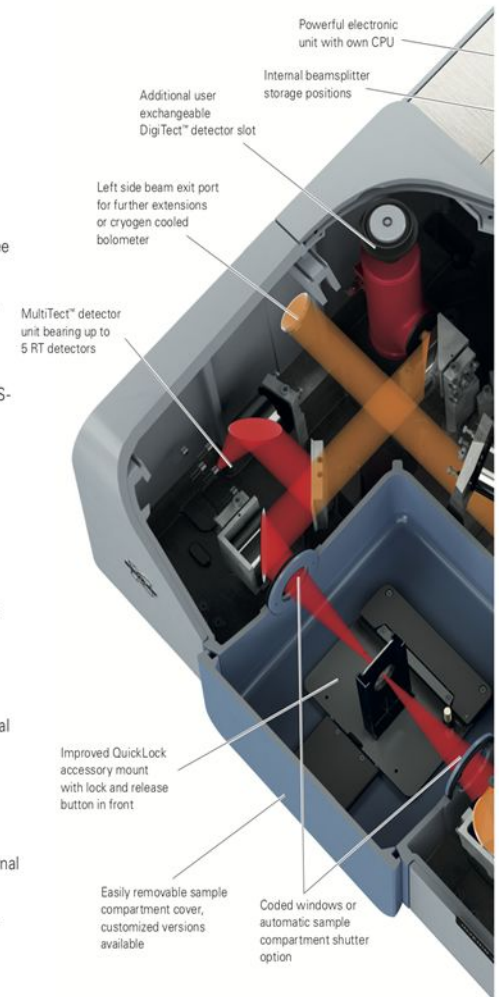
• The new intuitive FTIR R&D Spectrometer

Innovation with Integrity

FTIR

• Features

- Optimized footprint for laboratory benches
- Sealed and desiccated optics bench, optionally purgeable
- RockSolid™ based permanently aligned and wear-free interferometer for easy beamsplitter change
- 3 exit and 2 input beam ports software selectable, fourth exit port available on request
- OPUS software for operation and evaluation
- Integrated touch panel option with dedicated OPUS-TOUCH R&D software for user friendly handling
- Elegant LED light bar indicating instrument status
- Innovative 5x MultiTect™ detector technology
- User exchangeable DigiTect™ detector slot
- Transit™ Channel with board level MIR DTGS detector for quick transmittance results
- Fully digitized signal processing using dual channel 24-bit dynamic range ADC
- BRUKER FM technology covering 6000 cm⁻¹ to 80 cm⁻¹ in one single measurement
- Easy upgrade for near IR, far IR and UV/VIS spectral ranges
- Superior Rapid Scan, Slow Scan and Step Scan performance for modulated and time resolved spectroscopy
- Compatible with all VERTEX accessories and external modules
- Optional direct emission beam path bypassing the sample compartment
- Sample compartment cover can be removed and attached within 3 s



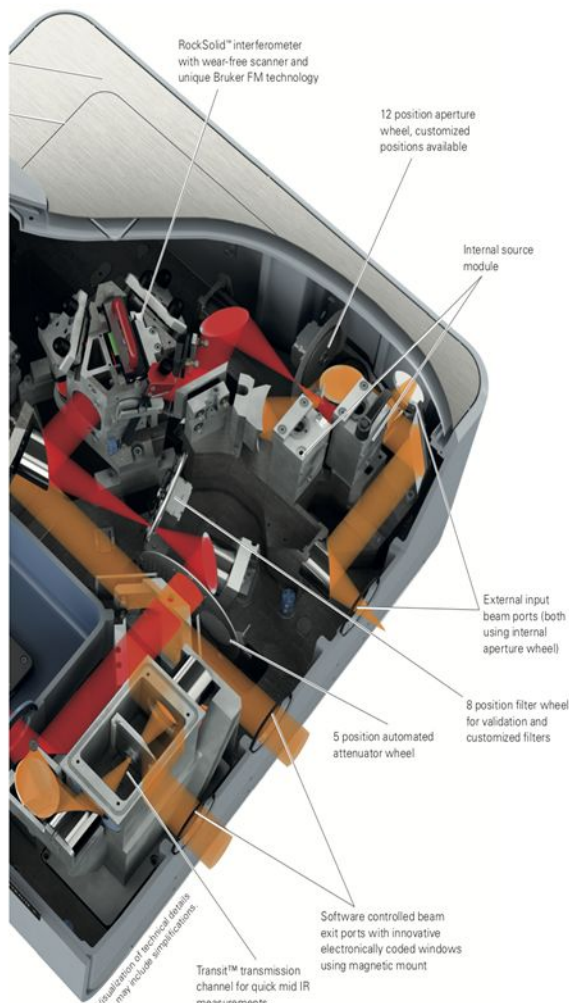
Transit™ channel for quick mid IR transmittance results without occupying the main sample compartment.



MultiTect™ detector unit with up to 5 software controlled RT or TE stabilized detectors.



Additional DigiTect™ detector slot for liquid N₂ cooled, fast, high gain and other detectors.



RockSolid™ interferometer with wear-free scanner and unique Bruker FM technology

12 position aperture wheel, customized positions available

Internal source module

External input beam ports (both using internal aperture wheel)

8 position filter wheel for validation and customized filters

5 position automated attenuator wheel

Software controlled beam exit ports with innovative electronically coded windows using magnetic mount

Transit™ transmission channel for quick mid IR measurements

Visualization of technical details may include simplifications.

Spectral Resolution

INVENIO®'s spectral resolution of better than 0.16 cm^{-1} fulfills the requirements for almost any measurement. No matter if condensed phase samples such as solids and liquids, or low temperature crystalline samples, or even gaseous samples, INVENIO® can handle them.

Spectral Range Extension

INVENIO® R can be optionally equipped with light sources, numerous beamsplitters and detectors to cover the entire spectral range from 15 cm^{-1} to $28,000 \text{ cm}^{-1}$ from the very far IR region, through the mid and near IR to the visible and ultraviolet region. Thanks to the permanently aligned RockSolid™ interferometer, the unique MultiTect™ detector technology, the multiple internal and external source positions and the optics prepared for multiple spectral ranges, changing spectral range is a very easy task.

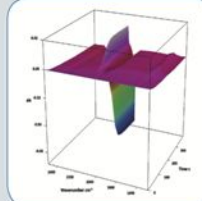
Unique Bruker FM Technology

The Bruker FM far and mid IR technology includes the unique ultra-wide range beamsplitter and the wide range DLATGS detector. In one single measurement, without any change of optical components, the complete far and mid IR spectral range is accessible. To cover the broad range from 6000 cm^{-1} to 80 cm^{-1} the standard internal IR source combined with the FM components is completely sufficient.



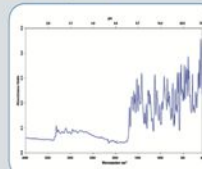
Application Examples

Rapid Scan Combined with Spectroelectrochemistry



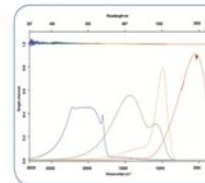
The 3D plot shows the oxidation of a ferrocyanide solution at potentials ranging from -0.3 V to 0.8 V . The change of the two characteristic bands during the whole oxidation process from getting started until equilibrium has been recorded with rapid scan, which enables a temporal resolution of better than 15 ms.

Bruker FM Spectrum



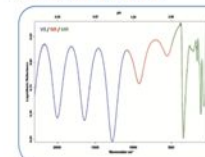
Sulfathiazole measured with INVENIO® using Platinum Diamond ATR, standard internal IR source and the ultra-wide range BRUKER FM optical components from 4000 cm^{-1} to 80 cm^{-1} in a single step measurement without any gap.

Visible Spectral Range



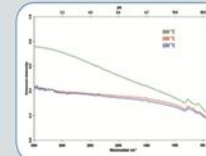
Background single beam spectra and 100%-lines measured in the UV/VIS and near IR ranges using 8 cm^{-1} spectral resolution and different aperture sizes. The internal near IR source, the NIR/VIS/UV broad band beamsplitter as well as three MultiTect™ detectors have been used for maximum short wavelength efficiency.

Hemispherical Reflectance



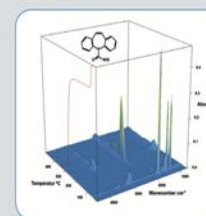
The above total reflectance spectrum of a coated glass mirror was measured by using two integrating spheres. The perfect fit of three different spectral ranges from ca. 23000 cm^{-1} to 400 cm^{-1} was achieved by automatic switching of two sources, two different types of beamsplitter as well as three detectors. The interference in the visible range can be used to determine the thickness of the coating on top of the mirror surface.

Emission Studies



Emittance measurement above room temperature are e.g. of interest for the characterization of absorber material used for solar thermal power plants. The above spectra show a coated copper surface measured at different elevated temperatures using the emission adaptor A540 mounted at one of the input beam ports of the INVENIO® and the standard room temperature detector.

TGA Coupling



The OPUS 3D plot shows the thermal decomposition of carbamazepine up to 500°C . The products have been identified with the help of a spectra library and the spectrum search function in OPUS software to be acetone at around 62°C , isocyanic acid after 230°C and ammonia from 445°C on. The example demonstrates that a TGA-FTIR coupling is well suited to follow the complete decomposition steps of a pharmaceutical active agent.



Permanently aligned interferometer and internal BMS storage positions for easy and reliable BMS exchange.



Sufficient space, even for bulky accessories in QuickLock™ mount with lock and release button in front.



Various external accessories, such as the TGA module, can be coupled to INVENIO®.

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

Bruker Optics is ISO 9001 and ISO 13485 certified.

Laser class 1 product.

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