AvaRaman Bundles

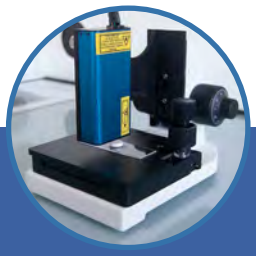
Raman technique

Raman technique is used for many different materials. The Avantes bundles are compiled with care and optimized for the use of powders and liquids. If very weak signals possibly come along with fluorescence background the Highsense Raman Bundle is recommended. Our AvaRaman-D (Highsense Bundle) contains our AvaSpec-HERO which has a higher quantum efficiency in NIR and better signal to noise performance.

When weak Raman signals occur (Integration time longer than 5 seconds) the Thermo-Electric-Cooled (TEC) spectrometer is recommended. This spectrometer is compiled within the AvaRaman-E (Performance Bundle).

When strong signals are available (aromatic compounds, alcohol based liquids) in general AvaRaman-F (Basic Bundle) is very suitable to perform these kind of measurements.

Bundles



AvaRaman-D (Highsense Bundle)

For the most challenging applications.

This bundle uses the AvaSpec-Hero for detection. The High end cooled back-thinned detector, low-noise electronics and optical bench with high Numerical Aperture, results in excel-lent Signal to Noise and Dynamic Range.

AvaRaman-E (Performance Bundle)

For demanding applications.

Cooling enables you to work with longer integration times, yet keeping the thermal noise limited.

AvaRaman-F (Basic Bundle)

For basic applications.

Based on an uncooled spectrometer this is the entry bundle for reasonable strong signals.

Raman Spectroscopy Applications

Applications

Raman spectroscopy utilizes inelastic scattering of photons off of covalently bound molecules to identify functional groups, crystallinity, and stresses and strains. It is a widely used tool in the spectroscopy community for both quantitative and qualitative molecular analysis, with applications ranging from medical diagnostics to material inspection. Find out more about three possible applications below.

Medical Diagnostics

Raman spectroscopy has been repeatedly shown to have massive potential for point-of-care medical diagnostics and monitoring due to its ability to provide a non-contact non-destructive molecular fingerprint of many common physiological biomarkers. In the field of cancer detection alone there have been thousands of research papers published ranging from applications such as interoperative cancer boundary detection during breast, brain, and oral tumor removal to urine testing for monitoring lung cancer response to treatment.

Silicon Wafer Testing

Another Raman application is the monitoring of both stresses and crystallinity in silicon wafers. Pure crystalline silicon is far more effective than its amorphous counterpart at converting light into electricity, and because of this, it is utilized in the production of over 85% of the commercially available solar cells on the market today. Raman spectroscopy is an ideal tool for the job, since the effect is polarization sensitive, the orientation of the silicon molecular structure will affect scattered Raman spectra.

Material Inspection

The last application to explore is incoming material inspection for pharmaceutical and nutraceutical manufacturing. Both utilize the same fingerprinting ability of Raman spectroscopy as described in the biomedical section. Raman is ideal for this application because the laser can be focused through optically transparent packaging allowing for the contents to be analyzed without ever opening the product and exposing its contents to the environment.

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