Articles from

Making Raman Spectroscopy More Accessible

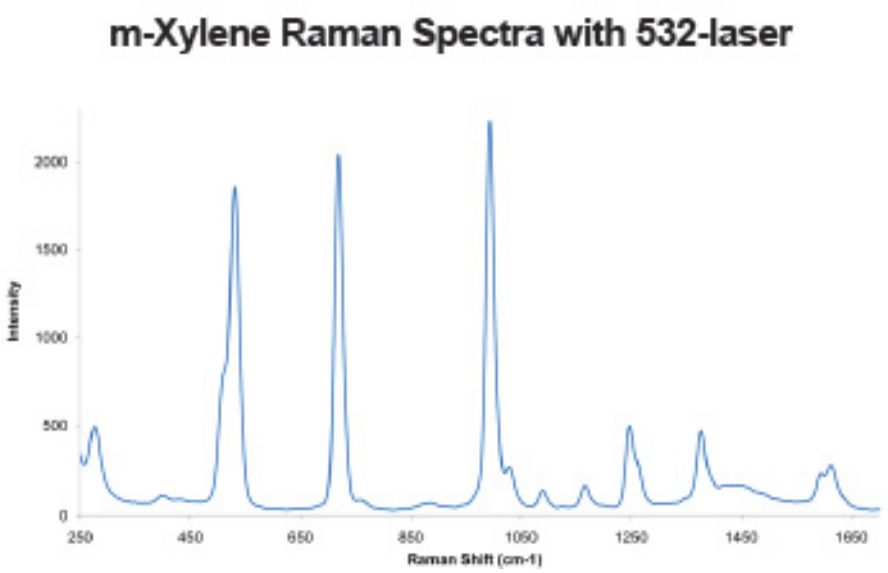
2012-02-02 19:02:06 Jeremy Sharp

For decades, Raman spectroscopy was a cumbersome, expensive research tool relegated to laboratories and arcane experiments.

But, today's economical, compact lasers and detectors make Raman spectroscopy a practical solution for non-destructive chemical identification across a range of new markets — including pharmaceutical processing, forensics, law-enforcement and homeland security.

Raman has been considered a high-resolution application. But, for many identification problems in commercial markets, such laboratory-level resolution is not necessary. A high-performance Raman system will typically achieve resolution of 2 to 4 cm-1.

Depending on choice of grating and entrance slit, lower-cost systems can still reach resolution of 6 to 11 cm-1. In other words, it is possible to obtain a system with resolution only 2-3x that of a laboratory instrument for a cost that is substantially lower.



Raman spectroscopy is easily achieved with the QE65000-Raman setup. This powerful quantitative and qualitative tool is ideal for a wide range of analytical applications, both in the laboratory and in the field.

Ocean Optics Raman systems are robust enough to operate in a range of environments. Thermal drift in the excitation wavelength may compromise SNR over time. But, regular yearly or monthly calibration will catch this. The Raman signature will still be emitted at the correct wavelengths. Likewise,

possible variations in power stability, over time, will affect intensity but not the shape or positioning of the peak.

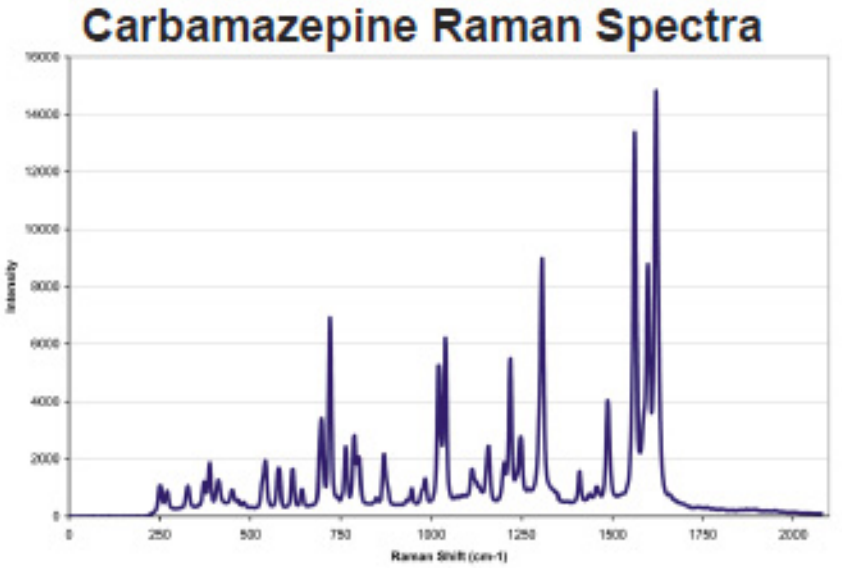
Raman spectroscopy offers a number of benefits for testing and characterization. Like regular IR spectroscopy, it is rapid and non-destructive. Raman can capture data from a sample contained in plastic or other materials that are optically transparent to the wavelengths of interest.

Unlike IR spectroscopy (which falls spectrally within the water window), Raman spectroscopy can be used to capture data on aqueous samples or samples with high moisture content. And, with the emergence of economical diode lasers in the NIR spectral region, Raman is a more attractive option for a wide range of applications than ever before.

How to select between a Raman system with a 785 nm laser and one with a 532 nm laser?

The 785 nm version is designed to minimize the fluorescence signal — making it useful for chemical identification and fingerprinting. Additionally, the 785 nm version generates well-defined peaks for use in chemometric analysis and can provide semi-quantitative data. Other wavelength options are available.

For applications where C-OH structural is important, the 532 nm version is your best option. Such measurements are typical of biological and pharmaceutical sample analysis where researches study characteristics of active ingredients, binders, fillers and excipients.



Raman is extremely versatile for measuring multiple sample types and comes with sampling accessories, software and USB connectivity that enables true plug and play operation