LONG-WAVELENGTH DISPERSIVE 1064NM RAMAN:

COUNTERFEIT OR GENUINE MATERIAL IDENTIFICATION – RUM, SHAMPOO, ET. AL.

Increased capability for identifying genuine versus counterfeit materials is achieved by using dispersive 1064nm Raman analyzers.

Counterfeiting is a growing problem that reaches to all different types of consumer and non-consumer products. This can result in significant loss of revenue for manufactures of genuine products and ill effects for consumers. Counterfeit products are made with similar physical characteristics to the genuine product making it difficult to distinguish between the two. However if the chemical characteristics of the counterfeit and genuine product are different then they will behave differently when used, sometimes with disastrous effects.

Raman spectroscopy is a powerful technique for chemical identification. The nondestructive Raman analysis produces chemically specific spectra and enables accurate identification. Two examples of counterfeiting are shown, methanol in drinking alcohol and counterfeit shampoo. Alcohol produced for human consumption should contain only ethanol; however there have been problems with drinking alcohol containing methanol, which can cause a variety of health problems including death. Some drinking alcohols and many shampoos are colored. Often colored materials show significant fluorescence when Raman spectrometers with 532nm or 785nm excitation are used. This fluorescence reduces the signal to the background noise ratio, can significantly increase the acquisition time, and reduces the number of peaks available for chemical identification.

Ideal for:

- Drug polymorphs/solvates identification and classification
- Identification of drug crystals
- Content analysis of tablets, gel caps, and liquids
- QA/QC of API, additives, and excipients
- Fast analytical tool for High Throughput Screening

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New lasers, optics, and detector technology originally developed for the telecommunications industry has allowed Rigaku to develop multiple handheld and laboratory Raman analyzers including systems with 1064nm excitation. The long excitation wavelength enables significant reduction in fluorescence while the small size and dispersive grating, with no moving parts; improve reliability for on-site and laboratory chemical identification.

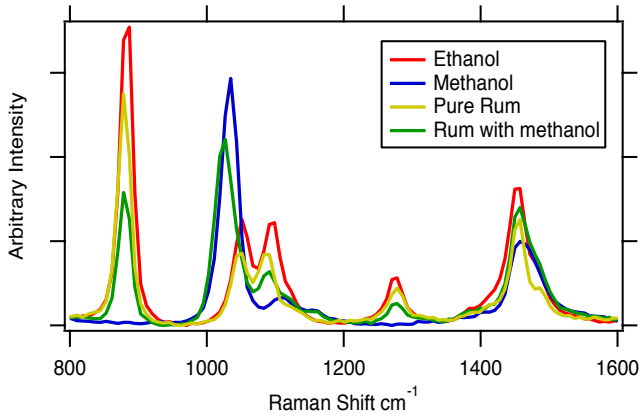

Figure 1: 1064 nm Raman spectra showing the difference between Rum with and without methanol.

Figure 1 shows 1064 nm Raman spectra of ethanol, methanol, pure Rum and Rum to which methanol was added. The Figure shows that pure ethanol and methanol have quite different Raman spectra. This makes it easy to tell the difference between the Rum that contains only ethanol and that which also contains methanol.

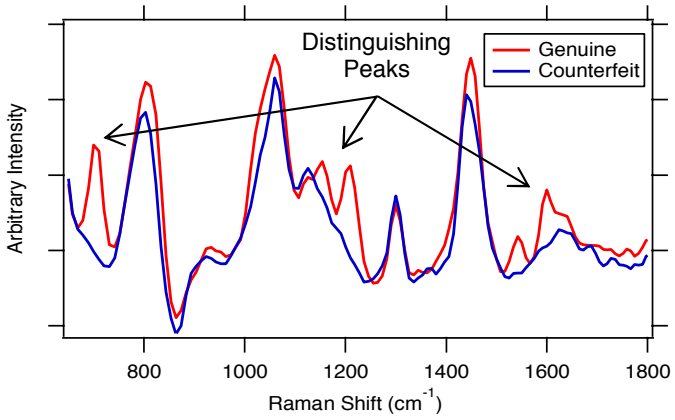

Figure 2: Raman spectra of genuine and counterfeit shampoos measured with 1064nm excitation.

Figure 2 shows the Raman spectra collected from both genuine and counterfeit shampoo samples, 1064 nm laser excitation was used to collect these spectra. When 785 nm or 532 nm excitation was used with these samples a large fluorescence band is seen which obscures all but the strongest Raman bands. However, when the 1064nm excitation was used, very clear Raman bands are seen and these bands allow for a clear distinction between genuine and counterfeit shampoos.

In action

The FirstGuard™ analyzing a sample.

Rigaku Raman Technologies, Inc.

1101 McKay Drive, Suite B
San Jose, California 95131 USA

Tel: (+1) 408-705-6560
Fax: (+1) 408-579-1095
Email: info@rigakuraman.com
www.rigakuraman.com