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Whitepaper

Quantitative laser Raman spectroscopy of gases

Abstract: Laser Raman spectroscopy is a powerful analytical technique that is used in a variety of applications for the compositional analysis of solid, liquid and gaseous samples. This whitepaper looks at some examples of how Raman systems can be used to quantitatively measure the composition of gas mixtures with high measurement precision, sensitivity and trueness.

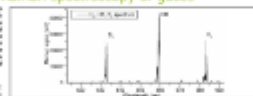


Figure 1: Raman spectrum of a gas mixture showing characteristic peaks.

When "backscattered" photons interact with a molecule, where the photon can be scattered with "elastic" or "inelastic" scattering. When the spectrum of the scattered light is observed, each of the scattered photons is a characteristic of the molecule. The intensity of the scattered light is proportional to the concentration of the molecule in the sample. The intensity of the scattered light is also proportional to the concentration of the molecule in the sample.

The Raman signal for any given component is calculated for the entire spectrum in the region of interest. The Raman signal for any given component is calculated for the entire spectrum in the region of interest.

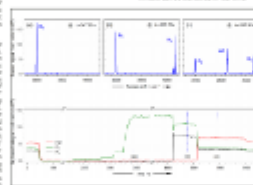


Figure 2: Multiple Raman spectra plots showing intensity versus wavenumber for different gas mixtures.

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Quantitative Laser Raman Spectroscopy of Gases

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