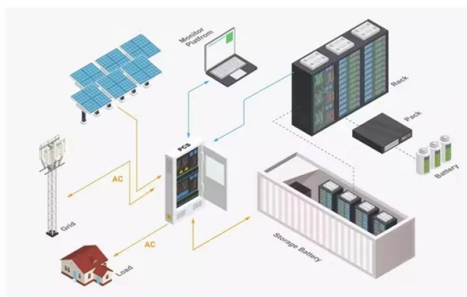


Can you detect vibration in a spectrometer



AI Overview

Yes, spectrometers such as IR and Raman instruments can detect molecular vibrations by measuring how molecules absorb or scatter light at specific vibrational frequencies.

How Vibrations Are Detected

Molecules are in constant motion, and their atoms vibrate around equilibrium positions. These vibrations include stretching (changes in bond length) and bending (changes in bond angle) and occur at characteristic frequencies determined by atomic masses and bond strengths. Spectrometers detect these vibrations by interacting light with the sample:

- Infrared (IR) Spectroscopy: Measures absorption of infrared light. A vibration is detected if it causes a change in the molecule's dipole moment. The resulting spectrum shows peaks at frequencies corresponding to specific vibrational modes.
- Raman Spectroscopy: Measures inelastic scattering of monochromatic light (usually from a laser). Vibrations are detected if they induce a change in the molecule's polarizability. The frequency shift in scattered light corresponds to vibrational energy levels.

Instrumentation

Modern IR spectrometers often use Fourier Transform Infrared (FTIR) technology, w...

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The Definitive Guide to Vibration Analysis: From FFT to AI

A complete guide to vibration analysis. Learn how sensors work, how to read FFT spectra,

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Vibrational Spectroscopy

Like all molecular energies vibrational energies are quantized, and all the allowed vibrational energy for a particular system can be

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A Guide to Vibration Spectroscopy: Understanding IR and Raman

IR and Raman scattering spectroscopy provide complementary information of molecular vibrations, with the former

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Fundamentals of Vibrational Spectroscopy | Nanopowder and

Applications of Vibrational Spectroscopy Chemical Identification and Structural Analysis: Vibrational spectroscopy is

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Raman spectroscopy

In the years following its discovery, Raman spectroscopy was used to provide the first catalog of molecular

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Spectroscopy: A Measurement Powerhouse | NIST

Spectroscopy. It may not be a household term, but it is one of the most popular and powerful measurement

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Guide to FT-IR Spectroscopy | Bruker

Though IR spectroscopy has become a somewhat general term for the chemical analysis technique where molecular vibrations are

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Vibrational Spectroscopy: Principles and Applications

Vibrational spectroscopy is an analytical method used to investigate materials at a molecular level. It operates by

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Module 1: Fundamentals of Spectroscopy

Module 1: FUNDAMENTALS OF SPECTROSCOPY It's amazing how much we can learn about molecules and materials by shining

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Estimation and correction of the influence of an IR spectrometer on ...

The influence of vibrations on accuracy of the measurement was observed on MIPAS – ENVISAT and in PFS Mars

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Defining Vibration Spectrum Analysis

Vibration spectrum analysis transforms time data into a spectrum, such as the frequency spectrum. Learn the definition and analysis

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It connects to a machine or component directly, and, once placed, can detect vibrations through various means –

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Learn about different vibration measurement products to better help you perform vibration testing quickly,

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Infrared Spectroscopy

Infrared spectroscopy can also be applied in the field of quantitative analysis, although sometimes it's not as accurate

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Introduction to vibrational spectroscopies

Vibrational spectroscopy may be defined as a non-destructive identification tool that measures the vibrational energy in a compound.

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8.10: Vibrational Spectroscopy Techniques

Infrared spectroscopy is a commonly used technique in the identification of molecular compounds. It is also a very

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Selection Rules: In vibrational spectroscopy, not all vibrations can be detected. A vibration must cause a change in

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Spectrometer

Figure 3 depicts the important features of simple instrumentation that can be used for absorption spectroscopy, and a typical

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Vibration Measurement Guide: Tools & Techniques | Fluke

These vibrations can originate from various sources and are often early indicators of issues such as

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Infrared spectroscopy

Infrared spectroscopy (IR spectroscopy or vibrational spectroscopy) is the measurement of the interaction of infrared radiation with

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Spectrum Analysis in Vibration

Discover the ultimate guide to spectrum analysis in vibration analysis, covering the basics, applications, and best

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Vibrational Spectroscopy

Infrared spectroscopy (IR spectroscopy or Vibrational Spectroscopy) is the spectroscopy that deals with the infrared region of the

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Vibrational Spectra

By analyzing vibrational spectra, we can identify chemical species and elucidate in details their structure and dynamics. Thus,

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How Spectrum Analyzers Are Used in Vibration and Acoustics Testing

Applications in Vibration Testing Vibration testing is crucial for ensuring the durability and reliability of mechanical

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3.7A: Vibrational Spectroscopy

All molecules are constantly vibrating, and can absorb energy from an incoming photon to increase their vibrations. The two types of

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Infrared (IR) spectroscopy: Uses of IR spectroscopy | Resource | RSC ...

Absorption of infrared radiation brings about changes in molecular vibrations within molecules and "measurements" of

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Vibration detection: its function and recent advances in medical ...

Here, we briefly describe the function of vibration detection and how it can be used for medical applications by way of whole body

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Vibrational Spectroscopy

Vibrational spectroscopy measures the vibrations emitted from a sample when a broad source of radiation is applied. Infra-red (IR)

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The Analysis of Vibrational Spectra: Past, Present and Future

Vibrational spectroscopy can be said to have started with the seminal work of Coblentz in the 1900s, who recorded

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Unlocking Molecular Secrets with Vibrational Spectroscopy

Some of the key benefits of Vibrational Spectroscopy include: Non-destructive analysis: Vibrational Spectroscopy

Contact Us

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