

Ion Spectrometer



Article Overview

An ion spectrometer, particularly an ion mobility spectrometer (IMS), separates and identifies ionized molecules in the gas phase based on their mobility in a carrier gas, providing rapid and sensitive chemical analysis.

Overview

An ion spectrometer is an analytical device used to detect, separate, and characterize ions in the gas phase. The most common type, ion mobility spectrometry (IMS), measures how ions move through a buffer gas under an electric field. The separation depends on the ion's size, shape, charge, and interactions with the gas, allowing identification of molecules even with similar masses or chemical structures .

How It Works

In IMS, ions are introduced into a drift tube where a uniform electric field propels them through a neutral gas. Ions with higher mobility reach the detector faster, producing a spectrum that reflects their chemical composition. Advanced gating systems, such as Bradbury-Nielsen shutters, control ion pulses for precise measurements. The ion mobility (K) is calculated from the drift time, electric field, and tube length .

Types of Ion Spectrometers

- Drift Tube IMS (DTIMS): Measures ion drift time in a uniform electric field.
- Traveling Wave IMS (TWIMS): Uses a moving electric wave to separate ions....

Article Content

Ion mobility spectrometry

Ion mobility spectrometry (IMS) is a method of conducting analytical research that separates and identifies ionized molecules present

timsTOF | Bruker

Ion mobility spectrometry (IMS) is a powerful analytical technique that has been widely applied over the

Ion Mobility Spectrometry

Differential mobility spectrometry (DMS) and ion mobility spectrometry are analytical techniques used to

Fundamentals of ion mobility spectrometry

Ion mobility spectrometry (IMS), in which electric fields are used to drag analytes through a buffer gas, is useful for

Ion-mobility spectrometry-mass spectrometry

Ion mobility spectrometry-mass spectrometry (IMS-MS) is an analytical chemistry method that separates gas phase ions based on

Mass Spectrometry

What mass spectrometry is, how it works, and what the technique is used for in analytical chemistry and other sciences.

the mass spectrometer

Ion stream C is the least deflected - it contains ions with the greatest mass/charge ratio. It makes it simpler to talk about this if we

Secondary ion mass spectrometry

Solid samples can be imaged and chemically analysed using secondary ion mass spectrometry. This Primer describes

Mass spectrometry | Definition, Applications, Principle, & Facts ...

Mass spectrometry, analytic technique by which chemical substances are identified by the sorting of gaseous ions in

Contemporary ion mobility spectrometry applications and future trends ...

Ion Mobility Spectrometry (IMS) has gained relevance in the field of analytical techniques over the past decades. If

Ion Mobility Spectrometer (IMS)

At the heart of this module is a silicon chip that integrates an ion filter and ion detector and is designed as a

What is Mass Spectrometry | Scripps Research

A mass spectrometer determines the mass of a molecule by measuring the mass-to-charge ratio (m/z) of its ion. Ions are generated

Ion-mobility spectrometry-mass spectrometry

Ion-mobility spectrometry-mass spectrometry Ion mobility spectrometry-mass spectrometry (IM-MS) workflow Ion mobility

Mass Spectrometry Tutorial (Dr. Kamel Harrata) | Chemical ...

Mass spectrometry consists basically of weighing ions in the gas phase. The instrument used could be considered a sophisticated

Ion-Mobility Spectrometry

Ion Mobility Spectrometry (IMS) is defined as an analytical technique that provides rapid gas phase separations and is increasingly

Mass Spectrometry Basics

Mass spectrometers weigh atoms and molecules. 1 A mass spectrometer produces charged particles (ions) from the chemical

Ion source

Mass spectrometer EI/CI ion source An ion source is a device that creates atomic and molecular ions.

Mass Spectrometry Instruments and Tools Explained | Waters

Explore essential mass spectrometry tools and instruments used in modern labs, including MS systems, detectors, and supporting

Ion Mobility Spectrometry: Fundamental Concepts, Instrumentation ...

Ion mobility spectrometry (IMS) is a rapid separation technique that has experienced exponential growth as a field of

16.1: Mass Spectrometry

An outline of what happens in a mass spectrometer Atoms can be deflected by magnetic fields - provided the atom is first turned into

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