Gas Required for Spectrometers



Overview

Gas Supply Requirements Ensure that the laboratory site meets the gas requirements as listed in the following table. NOTE If the location of your gas suppl.

Key Takeaways

Mass spectrometers require high-purity gases, typically nitrogen or helium, delivered at specific pressures and free from contaminants to ensure accurate and reliable operation.Types of Gases
• Nitrogen (N_2): Commonly used as a source gas, collision gas, and C-Trap bath gas in instruments like the Orbitrap Astral. Ultra-high purity (UHP, 99.999%) nitrogen is mandatory for optimal performance .

• Helium (He): Often used as a carrier gas in gas chromatography-mass spectrometry (GC-MS) systems for sample transport and separation .

• Other gases: Depending on the instrument, high-purity argon or hydrogen may be used for specific ionization or collision processes .
Purity Requirements
• Ultra-high purity (UHP, 99.999%) is required for critical functions such as reagent carrier gas and collision gas .

• High purity (HP) gases may be acceptable for less critical functions, but contaminants like particulates, oils, or moisture can damage the instrument .

• Avoid using particulate filters in gas lines, as they can introduce contamination .
Pressure and Delivery
• Typical nitrogen pressure for Orbitrap instruments: 600 ± 50 kPa (87 ± 7 psi), with a maximum line pressure of 650 kPa (94 psi), .

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• Gas lines must be clean, free of particulates and oils, and made of suitable materials such as copper or stainless steel for UHP gases .

• If the laboratory gas supply serves multiple instruments, a pre-regulator should be installed to maintain stable pressure for the spectrometer .

• Tubing length and connection fittings (e.g., 1/8” Swagelok) should be compatible with the instrument and allow easy access for installation and maintenance .
Consumption Considerations
• Gas consumption varies depending on the type of analysis and instrument usage. Continuous operation can require significant volumes of gas .

• Ensure the supply system can maintain the required pressure and purity even when other laboratory equipment is using the same gas source .
Summary

For reliable spectrometer operation, laboratories must provide high-purity gases at controlled pressures, with clean, compatible delivery lines. Nitrogen and helium are the most common gases, with UHP nitrogen being essential for collision and carrier functions. Proper installation, monitoring, and maintenance of gas lines are critical to prevent contamination and ensure accurate mass spectrometry results .

Article Content

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Gas Analysis by Mass Spectrometry

Small gas volume and high precision requirements (quantitation and m/z resolution) make dual-focusing sector systems the best

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20.3: Mass Spectrometers

As we noted in Chapter 11, a mass spectrometer must operate under a vacuum to ensure that ions can travel long distances without

4.3: Mass Spectrometers

Figure $4.3.1$ provides a general view of a mass spectrometer, and the requirements are described briefly below. Note that the

Gas Supply to Your Mass Spectrometer: Focus on Tubing

Choosing the correct tubing to supply gas to your mass spectrometer is an important decision. Discover what you should consider

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A liquid chromatographic system with a mass spectrometric detector (LC-MS) requires a supply of nitrogen as the

Spectrometer

A spectrometer is any instrument used to view and analyze a range (or a spectrum) of a given characteristic for a substance (e.g., a

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This tutorial discusses basic aspects of mass spectrometry that will be helpful to you in deciding the proper techniques and

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Mass spectrometry (MS) is an analytical technique that is used to measure the mass-to-charge ratio of

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Mass spectrometers are widely used in laboratories for educational purposes and in the field to study the emission of molecules.

4.11: Mass Spectrometry

Typically, liquid chromatography systems are paired with ESI-quadrupole mass spectrometers to take advantage of

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Learn about the basic principle of gas chromatography mass spectrometry (GC/MS). This GCMS primer explains the fundamentals

Nitrogen gas and Liquid nitrogen for your NMR instrument

In order to work, NMR spectrometers require nitrogen or liquid nitrogen to maintain the temperature of the superconducting magnet.

How the Mass Spectrometer Works

How a mass spectrometer works An outline of what happens in a mass spectrometer Understanding what''s going on The need for a

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The results unequivocally demonstrate that gas purge is a simple yet highly effective and efficient method to remove water vapor and

General Chapters: MASS SPECTROMETRY

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Gas and liquid chromatographs are widely used as sample inlet devices for mass spectrometers. These chromatographs provide for

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A mass spectrometer is a key tool for analyzing many substances. It has an ion source, a mass analyzer, and a detector. These

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

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Mass Spectrometry Basics

Mass spectrometers are often combined with equipment that separates compounds in mixtures before the compounds are

Gas Chromatography

Gas chromatography is a term used to describe the group of analytical separation techniques used to analyze volatile substances in

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In recent years, the various components of gas generation systems have been integrated into a single system to

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