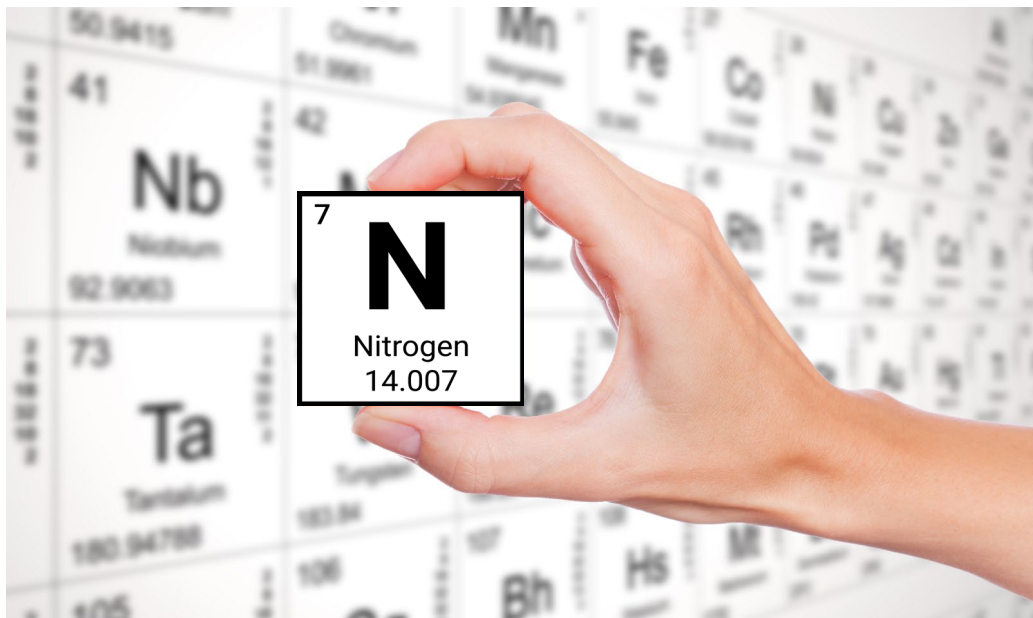


The importance of nitrogen in Mass Spectrometry

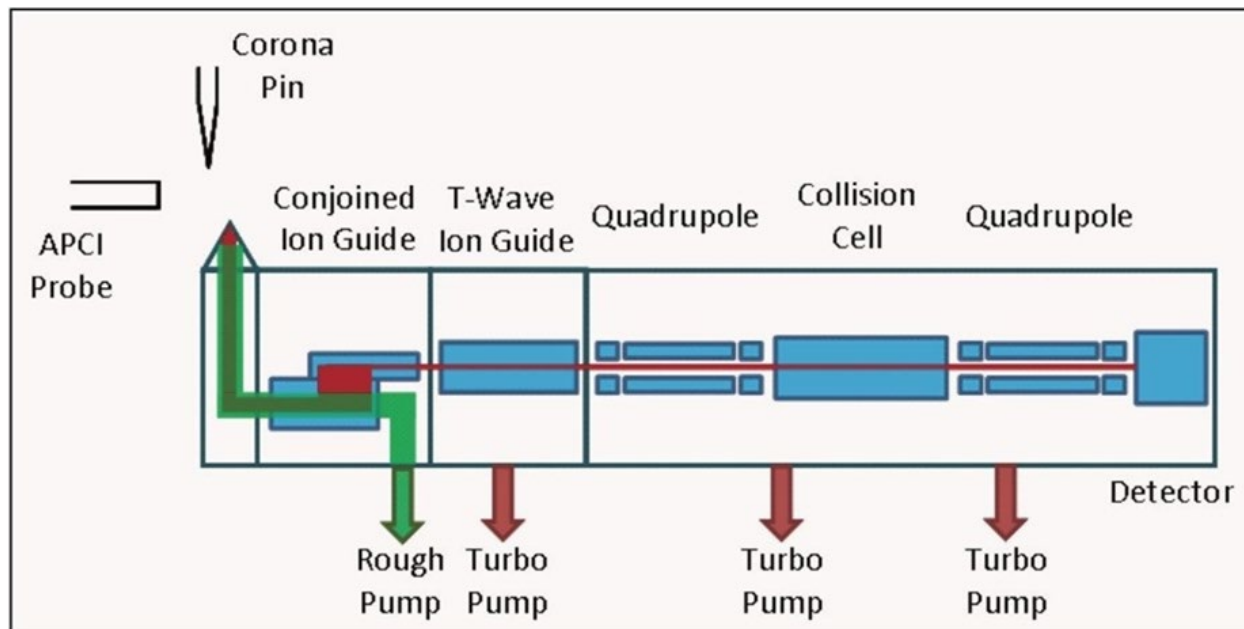


Nitrogen gas is commonly used in **mass spectrometers** for several reasons. First, it serves as a collision gas in collision-induced dissociation (CID) experiments. In CID, high-energy collisions between ions and nitrogen gas molecules cause the fragmentation of ions, which can then be manipulated and analyzed, providing consequently valuable structural information.

Nitrogen is therefore employed as the **make-up gas in the ionization source** of a mass spectrometer.

Considering that nitrogen is an inert gas, it does not readily react with other molecules, therefore it helps maintaining a constant pressure in the ionization region. This property makes it suitable for creating a **controlled and stable environment** within the mass spectrometer, minimizing unwanted chemical reactions or interferences.

When a sample is introduced into the ionization source, it undergoes various ionization techniques such as electron impact ionization or chemical ionization. Nitrogen gas acts as a quenching agent, reducing the formation of unwanted background ions. During the ionization process, energetic electrons or ions can collide with neutral molecules, leading to undesired ionization events. By introducing nitrogen gas into the ionization source, it acts as an inert medium, reducing the likelihood of such collisions and minimizing background interferences. This enables a **cleaner and more precise analysis of the sample**.



**Mass Spectrometer functioning diagram*

Furthermore, nitrogen gas assists in the **efficient transfer of ions** from the ionization source to the mass analyzer. It provides a medium through which the ions can travel and be directed towards the mass analyzer for subsequent analysis. The controlled flow of nitrogen gas helps maintain a steady ion stream, enabling optimal ion transmission and minimizing losses.

In summary, the use of nitrogen gas in the ionization source of a mass spectrometer ensures stable operating conditions, reduces unwanted background ions, and aids in the efficient transfer of ions for analysis. By creating a controlled environment and minimizing interferences, nitrogen gas contributes to the **accurate determination of molecular masses and the identification of compounds in a sample.**

In addition to the essential role of nitrogen gas in the ionization source, the use of a nitrogen gas generator alongside a mass spectrometer offers several advantages. A **nitrogen gas generator** is a device that produces high-purity nitrogen gas on-demand, eliminating the need for traditional nitrogen gas cylinders.

One major benefit of using a nitrogen gas generator is a continuous and reliable supply of nitrogen gas. Unlike cylinders that need to be replaced when emptied, a generator can produce nitrogen gas on an ongoing basis, ensuring **uninterrupted operation of the mass spectrometer**. This eliminates downtime associated with cylinder changeovers and reduces the need for frequent gas deliveries.

Another advantage is the **cost-effectiveness of a nitrogen gas generator**. By producing nitrogen gas on-site, the expenses associated with purchasing and maintaining gas cylinders are significantly reduced.

The generator operates by utilizing compressed air and a filtration system to separate and purify nitrogen gas, making it a more economical option in the long run.

Nitrogen gas generator provides a consistent purity of nitrogen gas. It typically produces **high-purity nitrogen** with low levels of impurities such as oxygen, moisture, and hydrocarbons. This purity is essential for achieving accurate and reliable results in mass spectrometry analysis, as any impurities can affect the ionization process and lead to erroneous measurements.

With a gas generator, researchers can have confidence in the quality and consistency of the nitrogen gas used in their mass spectrometer.



Additionally, a nitrogen gas generator offers a **space-saving solution**. Traditional gas cylinders require storage space and can be bulky, while a generator is compact and can be easily integrated into the laboratory setup. This helps optimizing the available space and provides flexibility in the placement of the mass spectrometer system.



In summary, the use of a nitrogen gas generator alongside a mass spectrometer provides a continuous and reliable supply of high-purity nitrogen gas. It offers **cost savings, consistent gas purity, and space efficiency**. These benefits contribute to improve operational efficiency, enhanced accuracy in mass spectrometry analysis, and a more convenient and economical workflow for researchers and laboratories.

LabTech develops innovative gas generators that can be used whenever high-quality nitrogen gas and rapid flow changes are required. The LN series is designed especially for analytical and industrial use, providing an **accurate control of the supply of nitrogen gas**.

Considering the running costs, safety issues and the risk of running out of gas during operations, the LN series is the most **advanced and reliable gas generating solution** available.