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Synchronized Discharge Ionization

A novel synchronous discharge ionization technique improves gas mass spectrometry analysis by reliably sampling constant-volume gas pulses for enhanced quantitative reproducibility.

Mass spectroscopy technology for chemical analysis has seen significant advancements in reliability, size, and ease of use; however, methods for direct analysis of gases have lagged. There is an unmet need for improved techniques for direct gas sampling and ionization.

Researchers at Purdue University have developed a novel technique for sampling and ionizing gases using synchronous discharge ionization. Pulses of neutral gas are introduced directly into the vacuum chamber of the mass spectrometer. Each pulse that enters the chamber is a constant volume of gas at atmospheric pressure. The ionization source is located inside the vacuum chamber and is pressure sensitive. When the pulse of gas is introduced into the vacuum chamber, pressure in the chamber increases, the ionizer is triggered, and sample ions move on for mass analysis. Following analysis, pressure returns to normal and the machine is ready for another sample. This sampling and ionization technique is compatible with virtually any mass analysis mechanism. Reproducibility of quantitative analysis is improved as a constant volume of atmospheric pressure gas is sampled during each pulse.

Advantages:

-Compatible with other mass analysis mechanisms

-Improved reproducibility of quantitative analysis

Potential Applications:

-Mass spectrometry

TRL: 4

Intellectual Property:

Technology ID
65881

Category
Materials Science & Nanotechnology/Materials Testing & Characterization Tools
Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

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Provisional-Patent, 2011-05-20, United States | EP-Patent, 2012-05-15, Germany | EP-Patent, 2012-05-15, France | DIV-Patent, 2012-05-15, European Patent | EP-Patent, 2012-05-15, United Kingdom | PCT-Patent, 2012-05-15, WO | NATL-Patent, 2012-05-15, European Patent | NATL-Patent, 2013-10-21, United States | NATL-Patent, 2013-11-19, Japan | Provisional-Patent, 2014-06-16, United States | CON-Patent, 2014-06-16, United States | PCT-Patent, 2015-06-16, WO | NATL-Patent, 2016-12-14, United States

Keywords: Mass spectroscopy, chemical analysis, direct gas sampling, gas ionization, synchronous discharge ionization, mass spectrometer, vacuum chamber, atmospheric pressure gas, constant volume sampling, quantitative analysis reproducibility