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Logical Operations in Mass Spectrometry

A conceptual extension of mass spectrometry efficiently explores three-dimensional data from a single injection, minimizing time and material usage, particularly benefiting ion traps and miniature instruments.

The information in tandem mass spectrometry (MS/MS) is a three-dimensional data domain which, as of right now, can only be accessed by zero or 1-dimensional experiments that explore a 2-dimensional data domain. These traditional MS/MS scans might require the sampling of multiple ion populations to answer structural questions. A method that could explore a 3-dimensional data domain following a single ion injection event would provide more options to explore the data space.

Researchers at Purdue University have developed a new methodology for operating a mass spectrometer that provides efficient routes from the large block of MS/MS data to answer particular structural questions. It is a major conceptual extension of MS/MS that allows experiments which explore the 3-dimensional data domain of MS/MS. Only data space relevant to the question is explored, minimizing time and ion utilization. This methodology is particularly valuable for ion traps and miniature in situ mass spectrometers, but the concepts could readily be extended to other types of mass spectrometers including triple quadrupoles.

Advantages:

-Extends power of MS/MS experiments

-Provides more options to explore data space

-Minimizes time and ion utilization

Potential Applications:

-Miniature instruments

-Ion traps

-Multi-analyzer instruments

Technology ID

2018-COOK-68210

Category

Artificial Intelligence & Machine Learning/AI-Integrated Imaging Systems & Industrial Vision and Inspection

Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

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TRL: 4

Intellectual Property:

Provisional-Patent, 2018-03-23, United States | PCT-Patent, 2019-03-18, WO | NATL-Patent, 2020-09-23, United States | CON-Patent, 2021-08-13, United States | CON-Patent, 2023-01-03, United States

Keywords: tandem mass spectrometry, MS/MS, 3-dimensional data domain, mass spectrometer methodology, ion traps, miniature in situ mass spectrometers, triple quadrupoles, multi-analyzer instruments, data space exploration, ion utilization, Analytical Instrumentation, Chemical Engineering, Chemical Weapons, Chemistry and Chemical Analysis, Illicit Drugs, Ion Traps, Pharmaceuticals, Structural Elucidation, Tandem Mass Spectrometry