ION MOBILITY SPECTROMETER

A FAST, SENSITIVE AND ROBUST HPLC ALTERNATIVE

ION MOBILITY SPECTROMETRY (IMS) is an emerging technique in the field of chemical analysis. Due to its excellent sensitivity, high speed and robustness, IMS has achieved extensive acceptance in many applications specially for detecting narcotics, explosives, drugs and contaminants.
IMS-200 Ion Mobility Spectrometer, a new and modern instrument manufactured by TOF Tech. Pars Company, is competitive to GC and ideal for academic research and industrial applications. It has the advantage that it can determine the presence or absence of an organic chemical in seconds.
IMS-200 benefits from THE INVERSE TECHNIQUE, which will IMPROVE RESOLUTION UP TO 60%. it is PATENTED.

Principle of Operation

The ions in question are generated by atmospheric-pressure chemical ionization. Sample material is heated to yield a vapor that is swept into a small ionization chamber where a patented corona discharge ionization source ionizes the molecules. The resulting ions are pulsed and accelerate towards a detector in a drift region, where they are separated according to size, mass and geometry. The ion current is plotted as a function of time to record an ion mobility spectrum.

Applications

- SECURITY
  Detection of Explosive And Narcotics
- ENVIRONMENT
  Detection of Chemical Vapors
  Detection of Air Pollutants And Waters
- FOOD CHEMISTRY
  Detection of Agricultural Pesticides
  Detection and Determination of Additives
  Determination of Antibiotics in Meat
- FUNDAMENTAL RESEARCH
  Analaytical Chemistry: Determination of Trace amounts of Chemicals in Different Matrices Such as: Blood Plasma, Saliva, Breath, Chewing Gum, Chicken Meat, Tablets, Syrups, ..
  Physical Chemistry: Study of Kinetics and Thermodynamics of Ion-Molecule Reactions
  Measuring Transport properties; Mobility and Diffusion Coefficient
  Determination of Proton Affinity and Electron Affinity
  Study of Gas Phase Ion Chemistry
  Instrumentation: Characterization of Different Atmospheric Pressure Ionization Sources

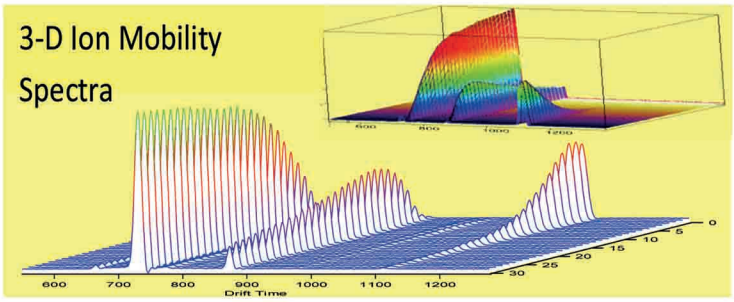
Specifications

Measuring principle	ION MOBILITY
Reduced mobility range	0.1-10
Ionization	CORONA DISCHARGE
Sampling	SOLID, LIQUID, OR GAS
Sensitivity	ppb
Detection	ELECTRICAL CURRENT
Dynamic range	ppb - ppm
The amount of sample	NANOGRAM OR MICROLITER
Ion polarity	POSITIVE/NEGATIVE
Communication	USB PORT
Powering	220-250 V, 2 A
Work temp. range	0-50 °C
Humidity working range	0-50%
Software	WINDOWS
Drift field range	0-460 V/CM
Drift temperature range	25-200°C
Analysis time	≤ 5 SEC.
Weight	3 KG
Dimensions	15 x 20 x 32 CM

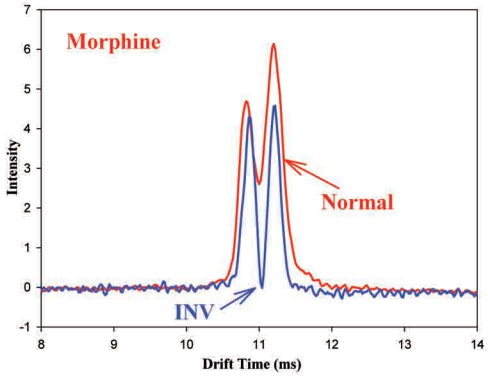
The Inverse Technique

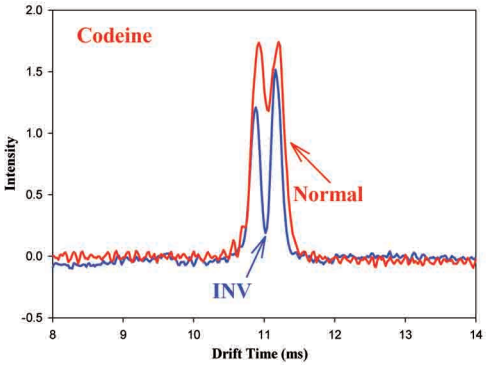
A novel method was proposed for enhancing the separation power of ion mobility spectrometry. In this technique, rather than generating an ion packet, a dip is created in the ion beam. The dip moves with the same velocity as the ion packet, and the detector reads an inverse peak at the same drift time as that of the normal operation.
Using this technique, we achieved 30 - 60% higher resolution compared to normal method.

Two close peaks that were not resolved via normal IMS are well resolved to the baseline using this technique. The main reason for the increased resolution is the absence of space charge in the dip. The charge of the species, which is the origin of further broadening, has been be employed to counteract the broadening by applying an inverted pulse to the shutter grid. This creates a gap that is traveling in an ion bath in which repulsion favors narrowing of the gap. This method is a simple but very effective way of increasing resolution.



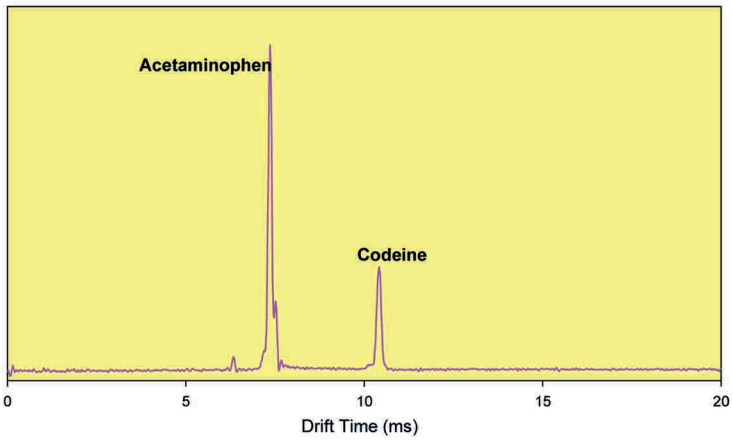
Instrumentation: Characterization of Different Atmospheric Pressure Ionization Sources





Analytical Application

Trace detection of:
Acetone in Breath, Exploseves, Tri-halomethanes in Water, Noscapine and Morphine, Aflatoxine in Pistash, Ammonia in Water, Methadone in Human Hair, Methamphetamin in Blood, Malasion, Antibiotics in chicken meat, Thiocyanate in saliva, Ochratoxin in licorice root, Testestron in Urine, ...



The injection tool only touches the sample.

Features

- Fast analysis; within few seconds
- Sensitive; detection in nano-gram scale;
- Simplicity; No need to vacuum pump
- Adjustable parameters; temperature, field and ion pulse width
- Non radioactive ionization source
- Enhanced resolution using unique Patented "Inverse Technique"
- Positive and negative polarity
- An intense electron source for negative polarity
- High signal to noise ratio
- Easy sampling and operation
- Economic
- Small scale (15 x 20 x 32 cm)

Industry and Market
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