

ION MOBILITY SPECTROMETER



Principle of Operation

IMS instrumentation is comprised of four major sub-components: an ion source, an ion gate, a drift region and a detector. Samples in solid, liquid or gaseous phase can be evaporated using an injection port and transferred into the reaction region of the IMS cell by carrier gas. Using the ion source, reactant ions are produced in atmospheric pressure and the product ions of sample might be produced from proton transfer reactions between analyte molecules and reactant ions. These ions move toward the detector, characterized by their gas phase mobilities in a weak electric field.

Specifications

Technology	Dual Ion Mobility Spectrometry (IMS)
Operating modes	Negative and positive
Detection limit	Nanogram to picogram range
Dynamic range	2-4 Orders of magnitude
Resolving power	Up to 70
Sampling	Solid, Liquid, Gas
Software	Specially developed for IMS in LABVIEW
Power	220 V, 900 W
Warm-up time	60 minutes
Analysis time	3-5 seconds
Operating temperature range	25 to 200 °C
Weight	30 kg
Dimensions	50 cm × 60 cm × 60 cm
Working conditions	0 to 25 °C, less than 50% humidity

Ion mobility spectrometry (IMS) emerged under the name of “plasma chromatography” in the 1960s and has been used for the trace detection of organic compounds. Simplicity, speed, low cost, ease of maintenance, and low detection limits (~ ppb) are luring scientists to IMS. Today, IMS is an accepted analytical method for qualitative and quantitative determination of trace amount of compound such as explosives, drugs, and environmental contaminants.

Ion mobility spectrometer model CD-1300 as a powerful analytical apparatus can be used for trace detection of various chemical compounds in both positive and negative modes, simultaneously. This instrument can be easily used as the detection system after various extraction techniques such as SPE, SMPE, and LPME, helping us to apply for different research in academic and industrial laboratories.

Applications

IMS (CD-1300) can be used for analysis of:

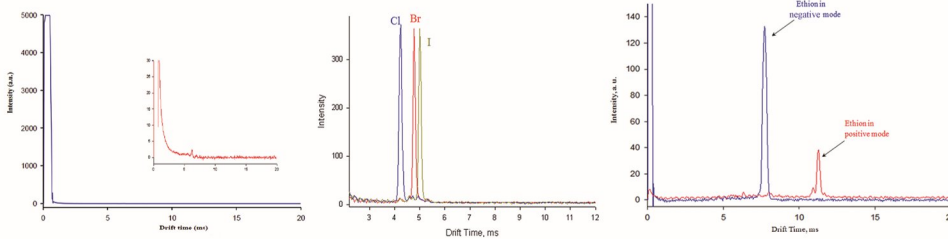
- Chemical gases (NO_x, SO_x, O₂, CO, CO₂, and halogens)
- Explosives (TNT, DNT, PETN, HMX, RDX, NG, ...)
- Illicit drugs (morphine, codeine, cocaine, heroin, methamphetamine, methadone, ...)
- Clinical drugs
- Biological amines
- Pesticides (insecticide, fungicide, and acaricide)
- Antibiotics (chloramphenicol, furazolidone, enrofloxacin, ...)
- Various chemical contaminants in environmental atmosphere, water, foodstuff and different biological matrices such as urine and plasma

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Innovation

Ionization source

In IMS (CD-1300), a novel design is used to establish the corona discharge without interference of negative ions (e.g. NO_x⁻, O₂⁻). This results in higher sensitivity, higher resolution, simplicity of spectrum interpretation, and analysis possibility of halogenated compounds, NO_x, SO_x, O₂, CO, or CO₂



Negative/positive switchable

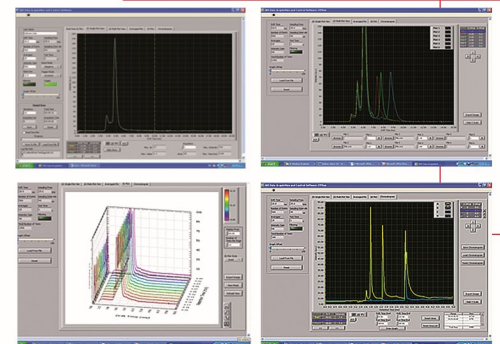
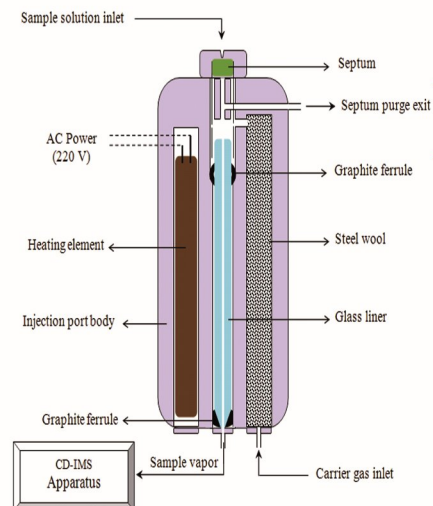
The IMS CD-1300 includes a specially designed high-voltage switch to change the instrument polarity, easily. So, tedious rearrangement of high-voltage cables do not required during the polarity selection.

Injection port

IMS, CD-1300, has an appropriate new injection port, resulting in possibility of direct injection of the known sample volume, without tedious sample preparation steps.

Software

The IMS (CD-1300) utilizes specially developed proprietary software. This software makes it easy to view ion mobility spectrum as well as quantitative results (height and area of the peak), when the instrument is in operating mode. The software also allows advanced operators to further review and analyze results in 3D and chromatogram format.



Features

- Corona discharge ionization source with a novel design
- All the equipments are incorporated in a unit box
- Simultaneous analysis in negative and positive modes
- Changing the polarity only by one switch
- Negative detection without interferences of NO_x or other negative ions
- Very fast analysis (< 5 sec)
- Very sensitive (~ pg)
- High signal to noise ratio
- Easy to use
- Simplicity, no vacuum needed
- Unique and specially developed proprietary software
- Novel designed injection port for accurate injection