ION MOBILITY SPECTROMETER (IMS)

TRACE DETECTOR FOR BENCHTOP GAS CHROMATOGRAPH

*Coupling available for Agilent GCs 6890/7890B and Shimadzu GC-2010 Plus

The stand-alone IMS by G.A.S. mbH enables the use of the IMS technology in very demanding gas phase applications where high separation capabilities and/or sensitivity are needed. Compared to other detectors the IMS offers a second dimension of separation and by that full orthoganality so that co-eluting compounds can still be separated before they are detected at low-/sub ppb level. According to the laws of IMS that operates at atmospheric pressure ions are separated by their mass and structure so that isomeric compounds can also be separated.

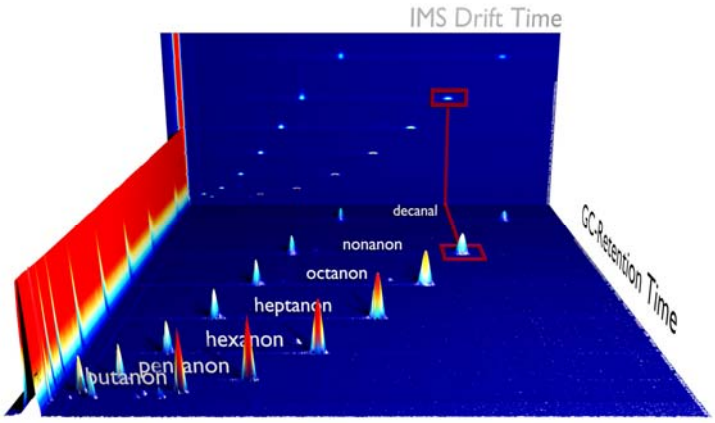
The applied tritium source with a low intensity lies below the exemption limit of the EU directive 29/96 EURATOM. The operation of the device can be in the positive mode to e.g. test for heteroatomic compounds while also performing with outstanding sensitivity in the negative mode for e.g. halogenated substances.

The device comes as ready-to-couple with softwares for setting of detector parameters same as drift gas flow. The provided transfer line is temperature-controlled to avoid 'cold spots'. With the oven exit on the right the GC-typical MSD (mass sensitive detector), usually located on the left side, can still be used in parallel.

ADVANTAGES

- **Sensitive:** Detection limits in the low **ppb_v ($\mu g/m^3$) range** for VOCs with heteroatoms like ketones, aldehyds, alcohols, amins or halogenated compounds
- **Selective** due to specific analyte ion drift times (2 dimensional separation, full orthogonality)
- **Flexible:** Positive and negative ion generation
- High GC sampling frequency
- **No licence for ^3H source required** according to EU directive 96/29 EURATOM
- High **reproducibility**
- Operation with **nitrogen or synthetic air**
- **A**tmospheric **P**ressure **I**onisation (API)
- Stand alone **data aquisition software** and software suite for **3D GC-IMS data analysis**
- **No** need for a **radiation protection officer**

TECHNICAL SPECIFICATIONS



2-dimensional separation of GC (ordinate) and IMS (abscissa)

APPLICATIONS

- Analysis of complex headspace compositions of raw material, foodstuff or beverages regarding flavour inducing compounds, e.g. [1]
- Support of sensory panels via impartial flavour documentation in quality control resp. off-smell detection
- Detection of low sulphurous compounds (H_2S, COS, DMS, mercaptanes) or halogenated hydrocarbons (methylene chloride, chloroform, e.g.) at low ppb-level
- Test for aldehydes, ketones, alcohols, siloxanes, carboxylic acids, aromatic compounds, esters, ether, terpenes, isocyanates, etc. [1-2]

1. Gerhardt, N. et al. Resolution-optimized headspace gas chromatography-ion mobility spectrometry (HS-GC-IMS) for non-targeted olive oil profiling. *Anal Biochem Chem* 409, 3933–3942 (2017). Link

2. Gerhardt, N. et al. Volatile Compound Fingerprinting by Headspace Gas Chromatography- Ion Mobility Spectrometry (HS-GC-IMS) for the Authenticity Assessment of Honey as Benchtop Alternative to 1H-NMR Profiling. *Anal Chem,* Article ASAP, available online, (2018). Link

MECHANICAL

Dimensions: Agilent version: 331x143x475 mm (HxWxD) Shimadzu version: 384x171x483 mm (HxWxD)
Transfer line: temperature-controlled ≤ 350°C
Driftgas inlet and outlet: 3 mm or 1/8“ Swagelok
Sample inlet: PEEK tubing, 0.5 mm inner diameter
Driftgas: N_2 / Synthetic air quality 5.0 (controlled by MFC)

ELECTRICAL

Communication: USB 2.0
Power consumption: max.40 W
Weight: 5 kg
DC input: 24 V DC ±10 %
Signal output: USB 2.0
Control interface: USB 2.0
Remote cable for synchronization IMS and GC

ION MOBILITY SPECTROMETER

Ionisation: ß-radiation
Source: Tritium (^3H) < 370 MBq → below the exemption limit of 1 GBq acc. to EURATOM 96/29
Maintenance: Routine check-up every 24 month
Detection limit: Typically low ppb-range
Dynamic range: typically 3 orders of magnitude

PC-SOFTWARE

- Stand alone data aquisition software (IMS sensor)
- Software suite for 3D data analysis (GC-IMS)
- GC-IMS Library Search (based on NIST R_I-indices 2014, license included)
- Software for MFC (drift gas mass flow controller)

Requirements: WINDOWS XP or later, USB 2.0

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