

## Specification

Resolution	>30,000 (FWHM)
Mass range	1 to 1,000 m/z
Ion-source	EI (Pos)
Sensitivity	<sup>132</sup> Xe(approx.30ppb in air) S/N>10
Mass accuracy	<0.002u (Internal Std) <0.005u (External Std)
Data recording speed	up to 50spectra/sec
Dimensions(mm)	W270 x H460 x D550
Weight	39kg

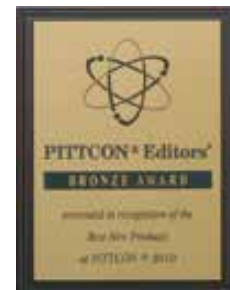


infiTOF-DUO

## Application

- Process gases monitoring for semiconducting manufactures
- Measurement of evolved gas from various materials by TPD-MS, TG-MS
- Analysis of trace components in Air and high-purity gas
- Contamination analysis of hydrogen gas for fuel cell
- Combustion gas analysis
- Isotope analysis

Pittcon2010  
Bronze Award



## World Leader in Aerosol & Gas Metrology

### Environment

- \* Measuring all green house gases simultaneously in real time
- \* Complex samples from air, soil, and water

### Energy

- \* Hydrogen and Helium isotopic differentiation
- \* Chemical differentiation of petroleum and derivatives
- \* Characterize combustion efficiency and byproducts

### Pharmaceutical

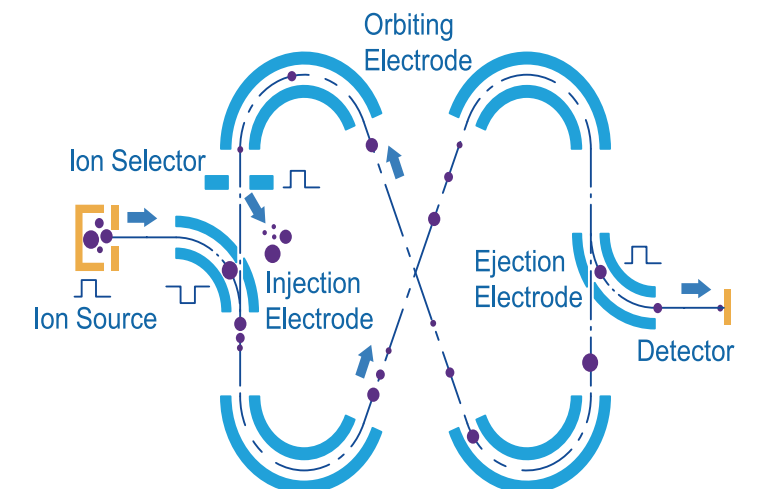
- \* Measure active/inactive ingredients in complex formulations
- \* Identify and quantify cannabinoids of interest

### High Purity Process Gases

- \* Specialty Gases for Semiconductor / and other areas

## INFI TOF Multi-turn Time-of-flight MS

- Highest resolution with the smallest footprint
- Readily optimize sensitivity and resolution for any case
- Combine with GC or TGA to analyze complex samples
- Resolution: >30,000 (FWHM @m/z 28)
- Mass range: m/z 0.8-1,000     - Ionization: EI



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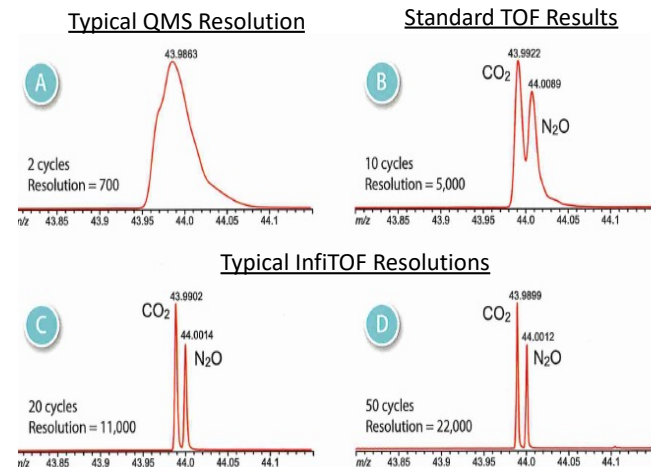


## Environment

- Measure all green-house gases with high resolution in real time ( $\text{CO}_2/\text{N}_2\text{O}$ ). Only one instrument is required to measure all greenhouse gases.

### Example

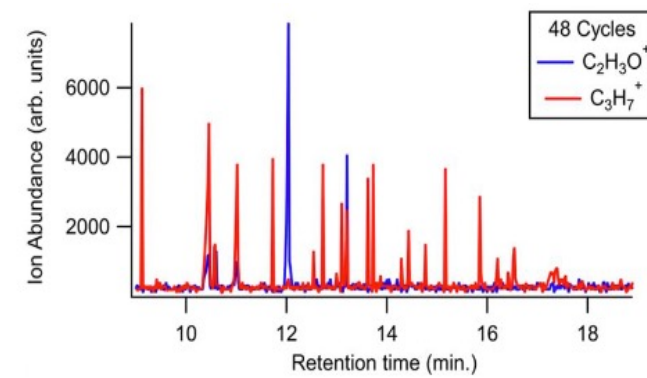
- Increasing the number of cycles through the InfiTOF achieves resolution well beyond QMS or lower resolution TOF instruments.



- Analysis of complex samples from air/soil/water

### Example

- Aerosol sample, mixture of organic molecules present in atmospheric conditions ( $\text{C}_2\text{H}_3\text{O}$  and  $\text{C}_3\text{H}_7$  are Acetyl and Isopropyl fragments).
- Data shown is pre-separated via GC.
- Advantage over standard to high-end TOF systems (2k – 8K). InfiTOF has a maximum limit of 30k-but much more cost effective.

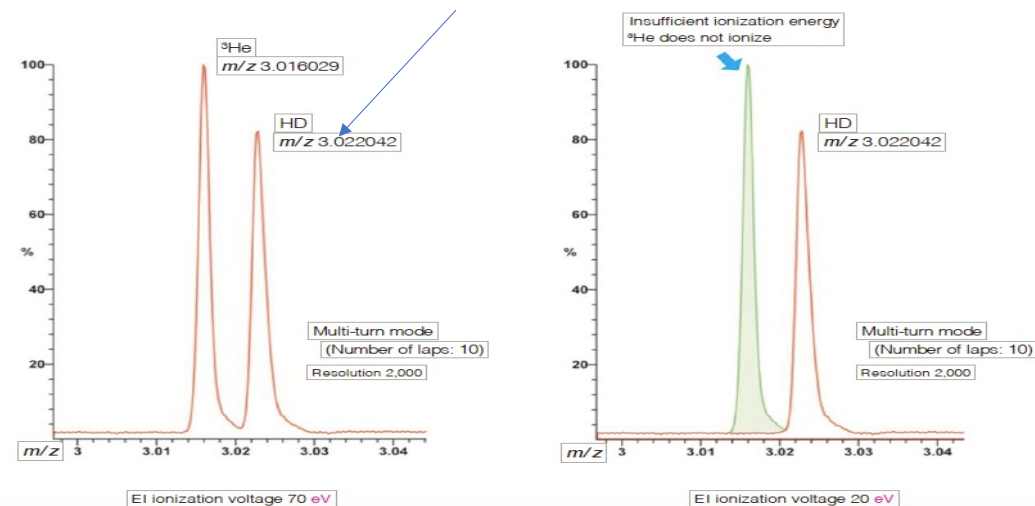


## Energy

- Hydrogen and Helium isotopic differentiation
- Chemical differentiation of petroleum and derivatives
- Characterize combustion efficiency and byproducts.

### Example

- Helium-3 ( $^3\text{He}$ ) is an isotope that exists in the atmosphere at only one millionth of helium-4 ( $^4\text{He}$ ), and is used in nuclear fusion research and neutron detection. Hydrogen Deuterium (HD) is  $^1\text{H} + ^2\text{H}$ . The example below shows that HD can be distinctly separated from  $^3\text{He}$  by the InfiTOF.

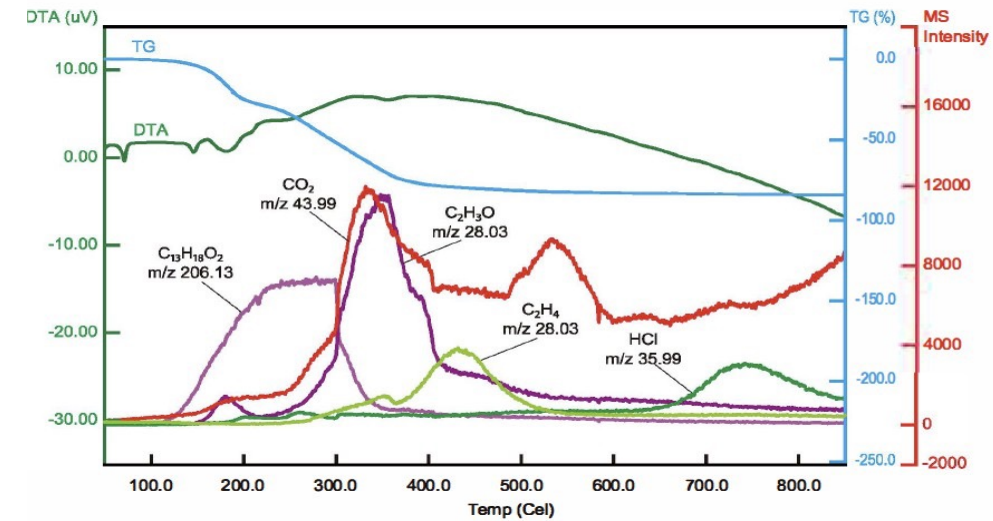


## Pharmaceutical

- Measure active/inactive ingredients in complex formulations
- Identify and quantify cannabinoids of interest
- Other

### Example

- TG/DTA analysis is used to confirm the thermal stability of the pharmaceuticals for safety reasons, and also as a qualitative analysis of the generated components. The below illustration shows how the InfiTOF can be used to confirm the presence and quantity of Caffeine ( $\text{C}_8\text{H}_{10}\text{N}_4\text{O}_2$ )--identified by fragments at (55,82,108,and 194) and Ibuprofen ( $\text{C}_{13}\text{H}_{18}\text{O}_2$ ).



## High Purity Process Gases (Semiconductor, other)

- Quality control for high purity gas providers used in semiconductor production, and other applications.
- Real-time 24/7 monitoring system.
- Advantages over Cavity Ring Down (CRDS) systems which require a unique laser / molecule. InfiTOF has super high resolution across a large mass range to detect any contamination that is present.

### Example

- Silane ( $\text{SiH}_4$ ) is used for polycrystalline deposition of interconnects or masking growth of epitaxial silicon. The InfiTOF detects Silane as a combination of  $\text{SiH}_3$  and  $\text{SiH}_2$ . With lower resolution TOF, both  $\text{SiH}_3$  and  $\text{SiH}_2$  would not separate Silane from the contaminants. Ideally only  $\text{N}_2$  and  $\text{SiH}_2/\text{SiH}_3$  should be present, but the higher resolution of the InfiTOF reveals many other contaminants (shown in pink).

