

Chromatographic
system

Tracera



Tracera: GC-2010 Plus in combination with BID detector

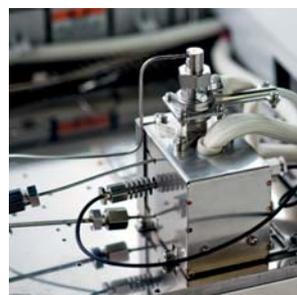
- The Tracera chromatographic system is based on the GC-2010 Plus gas chromatograph and is equipped with a unique highly sensitive Barrier Discharge Ionization Detector (BID).
- The Tracera system allows the determination of trace amounts of compounds of various natures that are difficult or impossible to determine using standard chromatographic detectors.

Ionization barrier discharge detector BID-2010 Plus

SHIMADZU discovers a new principle in helium ionization technology and introduces a state-of-the-art barrier discharge ionization detector (BID).

- With its combination of long-term stability and high sensitivity, the BID fills a previously existing gap in the detector lineup and falls between the reliable but low-sensitivity thermal conductivity detector and the highly sensitive but difficult to use pulsed discharge helium

ionization detector (PDHID). As in most helium ionization detectors, helium plasma is formed by electrical excitation of helium atoms. The discharge gas (ultra-pure helium) used for this purpose is fed into the detector head. Metal electrodes excite the helium and create a cold helium plasma. Ionization of substances occurs under the influence of light emitted by the helium plasma (energy 17.7 eV).



Barrier Ionization Detector (BID)

Stability

The electrodes are not contaminated because they do not have direct contact with the helium plasma: a thin quartz glass tube creates a dielectric barrier between the electrodes and the plasma. This is one of the reasons for the long-term stability of the barrier discharge ionization detector. Tests have shown that the relative sensitivity remains virtually unchanged even after more than 3,000 hours of operation.

Sensitivity

The sensitivity of the BID-2010 Plus is on average 100 times greater than the sensitivity of a thermal conductivity detector and 2 times greater than the sensitivity of a flame ionization detector (FID). Despite the high sensitivity, BID is very resistant to high concentrations of analyzed samples. Thus, BID, like the thermal conductivity detector, can be used for the analysis of liquid samples.

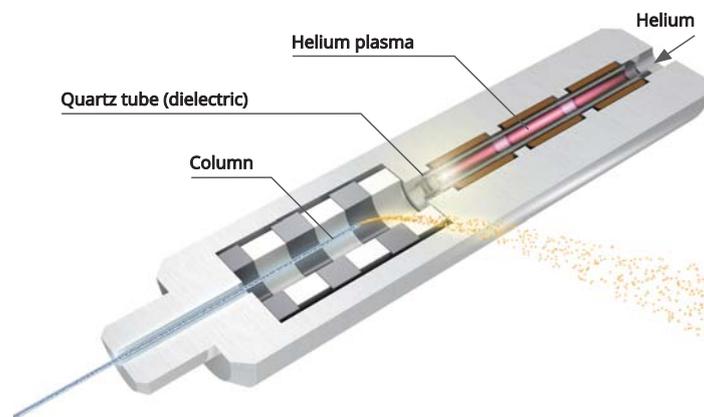
Improved detection limit

BID achieves a detection limit that is 50-100 times better than thermal conductivity detector and, depending on the substance, 1.5-5 times better than FID. The dynamic range of BID is five orders of magnitude, which is comparable to a thermal conductivity detector and only slightly less than FID.

The high sensitivity of the detector in combination with good overload resistance allows BID to play the role of a "substitute" for the FID detector. BID is especially advantageous compared to FID when analyzing organic substances containing heteroatoms (e.g. short chain alcohols, aldehydes and ketones).

As a result, the barrier discharge ionization detector not only takes its rightful place in the line of detectors, but also opens up new perspectives for many applications that currently require multiple detectors (e.g. greenhouse gas analysis).

The Tracera system allows for the simultaneous, highly sensitive detection of compounds of different natures using a single detector and a single carrier gas.



Technical specifications

Tracera: Gas Chromatograph GC-2010 Plus and Barrier Discharge Ionization Detector BID-2010 Plus

BID-2010 Plus Features:

Operating temperature range:	up to 350°C
Minimum detection limit:*	1 pg/s (dodecane, ionization gas flow 50 ml/min)
Dynamic range:	10 ⁵
Carrier gas:	helium

* The minimum detection limit is defined in the same way as for the flame ionization detector.



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