MICROTRAC MRB
PARTICLE CHARACTERIZATION

Online gas analyzer

BELMASS II

1 ~ 200 a.m.u.

part of VERDER scientific

For qualitative and quantitative gas analysis

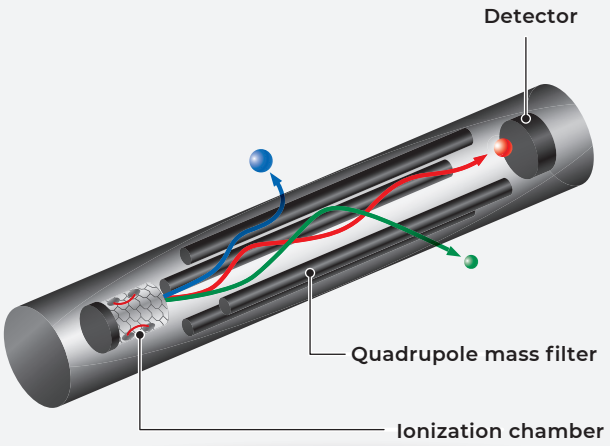
FEATURES

- Bench-top quadrupole mass spectrometer
- Heat hose enables vapor analysis
- For both qualitative and quantitative analysis

PRINCIPLE

Gas molecules are ionized in ionization chamber and travel down the quadrupole mass filter to the detector. The quadrupole mass filter consists of four parallel rods. Radio frequency voltage with a DC offset voltage is imposed between one pair of rods and the other. The applied voltage affects the trajectory of the ions. Only ions of a certain m/z (mass to charge ratio) will reach the detector for a given ratio of voltages: other ions will be thrown out and collide with the rods. A mass spectrum can be obtained by monitoring the ions passing through the quadrupole mass filter as the voltages on the rods are varied.

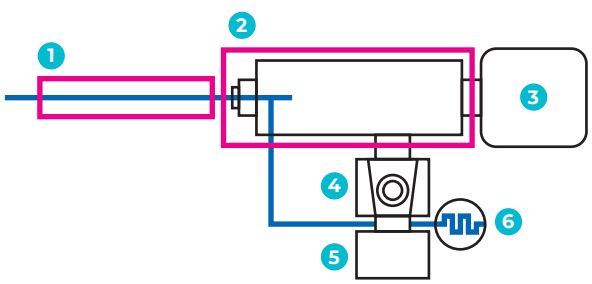
Overview of quadrupole mass detector



OVERVIEW

Mass detector is known as the most efficient detector for qualitative analysis. However, at the same time, it has poor quantitative capacity. Because it only analyzes a small amount of gas, it is difficult to obtain the good quantitative result. By selecting the most appropriate materials and component layout, Microtrac MRB has successfully produced “BELMASS II ” with a high quantitative capacity. Even ammonia gas can be analyzed easily by using the heat hose and dry diaphragm pump.

Outline of the system



1 Sniffer probe
2 Heat hose
3 Mass analyzer
4 Turbo molecular pump
5 Diaphragm pump
6 Vacuum gauge

MEASUREMENT SOFTWARE

- Strength of each component is continuously measured
- Start and end of measurement can be set within a specified time range by timer setting
- External data such as temperature can be imported by analog signal input
- Linear, logarithmic and auto scaling are available for the vertical axis
- Linkage with the BELCAT series catalyst analyzer is available

Selected Ion monitor

- Up to 16 mass numbers can be selected and monitors the time-lapse ion current.
- This mode is useful in case the kinds of reaction gases are known.

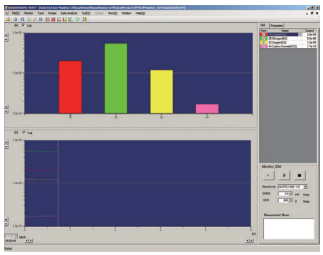
Mass peak monitor

- Mass peak monitoring continuously scans the set mass number range and displays the spectra.
- This mode is useful in case the kinds of reaction gases are unknown.

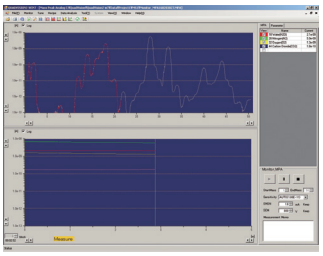
Status check

- Self-diagnosis function.
- Easy maintenance.

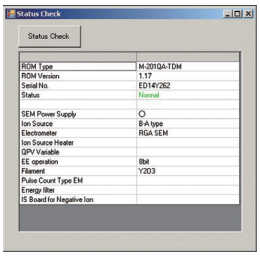
Selected Ion monitor



Mass peak monitoring



Status check

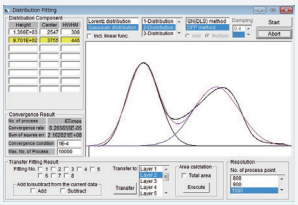


ANALYSIS SOFTWARE

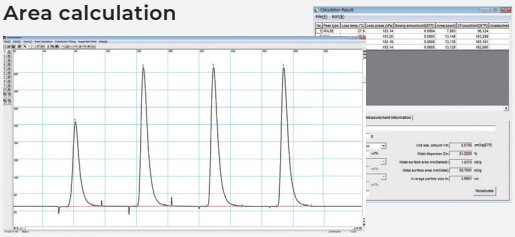
The Obtained mass spectrum can be analyzed with the MicrotracMRB original analysis software “ChemMaster II”.

- The spectrum can be edited and the area can be calculated in this program.
- Useful functions, such as “Base line correction”, “Spike noise filter”, etc. will make accurate chemisorption amount calculations.
- “Distribution Fitting”, a sophisticated peak deconvolution function can divide the measured spectrum into multiple peaks so that the number of active sites existing on the catalyst surface can be obtained.
- The pulse measurement spectrum can also be analyzed.
  The chemisorption amount, metal dispersion rate, and other properties can be calculated automatically.

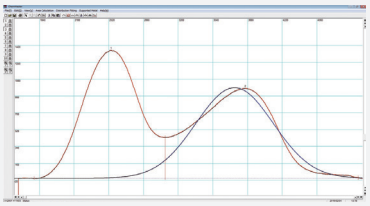
Distribution Fitting



Area calculation



Peak deconvolution

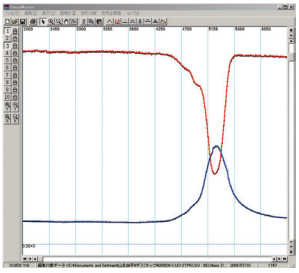


MESUREMENT EXAMPLE

Connecting BELMASS II with the BELCAT series makes it possible to evaluate the catalytic reaction (TPReaction) in more detail.
BELMASS II can record the sample temperature.
Suitable for thermal analysis.

TPR measurement on CuO

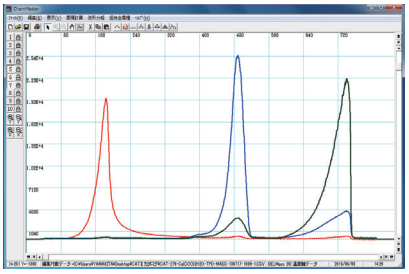
Hydrogen consumption and water production can be observed at the same time.



m/z=2 (H_2) m/z=18 (H_2O)

Thermal decomposition of calcium oxalate

By heating the sample, H_2O, CO and CO_2 can be detected.



m/z=18 (H_2O) *m/z*=28 (CO) *m/z*=44 (CO_2)

CONNECTION TO PRODUCTS

Connecting BELMASS II to the following products, enables these applications.

Model	Application
BELCAT II Catalyst analyzer	TPD, TPR, TPO, Pulse measurement,
	Catalytic reaction,
	Breakthrough curve measurement

※BELMASS II also can be used with a range of other instruments.

BELCAT II + BELMASS II

SPECIFICATIONS

Mass range	1～200 a.m.u
detector	Faraday cup / SEM
Min. detection limit	< 1 ppm. (Depends on the gas.)
Resolution	M/⊿M≧2M
Scan speed	Auto, 0.01, 0.03, 0.1, 0.3, 1, 3, 10 sec / a.m.u
Sniffer probe	1/16 inch capillary tube
Max. temperature of heat hose	200°C (SUS), 120°C (PEEK) (Option)
Gas consumption rate	Approximately 0.6 cc/min (at 1atm)
Sample gas pressure	Atmospheric pressure (50～150 kPa)
Vent connection	1/4 inch one-touch connection
Measurement channels	Max. 16 ch
Measurement Software Quadvision2	Selected Ion monitor
	Mass peak monitor
Analysis Software ChemMaster II	Spectrum image display
	Distribution Fitting
	Aera Calculation
	Convert to Temp. Axis
	Metal dispersion calculation
Other functions	System check
	Analog input
	Conversion of the saved data into CSV
Interface	RS232C
Analog input	1 CH (DC 0～10 V, mainly used as a temperature input.)
Dimensions, Weight	280 (W) × 400 (H) × 600 (D) mm, 36 kg

※This product complies with CE and UKCA
※Due to our policy of continuous improvement, the specifications are subject to change without notice.

※Specifications and appearance of the products listed are subject to change without notice.
※Products (goods and services) described in the catalog, depending on the destination and application, might be applicable to export regulations, etc. by the "Foreign Exchange and Foreign Trade Control Law".
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