MICROTRAC
PARTICLE CHARACTERIZATION

CHIMICA CENTRO
ADDED VALUE LAB SOLUTIONS

Online Gas Analyzer

BELMASS II

1 ~ 200 a.m.u.

part of VERDER scientific

BELMASS II

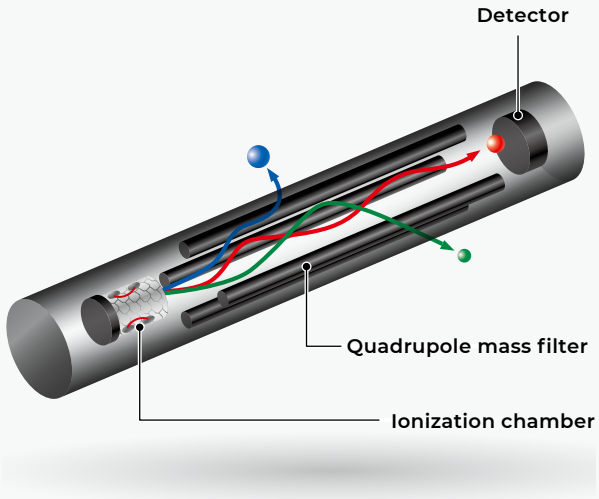
FOR QUALITATIVE AND QUANTITATIVE GAS ANALYSIS

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.

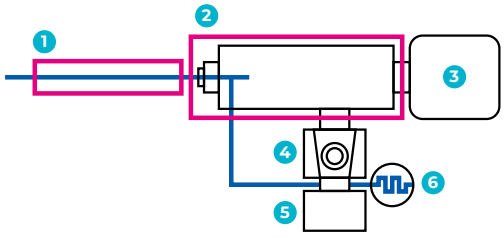
Overview of Quadrupole Mass Detector



OVERVIEW

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

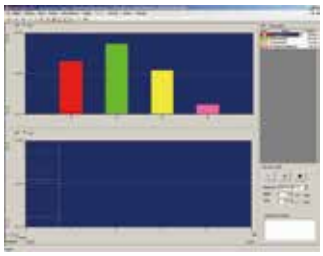
Outline of the system



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 via timer
- External data, such as the temperature, can be imported through an analog signal input
- Linear, logarithmic and auto scaling available for the vertical axis
- Compatible with the catalyst analyzer BELCAT II



Selected Ion Monitor

Selected Ion Monitor

- Up to 16 mass numbers can be selected and monitors the time-lapse ion current
- Useful mode when the types of reaction gases are known

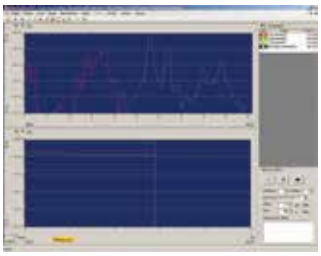
Mass Peak Monitor

- 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

Status Check

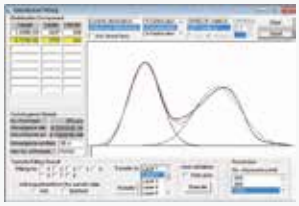


Mass Peak Monitoring

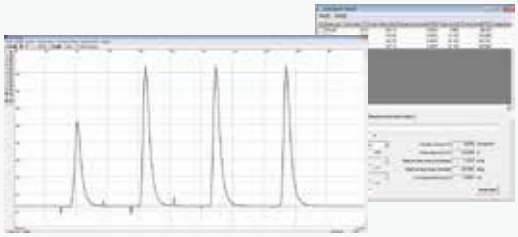
ANALYSIS SOFTWARE

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

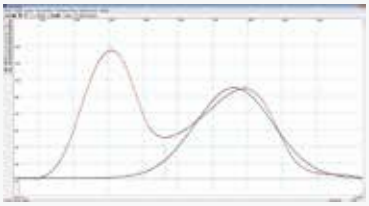
- The spectrum can be edited and the area can be calculated in this program.
- Useful functions, such as “Base line correction”, “Spike noise filter”, etc. will make accurate chemisorption amount calculations.
- “Distribution Fitting”, a sophisticated peak deconvolution function can divide the measured 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



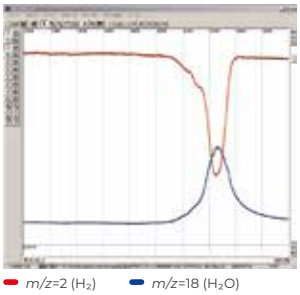
Area Calculation



Peak Deconvolution

MESUREMENT EXAMPLE

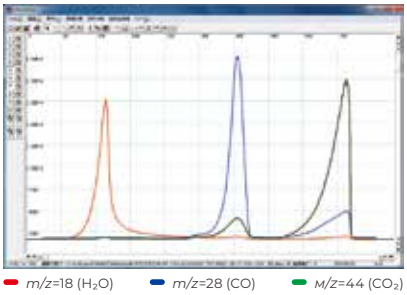
Connecting BELMASS ll and BELCAT II allows for the detailed evaluation of the catalytic reaction (TPReaction). The BELMASS ll can record the sample temperature, making it suitable for thermal analyses.



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

Tpr Measurement on CuO

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



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

Thermal Decomposition of Calcium Oxalate

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

CONNECTIVITY

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.

SPECIFICATIONS

Mass range	1~200 a.m.u.
Detector	Faraday cup / SEM
Min. detection limit	< 1 ppm. (depending on gas)
Resolution	M/ΔM ≥ 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) (optional)
Gas consumption rate	Approx. 0.6 cc/min (at 1 atm)
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 Area 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 technical specifications and appearance are subject to change without notice.
- Products, goods, and services described in the brochure, depending on destination and application, might be applicable to export regulations by the "Foreign Exchange and Foreign Trade Control Law". In response to the review of the Japanese government regarding the export of products, goods, and services, the permission must be obtained according to the regulations.

CHIMICA CENTRO
ADDED VALUE LAB SOLUTIONS

CHIMICA CENTRO SNC
Via Vinciguerra, 45 | 62019 Recanati (MC)
T +39 071 7572490 | **info@chimicacentro.it**
P.IVA 00970300430 | REG. MC N. 00970300430 | R.E.A. MC N. 107669

www.chimicacentro.it