



## Online Gas Analyzer

# BELMASS II

1 ~ 200 a.m.u.

## BELMASS II

# FOR QUALITATIVE AND QUANTITATIVE GAS ANALYSIS

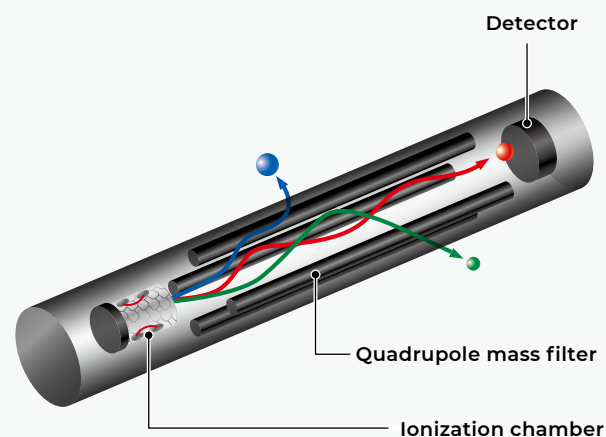


## PRINCIPLE

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.

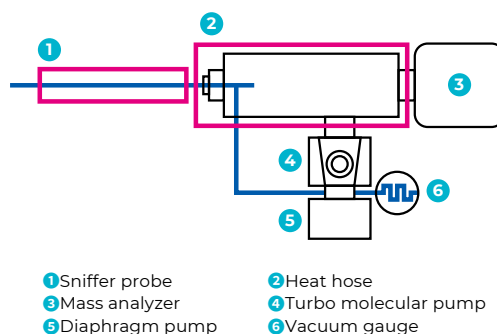
### Overview of Quadrupole Mass Detector



## 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

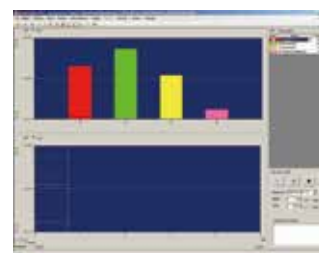


## MEASUREMENT SOFTWARE

- | 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

- | 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



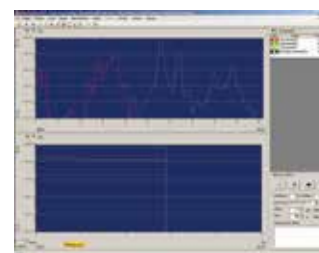
Selected Ion Monitor

### 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



Mass Peak Monitoring

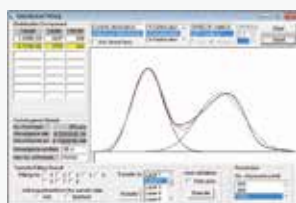
### Status Check

- | Self-diagnosis function
- | Easy maintenance

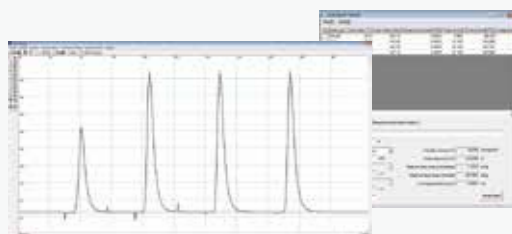
## ANALYSIS SOFTWARE

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

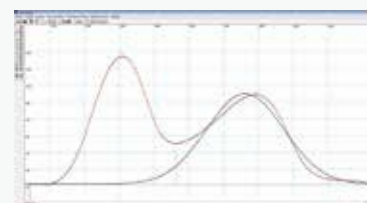
- | The spectrum can be edited and the area can be calculated in this program.
- | Useful functions, such as "Base line correction", "Spike noise filter", etc. will make accurate chemisorption amount calculations.
- | "Distribution Fitting", a sophisticated peak deconvolution function can divide the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



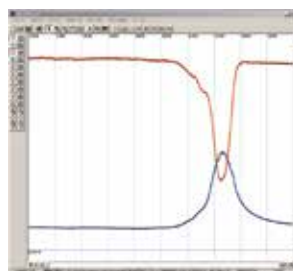
Area Calculation



Peak Deconvolution

## MESUREMENT EXAMPLE

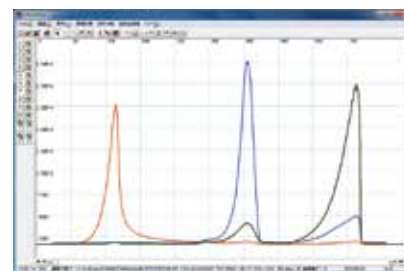
Connecting BELMASS II and BELCAT II allows for the detailed evaluation of the catalytic reaction (TPReaction). The BELMASS II can record the sample temperature, making it suitable for thermal analyses.



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

### 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

I 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	$M/\Delta M \geq 2M$
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

I This product complies with CE and UKCA.

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## MICROTRAC

PARTICLE CHARACTERIZATION

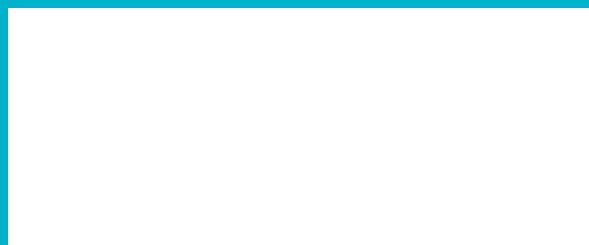
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