MICROTRAC
a VERDER company



BET SURFACE AREA ANALYZER

BELSORP MR1

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Compact, Fast and Highly Accurate

Microtrac's BELSORP MR1 focusses on easy handling and the fast characterization of porous materials. This instrument is precisely designed to measure specific surface areas using dynamic BET (Brunauer-Emmett-Teller) single-point method. Measurement of the specific surface area utilizing BET theory is one of the most common analytical methods in material evaluation based on adsorption phenomena. Generally, the specific surface area of a sample is calculated based on the amount of nitrogen adsorbed at liquid nitrogen temperature. The amount of adsorption can be measured by different methods, e.g., volumetric (BELSORP MINI X or MAX II series), gravimetric or dynamic. The BELSORP MR1 make use of the dynamic method.



The BELSORP MR1 is a highly efficient, stand-alone device that allows simultaneous pre-treatment and sample measurement. Due to our highly sensitive thermal conductivity detectors (TCD), thermometers & pressure gauges, an accurate measurement result is achieved in approx. 15 minutes. The automatic Dewar movement, the calibration function and the operation via the touch panel make the BELSORP MR1 extremely user-friendly and suitable for inexperienced users.

The analysis results are calculated automatically as soon as the measurement is completed. After the measurement, the specific surface area is displayed without the need for tedious manual calculation. The respective measurement results (including whole lists) can be transferred to a

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USB storage device, and are output as text files, Excel spreadsheets or printed report (rich text).

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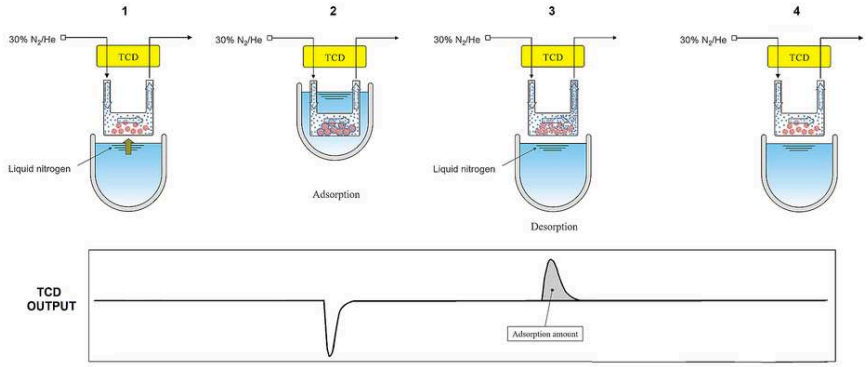
WHAT IS THE DYNAMIC METHOD?

For BET surface area determination, volumetric adsorption is frequently used, dynamic flow adsorption offers a simpler and often preferred way to measure BET surface area. In the dynamic flow method, a sample is cooled with a coolant (e.g. liquid nitrogen) while an adsorbate gas of a known concentration (e.g. 30 % nitrogen diluted in He) is supplied.

As the adsorbate is adsorbed onto the sample and the concentration of the adsorbate gas in the gas mixture decreases, the fluctuation (peak) in the detector (TCD) signals can be determined. When adsorption reaches equilibrium, the concentration of adsorbed gas in the gas mixture returns to its original value, causing the TCD signals to return to their baseline. If cooling is stopped at this point (Dewar moves down), the adsorbate is desorbed from the sample.

This temporarily increases the concentration of the adsorbate gas in the mixture, causing the detector (TCD) to give a peak. After the desorption is completed, the TCD signals return to the baseline. As the desorption peak is sharper and more suitable for accurate integration, it is generally used to calculate the specific surface areas.

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ACCESSORIES AND OPTIONS



The standard consumables comprise sample cells, filler rods, filters, liquid bottle, O-rings, caps and weighing platforms. Various sizes of sample cells, quick seals, and other optional consumables are also available.

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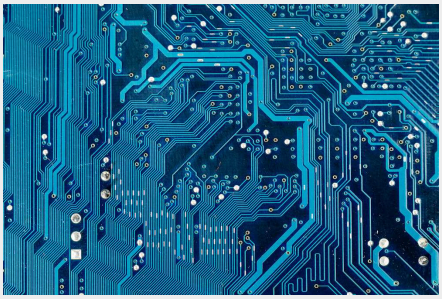
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TYPICAL APPLICATIONS

Microtrac's gas adsorption analyzers are used in a variety of fields. These include catalysts, batteries, fibers, polymer materials, zeolite, fuel cells, chemicals, pigments, cosmetics, MOF / PCP, magnetic powders, separation membranes, filters, toners, cement, ceramics, semi-conductors, and many more.



- battery materials
- catalysts
- zeolite
- ceramics
- carbon



- electronic components
- fuel cells
- Toner particles
- cement
- medicine / pharmaceuticals



- silica
- MOF / PCP
- pigments
- cosmetics

... and many more!

To find the best solution for your particle characterization needs, visit our application database

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TECHNICAL DATA

Measurement principle	Dynamic flow gas method (Single point BET)
Detector	Thermal Conductivity Detector (TCD)
Adsorption gas	N_2 / Kr
Carrier gas	He
Number of measured samples	1
Pretreatment temperature	Up to 400°C
Measurement range	0.01 m2/g and above
Repeatability	within ±1.0%
Measurement time	Approx. 15 minutes (including calibration, excluding pretreatment time)
Dimensions (W x H x D)	350 x 553 x 368 mm
Weight (main body)	30 kg
Utility - Power	AC 100 - 120 V / AC 200 - 240 V, 400 W, 50 / 60 Hz
CE certified	yes

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