THE PMI

CAPILLARY CONDENSATION FLOW POROMETER
ACCFP-20-1

Not just products.solutions!

Applications

The PMI Capillary Condensation Flow Porometer has the unique ability to measure gas permeability and flow rate distribution in addition to measuring pore diameter of nanopore samples with out using any toxic materials or extreme pressures and temperatures. No other instrument has such capabilities. It is utilized for characterization of porous membranes used in many industries such as biotech, pharmaceutical, filtration, food and environmental without any fear of harmful effects of high pressures and extreme temperatures on samples. Fragile samples with small pores can be easily evaluated by this technique.

Principle

At a given temperature, a vapor at a pressure less than the pressure, Po, of vapor in equilibrium with its liquid can condense in pores of a material. Kelvin equation gives the diameter of the pore in which condensation can occur at the relative vapor pressure,

$$\ln (P/Po) = - [(4 g V \cos Q) / (D R T)]$$

where g is the surface tension of condensed liquid, V is the molar volume of condensed liquid, Q is the contact angle of the liquid with the pore surface, D is the pore diameter, R is the gas constant, and T is the absolute test temperature. At the lowest relative vapor pressure, (P/Po), condensation occurs in the smallest pore. On increase of relative vapor pressure condensation occurs in larger pores.

Operation

The instrument is maintained at the desired temperature. Vapor is introduced in to the sample chamber of known volume. The vapor pressure is monitored until the system comes to equilibrium. From the final pressure, the diameters of pores in which condensation occurs are computed. A small amount of vapor is added to one side of the sample in the sample chamber so as to raise the pressure on that side by about 10 %. The decay of pressure is monitored as a function of time. Gas flow rates through the pores of the sample which do not contain condensed liquid at the maintained pressure of the vapor are computed from the time rate of pressure change. From repeated determination of flow rates at a number of vapor pressures, the pore size distribution is computed.
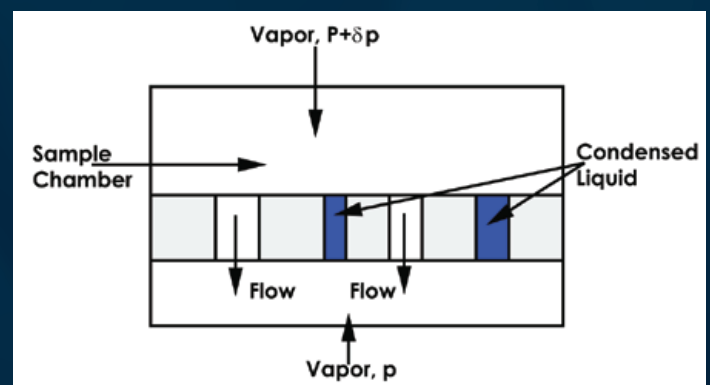
Principle of Operation for the
Capillary Condensation Flow Porometer

Features

- Fully automated, simple to use, with necessary software.
- Highly reproducible & accurate results.
- Pressure required is very small.
- No need for liquid nitrogen and can work with compressed air.
- Universal cell to measure variety of samples.
- No toxic material like mercury is used. No health hazard.
- No disposal related cost.
- Compatible PC & software to be supplied along with the machine.

Specification

- Pore Size Range: 1 nm to 200 nm
- Pressure: 15 psi
- Accuracy: 0.15 %
- Resolution: 1 in 60,000
- Flow Rate: low 10^{-4} cm^3/s
- Power Requirements: 220 VAC, 50 Hz

* Other specifications for this machine are available.
Specifications are subject to change without notice.
Design subject to change without notice.

Sales & Services

Our sales team is dedicated to helping our customers find which machine is right for their situation. We also offer custom machines for customers with unique needs. To find out what we can do for you, contact us. We are committed to customer support including specific service products, short response times & customer specific solutions. To quickly & flexibly meet our customer's requirement, we oller a comprehensive range of services.

Customize your machine today!

The most advanced, accurate, easy to use and reproducible porometers in the world.

Celebrating

35

years

of solutions

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