THE PMI FUEL CELL POROMETER

Porous Materials, Inc.

Not just products...*solutions!*

Description

The PMI Fuel Cell Porometer provides fully automated through-pore analysis including pore-throat diameter, pore size distribution, mean flow pore diameter, and liquid & gas permeability. The porometer's versatility allows the user to simulate operating conditions. The instrument has special features to measure the effects of compressive stress on a sample, test temperature, sample orientation, and layered structure on pore structure characteristics. The fully automated, user-friendly Fuel Cell Porometer is an asset in quality control and R&D environments.

Principle

The flow rate of an inert gas through the dry sample is measured with increasing pressure. The sample is brought in contact with a wetting liquid, the liquid spontaneously fills the pores in the sample, and the flow through the wet sample is measured with increasing differential pressure.

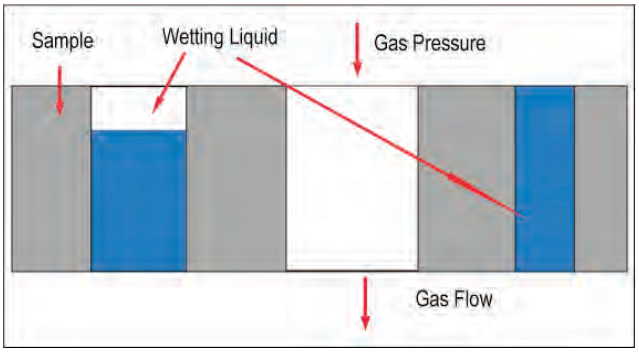

Figure 1
Principle of the Fuel Cell Porometer

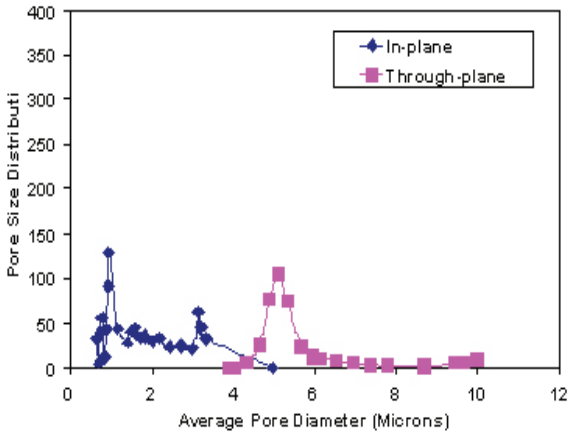

Figure 2
Principle of the Fuel Cell Porometer

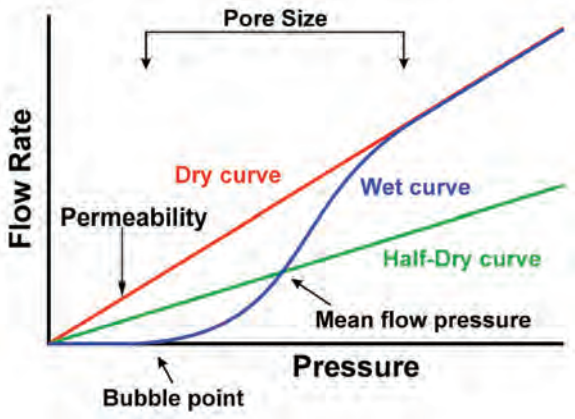

Figure 3
Flow Rate/Pressure Graph

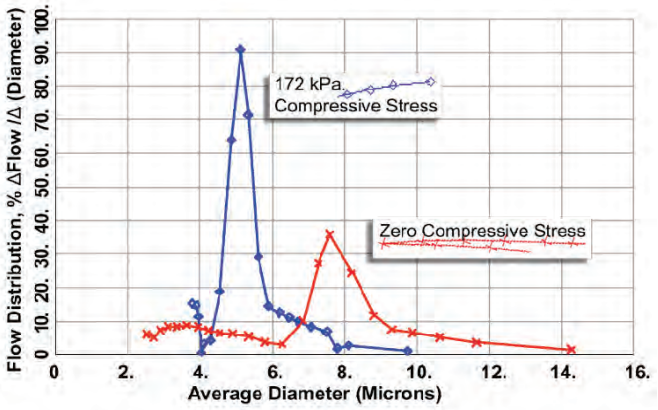

Figure 4
Flow Distribution Graph

Applications

The performance of many fuel cell components is determined primarily by the characteristics of the pore structure. Flow of reactants and products is determined by the pore size and pore distribution of electrodes, wide range of gas humidity found in many applications can change the pore structure, components subjected to compressive stress during operation can considerably modify the pore size, pore structure of each layer of multilayer composites often used as fuel cell components can determine the performance of the fuel cell, and reaction rate of reactants is governed by the surface area of through pores. The Fuel Cell Porometer is designed to measure all the relevant pore structure characteristics of fuel cell components.

Unique Features

- Characteristics measureable using gas with 0 to 100 % humidity
- Test temperatures can be 200°C and in special situations 800°C
- Pore size measured in samples under compressive stress of up to 1000 psi
- Pore structure of each layer of a multilayer composite
- Pore diameters down to about 0.013 µm

Features

- Measured flow rates through dry and wet samples with increasing differential pressures are used to compute many characteristics:
  - Pore throat diameters
  - Largest pore throat diameter
  - Mean flow pore diameter
  - Pore distribution
  - Gas Permeability
  - Through pore (envelope) surface area

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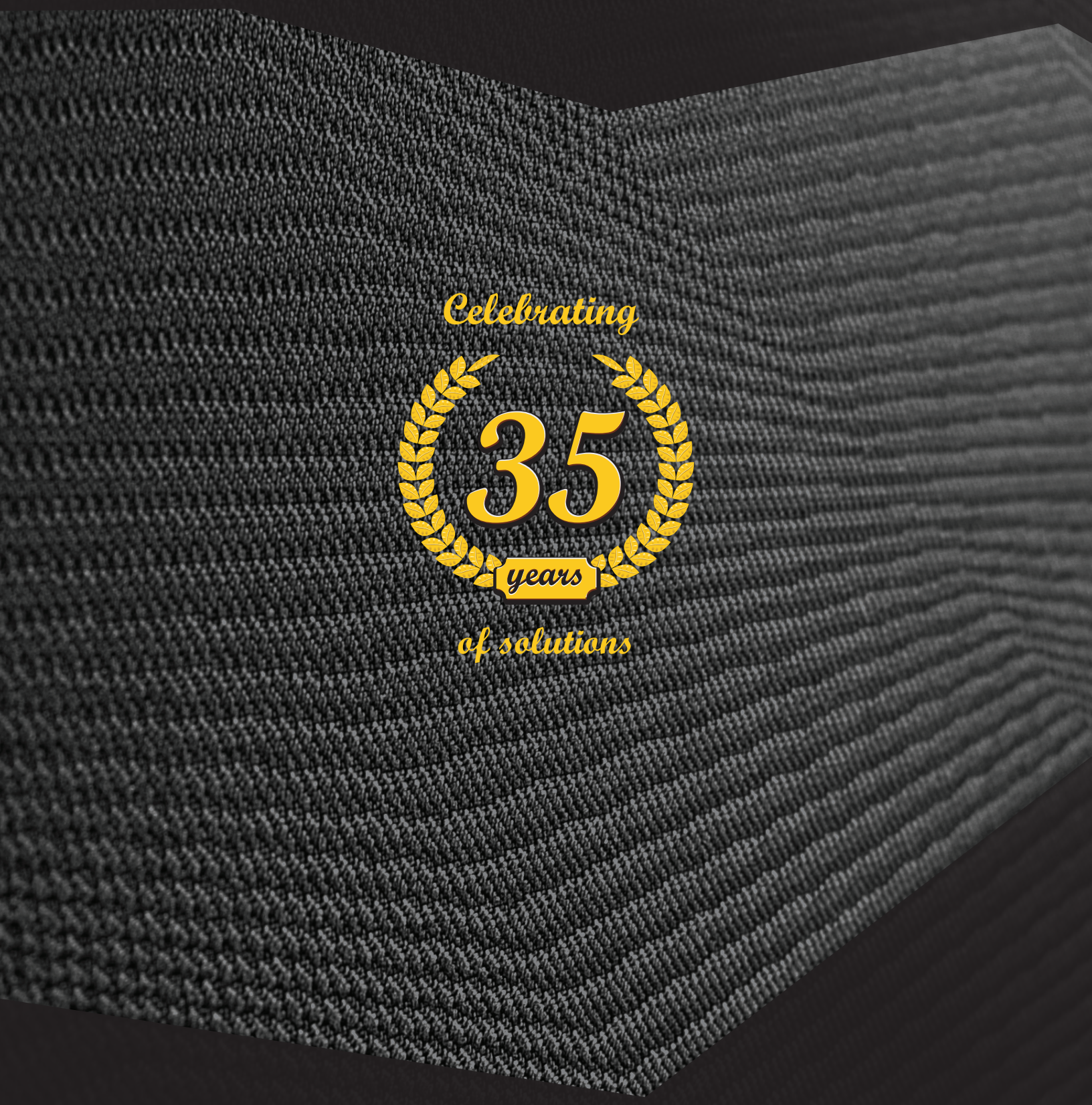
The most advanced, accurate, easy to use and reproducable porometers in the world.



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