



## Ebatco Nano

A Monthly Newsletter

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### **Nano Brief**

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From all of us at Ebatco, have a Happy New Year!

### **Ebatco**

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Last month, we highlighted one of the world-leading manufacturers of nanotechnology and surface analytical instrumentation we represent. Quantachrome Instruments is a company specializing in the analysis of powders and porous materials. The scientists at Quantachrome have over 40 years of experience in measurement techniques and instrument design for such applications

One of Quantachrome's instrument lines is the Porometer 3G series. Each instrument in the 3G series measures pore size through Porometry. By increasing the pressure, a wetting liquid, such as Porofil, placed on a porous sample will eventually evacuate from the pores. Once completely emptied, the same process is completed with the sample still in place. These processes are referred to as the wet and dry runs. High-resolution sensors measure the pressure and flow through the sample for both the wet and dry runs. The pore size of a sample is calculated from the measured pressure and flow data and the Washburn Equation. From this data, bubble point pressure and flow rate, pore size, pore density, pore size distribution, pore volume and gas/liquid permeability can all be characterized by a porometer.

Each porometer in the 3G series is designed for certain pore size ranges depending on the application needs. The 3G micro is designed for small to medium sized pores from 60 nanometers to 90 microns. For larger pore sizes typically found in fabrics and other woven materials, the 3G macro has the capability to measure pore sizes over 500 microns. The 3G z offers a wider range of measureable pore sizes than the micro or the macro. The 3G z can measure pore sizes as small as 40 nanometers and as large as 500 microns. The flagship of the series, the 3G zh, offers an even wider pore size measurement range than the 3G z. The 3G zh has the same maximum measureable pore size as the 3G z, but can measure pore sizes less than 20 nanometers.

### **Case Study**

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Filtration membranes rely on small pores to remove unwanted material. The pore size, pore density and pore size distribution are key characteristics affecting a filter's performance.

The porosity of any porous material can be characterized via through-pore analysis.

The Porometer 3G zh measures pore sizes from 18 nanometers to 500 microns.

The data presented here is the interfacial tension of a common dish detergent at its water solution/vegetable oil interface. The data indicates that interfacial tension with vegetable oil can be reduced significantly by adding about 0.01% volume ratio detergent into water. The interfacial tension was measured with a Kyowa DY-700 Surface Tensiometer using the Wilhelmy Plate method at room temperature. With a heating jacket type stage, the DY-700 can also measure interfacial tension at different temperatures.

Interfacial Tension of a common dish detergent water solution at a vegetable oil interface with changing concentrations.

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