

Errata Notice

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POROCheck Application Note

No. 03

Investigation of Porous Nano-Materials

A lot of thrilling activities are now focused on the design and development of nano-materials and their application in many fields like intelligent micro-machines, high-tech chemicals, advanced optics, electronics and energy storage.

Many nano-technological materials and devices are composed of various types porous structures which need to be identified, understood and related the performance of the device.

POROCheck can be used to characterizes such structures and easily determines related parameters.

Equipment & Experimental Conditions:

Instrument:	PSS AT-System
Eluent:	THF
Standards:	PSS Polystyrene Kit
Detection:	UV @ 254 nm
Processing:	PSS WINGPC (Acq.) PSS POROCheck

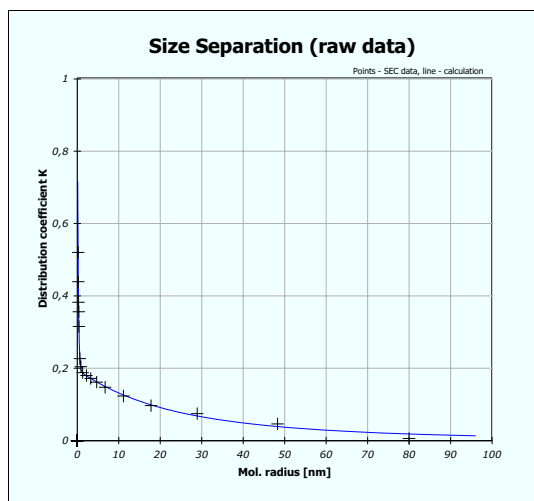


Fig. 1: Raw data already show the presence of wide and narrow pore structures

Fig. 1 shows the investigation of a nano-tubes by chromatographic porosimetry using molecular size probes. A wide range of sizes have been found (0 to 100 nm). The vast majority of open structures are nano-tubes in the range of 1 nm, while the larger ones allow access to the tubes ("joints"). POROCheck calculates the results of both populations automatically and determines the number and volume fraction of the tubes from the pore size distribution (see Fig. 2 and following table).

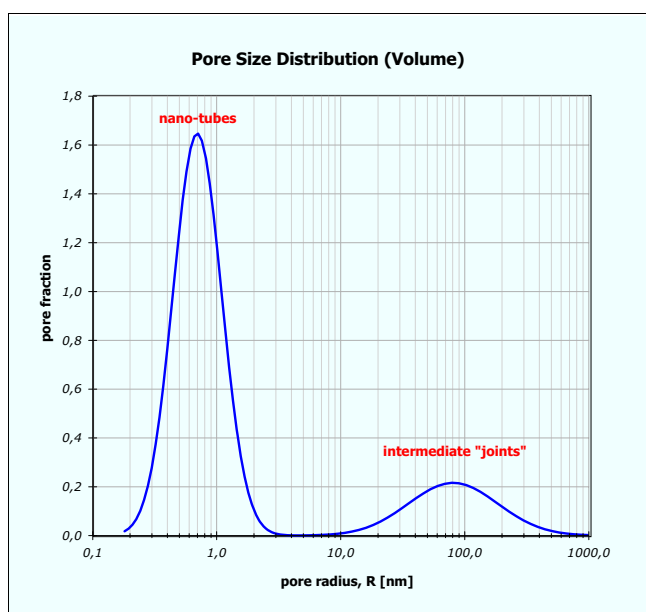


Fig. 2: Pore size distribution reveals tubes and joints

PSS POROCheck even calculates the optimum size of a guest molecule to enter such a tube; in this case the best molecular diameter would be about 0.4 nm.

PSS Pore Size Analysis Results

bimodal distribution detected

Pore volume fraction:	0.493
Pore surface / pore volume	2285 ± 127 m ² /ml
Overall pore radius	24.7 ± 1.3 nm
Average pore radii	0.8 and 95.6 nm
Width of the PSD	0,0 and 5.2 nm
number fraction of tubes	0.99
Volume fraction of tubes	0.78
Optimal guest radius	0.2 nm