

T33. Hg Porosimetry - CERTH



TEESMAT

Open Innovation Test Bed for Electrochemical
Energy Storage Materials

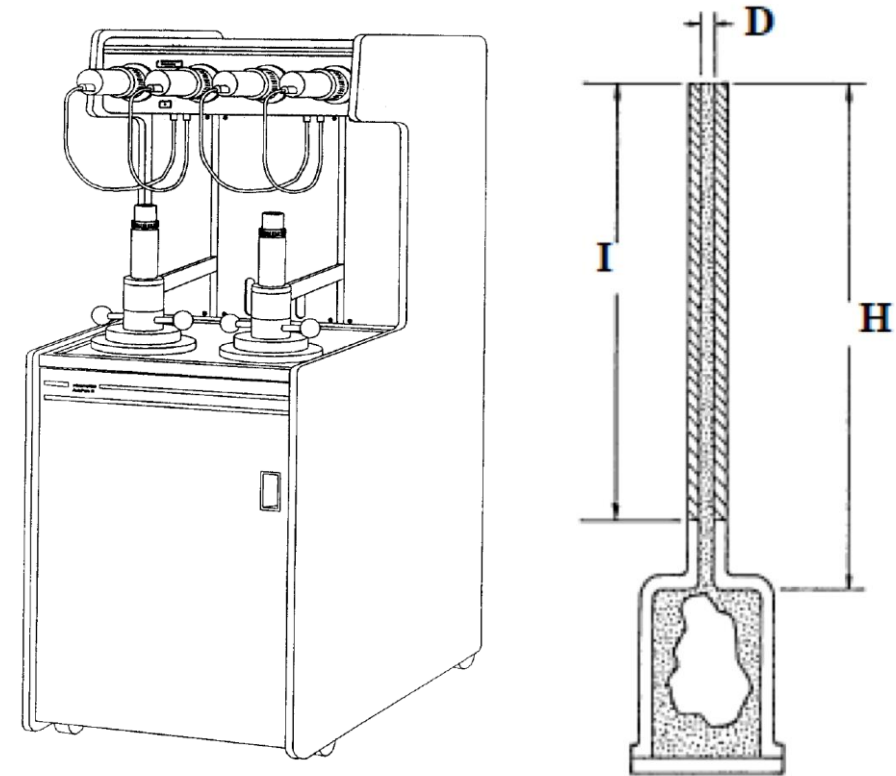
How it works:

Mercury porosimetry is based on the capillary law governing liquid penetration into small pores. Mercury is used as an intrusion liquid since it does not wet nor react with most materials. The volume of mercury V penetrating the pores of a solid or powder sample (placed inside a penetrometer) is measured directly as a function of applied pressure. This P-V information serves as a unique, accurate and reproducible characterization of the pore network.

Pore diameter range: (High pressure) $6\mu\text{m}$ to 5nm , (Low pressure) $3.5\mu\text{m}$ to $>900\mu\text{m}$

Volume of penetrometer: 3ml and 5ml

Measurement resolution: better than $0.1\mu\text{L}$



Left: schematic of the porosimeter (micromeretic AutoPore IV 9500)

Right: schematic of the penetrometer cross section



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What can be seen:

Mercury porosimetry obtains valuable data from which **pore size, volume, surface area, distribution, tortuosity, fractal dimensions** as well as **bulk/apparent densities**, and material **porosity, volume** and **permeability** can be determined.

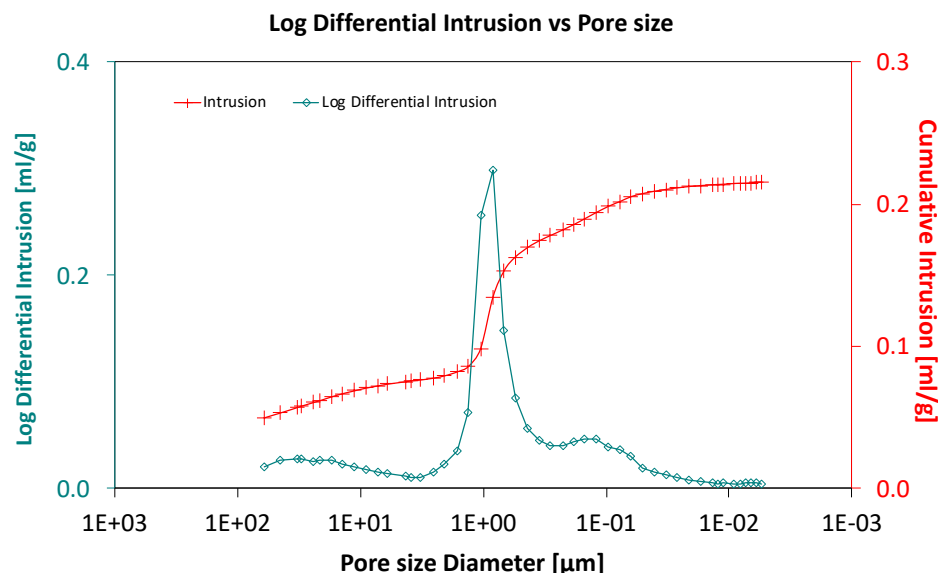
What kind of sample?

Both **solid** (for example electrode sheets) or **powder** samples with maximum size dimensions: a cylinder 2.5 cm diameter by 2.5 cm long

Why is it useful? Porosity is important for the electrochemical performance of the cell since it determines the ionic transport.



Image of an electrode sample placed inside a 5ml penetrometer



Investigation time-scale : day(s)

Maturity level : advanced



Grant Agreement
No 814106