POROMETRY - CHARACTERIZATION of PORES of MEDIA, MEMBRANES and ALL MATERIALS

PROGRAM :

Reminder of porous media/membrane characterization (3 h)

- **Fluid displacement techniques:**
  Gas-liquid and liquid-liquid displacement porometry (GL-LLDP)
  Mercury porometry (HgP), Liquid Extrusion porometry (LEP)

- **Capillary adsorption-condensation:**
  Gas adsorption-desorption porometry (GADP)
  Permporometry (PMP) - Evapoporometry (EP)

- **Capillary sodification:**
  Thermoporometry (THP)

- **Microscopic techniques:**
  Scanning or Transmission Electron Microscopy (SEM, TEM)
  Atomic Force Microscopy (AFM)

Principles of measurement - Relationship to the structural and functional information (pores shape and pores sizes, permeability, porosity, roughness porosity, surface potential, molecular weight cut off…) - Advantages and limitation of the measurements.

Technologies and application (1 h)

- Available **devices** on the market for these measurements,
- Calibration, verification methods,
- Examples of **application** to **membrane** especially for microfiltration, ultrafiltration, nanofiltration, reverse osmosis - membrane modules and filter structural morphology.

Demonstration and measurements with the IFTS Fluid - Fluid Porometer and the IFTS Scanning Electron Microscopy (3 h)

Determination of pores sizes distribution of industrial membranes for MF, UF to characterize their pores in the range of 2 nm to 300 µm in the laboratory: sample preparation, measurement, operation and expression of the results.

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Association loi 1901 – JO du 31/05/1981 - SIRET : 32279040300016, Agen – APE : 7112B - TVA : FR45 322790403