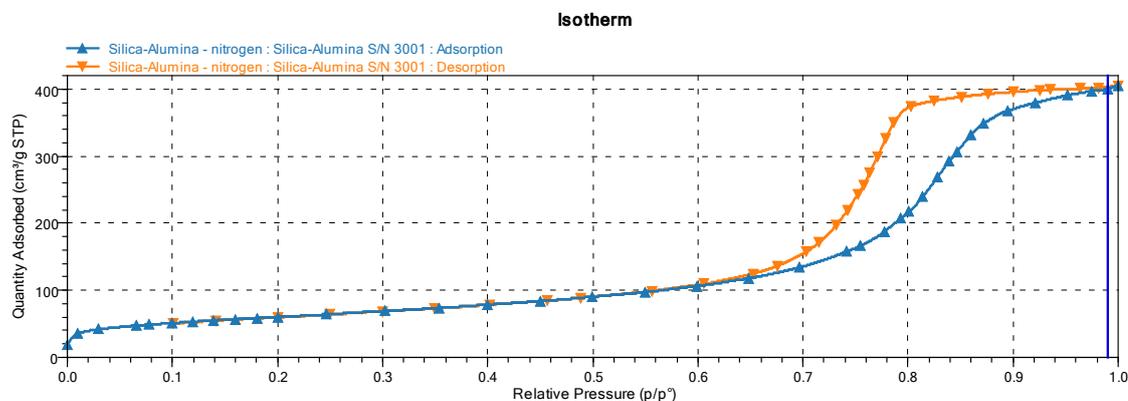


Purpose and principle

Determine the specific surface area using the Brunauer, Emmett and Teller 'BET' method, as well as the porosity (pore size distribution and pore volume) of a solid material.

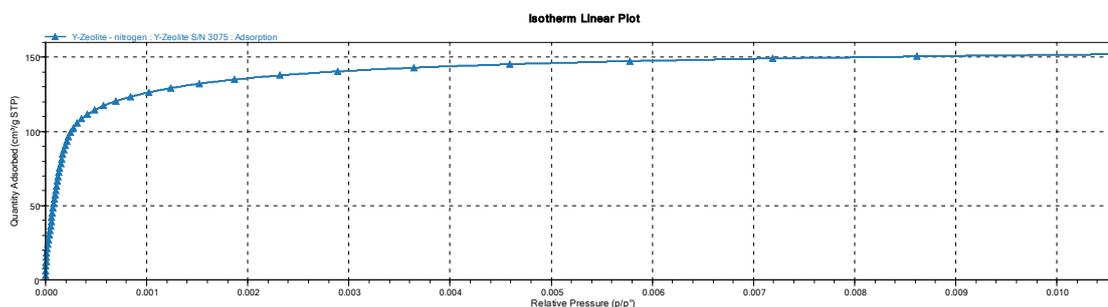
The quantity of nitrogen adsorbed - desorbed (physisorption) by the solid at the temperature of liquid nitrogen (77K) as a function of the relative pressure (P/P_0), between 10^{-3} and 1, is called the adsorption-desorption isotherm.



This isotherm can be used to determine :

- the specific surface area (in m^2/g) of said solid by applying the BET model:
 - at $0.05 < P/P_0 < 0.3$ for a mesoporous material ($2 \text{ nm} < d_{\text{pore}} < 50 \text{ nm}$)
 - at a lower P/P_0 range determined using the Rouquerol BET for samples with very low porosity (low specific surface area)
- porosity over the entire adsorption-desorption isotherm obtained

In a microporous analysis, the quantity of nitrogen adsorbed by the solid at the temperature of liquid nitrogen (77K) as a function of relative pressure (P/P_0), at very low relative pressures (of the order of 10^{-7} to 10^{-2}) gives a type I isotherm.



This is used to determine the pore distribution of the micropores.

Technical specifications

- Equipment:
 - MICROMERITICS ASAP 2420 analyser
 - Possibility of carrying out up to 6 simultaneous analyses

- MICROMERITICS ASAP 2420 degassing station
 - Possibility of degassing 12 samples simultaneously at a temperature of up to 450°C (one temperature / sample)
 - Mesoporous solid: 2 nm < dpore < 50 nm
 - Microporous solid : dpore < 2 nm
 - Adsorbates : N₂, CO₂
 - P/Po : 10⁻⁷ to 1
 - Analysis temperatures :
 - 77K in N₂ physisorption (liquid nitrogen temperature)
 - 273K in CO₂ physisorption (temperature of a water-ice mixture)



ASAP 2420

Analysis conditions / sample submission

- Sample = degassed powder stable under vacuum and temperature
 - Anticipate degassing conditions (humidity and potentially other gases adsorbed on the surface of the solid)
- Sample quantity: between 50 mg and 200 mg
- Use of glass tubes and rods for analysis:
 - ICPEES: At the charge of the different teams, references available from Fabrice VIGNERON

- External: Use of those from the plateau
- Standard analysis (duration: a few hours) = day or overnight booking possible
- Microporous analysis : booking of at least one week (includes standard analysis if not already carried out, measurement of the tubes free spaces then microporous analysis)

Contact and location

Our equipments for specific surface area and porosity analysis are available to both academic and industrial teams. The analysis department is located on the 1st level of building 104 (R4) in laboratory 3.

- Scientific Referee: [Ksenia PARKHOMENKO](#)
- Technical and training Referee: [Fabrice VIGNERON](#)

For information on how to access the department and its equipment, please contact the service referees.

For all requests for analysis (external) or training (internal), download the form below and return it to the service referees.

- **Formulaire de demande d'analyse/de formation - FR**
- **Analysis/training request form - EN**