

Surface characterization of porous materials by N₂ adsorption/desorption in example of clays

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Nitrogen adsorption isotherm measurement on porous materials at constant temperature 77 K and pressure ranging from 0.1 to 1000 mbar is the commonly used technique for the determination of their specific surface area and pore size distribution. Evaluation of specific surface area is done using the BET model and adsorption measurement in the pressure range 50-300 mbar, while the pore size distribution is estimated using the Kelvin equation in the capillary condensation pressure range, considered to happen between 400 to 1000 mbar.

This technique is used here aiming the changes of those surface parameters of natural Prrenjjas clay samples when treated with sulphuric acid of different concentrations.

Prrenjjas clay is a natural clay mineral from the southeast Albania of mainly montmorillonite type and high iron content. Its treatment with sulfuric acid in four different concentrations from 1.843 M up to 11.142 M, is shown to strongly influence its chemical composition, structure, specific surface area and pore volume. The acid treatment causes the leaching of almost all the metal ions present and the destruction of the crystalline structure of the clay. The Prrenjjas clay is used in decoloring of edible oils in Albania. Further uses in biomedical field as carriers in drug delivery or antibacterial agent for the montmorillonites are known as well.

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