Recent advances in the textural characterization of nanoporous materials

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Abstract

Assessing adsorption properties of nanoporous materials and their structural characterization is crucial for advancing their application in catalysis, separations and other industrial processes. Major progress was made within the last two decades in physical adsorption characterization also because of the development of sophisticated approaches based on statistical mechanics such as molecular simulation and density functional theory (DFT). This progress, coupled with the availability of high resolution experimental methodologies for the adsorption of various subcritical fluids (also allowing one to couple adsorption techniques with complimentary techniques such as small angle scattering), has to led to new methodologies for a reliable characterization of nanoporous materials.
In this lecture, we will review the recent advances in the physical adsorption characterization of nanoporous materials but will also discuss the existing challenges in the characterization of porous materials exhibiting more complex, hierarchical pore-network structures.