

## Nanoporous Materials for Gas Sorption and Separation: MOFs, Metal Oxides, and Carbons

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Nanoporous materials are ubiquitous in the material sciences because of their numerous potential applications in various areas, including adsorption, catalysis, energy conversion and storage, optoelectronics, and drug delivery. For appropriate purposes, we have developed new synthetic methods of novel nanoporous materials such as metal-organic frameworks (MOFs), metal oxides, and carbon materials. In this talk, we will present a novel synthetic strategy that exploits a metal-organic framework (MOF)-driven, self-templated route towards nanoporous metal oxides and graphitic carbon materials via thermolysis under inert atmosphere. Upon temperature, guest molecules, and pressure, structural flexibility of porous MOFs studied by in situ X-ray diffraction analysis will be also discussed. These novel nanoporous materials exhibit exceptional carbon dioxide adsorption capacity as well as high gas selectivity under conditions mimicking flue gas.