

Synthesis and Applications of Hierarchically Porous Metal-Organic Frameworks

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Porous Metal Organic Frameworks (MOFs) are currently an important class of advanced functional materials due to their novel coordination structure, relatively facile preparation, special properties and potential practical applications. The zeotype cubic metal(III) carboxylates with giant cages labeled MIL-100 and MIL-101 (MIL: Materials of Institut Lavoisier) using iron and chromium and the cheap and simplest aromatic carboxylates such as terephthalate and trimesate, respectively. These solids possess several unprecedented features such as hierarchical pore structures including a zeotype architecture, mesoporous cages accessible through microporous windows, an exceptionally high cell volume and surface area, numerous unsaturated metal Lewis acid sites, and high hydrothermal and chemical stability. In this work, we will show that these materials present a combination of interesting properties that makes them very attractive candidates for several important applications such as catalysis and sorption.