

Sonochemical Synthesis of Metal Organic Framework (MOF-5)

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Solvothermal synthesis of MOF-5 was conducted by sonochemistry using 1-methyl-2-pyrrolidone as a solvent. The effects of ultrasonic power level, irradiation time, temperature, solvent concentration, and substrate composition on the product crystallinity and morphology were investigated. Under an optimum set of synthesis conditions, uniform cubic crystals with average size of 10–20 μ m and a Langmuir surface area of 3200 m²/g were produced within 30 min. However, prolonged ultrasonic irradiation resulted in sharp deterioration of the physicochemical properties. In order to compare with MOF-5 prepared by normal convection heating for 24 h showed cubic crystals in a 400–500 μ m size range with a Langmuir surface area of ca. over 3200 m²/g, high pressure CO₂ adsorption was performed at 298 K/40 bar.