Synthesis of UiO-66 using microwave-assisted continuous reactor and its application for VOC recovery

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UiO-66 has been widely used for many applications due to its high surface area, and excellent chemical and thermal stability. Conventionally, UiO-66 has been prepared in autoclave by solvothermal synthesis, which requires a lengthy reaction time producing small amount of product. In this work, multi-grams of UiO-66 was repidly produced in a continuous tubular reactor under microwave irradiation. The metal salt and organic linker precursor solutions were continuously introduced into the tubular reactor by a microfluidic syringe pump system. The results showed that UiO-66 with high yield, porosity and crystallinity was produced within a short reaction time of 10 min. The characteristics of UiO-66 was affected by reaction temperature, residence time, and modulator concentration. The UiO-66 was tested for toluene adsorption at various adsorption temperatures.