

Bioactive Metal–Organic Framework Hollow Spheres with Encapsulated Enzymes as a New Biochemical Platform

정관영, 김동표[†]

포항공과대학교

(dpkim@postech.ac.kr[†])

Metal–organic frameworks (MOF) are crystalline porous materials consisting of metal ions coordinated by organic ligands. Because of their tunable pore size that can be controlled changing the length of organic ligand, it is possible to synthesize MOF with precise cavity distribution. Recently, Cu₃BTC₂ MOF hollow capsules have been reported by interfacial synthesis method using immiscible two liquid phase in a microfluidics system. However, this system has not being applied to biomaterials yet; using MOFs prepared by biocompatible ligands (bio-MOFs) important breakthroughs are expected. The non-toxic bio-MOFs (e.g. iron fumarate MIL-88A) are of crucial interest for applications such as controlled release of drugs, imaging or enzyme catalytic reaction.

Herein, we developed the new functional hollowed MOF capsules using microfluidics system. Three types of enzymes (acetylcholinesterase, glyceroldehydrogenase, phosphatase) were chosen for further biomass related applications. These enzymes were encapsulated and protected by defect-free MOF capsules.