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Silver nanoparticles embedded over porous MOF for CO₂ fixation via carboxylation of terminal alkynes at ambient pressure

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Abstract : Ag nanoparticles (NPs) has been supported over a porous Co(II)-salicylate metal-organic framework to yield a new nanocatalyst AgNPs/Co-MOF and it has been thoroughly characterized by powder X-ray diffraction (XRD), thermogravimetric analysis (TGA), energy dispersive X-ray spectrometry (EDX), high-resolution transmission electron microscopy (HR-TEM), UV-vis diffuse reflection spectroscopy (DRS) and N₂ adsorption/desorption analysis. The AgNPs/Co-MOF material showed high catalytic activity in the carboxylation of terminal alkynes via CO₂ fixation reaction to yield alkynyl carboxylic acids under very mild conditions. Due to the presence of highly reactive AgNPs bound at the porous MOF framework the reaction proceeded smoothly at 1 atm CO₂ pressure. Moreover, the catalyst is very convenient to handle and it can be reused for several reaction cycles without appreciable loss of catalytic activity in this CO₂ fixation reaction, which suggested a promising future of AgNPs/Co-MOF nanocatalyst.

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