

Metal–Organic Frameworks as Catalysts for the Synthesis of Glycerol Carbonate from Glycerol and Urea

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Metal–organic frameworks (MOFs) are crystalline porous materials composed of metal ions or metal ion clusters as nodes and organic ligands as linkers. These porous materials are perfectly suited for heterogeneous catalyst due to their physical properties. The catalytic properties of a MOF relate on chemical manipulations aimed at fine tuning of the structures and functions. In this study isorecticular MOFs (IRMOFs) were prepared by solvothermal method, fast precipitation method and microwave–assisted solvothermal method. Functionalized IRMOFs (F–IRMOFs) were also prepared by (post)–functionalization of IRMOFs. The catalysts have been characterized by XRD, FT–IR, BET, and TGA. The catalytic performance of IRMOFs is investigated for the synthesis of glycerol carbonate from glycerol and urea. The reaction was carried out in a semi–batch reactor system, under vacuum or purging nitrogen for removing ammonia. Various operation conditions such as reaction temperature, time and degree of vacuum were studied. It was found that higher temperature and higher degree of vacuum and longer reaction time were favorable for good glycerol conversion.