

Catalytic Performance of UiO-66 in the Synthesis of Glycerol Carbonate from Glycerol and Urea

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Metal organic frameworks (MOFs) are a class of crystalline porous materials constructed from metal or metal oxide building blocks connected by organic linkers. In this work, zirconium-based MOF catalysts, UiO-66-X (X =H, NH₂, Br, OH), were prepared by solvothermal method and fast precipitation method. The catalysts were characterized using XRD, FT-IR, BET, SEM, TPD and TGA. We investigated the reactivity of UiO-66-X catalysts 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. The effects of reaction parameters such as different functional group of catalyst, reaction temperature, time and degree of vacuum were studied. UiO-66-OH catalyst showed the highest activity because -OH group of UiO-66-OH having high hydrophilic character assisted the adsorption of the hydrophilic glycerol to the active center. It was found that higher temperature, higher degree of vacuum and longer reaction time were favorable for glycerol conversion.