Immobilization of zirconia-based catalyst on metalorganic framework (MOF) as highly efficient catalyst for ketonization reaction

ABSTRACT

The immobilization of Co-ZrO2 nanoparticles on the MOF has been investigated for ketonization reactions. The prepared catalysts were synthesized by intimate hybridization and were characterized by X-ray diffraction (XRD) and Field Emission-Scanning Electron (FE-SEM) microscopy analyses. The ketonization reaction of the model compound was performed via the reflux method, and the catalytic performance of the resulting products was then evaluated in terms of their free fatty acid (FFA) conversion. The XRD pattern shows the well-developed ZrO2 phase for both Co-ZrO2 and CoZrO2-ZIF8 catalysts, respectively. Meanwhile, the morphology of the present catalyst analyzed by FE-SEM shows an intimate hybridization between those two materials, with the Co-ZrO2 nanoparticles, which were immobilized on the MOF. The FFA conversion exhibits slight improvement on the hybridized catalyst, which is 89.3 % compared to 81.3 % for the as-prepared catalyst. This finding suggests the enhancement of the catalytic activity resulting from the successful hybridization between Co-ZrO2 nanoparticles and MOF.