

Preparation of Zeolite MCM-22 Catalyst for Biodiesel Production

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Biodiesel, an alternative fuel to petroleum fuel, has been more and more attractive, because it is made from environment-benign, renewable, and sustainable sources, such as vegetable oils. In general, biodiesel is produced from transesterification of triglycerides in short-chained alcohols in the presence of suitable catalysts.

In this study, zeolite MCM-22 catalysts prepared *in-house* were chosen for catalyzed transesterification of triglycerides in excess methanol. Hydrothermal synthesis of zeolite MCM-22 was carried out at 150°C for 72 to 96 h by using hexamethylenimine (HMI) as a template. Subsequently, alkali ions was ion-exchanged onto zeolite MCM-22 in order to increase the catalytic activity of zeolite MCM-22. As-prepared zeolite catalysts were characterized with various techniques such as XRD, SEM, BET, IR and EDS. The factors that influence the catalytic activity of zeolite MCM-22, such as the process time, the pH value and the concentration and sources of alkali ions, will be presented and discussed. The obtained biodiesel was analyzed by GC and NMR. The conversion of triglycerides to biodiesel could reach 99.4% in 2 h in the presence of zeolite MCM-22 ion-exchanged with 4 wt%-eq. NaOH for 0.5 h. Catalytic performance of zeolite MCM-22 in transesterification did not show a significant decrease in catalysis at least for three batch cycles.

Keywords: Biodiesel, Transesterification, Ion Exchange, Zeolite.

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