

Biodiesel production via transesterification of palm oil using NaOH/Al₂O₃ catalysts.

Abstract

Due to the increase in price of petroleum and environmental concerns, the search for alternative fuels has gained importance. In this work, biodiesel production by transesterification of palm oil with methanol has been studied in a heterogeneous system using sodium hydroxide loaded on alumina (NaOH/Al₂O₃). NaOH/Al₂O₃ catalyst was prepared by impregnation of alumina with different amount of an aqueous solution of sodium hydroxide followed by calcination in air for 3 h. The prepared catalysts were then characterized by using x-ray diffraction (XRD), Fourier transform infrared spectrometer (FT-IR), Brunner-Emmett-Teller surface area measurement (BET), scanning electron microscopy (SEM) and temperature-programmed desorption of CO₂(CO₂-TPD). Moreover, the dependence of the conversion of palm oil on the reactions variables such as the molar ratio of methanol/oil, the amount of catalysts used, reaction temperatures and reaction times were performed. The conversion of 99% was achieved under the optimum reaction conditions. The biodiesel obtained was characterized by FT-IR and the pour point was measured.

Keyword: Biodiesel; Heterogeneous catalyst; Palm oil; Transesterification.