

Bio-Glycerol Acetalization Using Tungsten Catalyst Supported on Rod-type SBA-15

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Acetalization of glycerol has a great industrial importance due to the large production of glycerol in biodiesel industry. The products of glycerol acetalization have been widely used as fuel additives, surfactant bases and scents in cosmetic industries. In this research, glycerol conversion with acetone has been studied using mesoporous  $WO_3$ /rod-type SBA-15 as a catalyst. A series of  $WO_3$ /rod-type SBA-15 catalyst with varying  $WO_3$  loadings (5–20wt%) were prepared by wetness impregnation method using tungsten precursor. The catalysts were physicochemically characterized with X-ray diffraction (XRD), Raman spectroscopy, scanning electron microscopy (SEM),  $N_2$  adsorption-desorption analysis and  $NH_3$  temperature-programmed desorption ( $NH_3$ -TPD). Among the catalysts, 15wt%  $WO_3$ /rod-type SBA-15 was found to be the most active catalyst in acetalization reaction at 30°C. The catalyst exhibited 99% glycerol conversion with 97% selectivity for five-membered (1,3-dioxolane) cyclic product. The excellent performance of the catalyst is mainly due to their high specific surface areas, high pore volumes and strong surface acid properties. These results suggest that  $WO_3$ /rod-type SBA-15 is highly active catalyst for the acetalization of glycerol.