

Hydrogenolysis of glycerol to 1,2-propanediol over Cu-based modified catalysts

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Glycerol is a main by-product of biodiesel production derived from biomass such as vegetable oil, palm oil etc. One of the most attractive approaches of converting glycerol is to produce propanediol(1,2-PDO) by selective hydrogenolysis of glycerol. Catalysts consisting of supported noble metals such as Ru, Rh, and Pt are well-known as active catalysts in the hydrogenolysis of glycerol to 1,2-PDO. Unfortunately, these catalysts often promote excessive C-C cleavage, resulting in a low selectivity to 1,2-PDO in spite of high conversion of glycerol. Cu-based catalysts have been reported to have a superior performance in this reaction due to their poor activity for C-C bond cleavage and high efficiency for C-O bond hydrogenolysis.

In this study, Cu-based modified catalysts were prepared by sol-gel and hydrothermal methods, and the hydrogenolysis of glycerol over the prepared catalysts was investigated under mild conditions. The prepared catalysts before and after the reaction were characterized by XRD, TEM, N₂ physisorption, CO chemisorption, TPR and NH₃-TPD measurements.