

Direct Conversion of Cellulose into Sorbitol over Dual-Functional Catalysts in Neutral Aqueous Solution

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Cellulose is the most abundant chemical in ligneous biomass, which is not edible species. Though cellulose occupies almost half of lignocellulosic biomass, high crystalline structure and water-insoluble property hinder developing its application. But recently, several researches were presented about cellulose cracking into useful molecules, for example, sugars and sugar-alcohols. Especially, sugar-alcohol sorbitol is a promising platform molecule, through which hydrogen, liquid alkanes can be obtained. In this study, selective conversion of cellulose into sorbitol over Ru nanoparticles and sulfonic group functionalized activated carbon was carried out. The catalysts were prepared by sulfonation of activated carbon and Ru chemical reduction step. By cellulose hydrogenation reaction, maximum 70% of sorbitol yield could be achieved, and little amount of other hydrocarbon molecules were detected but sorbitol. In addition, we found that the used catalyst is active up to five cycle with little deactivation.