

Synthesis of 5-hydroxymethyl-furfural (HMF) from Fructose Using Heteropolyacid catalysts Supported on Inorganic supports

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There have been many researches on developing new technology that replace petroleum-based chemistry. One of the promising substitutes, 5-hydroxymethyl-furfural (HMF) can be applied for fine chemicals, pharmaceuticals and furan-based polymers. HMF can be obtained via dehydration from fructose and glucose which are part of abundant sucrose. Among the various heterogeneous catalysts, heteropolyacids (HPAs) can be attractive acid catalyst candidates for dehydration reaction. Especially, Keggin-type tungsten-based HPAs ($H_4SiW_{12}O_{40}$ and $H_3PW_{12}O_{40}$) are the most suitable due to their strong Bronsted acidity and high thermal stability. In this work, to compensate the drawback of HPAs, low surface area, we used impregnation method using inorganic supports such as SiO_2 , Al_2O_3 , and TiO_2 . The prepared catalysts have been characterized by XRD, BET, FT-IR and NH_3 -TPD. Catalytic activity of HPA catalyst was evaluated using 10 wt% fructose solution and products were measured by HPLC. HPA catalysts supported on inorganic supports showed high reactivity for the production of HMF from fructose via dehydration.