

Fructose dehydration into 5-Hydroxymethylfurfural using solid acid catalyst and ionic liquid

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An efficient production of 5-HMF by dehydration of fructose was developed using an inexpensive solid acid catalyst niobium pentachloride (NbCl₅) in an imidazolium-based ionic liquid (IL), 1-butyl-3-methylimidazolium chloride ([bmim]Cl). The selected IL acted as the solvent as well as water scavenger. Under mild reaction conditions, yield of 5-HMF as high as 80% was achieved within 30 minutes at 80°C. With the dehydration reaction in [bmim]Cl/NbCl₅, high temperature and long reaction time requirements have been significantly reduced. The influence of different reaction parameters on the dehydration was also studied. Furthermore, side product formation of levulinic acid or formic acid was conveniently absent in this reaction system. This work was supported by Priority Research Centers Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education, Science and Technology (2011-0022968).