

Niobic Acid Catalyzed Hydroxyalkylation/Alkylation of 2-Methylfuran with Aldehydes and Ketones

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In the production of high-grade liquid fuel from biomass-derived carbohydrates or platform chemicals, C-C coupling reactions such as aldol condensation and hydroxyalkylation-alkylation are most available for increasing the carbon chain and thereby producing fuel precursors. In this work, the catalytic application of niobic acid, synthesized by low temperature peptization of niobic acid sol prepared from ethanolic NbCl₅ solution, to the hydroxyalkylation/alkylation of 2-methylfuran with biomass-derived aldehydes and ketones was explored. Among the catalysts investigated, the niobic acid thermally treated at 400°C exhibited the best catalytic performance. According to the results of characterization, the activity of niobic acid can be rationalized by its high surface area, large pore diameter, good water resistance, and by the presence of surface Nb-OH groups which acted as Brønsted acidic sites. This work was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (NRF 2017R1D1A1B03036324).

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