

Phenolic-Based Chemical Production from Catalytic Depolymerization of Alkaline Lignin over Fumed Silica Catalyst

Authors : S. Totong, P. Daorattanachai, N. Laosiripojana

Abstract : Lignin depolymerization into phenolic-based chemicals is an interesting process for utilizing and upgrading a benefit and value of lignin. In this study, the depolymerization reaction was performed to convert alkaline lignin into smaller molecule compounds. Fumed SiO₂ was used as a catalyst to improve catalytic activity in lignin decomposition. The important parameters in depolymerization process (i.e., reaction temperature, reaction time, etc.) were also investigated. In addition, gas chromatography with mass spectrometry (GC-MS), flame-ionized detector (GC-FID), and Fourier transform infrared spectroscopy (FT-IR) were used to analyze and characterize the lignin products. It was found that fumed SiO₂ catalyst led the good catalytic activity in lignin depolymerization. The main products from catalytic depolymerization were guaiacol, syringol, vanillin, and phenols. Additionally, metal supported on fumed SiO₂ such as Cu/SiO₂ and Ni/SiO₂ increased the catalyst activity in terms of phenolic products yield.

Keywords : alkaline lignin, catalytic, depolymerization, fumed SiO₂, phenolic-based chemicals

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