The roles of heterogeneous catalysts for depolymerization of lignin in supercritical ethanol

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Lignin which is one of the constituents of lignocellulosic biomass is an amorphous co-polymer consisting of various aromatic compounds, cross-linked by C-C and C-O bonds. In this work, catalytic conversion in supercritical ethanol was conducted to explore the reaction pathway of benzyl phenyl ether (BPE), containing α-O-4 bonds and depolymerization of real lignin sources without supplying external hydrogen. At first, When the α-O-4 bond of BPE was cleaved with the carbon-supported catalysts with noble metals, phenol and toluene were mainly produced. The conversion of BPE was more than 95 % over all of the catalysts with noble metals at 270 ℃ for 4 h, and the conversion speed and the yield distribution were different for each catalyst. Secondly, it was observed that the trend of yields according to the amount of transition metal loading formed the volcano shape curve and had a linear correlation between the yield of mono-aromatic compounds and acid density. In addition, it was found that Cu metal among transition metals plays an important role in promoting the depolymerization of lignin.