Development of bifunctional catalyst for the catalytic conversion of lignin-derived fragments

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Lignin is a natural phenolic polymer composed of monomeric units of phenylpropanes, including *p*-hydroxylphenylpropnae, guaiacylpropane, and syringylpropane, are connected to various linkages of ethers (β-O-4, α-O-4, and 4-O-5) and C-C bonds (5-5, -5, and β-β). Lignin is a promising resource to produce valuable liquid fuels by depolymerization and deoxygenation processes. We studied the catalytic conversion of lignin using bifunctional catalysts containing noble metal nanoparticles supported on silica-alumina aerogels. The hydrodeoxygenation (HDO) to remove oxygen functionalities produced saturated cycloalkanes. THe HDO processes of guaiacol and benzyl phenyl ether were performed mainly producing cyclohexane, methylcyclohexane, and dicyclohexylmethane. The catalysts were characterized using ICP-AES, N_2-physisorption, NH_3-TPD, CO-chemisorption and NMR elucidate the effects of catalyst structures on the catalytic activity.