Hydrodeoxygenation of lignin model compounds to produce hydrocarbon biofuels

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Lignin is a natural glue which consists of phenylpropane monomers, such as *p*-hydroxylphenylpropane, guaiacylpropane, and syringylpropane, connected to various ether linkages, such as β-O-4, α-O-4, and 4-O-5 bonds. We studied the catalytic conversion of lignin model compounds of monomers including guaiacol and guaiacylpropane. Additionally, benzyl phenyl ether was used as a phenolic dimer containing α-O-4 linkages. Solid acid catalysts were used to produce saturated cyclic compound, such as cyclohexane, propylcyclohexane, dicyclohexane, and dicyclohexylmethane, by hydrogenating phenyls and eliminating oxygens. Obtained products were identified and quantified using GC-MS and GC-FID. The catalysts were characterized by ICP-AES, N_2-physisorption, XPS, NH_3-TPD, CO-chemisorption, and solid-state NMR to elucidate the correlation between structures and activities of catalysts.