

Comparison of non-catalytic pyrolysis products composition of lignin and Yellow Poplar in different pyrolysis atmosphere

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Lignin, an aromatic constituent of woody biomass, is a potential renewable aromatic feedstock for a sustainable future carbon economy. Lignin is a polymer of phenylpropane units containing three different aromatic ring substitution patterns: p-hydroxyphenyl, guaiacyl and syringyl depending on the wood species. These monomers are linked together through various kinds of ether linkages (C–O) and condensed (C–C) bonds, which leads to a rigid structure for lignin. Pyrolysis of Lignin and Yellow poplar produces bio-oil, which majorly contains high amount of water, acid content, oxygen-derivatives of organic compounds such as ketones esters etc. The aim of this work is consumption of CH₄ as source of hydrogen, methyl radicals, which will utilized in the hydrogenation, coupling reactions with oxygenates, phenols present in the bio-oil, and finally removes oxygen and increases the aromatic hydrocarbons in the bio-oil. Due to the wide availability of methane as the main component of natural gas, its use in the pyrolysis as a source of hydrogen is beneficial to produce bio-fuel rich in aromatic benzene monomers from the Lignin and Yellow poplar biomass.