Hydrogenation as a Method for Upgrading Lignin-Based Bio-Oil to High Value Chemicals

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During the previous year’s experimentation, it was found that Pinus ponderosae infested with Dendroctonus ponderosa was able to be turned into a feasible bio-oil through the use of liquefaction at 300°C for six hours. This years project examines upgrading this bio-oil to a biofuel through the use of hydrogenation/deoxygenation. It was hypothesized that the lignocellulose bio-oil can be upgraded through hydrogenation with the use of the catalyst raney nickel. Bio-oil was created using liquefaction and then hydrogenated/deoxygenated using the Parr 4838 Reactor. When the samples were complete they underwent analysis using Gas Chromatography Mass Spectroscopy and Attenuated total reflection Infrared Spectroscopy. The results of this experiment indicate that the bio-oil was able to be successfully upgraded, as there was a decrease in alcohol and double-bonded carbonyls, and an increase in hydrogen.

Awards Won: