# Synthesis of Magnetically Separable Catalysts and Nanosupports for Synthesizing Transportation Fuels

Hendricks, Shannon

The purpose of this project is to synthesize magnetically separable nanosupports which can then be applied to transportation fuels productions. Transportation fuels are necessary for the world to function; yet the combustion products are bad for the environment. Instead of capturing CO2 through artificial means, using trees to capture carbon and then converting the rest into transportation fuels creates a carbon neutral system. Nanocatalysts created from magnetically separable nanoparticles are an efficient way of converting biomass, a solid of highly viscous liquid, to transportation fuels because of their small size which can be easily slurried throughout the mixture. Silica coated magnetically separable nanoparticles were created by the reaction that tetraethyl orthosilicate (TEOS) undergoes under the presence of ammonium hydroxide (NH4OH) and water where TEOS decomposes to form SiO2. The procedure was altered in order to determine the best way to synthesize the magnetically separable nanoparticles and the particles are tested by comparing the graphs of a UV-Vis test and the images taken by an electron microscope. The silica coated nanosupports were then connected to a known catalyst and tested in a batch reactor using a model reaction similar to the one used for breaking down biomass to fossil fuels. The nanocatalysts were able to convert the bio oil model compound into aromatic products and after reaction the catalyst was still magnetically separable.

**Awards Won:**