P.U.R.E. Research Plan Form

Mentee Information

Name: ____Vivek Vermani_________ Date: ___09/21/16_________
NetID: _vermani2_____ Email: _vermani2@illinois.edu_ Year (F, S, J, Sr): ____S__ Major: ___Chemical Engineering___

Mentor Information

Name: ___SiWei (Andy) Chang________________________ Date: ___09/21/16_________
NetID: __schang47______ Email: __schang47@illinois.edu__ Department: __Chemical Engineering________
Faculty Advisor: ____David Flaherty________________

Fall 2016 Research Plan

1.) Write a brief outline of your research plan:

The purpose of this research is the rational design of a catalyst to enhance C-O bond rupture, as that is a necessary step in the refinement of bio-oil to a usable petroleum substitute. This requires having a better understanding of the mechanism by which organic molecules break down on catalyst surfaces. The surfaces used in this work are Ruthenium and Ruthenium Phosphide, and the research will involve performing experiments with acetic acid and propionic acid to learn the activation energies for different steps of the reaction mechanism, which products are formed, and their ratios depending on the catalyst used. Some examples of the experiments involved are Temperature Programmed Reaction (TPR), which involves dosing the reactant on the catalyst surface and heating to learn when different products are formed, as well as Molecular Beam Scattering, which involves dosing a reactant on the sample at either different temperatures or pressures to see the amount of different products formed at those conditions. Together, these experiments are able to give comprehensive information about the different catalysts act.

2.) What do you hope to learn and achieve by the end of the semester?

My goal from this research is to gain more experience with working in a lab and performing experiments with applications outside of classwork. I hope to build on my current knowledge of organic chemistry by learning more about surface chemistry as well as learning different techniques for data analysis and how it can be interpreted. I would also like to develop my written and verbal communication skills through the poster presentation. Ideally, over the course of this semester, I would want to stay to work on the completion of the data collection and analysis for at least one research paper.

Mentee Signature: ___________________________ Date: __7/20/2016__
Mentor Signature: __________________________ Date: __7/20/2016__