Risk Assessment Form (3)

Must be completed before experimentation.

Student's Name(s) Edgar Ma

Title of Project Improving CO2 hydrogenation: Guanidine treatment over Fe-Co bimetallic catalysts

To be completed by the Student Researcher(s) in collaboration with Designated Supervisor/Qualified Scientist: (All questions must be answered; additional page(s) may be attached.)

1. List all hazardous chemicals, activities, or devices that will be used; identify microorganisms exempt from pre-approval (see Potentially Hazardous Biological Agent rules).

   Metallic complexes, synthesized from iron, cobalt, and citric acid, will be used. Cerium oxide and guanidine will also be used. Carbon dioxide, hydrogen, helium, will be used as reaction gas. In addition, high temperature ovens and furnaces will be used to calcine synthesized catalysts and control reaction temperature.

2. Identify and assess the risks involved in this project.

   Iron and cobalt powder are toxic if inhaled or swallowed. Both are known to be flammable solids. Contact with skin may cause irritation. May cause serious eye irritation. Both substances are stable if not exposed to intense heat. Cerium oxide may cause respiratory irritation if inhaled. It is not known to be flammable or unstable, however, it should not be exposed to strong oxidizing agents.Guanidine is harmful if swallowed. It can cause irritation upon contact with skin or eyes. It is not known to be flammable. Guanidine is stable if not exposed to strong oxidizing agents. Pressurized gas containers may explode if heated or on impact. In addition, hydrogen is a flammable gas

3. Describe the safety precautions and procedures that will be used to reduce the risks.

   Proper safety equipment such as lab coats, goggles, breathing masks, and gloves will be worn at all times in the laboratory. Upon leaving the laboratory, hands will be washed with soap and water. The student researcher will not handle any potentially hazardous chemicals without supervision, and he will be clearly instructed of any dangers regarding chemicals and how to properly dispose of them. The designated supervisor will handle chemicals if deemed too dangerous for the student researcher. Regular checks of gas lines will be conducted to ensure no leakage occurs. Pressurized containers of gas will be secured by chains to ensure they don't fall over

4. Describe the disposal procedures that will be used (when applicable).

   All hazardous chemical waste is contained is clearly labeled bottles where it is later disposed of accordingly with help from the lab manage. This includes heavy metals and metal oxides. Spent catalysts are stored in designated containers.

5. List the source(s) of safety information.

   Long Island University Post's General Laboratory Safety Information

To be completed and signed by the Designated Supervisor (or Qualified Scientist, when applicable):
I agree with the risk assessment and safety precautions and procedures described above. I certify that I have reviewed the Research Plan/Project Summary and will provide direct supervision.

Alexandra Leichnam	Alexandra Leichnam	07/1/19
Designated Supervisor's Printed Name	Signature	Date of Review (mm/dd/yy)

Student Researcher at LIU Post	leichnam.a@gmail.com
Position & Institution	Phone or email contact information

I have worked in Dr. Zhang's lab for over a year now, I am familiar with its equipment and potential risks involved.

Experience/Training as relates to the student's area of research