

## **Appendix 1: Safety Information**

### **General Safety Considerations**

Safety and personal protection are of utmost importance in a laboratory environment. In the United States, the Occupational Safety and Health Administration (OSHA) establishes guidelines and enforcement of the Material Safety Data Sheet (MSDS) which contains critical safety information for every chemical used in a lab. Combined with university policies and safety practices, individuals can avoid hazards while conducting chemical experiments. The following outlines general precautions and chemical-specific precautions employed in relation to this project.

Personal Protective Equipment (PPE) was used at all times in the lab. This equipment included safety glasses, gloves, long pants, close-toed shoes, and a lab coat when appropriate. A chemical fume hood was used when handling volatile solvents and for conducting reactions. Broken glassware was handled with a broom, dustpan, gloves, and eye protection and disposed of in a specified glass waste container. No food was consumed in the lab and all chemicals were properly disposed of in accordance with the Environmental and Occupational Health and Safety department standards.

### **Chemical-Specific Considerations**

The following chemical-specific safety guidelines outline the potential hazards of each chemical with the appropriate PPE or techniques used to mitigate danger. The referenced material safety data sheet is provided for each chemical which contains more detailed information.

#### **Acetone (2-propanone)**

1. Skin Hazard

- a. Mitigation: Nitrile gloves. Changed upon contamination.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
2. Eye Hazard
    - a. Mitigation: Safety glasses.
    - b. Response: Eyewash station with continual flushing for at least 15 minutes.
3. Vapor Hazard
    - a. Mitigation: Chemical fume hood.
    - b. Response: Evacuation to a well-ventilated area if inhaled.
4. Flammability Hazard
    - a. Mitigation: Keep from sources of ignition.
    - b. Response: Evacuate and notify emergency services.
5. Disposal: Non-halogenated waste container.

Reference: *Acetone*; MSDS No. AC167645000 [Online]; Fisher Scientific: Fair Lawn, NJ, February 28, 2008. <https://fscimage.fishersci.com/msds/00140.htm> (accessed May 30, 2015).

### **Base Bath (ethanol, potassium hydroxide)**

1. Skin Hazard
    - a. Mitigation: Heavy-duty acid/base protective gloves (cover wrist). Rinsed with water before and after use.
    - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
2. Eye Hazard
    - a. Mitigation: Safety glasses.
    - b. Response: Eyewash station with continual flushing for at least 15 minutes.
3. Vapor Hazard

- a. Mitigation: Cover with lid when not in use.
  - b. Response: Evacuation to a well-ventilated area if inhaled.
4. Flammability Hazard
    - a. Mitigation: Keep from sources of ignition.
    - b. Response: Evacuate and notify emergency services.
  5. Disposal: Contact Environmental and Occupational Health and Safety department.

References: *Ethanol*; MSDS No. NC9602322 [Online]; Fisher Scientific: Fair Lawn, NJ, March 18, 2003. <https://fscimage.fishersci.com/msds/89308.htm> (accessed May 30, 2015).

*Potassium hydroxide*; MSDS No. P5958 [Online]; Sigma-Aldrich: Saint Louis, MO, February 26, 2015. <http://www.sigmaaldrich.com/catalog/product/sial/p5958?lang=en&region=US> (accessed May 30, 2015).

### **Dichloromethane (methylene chloride)**

1. Skin Hazard
  - a. Mitigation: Nitrile gloves. Changed upon contamination.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
3. Vapor Hazard
  - a. Mitigation: Chemical fume hood.
  - b. Response: Evacuation to a well-ventilated area if inhaled.
4. Flammability Hazard

- a. Mitigation: Keep from sources of ignition.
  - b. Response: Evacuate and notify emergency services.
5. Disposal: Halogenated waste container.

Reference: *Dichloromethane*; MSDS No. AC113460000 [Online]; Fisher Scientific: Fair Lawn, NJ, September 30, 2008. <https://fscimage.fishersci.com/msds/14930.htm> (accessed May 30, 2015).

### **Acetonitrile (ethyl nitrile)**

1. Skin Hazard
  - a. Mitigation: Chloroprene gloves. Changed upon contamination.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
3. Vapor Hazard
  - a. Mitigation: Chemical fume hood.
  - b. Response: Evacuation to a well-ventilated area if inhaled.
4. Flammability Hazard
  - a. Mitigation: Keep from sources of ignition.
  - b. Response: Evacuate and notify emergency services.
5. Disposal: Non-halogenated waste container.

Reference: *Acetonitrile*; MSDS No. AC149520000 [Online]; Fisher Scientific: Fair Lawn, NJ, February 28, 2008. <https://fscimage.fishersci.com/msds/00170.htm> (accessed May 30, 2015).

**N,N-diisopropylethylamine (DIPEA)**

1. Skin Hazard
  - a. Mitigation: Nitrile gloves. Changed upon contamination.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
3. Vapor Hazard
  - a. Mitigation: Chemical fume hood.
  - b. Response: Evacuation to a well-ventilated area if inhaled.
4. Flammability Hazard
  - a. Mitigation: Keep from sources of ignition.
  - b. Response: Evacuate and notify emergency services.
5. Disposal: Non-halogenated waste container.

Reference: *N,N-diisopropylethylamine*; MSDS No. D125806 [Online]; Sigma-Aldrich: Saint Louis, MO, January 9, 2015.

<http://www.sigmaaldrich.com/catalog/product/sial/d125806?lang=en&region=US> (accessed May 30, 2015).

**N,N-dimethylformamide (DMF)**

1. Skin Hazard
  - a. Mitigation: Nitrile gloves. Changed upon contamination.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.

2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
3. Vapor Hazard
  - a. Mitigation: Chemical fume hood.
  - b. Response: Evacuation to a well-ventilated area if inhaled.
4. Flammability Hazard
  - a. Mitigation: Keep from sources of ignition.
  - b. Response: Evacuate and notify emergency services.
5. Disposal: Non-halogenated waste container.

Reference: *N,N-dimethylformamide*; MSDS No. D4551 [Online]; Sigma-Aldrich: Saint Louis, MO, February 26, 2015.

<http://www.sigmaaldrich.com/catalog/product/sigma/d4551?lang=en&region=US> (accessed May 30, 2015).

## **Methanol**

1. Skin Hazard
  - a. Mitigation: Nitrile gloves. Changed upon contamination.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
3. Vapor Hazard
  - a. Mitigation: Chemical fume hood.

- b. Response: Evacuation to a well-ventilated area if inhaled.
- 4. Flammability Hazard
  - a. Mitigation: Keep from sources of ignition.
  - b. Response: Evacuate and notify emergency services.
- 5. Disposal: Non-halogenated waste container.

Reference: *Methanol*; MSDS No. AC167830000 [Online]; Fisher Scientific: Fair Lawn, NJ, February 11, 2008. <https://fscimage.fishersci.com/msds/14280.htm> (accessed May 30, 2015).

### **Silica Gel**

- 1. Skin Hazard
  - a. Mitigation: Nitrile gloves. Changed upon contamination.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
- 2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
- 3. Inhalation Hazard
  - a. Mitigation: 3M dust mask.
  - b. Response: Evacuation to a well-ventilated area if inhaled.
- 4. Flammability Hazard
  - a. None
- 5. Disposal: Silica-gel specific waste container after evaporation of solvent in fume hood.

Reference: *Silica Gel*; MSDS No. 391484 [Online]; Sigma-Aldrich: Saint Louis, MO, February 26, 2015. <http://www.sigmaaldrich.com/catalog/product/sial/391484?lang=en&region=US> (accessed May 30, 2015).

## **Acetic Acid**

1. Skin Hazard
  - a. Mitigation: Heavy duty gloves. Changed upon contamination and rinsed before/after use. Lab coat worn.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
3. Vapor Hazard
  - a. Mitigation: Chemical fume hood.
  - b. Response: Evacuation to a well-ventilated area if inhaled.
4. Flammability Hazard
  - a. Mitigation: Keep from sources of ignition.
  - b. Response: Evacuate and notify emergency services.
5. Disposal: Neutralized with sodium bicarbonate then poured down drain with copious water. Knight Chemical Lab is equipped with acid-neutralization sewage and glass pipes.

Reference: *Acetic acid*; MSDS No. 537020 [Online]; Sigma-Aldrich: Saint Louis, MO, January 16, 2015. <http://www.sigmaaldrich.com/catalog/product/sial/537020?lang=en&region=US> (accessed May 30, 2015).



## Hydrobromic Acid

### 1. Skin Hazard

- a. Mitigation: Heavy duty gloves. Changed upon contamination and rinsed before/after use. Lab coat worn.
- b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.

### 2. Eye Hazard

- a. Mitigation: Safety glasses.
- b. Response: Eyewash station with continual flushing for at least 15 minutes.

### 3. Vapor Hazard

- a. Mitigation: Chemical fume hood.
- b. Response: Evacuation to a well-ventilated area if inhaled.

### 4. Flammability Hazard

- a. Mitigation: Keep from sources of ignition.
- b. Response: Evacuate and notify emergency services.

### 5. Disposal: Neutralized with sodium bicarbonate then poured down drain with copious water. Knight Chemical Lab is equipped with acid-neutralization sewage and glass pipes.

Reference: *Hydrobromic acid*; MSDS No. 438065 [Online]; Sigma-Aldrich: Saint Louis, MO, June 24, 2015. <http://www.sigmaaldrich.com/catalog/product/sial/438065?lang=en&region=US> (accessed May 30, 2015).

## Heptane

### 1. Skin Hazard

- a. Mitigation: Nitrile gloves. Changed upon contamination.

- b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
- 2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
- 3. Vapor Hazard
  - a. Mitigation: Chemical fume hood.
  - b. Response: Evacuation to a well-ventilated area if inhaled.
- 4. Flammability Hazard
  - a. Mitigation: Keep from sources of ignition.
  - b. Response: Evacuate and notify emergency services.
- 5. Disposal: Non-halogenated waste container.

Reference: *Heptane*; MSDS No. BP1115-500 [Online]; Fisher Scientific: Fair Lawn, NJ, April 7, 2014.

<https://www.fishersci.com/shop/msdsproxy?productName=H2020&productDescription=HEPTANE+20L&catNo=H20-20&vendorId=VN00033897&storeId=10652> (accessed May 30, 2015).

### **Toluene (methylbenzene)**

- 1. Skin Hazard
  - a. Mitigation: Nitrile gloves. Changed upon contamination.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
- 2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
- 3. Vapor Hazard

- a. Mitigation: Chemical fume hood.
  - b. Response: Evacuation to a well-ventilated area if inhaled.
4. Flammability Hazard
    - a. Mitigation: Keep from sources of ignition.
    - b. Response: Evacuate and notify emergency services.
  5. Disposal: Non-halogenated waste container.

Reference: *Toluene*; MSDS No. AC610110040 [Online]; Acros Organics: Fair Lawn, NJ, March 12, 1998. <http://www.soest.hawaii.edu/krubin/MSDS/toluene.html> (accessed May 30, 2015).

## **Hexanes**

1. Skin Hazard
  - a. Mitigation: Nitrile gloves. Changed upon contamination.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
3. Vapor Hazard
  - a. Mitigation: Chemical fume hood.
  - b. Response: Evacuation to a well-ventilated area if inhaled.
4. Flammability Hazard
  - a. Mitigation: Keep from sources of ignition.
  - b. Response: Evacuate and notify emergency services.
5. Disposal: Non-halogenated waste container.

Reference: *Hexanes*; MSDS No. H292-1 [Online]; Fisher Scientific: Fair Lawn, NJ, April 7, 2014.  
<http://www.fishersci.com/msdsproxy%3FproductName%3DH292200%26productDescription%3DHEXANES%2BACS%2B200L%26catNo%3DH292-200%2B%26vendorId%3DVN00033897%26storeId%3D10652> (accessed May 30, 2015).

### **DMSO- $\delta_6$ (Dimethyl sulfoxide, deuterated)**

#### 1. Skin Hazard

- a. Mitigation: Nitrile gloves. Changed upon contamination and rinsed before/after use.
- b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.

#### 2. Eye Hazard

- a. Mitigation: Safety glasses.
- b. Response: Eyewash station with continual flushing for at least 15 minutes.

#### 3. Vapor Hazard

- a. Mitigation: Used in open area and bottle closed and returned to sealed container immediately.
- b. Response: Evacuation to a well-ventilated area if inhaled.

#### 4. Flammability Hazard

- a. Mitigation: Keep from sources of ignition.
- b. Response: Evacuate and notify emergency services.

#### 5. Disposal: Non-halogenated waste container.

Reference: *Dimethyl sulfoxide- $d_6$* ; MSDS No. 547239 [Online]; Sigma-Aldrich: Saint Louis, MO, January 26, 2015.

<http://www.sigmaaldrich.com/catalog/product/aldrich/547239?lang=en&region=US> (accessed May 30, 2015).

### **Valeraldehyde (pentanal)**

1. Skin Hazard
  - a. Mitigation: Nitrile gloves. Changed upon contamination.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
3. Vapor Hazard
  - a. Mitigation: Chemical fume hood.
  - b. Response: Evacuation to a well-ventilated area if inhaled.
4. Flammability Hazard
  - a. Mitigation: Keep from sources of ignition.
  - b. Response: Evacuate and notify emergency services.
5. Disposal: Non-halogenated waste container.

Reference: *Valeraldehyde*; MSDS No. 110132 [Online]; Sigma-Aldrich: Saint Louis, MO, March 3, 2015. <http://www.sigmaaldrich.com/catalog/product/aldrich/110132?lang=en&region=US> (accessed May 30, 2015).

### **Butanal (butyraldehyde)**

1. Skin Hazard
  - a. Mitigation: Nitrile gloves. Changed upon contamination.

- b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
- 2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
- 3. Vapor Hazard
  - a. Mitigation: Chemical fume hood.
  - b. Response: Evacuation to a well-ventilated area if inhaled.
- 4. Flammability Hazard
  - a. Mitigation: Keep from sources of ignition.
  - b. Response: Evacuate and notify emergency services.
- 5. Disposal: Non-halogenated waste container.

Reference: *Butyraldehyde*; MSDS No. W221902 [Online]; Sigma-Aldrich: Saint Louis, MO, March 6, 2015.

<http://www.sigmaaldrich.com/catalog/product/aldrich/w221902?lang=en&region=US> (accessed May 30, 2015).

#### **4-hydroxybenzaldehyde**

- 1. Skin Hazard
  - a. Mitigation: Nitrile gloves. Changed upon contamination.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
- 2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
- 3. Inhalation Hazard

- a. None.
4. Flammability Hazard
  - a. None.
5. Disposal: Solid waste container.

Reference: *4-hydroxybenzaldehyde*; MSDS No. W398403 [Online]; Sigma-Aldrich: Saint Louis, MO, January 26, 2015.

<http://www.sigmaaldrich.com/catalog/product/aldrich/w398403?lang=en&region=US> (accessed May 30, 2015).

### **Hexanal**

1. Skin Hazard
  - a. Mitigation: Nitrile gloves. Changed upon contamination.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
3. Vapor Hazard
  - a. Mitigation: Chemical fume hood.
  - b. Response: Evacuation to a well-ventilated area if inhaled.
4. Flammability Hazard
  - a. Mitigation: Keep from sources of ignition.
  - b. Response: Evacuate and notify emergency services.
5. Disposal: Non-halogenated waste container.

Reference: *Hexanal*; MSDS No. 115606 [Online]; Sigma-Aldrich: Saint Louis, MO, January 9, 2015. <http://www.sigmaaldrich.com/catalog/product/aldrich/115606?lang=en&region=US> (accessed May 30, 2015).

## **2-(bromomethyl)naphthalene**

1. Skin Hazard
  - a. Mitigation: Nitrile gloves. Changed upon contamination.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
3. Inhalation Hazard
  - a. Mitigation: Chemical fume hood.
  - b. Response: Evacuation to a well-ventilated area if inhaled.
4. Flammability Hazard
  - a. None.
5. Disposal: Solid waste container.

Reference: *2-(Bromomethyl)naphthalene*; MSDS No. 143677 [Online]; Sigma-Aldrich: Saint Louis, MO, June 30, 2014.

<http://www.sigmaaldrich.com/catalog/product/aldrich/143677?lang=en&region=US> (accessed May 30, 2015).

## **Imidazole (1,3-diaza-2,4-cyclopentadiene)**

1. Skin Hazard



- a. Mitigation: Nitrile gloves. Changed upon contamination.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
2. Eye Hazard
    - a. Mitigation: Safety glasses.
    - b. Response: Eyewash station with continual flushing for at least 15 minutes.
3. Inhalation Hazard
    - a. Mitigation: Chemical fume hood.
    - b. Response: Evacuation to a well-ventilated area if inhaled.
4. Flammability Hazard
    - a. None.
5. Disposal: Solid waste container.

Reference: *Imidazole*; MSDS No. I2399 [Online]; Sigma-Aldrich: Saint Louis, MO, September 1, 2014. <http://www.sigmaaldrich.com/catalog/product/sial/i2399?lang=en&region=US> (accessed May 30, 2015).

### **Potassium bromide (KBr)**

1. Skin Hazard
  - a. Mitigation: Nitrile gloves. Changed upon contamination.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
3. Inhalation Hazard
  - a. Mitigation: Chemical fume hood.

- b. Response: Evacuation to a well-ventilated area if inhaled.
- 4. Flammability Hazard
  - a. None.
- 5. Disposal: Solid waste container.

Reference: *Potassium bromide*; MSDS No. 243418 [Online]; Sigma-Aldrich: Saint Louis, MO, June 24, 2014. <http://www.sigmaaldrich.com/catalog/product/sial/243418?lang=en&region=US> (accessed May 30, 2015).

### **Sodium bromide (NaBr)**

- 1. Skin Hazard
  - a. Mitigation: Nitrile gloves. Changed upon contamination.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
- 2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
- 3. Inhalation Hazard
  - a. None.
- 4. Flammability Hazard
  - a. None.
- 5. Disposal: Solid waste container.

Reference: *Sodium bromide*; MSDS No. 220345 [Online]; Sigma-Aldrich: Saint Louis, MO, November 20, 2014.

<http://www.sigmaaldrich.com/catalog/product/sial/220345?lang=en&region=US> (accessed May 30, 2015).

### **Chloroform (trichloromethane)**

1. Skin Hazard
  - a. Mitigation: Nitrile gloves. Changed upon contamination.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
3. Vapor Hazard
  - a. Mitigation: Chemical fume hood.
  - b. Response: Evacuation to a well-ventilated area if inhaled.
4. Flammability Hazard
  - a. Mitigation: Keep from sources of ignition.
  - b. Response: Evacuate and notify emergency services.
5. Disposal: Halogenated waste container.

Reference: *Chloroform*; MSDS No. 288306 [Online]; Sigma-Aldrich: Saint Louis, MO, March 3, 2015. <http://www.sigmaaldrich.com/catalog/product/sial/288306?lang=en&region=US> (accessed May 30, 2015).

### **Diethyl ether**

1. Skin Hazard
  - a. Mitigation: Nitrile gloves. Changed upon contamination.

- b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
- 2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
- 3. Vapor Hazard
  - a. Mitigation: Chemical fume hood.
  - b. Response: Evacuation to a well-ventilated area if inhaled.
- 4. Flammability Hazard
  - a. Mitigation: Keep from sources of ignition.
  - b. Response: Evacuate and notify emergency services.
- 5. Disposal: Non-halogenated waste container.

Reference: *Diethyl ether*; MSDS No. AC123990000 [Online]; Fisher Scientific: Fair Lawn, NJ, July 30, 2008. <http://fscimage.fishersci.com/msds/90868.htm> (accessed May 30, 2015).

### **Sodium bicarbonate**

- 1. Skin Hazard
  - a. Mitigation: Nitrile gloves. Changed upon contamination.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
- 2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
- 3. Vapor Hazard
  - a. Mitigation: Chemical fume hood.
  - b. Response: Evacuation to a well-ventilated area if inhaled.

4. Flammability Hazard
  - a. Mitigation: Keep from sources of ignition.
  - b. Response: Evacuate and notify emergency services.
5. Disposal: Solid waste container.

Reference: *Sodium bicarbonate*; MSDS No. S6014 [Online]; Sigma-Aldrich: Saint Louis, MO, January 22, 2015. <http://www.sigmaaldrich.com/catalog/product/sial/s6014?lang=en&region=US> (accessed May 30, 2015).

### **Cisplatin and Novel Imidazolium Salts**

1. Skin Hazard
  - a. Mitigation: Nitrile gloves. Changed upon contamination.
  - b. Response: Skin washed vigorously with soap and water. Safety shower if spilled.
2. Eye Hazard
  - a. Mitigation: Safety glasses.
  - b. Response: Eyewash station with continual flushing for at least 15 minutes.
3. Respiratory Hazard
  - a. Mitigation: Chemical fume hood.
  - b. Response: Evacuation to a well-ventilated area if inhaled.
  - c. Danger: Dust formation should be avoided due to possible inhalation.
4. General Health Effects
  - a. Cisplatin is a chemotherapeutic drug that should not be ingested without a prescription. Acute toxicity is possible leading to symptoms such as neurological deficit, diarrhea, and allergic reactions. Long term exposure may lead to carcinogenic effects.

- b. The novel imidazolium salts synthesized in this experiment demonstrated antitumor efficacy (**3** and **5**) comparable to cisplatin indicating additional precaution should be taken to ensure they are not ingested. The purpose of these compounds as chemotherapeutics has strong implications for negative health effects if improperly handled. While currently approved chemotherapeutics have medicinal benefit, they are often highly toxic if used improperly.
5. Flammability Hazard
    - a. None
  6. Disposal: Solid waste container.

Reference: *cis-Diamineplatinum(II) dichloride*; MSDS No. 479306 [Online]; Sigma-Aldrich: Saint Louis, MO, February 24, 2014.

<http://www.sigmaaldrich.com/catalog/product/aldrich/479306?lang=en&region=US> (accessed July 25, 2015).