Engineering Physics / CEDT Research Hazards Safety Report

Researcher: Colleen Chau Phone: 778-926-3340 Office: ETB 303
Labs: ETB 306, HSC 3H31/4N02, HSC 4H14, JHE A105

Supervisor: Dr. Qiyin Fang Phone: 905-525-9140 ext. 24227 Office: ETB 405
Dr. John Brash Phone: 905-525-9140 ext. 24946 Office: ETB 410

1. Potential hazards related to the research project

Chemical	Explosive	Flammable	Oxidizing	Toxic	Corrosive	Radioactive	High pressure	Special PPE/handling
Nitrogen Gas							✓	
Ethanol		✓		✓				
Acetone		✓		✓				Fume hood
Tris-HCl buffer		✓						
Dopamine hydrochloride				✓				
Sylgard 184 Silicone Elastomer base		✓						
Sylgard 184 Silicone Elastomer Curing Agent		✓						
Polyethylene Glycol				✓				
Toluene		✓		✓				Fume hood
Sodium Hydroxide			✓		✓			
Magnesium sulphate				✓				Dust mask, hygroscopic
Triethylamine		✓		✓	✓			Fume hood
Acetic Acid		✓			✓			Fume hood, gloves
Acrylic Acid		✓		✓	✓			Fume hood, cotton lab coat
2-(Dimethylamino)ethyl methacrylate		✓		✓	✓			Fume hood, cotton lab coat
Ascorbic Acid								
(3-trimethoxysilyl)propyl 2-bromo-2-methylpropionate					✓			Gloves
Methanol		✓		✓				Fume hood
Hydrogen Chloride		✓			✓			
Iodine – 125						✓		Fume hood, Lead covers

Class A: High pressure – N2
Class B: Flammable materials – 70% and 99% ethanol, acetone, toluene, triethylamine, acrylic Acid, 2-(Dimethylamino)ethyl methacrylate, methanol, acetic acid, hydrogen chloride
Class D2: Long-term toxic effects – acetone, toluene, triethylamine

Class E: Corrosive materials – Acetic acid, (3-trimethoxysilyl)propyl 2-bromo-2- methylpropionate, 2-(Dimethylamino)ethyl methacrylate, sodium hydroxide, hydrogen chloride

Radiation: Laser – AFM, Ellipsometer
Electrical: High voltage enclosed – Laser sources, Water contact angle instrument, XPS, gamma counter
Potential falling objects – items on shelves and cupboards
Biohazards – E. coli, Bovine serum albumin
Very bright light – UV light
Loud Noise – None

2. Routine Operating Procedures

- Read MSDS of all chemical agents used and review safety measures before conducting the experiment.
- Wear appropriate PPE before beginning lab work (gloves, glasses, lab coat, etc.)
- No headphones, loud noises, video games, or other modes of distraction that may prevent hearing and response to emergencies allowed in the lab.
- No unauthorized visitors allowed in the labs.
- Must wear pants and closed toed shoes while working in the lab.
- Liquid waste must be disposed of in appropriate chemical waste containers.

3. Working after hours

- At least two people must be working together when working during holidays or overnight (after 6:00 pm).
- Overnight experiments need approval by Dr. Fang and the lab manager.
- The researcher and supervisor's telephone number must be on the door of the lab you are working in overnight

4. Routine Operating Procedures for use of Radioisotopes

- Wear appropriate PPE
- Must wear long sleeves, pants, and closed toe shoes
- No items should be removed from the radiolabelling room, therefore items brought into the radiolabeling room also cannot be removed
- Use of isotopes must be documented with the quantity and date used
- Wear dosimeter for all radiation work
- Radioactive waste must be disposed of in the radiolabelling room in the proper containers

5. Emergency Preparedness

- Chemical spills – consult MSDS before handling of chemicals, store chemicals in correct location, label all chemicals, and only handle chemicals when wearing appropriate PPE. Use chemical spill kits and contact lab manager.

- High voltage/current devices – consult manuals and receive proper training before use and operation of the device. Do not do any maintenance or work on device when on or connected to power.
- Potential falling objects – Place objects on shelves with care so that they are stable and with compatible objects/chemicals around it. When removing objects from shelves, take care to prevent knocking adjacent objects from the shelves.
- Radioactive spills – receive proper training when handling radioactive material, only use radioactive materials in designated spaces and always line surfaces with absorbent pads. Only use volatile radioactive materials in hot room fume hood. Contact lab manager and EOHSS for large spills.

6. Safety Procedures related to chemistry labs

- Gas tanks should not be emptied → should couldn't more than 0.5 – 1 kg/cm^2 of gas
- The gas tank pressure should not be less than 1 – 2 kg/cm^2
- Chemical fire extinguishers:
    i. Sand fire extinguisher: metals (Na, K, Mg, NaO_2)
    ii. Foam fire extinguisher: liquids lighter than water
    iii. CO_2 fire extinguisher: electrical equipment (can also use sand extinguisher)