

## Overview of reported safety incidents/accidents in FRNY during the academic year 2013-2014

### 1. **October 10, 2013: Tetrahydrofuran (THF) spill in FRNY 2182:**

#### Description of incident:

- About 4 liters of tetrahydrofuran (THF) spilled from the lab's solvent column (packed with alumina powder) while installation of a new alumina packed column was being performed on the unit. The spill arose from a connection that was not tightened properly. The connection came undone during restarting of the column using a pressurized nitrogen gas cylinder, thus the THF spilled on the floor.
- Fortunately, no one was in direct contact with the spill or acutely exposed to this solvent during its release and/or cleanup. All laboratory members were wearing full personnel protective equipment (PPE).
- One of the REM Environmental technicians was present in an adjacent lab and assisted in the clean-up process.
- After clean-up, REM tested the air quality and the level of THF in air was well below the admissible limits, therefore the lab resumed normal operation.

#### Action taken to prevent further such incidents

- a new lab written SOP for column changing and maintenance of this unit was developed and is now in place. All lab members were trained on this SOP.

### 2. **March 17, 2014: Hot selenium mixture spill in FRNY 3140:**

#### Description of incident:

- A researcher filled a syringe with freshly prepared soluble selenium in oleylamine at 60°C by emptying 6 ml of room temperature argon into 15ml vial with septa, and then removing 5 ml solution and 1ml of 60°C argon.
- Upon extracting the syringe, the pressurized argon expelled the solvent left in the needle onto the researcher's lower face (nose and lips), neck, shirt, and labcoat.
- After stripping the clothing off his upper body, the researcher cleaned off the chemicals in the bathroom for fifteen minutes with the soap and plenty of water.
- The contaminated clothing was disposed of in the chemical waste.
- The researcher was transported to hospital, and was released shortly after examination, as no further medical attention was needed.

#### Actions taken to prevent further such incidents/Recommendations

- Utilization of lab eyewash and safety showers should be first response before going to bathroom. Seconds matter when dealing with reactive chemicals.
- When transferring chemicals between containers, the fume hood sash should always be lowered; this way it acts as a shield between your face and the chemicals handled.
- Operating procedures were reviewed by the PI and changes to the initial protocol were implemented to increase safety.

**3. March 19, 2014: Exposure to glass bead dust due to malfunctioning of abrasive blasting cabinet in FRNY 3124:**

Description of incident:

- Under heavy operation, the abrasive blasting cabinet (FRNY 3124) malfunctioned and sent glass dust/beads in the air. Newly trained students did not realize the extent of the blast cabinet failure and continued to use it. This caused extensive release of glass dust in the room.
- A researcher cleaned the room for several hours between 3/17/14 and 3/18/14 while wearing a half-mask respirator. On 3/19/14 the researcher attempted to use other equipment in the lab, while the lab was still contaminated with/covered in glass dust.
- Researcher complained of chest pain and sought medical attention. After examination, researcher was released from hospital, no treatment was needed.

Actions taken to prevent further such incidents/Recommendations

- PI closed the lab and all activities were stopped until decontamination was performed.
- REM was contacted and provided professional cleaning of the lab. Air quality was tested after cleaning and dust level was found to be well below the admissible level. Following testing, the lab was reopened and normal operations resumed.
- The use of malfunctioning equipment was prohibited until malfunction is corrected. An order for repair was submitted to the relevant company.
- Recommendations by REM: Equipment users should be fully trained and supervised until competent in the use of equipment. Training should include dust hazard training related to the operations performed. When work appears to be unsafe or questionable, work should be stopped and the situation should be fully evaluated and determined safe prior to resuming work.

**4. April 29, 2014: Implosion of glass reaction vessel containing isoprene, during cryogenic vacuum operation in fume hood in FRNY 2182:**

Description of incident:

- The incident occurred at around 11 pm, when a 25 mL glass vessel containing isoprene imploded in a fume hood during cryogenic vacuum operation, sending glass pieces into the face and hands of the sole laboratory member supervising the reaction. Sudden vessel failure occurred while the researcher was attempting to locate the source of anomalous pressure readings of the vessel under vacuum operation. The blast was in direct sight of the exploded vessel, as it was being looked at from under the lowered fume hood sash.
- The researcher was fully equipped with the required PPE (full body protection, safety glasses, safety gloves, lab coat), thus the injury was not serious.
- The researcher contacted the PI who, after advising on calling the emergency services (911), came to the scene as well. The researcher, who was not exposed to hazardous chemicals, was transported by the emergency services to the emergency room for medical attention. After removal of residual glass in the wounds, the patient was discarded from hospital at 2 am. No further medical attention was needed after that.

Actions taken to prevent further such incidents/Recommendations:

- PI closed the lab for investigation and review of polymerization reaction procedures.
- Strengthened engineering controls were introduced as additional safety measures: (i) the introduction of a face shield for isoprene polymerization reactions; (ii) fume hood

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sash to be fully closed during all stages of the polymerization reaction, and (iii) having a team member within 10 feet of the person performing the reaction at all times during the setup of the reaction.

- A new SOP to include these safety measures was developed and all team members were trained on the new SOP.

### Lessons learned:

- Even in a safety conscientious community as our School, accidents/incidents can happen.
- It is extremely important that researchers strictly follow SOPs and written protocols when conducting research activities in a lab environment.
- The use of PPE is **mandatory** at all times in our labs, this will reduce the severity of an injury, should this happen.
- No one should work alone in a lab. Always have someone near you, who can assist in case of emergency.
- The eyewash stations and safety showers should be used as first resource in case of a chemical splash on face and/or body.

Compiled by:

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