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# Safety *first*

BRINGING A SAFETY WORKPLACE TO ALL MEMBERS OF THE CHEMISTRY BUILDING

## Pizza Inspections Results!

Recently the Chemistry department started doing spot inspections throughout the department. The goal of these inspections is to promote safety throughout the building. Every few months the Safety Strategy Team will be going around to each lab and look for a specific item such as housekeeping, ergonomics, proper PPE, etc. The lab that is found to be best at the chosen item will be given a pizza party for their lab.

For our first inspection we focused on housekeeping issues. Many labs we found to have done an admirable job of keeping their labs clean but three main issues were found in many labs throughout the building and need to be looked at closely.

- Loose Razor Blades
- General Clutter on Floors and Counters
- Overflowing Chemical Shelving

The lab that was found to have the best housekeeping practices and cleanest lab was the Ruotolo lab.



## Lab Attire Reminder

Now that warm weather is finally upon us please remember that shorts, skirts, pants or any type of clothing that leaves any part of the leg skin exposed are NOT allowed in labs at any time. This rule affects ALL LABS in the building including those labs that mostly use biological material and buffers.

In addition, please remember that we require closed toed shoes at all times when in a lab, flip flops and sandals are not appropriate.

# Lessons Learned

## Round Bottom Flask Incident

A graduate student was working with a round bottom flask containing a solution of 3-phenyl-2-propyn-1-ol, manganese dioxide, dichloromethane and activated carbon. When they were attempting to put a stopper the flask, it tipped onto its side and caused some of the solution (approximately 10ml) to spray upward. This caused several drops to go up the student's nostril during the spill.

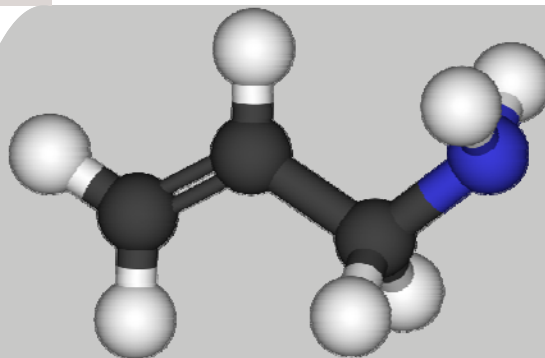
The incident happened due to the flask not being held in place when being stoppered. It is important to always hold a container with your hand or a clamp when adding or removing stoppers or attaching to other glassware.



## Allylamine Incident

A graduate student was blowing nitrogen over a scintillation vial of allylamine solution to minimize the amount of oxidization that can occur. During this process the vial slipped out of the student's left hand and spilled onto their right forearm. The student was wearing safety glasses during the experiment but was not wearing a labcoat at the time of the incident. Luckily they were wearing a long-sleeved fleece which was removed immediately upon contact with the solution, preventing the material from coming into contact with the skin.

This incident showed us the extreme importance of wearing proper PPE including labcoats when working in the lab. Allylamine is extremely toxic via dermal exposure and could have posed a serious risk to the graduate student if there was an exposure.





# Pizza Inspection Findings

## Cluttered Countertops and Floors

The biggest issue found during the inspections were countertops so full of equipment and glassware that there was no space left to safely work.

In many labs the walkway floor was being used for storage of equipment and even chemicals causing trip hazards.

## Chemical Storage Issues

Some labs were found to have shelves overflowing with chemical bottles

There is no quick fix to these chemical storage issues. There are, however, several things that can be done to minimize the issue:

- Perform regular checks of chemicals in the lab and dispose of anything that is no longer used.
- Keep chemical containers organized to be able to keep better track what's already in the lab and prevent reorders.
- Make use of the chemical storage closets for less frequently used chemicals.



## Razor Blades

Another common issue found were loose razor blades laying on counters in labs.

There are several things that can fix the issues found with razor blades:

- Using a cork ring to store razor blades is the cheapest and safest solution.



- Another option are magnetic razor blade holders which can be purchased online.



# Explosive Results

Recently there was a serious incident at the University of Hawaii which severely injured a postdoctoral researcher and cost her one of her arms.

The cause of the explosion is still under investigation but the initial belief is that it was caused when the postdoc was combining gases from high pressure cylinders into a 49L low pressure tank to create a mixture of hydrogen, oxygen and carbon dioxide to feed bacteria being used to produce biofuels and bioplastic.

Unfortunately the pressure gauge in the tank did not conform to their own guidelines as listed in their 2013 research paper and was not intrinsically safe. It is believed that an electrostatic discharge occurred when the gauge was turned off by the researcher and that the discharge traveled from the researchers hand through the gauge into the tank and ignited the hydrogen and oxygen in the tank causing it to explode.

So far we know of several things were done improperly that may have caused this incident. First and foremost was the use of an improper gauge in an explosive environment. Whenever using a piece of equipment in an area that has the potential of being explosive it is important to check the equipment to make sure it is intrinsically safe. All intrinsically safe items will have it written on them or have a symbol such as the ones below on them.

An even more concerning issue was found during the investigation. The lab had a similar experiment the day before this incident using a smaller tank that ended up with a "small internal explosion". Unfortunately this first incident did not raise a red flag and did not cause the lab to reassess the experiment before upsizing it.



Above—Photo of tank before explosion by Jian Yu

Below—Photo of tank after explosion by Honolulu Fire Department



Photos of laboratory after explosion by Honolulu Fire Department





# Ergonomics Corner

## Pipette Ergonomics

### Pipette Posture

- Maintain straight wrists- Do not twist or rotate your wrists while using the pipette
- Always have a relaxed but firm grip on the pipette
- Keep elbows and your body close to your work
- Try to sit with your work slightly below your elbows which will reduce the need to raise your arms
- For every 15 minutes of pipette work, take a 2 minute break
- Rotate pipette tasks with other activities

### Pipette Selection

- Select the lightest pipette that can fit in your hand comfortably
- When possible, use multi-channel pipettes to reduce repetitions
- Try pipette that have finger aspirators and thumb dispensers to reduce thumb strain
- Latch-mode or electronic pipettes are useful for repetitive tasks
- Use thin-walled pipette tips that are easy to eject



### Pipette Injuries and Common Causes

Discomfort	Possible Cause
Wrist and Elbow	Repetitive Tip Insertion/Pipette Manipulation
Thumb side of Wrist wor where the fingers and thumb join the palm	Forceful Pipette Grip/plunger/ejection with thumb
Weakness in the hand; numbness or tingling in the fingers or wrist	Awkward wrist posture while using pipette
Elbow and forearm, contact pain on the elbow	Tip insertion and Ejection away from the body

## Waste Reminders

- ◇ Summer is the best time to go through all of your old chemicals and dispose of anything that's old or no longer used.
- ◇ Please contact our Waste Coordinator, Laurie MacDonald at [lanald@umich.edu](mailto:lanald@umich.edu), whenever removing large quantities of waste from your lab.





## Flammable Refrigerators

In many laboratories in Chemistry and elsewhere on campus there are normal, household refrigerators and coldrooms being used for chemical storage.

It is acceptable to use normal fridges in the lab and coldrooms for non-flammable and non-volatile chemicals but flammable chemicals must

always be kept in Flammable-Safe or Explosion-Proof Refrigerators.

Normal refrigerators and coldrooms contain lights, fans, thermostats and other electronics inside of them that may generate ignition sources. In 2015 there was a large explosion in a lab at MSU caused by a bottle of isopentane being kept in a normal fridge.

The explosion was powerful enough to break windows 20 feet away and blow the fridge door across the lab. Luckily at this time no one was in the lab so there were no injuries. Similar incidents have occurred all over the country, many causing damage in the hundreds of thousands of dollars.

As a rule, any chemicals with a

***As a rule, any chemicals with a flashpoint less than 100°F (38°C) should not be stored in cold rooms or household refrigerators.***

flashpoint less than 100°F (38°C) should not be stored in cold rooms or house-

hold refrigerators, all flammable materials must be kept in flammable-safe or explosion-proof refrigerators.

# UPCOMING INSPECTION

Anytime now



Please remember that we are still on schedule to receive an MDEQ Inspection. Please make sure all of your waste pails and bottles are properly labeled, dated and no older than 60 days. Also please keep all bottles capped when not being filled

## Events

Spring Classes Begin	May 3, Tue
Memorial Day	May 30, Mon
Spring Classes End	June 20, Mon
Spring Term End	June 24, Fri
Summer Classes Begin	June 29, Wed
Independence Day	July 4, Mon
Summer Classes End	Aug 16, Tue
Full/Summer Terms End	Aug 19, Fri

## Dry Ice/LN2

### Dry Ice

Dry ice is available from 10:00am-11:00am and from 2:00pm-3:00pm Monday-Friday in room A601

### Liquid Nitrogen

Department dewars are accessible 24 hours a day outside of room A602 for small (under 15L) of liquid nitrogen quantities.

Large dewars of liquid nitrogen can be ordered by emailing [chrpeter@umich.edu](mailto:chrpeter@umich.edu) or [steventi@umich.edu](mailto:steventi@umich.edu) at least one business day before it's needed.



## Contact Information

Package Shipping  
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Waste Issues  
Laurie MacDonald—[lanald@umich.edu](mailto:lanald@umich.edu)

Safety Issues/Concerns  
Christopher Peters—[chrpeter@umich.edu](mailto:chrpeter@umich.edu)  
Tracy Stevenson—[steventi@umich.edu](mailto:steventi@umich.edu)

Vertere Questions  
Anson Pesek—[ahpesek@umich.edu](mailto:ahpesek@umich.edu)

Maintenance Requests  
Routine Work Request Form on Chemistry Intranet



This puppy wants you to be safe