Chemistry Safety Notes

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"Chemistry Safety Notes" is published by the Chemistry Dept. Safety Committee, written & edited by Debbie Decker, Safety Mgr.

Proper Attire in the Stockroom

Because I love consistency, effective immediately, long pants (covered legs) and proper footwear (covered feet) will be required to cross the threshold in the Stockroom, and associated locations. Large signs have been put up in areas where proper attire is required, as a reminder.

Piranha Solution

Recently, there was some correspondence on a health and safety listserv about Piranha and how best to prepare it. Piranha is typically 3:1 sulfuric acid and hydrogen peroxide.

Adding peroxide to acid, slowly, gently and with stirring, is the preferred method. Review the guidance from Princeton for some excellent details. It seems counter-intuitive but this is what's recommended. Using 30% hydrogen peroxide, rather than higher concentrations, is also recommended.

Fire Extinguisher Training

A professor reminded me recently that fire extinguisher training is available for laboratory groups. She had scheduled it for her group and it was very positive. Not only was it good training, it was also a good team-building opportunity.

Please contact Rocci Twitchell at rrtwitchell@ucavis.edu or 530.752.4268 to arrange the training for your group.

Reminder:

Test the eyewash/shower and inspect the fire extinguisher in the lab. Every month, please, and document that you did it!

Sodium Azide SOP

I recently worked with the Louie lab to update their Sodium Azide Standard Operating Procedure.

If you'd like a copy of it for use in your lab, let me know and I'll send along a copy.

Upcoming Construction Projects

Big plans are afoot:

1. Security upgrades to exterior and interior doors; additional monitoring at entrances.

2. Life Safety/Seismic upgrades include building sprinklers and seismic corrections to both buildings.

3. Complete renovation of the Chemistry/Chemistry Annex buildings.

4. New Chemistry, Chemical Engineering, Materials Science building. It's probably going to land on Surge IV, to the west of the Silo.

If you'd like a look at the preliminary sketches, come on by my office.

Green Labs and Sustainability

Our friend, Allen Doyle from the campus Sustainability office, offers the following update:

Several Chemistry Department researchers and PIs are stepping up into Green Labs certification, demonstrating their commitment to a smaller environmental footprint. This UC Davis program is carried out by research groups, and conserves energy, water, plastic, chemicals and electronics in the scientist's workplace—the lab! More information on the program is here. New labs are always welcome to sign up.

http://sustainability.ucdavis.edu/action/green_workplace/green_labs.html

Completed the Green Lab Challenge: Franz—Gold level achievement

In Progress: Highlights

Atsumi

Chen - Plug load measurements and reductions

Louie

Osterloh - Curriculum and Green Chemistry promotion

Shaw - Aspirator Round-Up

Advanced Organic Teaching Lab (Jillian and Carlo)

Finally, in his last week working at UC Davis, Mike Sisto couldn't resist surveying all the vacuum aspirators in the Chemistry building, so we can figure out how to collect them. Stay tuned for the Round Up!

More details on the University of Minnesota explosion and response

Excerpted from a Post By Jyllian Kemsley on Jul 30, 2014 in The Safety Zone by C&EN

The fume hood after the explosion. Credit: University of Minnesota

On June 17, an explosion in a chemistry lab at the University of Minnesota injured graduate student Walter Partlo. He was making trimethylsilyl azide, starting with 200 g of sodium azide. The incident originated in lack of hazard awareness, school representatives say, and the department response focuses on identifying hazardous processes and communication.

The synthesis was based on previously published methods, with some alterations—in particular, the solvent Partlo used was polyethylene glycol (PEG), says chemistry department chair William B. Tolman. Partlo is a fifth-year graduate student in professor T. Andrew Taton's group, which had run the reaction at least ten times previously, Tolman says. When the explosion happened, the reaction was on its second day. Partlo was on his way from the lab office to the hall when he noticed that the thermometer was askew.

He stopped and reached into the hood, but he didn't have time to touch anything before the experiment exploded, says Anna Sitek, a research safety specialist in UMN's department of environmental health and safety. Partlo wasn't wearing any personal protective equipment. The explosion left him with second-degree burns and glass injuries to his arm and side; he also injured an eardrum. The explosion also destroyed the experimental apparatus and hood.

Tolman, Sitek, and other investigators have not been able to definitively identify what went wrong with the reaction, Tolman says.

More important than the reaction, Tolman emphasizes, is the deeper root cause of the incident: insufficient recognition of the reaction's hazards. Warnings included with literature protocols were "pretty lame," he says. He also thinks that the lab group became complacent after doing the reaction several times without incident.

Also, as people modified the protocol, they didn't appear to understand how changes might affect the risk of the synthesis.

"Overall, there was clearly a lack of proper hazard assessment," Tolman continues. "They didn't stop and say, 'This is a really dangerous procedure, should we be doing this at all, or should we be taking extra precautions?'

For his part, Partlo says that "I think that the biggest lesson that I have taken away from the experience is that though a synthetic procedure is well-documented in the literature, the inherent safety concerns may not be." He continues: "When planning a reaction, [many] things should be considered and the equipment and scale of the reaction should be adjusted accordingly to ensure proper management of potential risks."

Going forward, Tolman hopes that a review of standard operating procedures (SOPs) and new communication efforts will help ensure that something similar doesn't happen in the future.

Additionally, lab groups will now be required to use safe operation cards on hoods to communicate who's running a reaction, what it is, and its hazards. Tolman is also now requiring groups to hold at least monthly meetings at which safety must be discussed.

Taton and his group members are also working on safety letters that will be sent to C&EN and the journals involved, Tolman says.

Tolman, Sitek, and colleagues also have recommendations for the chemistry community at large:

1. Update risk assessment procedures
   (a) to identify factors affecting the probability and severity of an energetic event occurring
   (b) to consider the capabilities of available safety controls.
   To paraphrase the limitations of the Laboratory Hazard Risk Assessment Matrix according to the ACS guidance document Identifying & Evaluating Chemical Hazards in the Research Lab, a higher degree of training is required to consistently and accurately rate the severity of consequences and probability of occurrence for a given risk and may also require a secondary assessment and or tool.
2. Warn researchers not to assume journals include complete risk control information. Encourage researchers to check multiple sources for information about hazards and include safety sources other than the SDS and published procedures. Examples: ToxNet's Hazardous Substances Data Bank and Bretherick's.
3. Encourage researchers to perform complete risk assessments on all potentially hazardous experiments.
4. Develop additional tools and training to help researchers assess the severity of consequences, probability of occurrence and capacity of controls.