Chemistry Safety Notes

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Department Self-Inspections - Corrective Actions

*If you haven't yet done so, you **MUST** close the loop on the self-inspections! There are about eight of you who have not yet documented completion in the lab-specific Google Doc. If you need help or a repeat of the link, please let me know.*

To those of you who have completed your corrective actions: Thank you very much for promptly attending to this important safety detail!

Injury Reporting

Do you know what to do if you or a co-worker/student is injured? The Department IIPP has the details in Section V. Here's a summary of the high points:

If it's a medical emergency or serious injury, call 911. Inform the supervisor and Safety Manager as soon as practical.

If it's a non-emergency during work hours (M-F, 8-5), employees go to Occupational Health in the Cowell Building. Students go to the Student Health Center.

If it's a non-emergency outside of work hours, go to Davis Urgent Care.

All injuries must be reported. Employees create an Employer's First Report. Students fill out the Chemistry Department Incident Report Form.

Employees will need to report the work-related injury/illness to Workers' Comp at (877)682-7778.

Additional details in Section V of the IIPP <—

Building Project Updates:

With the exception of the roll-up door at the third floor dispensary, the security/door project is substantially completed. Proximity door locks are being programmed and the Department will be implementing proximity access soon.

The sprinkler project will launch off this summer with project duration planned to be about a year. Disruption to laboratory operations will be minimized.

Following closely behind the sprinkler project will be seismic and renovation projects. Start times for those projects is a little murky at the moment but 1Q 2018 is pretty solid.

As projects move forward, Design and Construction Management will continue to communicate with the Department by email and postings. Affected labs will be given as much notice as possible about construction activities

Hazardous Waste Management

There seems to be some confusion about managing hazardous waste in the new WASTe environment. Here are some hints and tips:

* Every container of waste must be labelled with an approved hazardous waste label.
* If you are actively adding waste to a container and need to document what's going into the container, you may use the previous paper label. That label must be properly filled out and include the accumulation start date.
* Waste may be accumulated in the lab up to 9 months. Disposal every 6 months is strongly recommended.
* Remembering your accumulation rules, be sure to request pick up through WASTe, and affix the WASTe-generated label to the container.
* You don't need to put the label in a plastic sleeve.

QE Season

'Tis the time of year to see stressed-out grad students, feverishly prepping for their qualifying exams.

It's important to take care of oneself in stressful times. It's also important for those of us around those who are prepping to be aware when someone really needs help. Here are some resources that may be helpful (also available on the department website under the Safety tab):

Student Health Center counseling services are available through the CAPS program.

Red Folder A faculty and staff guide for assisting students of concern. Provides emergency and non-emergency numbers, as well as 24-hour and after hours resources.

Student Health and Counseling Services - Helping Dangerous Students SHCS offers tips for recognizing troubled students and what you can do to help.

Biological Use Authorization (BUA) - When do you need one?

Research that involves any of the following activities or materials requires a Biological Use Authorization (BUA).

* Research involving recombinant DNA technology, except projects that are exempt under the NIH Guidelines for Research Involving Recombinant DNA Molecules. For exempt rDNA activities, please see our FAQ entry on this topic.
* Work with materials that are infectious (or potentially infectious) to plants, animals, or humans (including replication-defective viral vectors).
* Working with any material that falls under the Cal OSHA Bloodborne Pathogen Standard. This includes any work with human cell lines, human blood or blood products, and human body fluids. At UC Davis, work with non-human primate (NHP) cells, established NHP cell lines, and NHP blood or blood products also requires a BUA.
* Storage of biohazardous materials that are not being used.

Access the BUA page for details on how to apply for a BUA.

Elevator Safety

If you happen to notice the elevator you're waiting for is acting strangely—making a weird noise, the door is not closing properly or closing part way and then opening again—please don't get on the elevator. Call Scott Berg or the Work Order desk directly at (530) 752-1655 and report the broken elevator. Facilities Maintenance considers elevator problems as emergencies and will dispatch someone immediately to correct the problem.

If you're in an elevator that's acting strangely, please don't try to open the doors, get out of partially opened doors, or try to exit if the elevator is stopped partially between floors. Stay put and use the emergency phone in the elevator or contact the Work Order desk (if you have a cell phone on you).

The Secrets of Memorably Bad Presentations

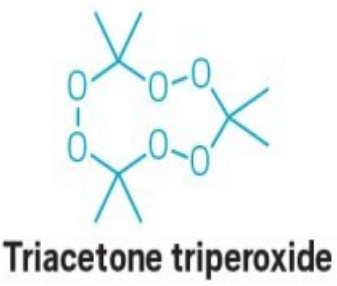
The stuff you find when looking for something else …

I found this awesome memorably bad presentation, illustrating how bad it can get. Visit http://sholl.chbe.gatech.edu/david_sholl.html and scroll down to the bottom of the page. It's 30 minutes but time well-spent. There's also a bad talk bingo sheet you can download and play with your friends at inappropriate moments.

How a student unintentionally made an explosive at U Bristol

Posted By Jyllian Kemsley on Feb 15, 2017

Last week, the Safety Zone reported that a University of Bristol student had unintentionally made approximately 40 g of triacetone triperoxide (TATP), prompting building evacuations and a controlled detonation by an explosives team. Here's a statement about the incident, prepared by Timothy C. Gallagher, a chemistry professor and dean of the Faculty of Science, and Nicholas C. Norman, head of the school of chemistry.


Triacetone triperoxide

On 3 February 2017, a graduate student in the School of Chemistry at the University of Bristol was carrying out a literature procedure to oxidise an aldehyde to the carboxylic acid using aqueous acidified chlorite. The experiment was carried out on a 5 mmol scale (just under 1g of aldehyde) and risk assessments identifying all hazards had been undertaken and signed off by both student and supervisor. The reaction solvent was acetone (50 mL).

Part of the procedure involved adding a quantity of 30% hydrogen peroxide (H_2O_2) solution to remove some of the by-products of the reaction, whose presence was (apparently) associated with a yellow colour (possibly including chlorine dioxide). The literature indicated that H_2O_2 be added until this yellow colour had disappeared, which should have required about 1 mL of peroxide solution.

The student, focusing on the yellow colour, which did not completely disappear, continued to add hydrogen peroxide solution until about 50 mL had been added. During workup to remove the solvent, the student realised that the solvent volume was not decreasing and that the liquid was becoming viscous, and so likely contained far more "product" than was expected. GCMS analysis indicated the presence of triacetone triperoxide (TATP), and it was estimated that this could amount to 30-40g if all the excess H_2O_2 had reacted with the acetone solvent.

At that point, the graduate student immediately alerted the supervisor, who escalated this to the Head of School. A series of decisions were made and actions taken that resulted in the disposal of the suspected TATP by means of a controlled explosion carried out by the emergency services.

Nobody was injured and no damage was done in the lab. Although the TATP presented an explosion hazard, the risk of explosion was considered minor due to all material remaining in solution; TATP is far more sensitive to detonation as a solid. Immediate disposal was warranted, however, due to the risk of precipitation/crystallisation of a solid material.

There are lessons to be learned from what happened and some messages.

First, the student was concerned with adding hydrogen peroxide to remove the yellow colour (due, at least in part, to chlorine dioxide, which is itself a hazardous material), but overlooked the much greater hazard of adding a large amount of hydrogen peroxide to a reaction containing acetone as the solvent. The student overlooked the hazard despite the fact that the potential formation of TATP had been identified in the original risk assessment. This illustrates how focus in one area can lead to ignoring another even though the consequences of the other are known.

Secondly, and linked to the first lesson, the role of the solvent (acetone) was also overlooked—solvents are often regarded as benign–although again the presence of acetone and the risks associated with that in the presence of H_2O_2 had been identified.

However, and this is critical, having realised what had happened, the graduate student immediately took the action needed to mitigate a potentially dangerous situation, rather than delaying or, worse, trying to cover it up. This was highly responsible – the most important thing done – and shows the value of investing in developing and fostering a culture in which colleagues recognise errors and misjudgements, and they are supported to report near misses.

The airline industry can teach us a lot in this regard. The necessity of having a "safe period," during which one can report a near miss without penalty, is essential. Clearly, reckless behaviour is unacceptable, but we don't believe this was the case here. Rather, it was more around a lapse in concentration, which (if we are honest) we are all capable of. The actions taken once the issue had been identified are, for us, key to the culture we are striving to foster for openness in reporting accidents and incidents. There is no question of action being taken against a graduate student whose positive actions have been recognised.

However, in future, we are instituting more stringent risk assessments, and checking of those assessments, for any reaction involving hydrogen peroxide. Specifically, this will involve preparing an individual risk assessment for hydrogen peroxide even if its use in a reaction is only minor. All such assessments will then be subjected to additional scrutiny.