ENVIRONMENTAL HEALTH AND SAFETY
THE UNIVERSITY OF UTAH

Lessons Learned

Overheated solution burst inside fume hood

What Happened:

A small capped vial containing a supersaturated solution of lead and cesium bromide in dimethyl sulfoxide, under heat, burst inside a closed fume hood. The sample had been heated in the fume hood for several days at a temperature of 140C. This was done to keep the perovskite salts precipitating very slowly in order to harvest small crystals.

A graduate student was working near the fume hood when the solution burst, sending debris into the sash of the fume hood and causing it to shatter. The graduate student was facing away from the fume hood at the time of the accident and was not hurt. Upon investigation it was determined that the temperature dial on the heater had inadvertently been bumped which elevated the heating setting.

The increased temperature setting led to the DMSO boiling, over-pressuring the glass vial, and eventually bursting.

What Went Right:

- The sash of the fume hood was completely closed at the time of the accident
- The graduate student working nearby was unharmed
- EHS and University Police were contacted immediately
- The laboratory was evacuated and secured immediately after the incident

Lessoned Learned:

This incident emphasizes the importance of maintaining situational awareness when working in a laboratory. Workers need to be aware of potentially hazardous procedures taking place in the lab and should not disturb or disrupt those procedures unless authorized to do so.

The following lessons learned were identified by laboratory personnel and EHS for operations that require heating solutions in closed vessels:

- Replace ordinary screw-on caps with pressure relief caps
- An approved blast shield should be placed over the solution assembly to protect workers
- A hot-plate with a lockable temperature setting should be used
- The solution being heated and precipitated should be marked with warning signs
- Maintain situational awareness while working in a laboratory
- Always wear the proper Personal Protective Equipment (PPE), including lab coat and safety glasses

If you have questions, contact EHS at 801-581-6590