Date Published: 09-14-2023

LESSONS LEARNED

Berkeley UNIVERSITY OF CALIFORNIA EH&S OFFICE OF ENVIRONMENT, HEALTH AND SAFETY

Fume Hood Sash Cracks due to Reaction Vessel Overpressurization

What Happened?

Using dry Dimethyl Sulfoxide (DMSO) as solvent, a reaction between an organic macrocycle and bromoethane was placed in a round bottom pressure vessel. The reaction was heated using armor aluminum beads in a stainless steel bowl sitting atop a hotplate. The setup was briefly left unattended inside a fume hood with the sash closed.

Without a means for temperature control, the hotplate generated excess heat, which in turn produced excess pressure. Overpressurization caused the round bottom vessel to shatter. Glass shards along with the aluminum heating beads sprayed across the enclosed fume hood, causing several parts of the fume hood sash to crack.

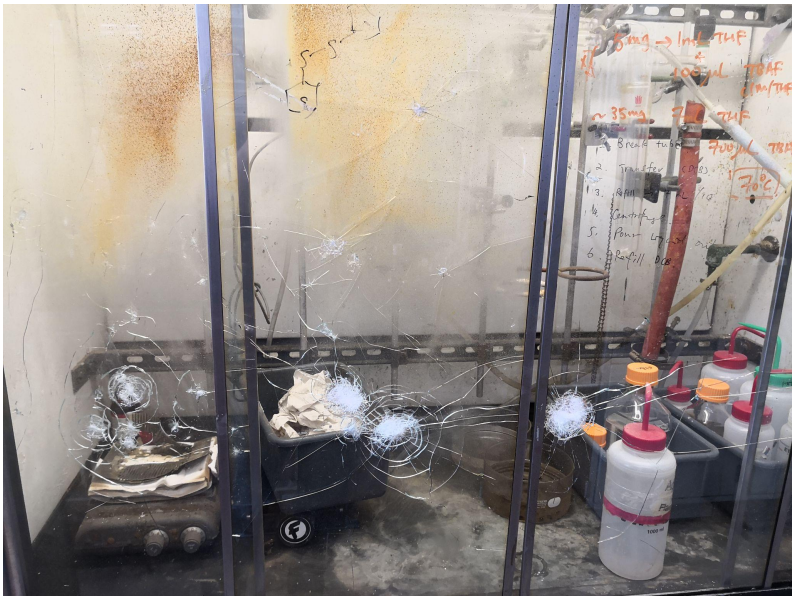

Figure 1: Fume Hood After Incident

What went right?

- The fume hood sash was properly positioned, which contained the fragments from the setup
- The researchers immediately unplugged the hotplate, alerted lab members of the incident, and promptly cleaned up after assessing the extent of overpressurization
- A request was immediately submitted to replace the damaged fume hood sash
- The researcher provided a summary of the incident and shared details with EH&S for follow-up

What should be done differently?

- A hotplate with a temperature control feature should have been used. Ensure that hotplates used are calibrated prior to use.
- Researchers should have reported the incident to EH&S at the time of the incident
- The reaction should have been monitored

Fume Hood Sash Cracks due to Reaction Vessel Overpressurization

What corrective actions have been taken/will be taken?

- The incident was discussed with the lab and the SOP pertaining to setting up reaction in pressure tubes was modified. The SOP now lists the use of a safety shield in future experiments of this nature.
- Experiments will be conducted using equipment with controlled heating elements
- EH&S is working with the College of Chemistry in establishing timely reporting responsibilities by researchers and Principal Investigators

Lessons Learned

Use equipment with controlled heating elements to avoid overheating and prevent excess pressure buildup. Reaction set ups should be monitored throughout its progress and the corrective actions set forth above should be implemented to avoid similar incidents.