



The University of Akron
OHIO's POLYTECHNIC UNIVERSITY
College of Polymer Science
and Polymer Engineering

Office of Operations - Safety Office

LESSONS LEARNED

September 2017 – Triphosgene Spill

What happened?

A graduate student researcher working alone was performing an interfacial polymerization. The researcher was wearing gloves, safety glasses and a lab coat. The dissolved monomer in water was in the hood, while the researcher was preparing a triphosgene solution using a 15ml centrifuge tube. The tube was then placed in the hood with a foam base for support. While moving a hot plate into the researcher's hood the cord knocked the triphosgene centrifuge tube on to the ground spilling the contents. The researcher turned on the emergency ventilation, panicked with the flow alarms sounding, turned them all off and tried to mitigate the situation by adding DMF to the spill which resorted in Phosgene gas. Realizing this was the wrong application the researcher exited the room to find a senior student without leaving notification on the lab doors about the hazard. Three researchers unknowingly entered the room, alerted to the smell and exited the room quickly. Safety and the PI were contacted by the student researcher after obtaining help from the senior student. EOHS responded and cleaned up the spill.



What was the cause?

The hot plate cord wrapped around the back side of the centrifuge tube knocking it out of the hood.

What went wrong?

- Researcher was working alone.
- Researcher turned off the emergency flow alarms.
- Researcher did not leave visible signs warning others of hazard.
- Specific research group procedures were not followed.
- Researcher did not review the Triphosgene SDS safety procedures prior to working with chemical.

What went right?

- Researcher was wearing safety glasses, lab coat and gloves.
- EOHS/Safety and PI were contacted.
- Student was cooperative with EOHS.
- Lab specific safety training was conducted prior to working in the lab.

What corrective action was taken?

- Primary Investigator initiated a Safety Stand Down to review the incident and group safety protocols.
- CPSPE Safety Officer will find other options to train students not familiar with the 911 system.
- One on one safety training was conducted with the researcher to review safety procedures.

How can incidents like this be prevented?

- Never work alone.
- Review the SDS and understand the safety procedures.
- Leave the area making sure others are aware of the hazard.
- Do not dismantle any safety device or alarm.
- All high hazard substances need to be clamped in the hood.
- Use appropriate glassware for experiments.
- More training on the 911 and 2911 system.
- Make sure all seals or lids are properly secured.

Resources:

[UA Chemical Hygiene Plan](#) Excerpt: Chemical Spills p. 125-127

- Evacuate all non-essential persons from the spill area
- If needed, call for medical assistance by dialing 911 from a campus phone or 330-972-2911 from an off-campus or cell phone.
- Help anyone who may have been contaminated. Use emergency eyewashes/showers by flushing the skin or eyes for at least 15 minutes.
- Post someone just outside the spill area to keep people from entering. Avoid walking through contaminated areas.
- You must have the proper protective equipment and clean-up materials to clean-up spills. Check the chemical's SDS in your laboratory or online for spill clean-up procedures, or call EOHS for advice.
- Turn off sources of flames, electrical heaters, and other electrical apparatus, and close valves on gas cylinders if the chemical is flammable.
- Confine the spill to a small area. Do not let it spread.
- Avoid breathing vapors from the spill. If the spill is in a non-ventilated area, do not attempt to clean it up. Call for emergency personnel to respond and clean up the spill.
- Wear personal protective equipment, including safety goggles, gloves, and a laboratory coat or other protective garment to clean-up the spill.
- Work with another person to clean-up the spill. Do not clean-up a spill alone
- DO NOT ADD WATER TO THE SPILL.
- Use an appropriate kit to neutralize and absorb inorganic acids and bases. For other chemicals, use the appropriate kit or absorb the spill with sorbent pads, paper towels, vermiculite, dry sand, or diatomaceous earth. See below for additional information.
- Collect the residue and place it in a clear plastic bag. Double bag the waste and label the bag with the contents. Notify EOHS.