

Lessons Learned

Glass Container Incident

March 2, 2023

What Happened?

During a chemical procedure, a glass container shattered when it was being placed on a benchtop for use. The researcher was preparing to perform a procedure when they removed a 100 mL glass container from their lab's freezer and placed it on the benchtop. When the researcher left the bench area to get supplies, the chemical in the glass container started to reach room temperature. As a result, the pressure inside the container increased, causing the glass container to shatter.

Incident causes

The **root cause** of the incident is the failure to have and follow a written Standard Operating Procedure (SOP) for the process involved. The employee was unaware of the requirement to properly store the chemical under inert conditions and how to use the chemical properly and safely. When the chemical was removed from the freezer, the temperature change created an increase in gas pressure, which broke the glass container in which the chemical was stored. Since there was no standard operating procedure for the task, the researcher was unaware of the hazards associated with the chemical involved and proper usage and storage requirements.

Contributing Causes of Incident:

- The researcher did not use a glove box when removing the chemical from the freezer and bringing it to room temperature. A glove box is an appropriate inert atmosphere.
- Based on the Safety Data Sheet (SDS), the solid chemical should not have been contained in a glass container.
- The researcher was working alone.
- The researcher was not wearing proper PPE (he was not wearing the blue flame resistant (FR) lab coat).
- The chemical was not listed in the lab's hazardous materials inventory.
- The lab ordered higher quantities of the chemical without knowledge of proper storage, use, and disposal.
- The lab's freezer for storing chemicals is not a lab-safe freezer.

What can be done to prevent this from occurring again?

Immediate Corrective Action: Prepare an SOP that addresses the safe work practices and procedures, including emergency response and spill cleanup, while using and storing the material. The chemical is moisture-sensitive and needs to be kept under inert gas, and the use of a blue FR (flame-resistant) lab coat is required. After the SOP has been created, train all employees on the SOP and how to safely handle and store the material.

Recommendations:

- 1) The chemical should be purchased from vendors that supply the chemical in polyethylene containers to accommodate any potential pressure buildup. Note: The vendor should be packaging the chemical using polyethylene containers. Avoid purchasing chemicals from vendors who supply these chemicals in containers that are not appropriate for safe storage and transportation. Please refer to the following EHS Reference Guide for additional information when working alone in a lab: [Storage of Flammables and Combustible Materials](#)
- 2) The chemical container must be stored in an approved lab-safe refrigerator/freezer because the chemical releases highly flammable vapors.
- 3) All researchers and lab members must be familiar with the proper use and storage of all chemicals before purchasing and using them. In addition, all staff should receive chemical-specific training before use.
- 4) The lab's chemical inventory should include the contents of all chemicals (including chemicals stored in the freezer used in this lab). The lab should identify all highly hazardous and reactive chemicals in use or stored in the lab and prepare and train staff on SOPs for using these chemicals.
- 5) Researchers should not be working in the lab alone while using highly hazardous chemicals, and must wear the required PPE during procedures, as would be indicated in an SOP. Please refer to the following EHS Reference Guide for additional information when working alone in a lab: [Working Alone Safety](#)
- 6) Lab members should be trained on all SOPs, review the lab's Chemical Hygiene Plan, and be knowledgeable of the emergency response procedures while working in the lab. Please refer to the following EHS webpage for additional information on Chemical Safety: [EHS Chemical Safety Website](#)
- 7) Always ask for help if you need it and do NOT work alone while using highly hazardous chemicals.

Where to Get Help or More Information

For more information or questions, or to receive assistance, please contact EHS at (949) 824-6200 or at safety@uci.edu.

