

LESSON LEARNED

Chemical Safety

CHEMICAL OVERVIEW

Hydrazine Monohydrate is a colorless, clear, highly corrosive, and toxic liquid. It is a carcinogen as well as a mutagen, and an aquatic hazard. This chemical is widely used in various industries including pharmaceutical, agriculture, chemical synthesis, and is even used for rocket fuel.

POTENTIAL HAZARDS



MATERIAL:	INCOMPATIBILITIES:	STORAGE CONDITIONS:
Hydrazine Monohydrate	Oxidizing agents, Oxygen, Copper, Organic materials, Zinc	Store in refrigerator.

WHAT HAPPENED?

HYDRAZINE MONOHYDRATE EXPLOSION

A lab was attempting a synthesis of an unfamiliar compound.

As part of the reaction, Hydrazine Monohydrate was added during a heating step. Members of the lab stepped away while the reaction occurred inside a fume hood, and the buildup of pressure caused the mixture to explode.

The fume hood was covered in the chemical mixture, and the sash was cracked in multiple spots from the explosion.

WHAT WENT RIGHT?

- The correct PPE was worn.
- Reported the incident to EH&S in a timely manner.
- The fume hood sash was appropriately closed; no additional damage was caused to lab personnel or space.

WHAT WENT WRONG?

- The researcher was unfamiliar with the procedures for handling the compound.
- No initial risk assessment was conducted.
- SDS were not reviewed prior to initiation of the experiment.
- No SOP or procedure protocol was created or reviewed.
- Experiments were scaled up without consulting EH&S or performing a pilot/initial trial.

CORRECTIVE ACTIONS

- ✚ Conduct a Risk Assessment prior to initiating an experiment.
- ✚ Review SDSs and scholarly literature regarding intended experiments.
- ✚ Create a detailed SOP (see EH&S template) that references: Purpose, Scope, Responsibilities, Hazard Identification, Control Measures, Procedures, Special Handling and Storage requirements, Waste Disposal, and Emergency Procedures.
- ✚ Have the PI review the Risk Assessment, SDS information, scholarly literature, and SOPs with laboratory personnel.
- ✚ Review the Chemical Hygiene Plan (EHS869).

HOW CAN INCIDENTS LIKE THIS BE PREVENTED?

- ✚ **No Scaling Up:** Do not scale up the amounts of chemicals. Work with a small amount to determine compatibility and effects from the reaction. Consult with EH&S if a scale-up is needed.
- ✚ **SOPs:** Create robust SOPs to cover new methods and/or chemicals, resulting in safe procedures that can be referenced in the future. SOPs can also cover clean-up procedures, allowing for quick response to a chemical spill or event.
- ✚ **SDS:** Prior to starting your experiment, consult the SDS for any special information regarding compatibility with other chemicals, special handling, and any required PPE.
- ✚ **Situational Awareness:** Always pay close attention to all aspects of an experiment in progress. Working alone is not recommended. Notify your coworkers prior to conducting this work and ensure that at a minimum of 1 person is nearby and aware that the work is occurring.
- ✚ **Fume Hood:** Use this chemical in a clutter free certified fume hood only. Do not store chemicals in fume hoods. Keep the sash positioned between you and the reaction apparatus.
- ✚ **PPE** is to be worn by those conducting the work and any adjacent personnel.