

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

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.