

Principal Investigator: _____

Date Approved: _____

This document covers basic chemical safety protocols (CSP) for pyrophoric and self-heating materials and supplements the laboratory Chemical Hygiene Plan as appropriate. Additional lab-specific safety operating procedures for pyrophoric and self-heating materials may also be required. The use of any pyrophoric and self-heating materials is subject to pre-approval by the Principal Investigator (PI) and/or the designated Laboratory Responsible Safety Person. DO NOT USE ANY PYROPHORIC AND SELF-HEATING MATERIALS UNTIL YOU HAVE OBTAINED THE NECESSARY PRE-APPROVAL AND TRAINING.

Pyrophoric and Self-heating Materials

A pyrophoric material is defined by the National Fire Protection Agency (NFPA) as having an autoignition temperature below 130°F (55°C). A self-heating material is one which reacts with air, in the absence of external energy, to produce heat. Self-heating materials may ignite if stored in large quantities. These materials typically also react violently with water. Because of this, pyrophoric and self-heating materials must always be handled under inert atmosphere.



Personal Protective Equipment & Personnel Monitoring

**Lab Coat**

Flame resistant lab coat.

**Gloves**

If used outside of a glove box, fire-resistant hand protection (e.g. chloroprene gloves over flame-resistant glove liners).

**Eye Protection**

ANSI Z87.1-compliant safety glasses or safety goggles if a splash hazard is present

Labeling & Storage

Store pyrophoric and self-heating materials in a flammable storage cabinet with self-closing hinges or in a refrigerator rated for flammable storage. All pyrophoric and self-heating materials must be stored away from combustible materials, oxidizing acids, oxidizers, and aqueous solutions. Also, if not plainly visible (e.g. through a cabinet window), labeling must be applied to storage locations where these are stored to avoid an inadvertent encounter.

Cautions & Considerations

Use and store only in fully-sprinklered buildings. Also refer to the Sigma-Aldrich technical bulletins, '[Handling Air-Sensitive Reagents](#)' (AL-134) and '[Handling Pyrophoric Reagents](#)' (AL-164) which provide extensive detail on techniques to safely handle, store, and transfer these materials in a laboratory environment

Engineering Controls, Equipment & Materials

Glove Box

Whenever possible, pyrophorics should be handled inside of a glove box.

Fume Hood

A Schlenck line inside of a fume hood may be used to provide an inert atmosphere for working with pyrophorics. Lab specific procedures and guidance are required for the transfer of pyrophoric materials outside a glove box. These should be included and reviewed as part of this Chemical Safety Protocol.

Housekeeping

Spills

If pyrophoric materials spill in a glove box, quench the spilled material slowly with isopropanol. Absorb with a non-combustible absorbent and dispose as hazardous solid waste.

If pyrophoric materials spill outside of a glove box, a Class B/C fire extinguisher may be used to extinguish a small fire. Alternatively, powdered lime can be used to completely smother and cover any spill that occurs. If you do not feel comfortable using a fire extinguisher, call Vanderbilt University Public Safety (VUPS) at 615-421-1911 or use the Vandysafe app on your smart phone.

Report any exposure through Risk and Insurance Management's Origami portal and mark that it occurred in research when prompted. Both VUPS and the Origami system will notify EHS of the incident. Remain on-site at a safe distance to provide detailed information to first responders.

Quenching

Do not return unused pyrophoric materials to their original container. Unused pyrophoric materials must be quenched under inert atmosphere with adequate cooling by slowly adding first isopropanol, then methanol, then water.

Disposal/Waste

Containers with residuals must be triple-rinsed with an inert dry solvent under an inert atmosphere and the rinse solvent quenched and discarded as Hazardous Waste, as described in '[Handling Pyrophoric Reagents](#)' (AL-164) Section IV DISPOSAL . After the triple rinse is complete, the container is opened to the atmosphere at a safe location, (i.e., in the back of a fume hood). After allowing the container to be exposed to the atmosphere for at least a week, the container must be triple-rinsed with water before discarding.

For the quenched rinse solvent, refer to the laboratory *Chemical Hygiene Plan* (Section 6.7) for information on proper chemical waste disposal procedures.

First Aid & Emergencies

Fire

DO NOT use water to put out fire, instead use a Class B/C fire extinguisher.

Skin or Eye Contact

Remove contaminated clothing and accessories; flush affected area with water. If symptoms persist, get medical attention.

