AU Lab Safety Sheets

Water Reactive Chemicals Overview

Risk Management & Safety

316 Leach Science Center

844-4870

Lab Safety

Shawn McNulty – 740-9711

Heath Hardison – 740-9798

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The information presented in this overview is intended to provide general guidance regarding the hazards associated with water reactive chemicals. It is not intended to be a specific procedure for your laboratory. Specific written procedures are the responsibility of the Principal Investigator. If you have any questions concerning the applicability of any item listed in this procedure, contact Risk Management & Safety (RMS) at 334-740-9711, or the Principal Investigator of your laboratory.

Water reactive substances are dangerous when wet because they undergo a chemical reaction with water. This reaction may release a gas that is either flammable or presents a toxicity hazard. In addition, the heat generated when water contacts such a material is often enough for the item to spontaneously combust or explode. The most common water reactive chemicals include sodium, potassium, lithium metals and aluminum alkyls.

Decontamination Procedures

Personnel: Wash hands and arms with soap and water immediately after handling water reactive chemicals.

Area: Carefully clean work area after use.

Emergency Procedure

Emergency procedures which address response actions to fires, explosions, spill, injury to staff, or the development of sign and symptom of overexposure should be developed. The procedures should address, at minimum, the following:

- Who to contact: (911, RMS, and Principal Investigator of the laboratory including evening phone number)
- The location of all safety equipment (showers, spill equipment, eye wash, fire extinguishers, etc.)
- The location and quantity of all water reactive chemicals in the laboratory
- The method used to alert personnel in nearby areas of potential hazards
- Special first aid treatment required by the typed of water reactive chemicals handled in the laboratory

Eye Protection

Researchers should asses the risks associated with an experiment and use the appropriate level of eye protection. Safety glasses with side shields provide the minimum protection acceptable for regular use. Chemical splash

goggles or face shields should be worn when there is a risk of splashing hazardous materials.

Eyewash

Where the eyes or body of any person may be exposed to water reactive chemicals, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use. Bottle type eyewash stations are not acceptable.

Fume Hood

Many water reactive chemicals will liberate hydrogen when they react with water. The use of a fume hood is recommended to prevent the buildup of combustible gases.

Glove (Dry) Box

A glove box should be used to handle water reactive chemicals when a dry atmosphere is required.

Gloves

Gloves should be worn when handling water reactive chemicals. Disposable nitrile gloves provide adequate protection against accidental hand contact with small quantities of most laboratory chemicals. Lab workers should contact RMS for advice on chemical resistant glove selection when direct or prolonged contact with hazardous chemicals is anticipated.

Hazard Assessment

Hazard assessment of work involving water reactive chemicals should address proper use and handling techniques, fire safety (including the need for Class D fire extinguishers), storage, water reactivity, and waste disposal issues.

Protective Apparel

Lab coats, closed toed shoes, and long sleeved clothing should be worn when handling water reactive chemicals. Additional protective clothing should be worn if the possibility of skin contact is likely.

Safety Shielding

Safety shielding is required any time there is a risk of explosion, splash hazard, or a highly exothermic reaction. All manipulations of water reactive chemicals which pose this risk should occur in a fume hood with the sash in the lowest feasible position. Portable shields, which provide protection to all laboratory occupants, are acceptable.

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Safety Shower

A safety or drench shower should be available in a nearby location where the water reactive chemical is used.

Signs and Labels

All water reactive chemical containers must be clearly labeled with the correct chemical name. Handwritten labels are acceptable; chemical formulas and structural formulas are not acceptable.

Special Storage

Water reactive chemicals should be stored in a cool and dry location. Keep water reactive chemicals segregated from all other chemicals in the laboratory. Minimize the quantities of water reactive chemicals stored in the laboratory.

Date all containers upon receipt. Potassium will form peroxides and superoxides when stored under oil at room temperature. Examine storage containers frequently. Contact RMS at 844-4870 to dispose of any container that exhibits salt build up on its exterior. Dispose of all water reactive chemicals whenever they are no longer required for current research.

Never return excess chemicals to the original container. Small amounts of impurities may be introduced into the container which may cause a fire or explosion.

Special Ventilation

Special ventilation is required if these materials are used outside of a fume hood. If your research does not permit the handling of water reactive chemicals in a fume hood, you must contact RMS to review the adequacy of all special ventilation.

Spill Response

Anticipate spills by having the appropriate clean up equipment on hand. The appropriate clean up supplies can be determined by consulting the Material Safety Data Sheet (MSDS). This should occur prior to the use of any water reactive chemicals. Spill control materials for water reactive chemicals are designed to be inert and will not react with the reagent. Do not put water on the spill.

In the event of a spill, alert personnel in the area that a spill has occurred. Turn off all ignition sources and vacate the laboratory immediately.

Auburn University categorizes spills as either simple or complicated, and lab personnel should respond to the spill according to the definitions below.

Simple Spill – Can be safely cleaned up by properly lab personnel, using appropriate spill cleanup materials. No immediate danger to personnel, property, or the environment.

Complicated Spill – Cannot be safely or effectively cleaned up by lab personnel due to the large volume of spill or the highly hazardous characteristics of the chemical. An immediate or potential danger to personnel, property, or the environment exists. Call 911. Remain on the scene, but at a safe distance, to receive and direct safety personnel when they arrive.

Waste Disposal

All materials contaminated with water reactive chemicals should be disposed of as hazardous waste. Alert RMS if you generate wastes contaminated by water reactive chemicals. These wastes may pose a flammability risk or toxicity risk and should not remain in the laboratory overnight.

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