CHEMICAL STORAGE

Proper chemical storage is required to minimize the hazards associated leaks, spills, and accidental mixing of incompatible chemicals.

Labeling

All hazardous chemicals must be clearly labeled for the benefit of current users, emergency personnel, and future users. Make sure all labels are legible and in good condition. Repair or replace damaged or missing labels.

Manufacturers' Labels

OSHA requires that manufacturers provide labels with the following information:

- contents of the container
- physical and health hazard information
- name, address, and emergency phone number of the manufacturer or other responsible party

Original manufacturers' labels must not be removed or defaced.

Material Safety Data Sheets (MSDSs) must be accessible to anyone working with these chemicals. Electronic format MSDSs are available from current materials suppliers:

Alfa Aesar: http://www.alfa.com/webapps/ec120w.pgm

Sigma Aldrich: http://www.sigmaaldrich.com/safety-center.html

Most MSDSs can be also found at: http://www2.hazard.com/msds/

NJIT Labels

Hazardous chemicals that are not in the manufacturer's original container (e.g., samples and working solutions prepared in the lab) must, at a minimum, be labeled with the contents of the container. If the contents are hazardous, attach a label indicating the hazard to warn individuals in the work area. It is not necessary to label containers that will be used temporarily (during one work shift) and are under your immediate control.

Materials prepared by mechanical milling should be labeled to include the following information:

- Operator Name:
- Material: Chemical Formula, e.g., $8Al \cdot MoO_3$
- Mill Abbreviation: AM (attritor mill); PM (planetary mill) or SM (shaker mill)
- Date prepared
  Additional description or project details, e.g., store under hexane

General Storage Guidelines

- Use MSDSs for guidance on storage, incompatibility, reactivity and stability for chemicals.
- Do not tip bottles when returning them to a shelf. Shelves must have enough clearance to accommodate the largest container.
- Do not store chemicals (except cleaners) under sinks. Use approved flammable storage lockers, corrosive storage lockers, shelves or cabinets.
- Conduct periodic cleanouts to prevent accumulating unnecessary chemicals.
- Ensure that caps and lids on all chemical containers are tightly closed to prevent evaporation of contents.
- Avoid exposure of chemicals to heat or direct sunlight.
- Store solids on shelves or in cabinets.
- Avoid storing chemicals on countertops or in fume hoods except for those being currently used.

Segregation and Storage of Chemicals According to Hazard Class

Chemical storage guidelines are presented below. Use these to segregate and store chemicals according to their hazard class. This prevents an undesirable chemical reaction from occurring should two or more chemicals accidently mix.

Chemical Incompatibility Matrix

The chemical incompatibilities shown below are not exhaustive. As a result, it is important for Laboratory personnel to research the properties of the chemicals they are using. Use MSDSs for guidance on chemical incompatibility. Also ensure you read the container's label – it should also have storage guidelines.

	Acids, inorganic	Acids, oxidizing	Acids, organic	Alkalis (bases)	Oxidizers	Water-reactives	Organic solvents
Acids, inorganic			X	X		X	X
Acids, oxidizing			X	X		X	X
Acids, organic	X	X		X	X	X	
Alkalis (bases)	X	X	X			X	X
Oxidizers			X			X	X
Water- reactives	X	X	X	X	X		
Organic solvents	X	X		X	X		

X = Not compatible—do not store together

Additional guidelines

Acids

- Segregate acids from reactive metals such as sodium, potassium, and magnesium.
- Segregate oxidizing acids from organic acid and flammable materials.
- Segregate acids from chemicals that could generate toxic or flammable gases upon contact, such as sodium cyanide, iron sulfide and calcium carbide.
- Segregate acids from bases.

Bases

- Segregate bases from acids, metals, explosives, organic peroxides and easily ignitable materials.
- Do not store aqueous sodium and potassium hydroxide solutions in aluminum drip trays. These will corrode aluminum.

Solvents (Flammable and combustible liquids)

- Store in approved safety cans or cabinets.
- Segregate from oxidizing acids and oxidizers.
- Keep away from any source of ignition: heat, sparks, or open flames.

Oxidizers

- Keep away from combustible and flammable materials.
- Keep away from reducing agents such as zinc, alkali metals, and formic acid.

Water-Reactive Chemicals

- Store in a cool, dry place, away from any water source.
- Make certain that a Class D fire extinguisher is available in case of fire.

Pyrophoric Substances

- If in original container store in a cool, dry place, provide an airtight seal.
- Store in a glove box after the material has been opened.

Cryogens

- Store and handle in a well-ventilated area. When liquid cryogens are converted to the gaseous phase, they may create an oxygen deficiency. Do not use cryogens in small enclosed spaces.
- Use only approved storage vessels (i.e., thermos-like evacuated, double-walled containers) with pressure-relief mechanisms. Non-approved vessels may explode.
- Secure containers so they will not tip over or obstruct an aisle, hallway, or corridor.
- Liquid nitrogen and liquid helium are capable of liquefying oxygen from air. This form of oxygen enrichment can become a strong fire hazard.
- Use appropriate protective equipment for handling cryogens: insulated holders for carrying vessels; eye protection, goggles, or face shields; and aprons. Use cryogenic gloves or leather gloves when handling supercold surfaces.