Sem 6th chemistry hons.

Safe storage and disposal of chemical waste

Safe Handling and Storage of Chemicals

By following a few simple guidelines, the risks associated with handling and storage of material within the laboratory can be reduced considerably.

Laboratory workers should date containers with the day, month and year they are first opened and first received. This is required for materials that have potential to form organic peroxides and recommended for all other materials.

Laboratories should minimize chemical storage to only those chemicals which will be actively used. Laboratory doors should remain closed at all times.

Workers should not use chemicals or equipment if they have not been trained to do so.

Use the following chemical storage guidelines for work with specific chemical hazards:

General Chemical Safety Guidelines

Acids

Store large bottles of acids on low shelves or on trays in acid cabinets or a cabinet marked “corrosives”

Segregate oxidizing acids from organic acids, flammable and combustible materials.

Segregate acids from bases, active metals such as sodium, potassium, magnesium, and other incompatible materials.

Use bottle carriers or a cart to transporting acid bottles.

Have spill control pillows or acid neutralizers available in the event of a spill. Do not use bases to neutralize acid spill.

Bases

Segregate bases from acids and other incompatible materials.

Store large bottles of liquid bases on trays in a cabinet marked “Bases” or “Corrosives”.

Store solutions of inorganic hydroxides in polyethylene containers.

Have spill control pillows or caustic neutralizers available for caustic spills. Do not use acids to neutralize base spills.

Flammables

Only store flammable liquids in a specially equipped flammable-safe refrigerator or flammables cabinet.

Keep away from sources of ignition.

Keep fire extinguishing and spill control equipment readily available.

For flammable metals, have a Class-D fire extinguisher available. See “fire extinguishers” for more information.

Oxidizers

Store in a cool, dry area

Store away from flammable and combustible materials, such as paper, wood, etc..

Peroxide-Forming Chemicals

Date the container when received and when opened.

Store in airtight containers in a dark, cool, dry area.

Check container for formation of peroxides, as needed, using appropriate indicator strips.

Dispose of peroxide forming chemicals on or before expiration date or one year after opening, whichever is first.

Compressed Gases

Store in a secure and upright position.

Chain cylinders individually, 2/3 to 3/4 from the floor.

Indicate the status of the cylinder: Full or In Use or Empty.

When not in use, replace the valve cap.

To transport use a cylinder cart.

Remove all manifolds and regulators, secure the valve cap, and chain or strap the cylinder to the cart before moving.

Disposal of chemical waste

It is the clear responsibility of all research workers to ensure the safe and correct disposal of all wastes produced in the course of their work. Improper and irresponsible disposal of chemical wastes down drains, to the Local Authority refuse collection, or into the atmosphere is forbidden by law. The Aldrich Handbook provides a useful summary of the correct disposal procedure for most chemicals. Due to new legislation, increasingly strict environmental controls and the escalating costs of disposal, it is essential that the appropriate disposal procedures given below are strictly adhered to:

.Wash down drains with excess water:-

Concentrated and dilute acids and alkalis

Harmless soluble inorganic salts (including all drying agents such as $CaCl_2$, $MgSO_4$, Na_2SO_4, P_2O_5)

Alcohols containing salts (e.g. from destroying sodium)

Hypochlorite solutions from destroying cyanids, phosphines, etc.

Fine (tlc grade) silica and alumina

It should be noted in particular that no material on the "Red List" should ever be washed down a drain. This list is as follows:

compounds of the following elements:- antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, tellurium, thallium, tin, titanium, uranium, vanadium and zinc.

organohalogen, organophosphorus or organonitrogen pesticides, triazine herbicides, any other biocides.

cyanides

mineral oils and hydrocarbons

poisonous organosilicon compounds, metal phosphides and phosphorus element

fluorides and nitrites

Incineration (Solvent Waste collection)

all organic solvents including water miscible ones

soluble organic waste including most organic solids

paraffin and mineral oil (from oil baths and pumps)

Laboratory waste bins and controlled waste

All waste suitable for the Local Authority refuse collection, except recyclable paper and glass, is termed 'controlled waste'. Items in this category which includes dirty paper, plastic, rubber and wood, should generally be placed in the waste bins available in each laboratory and will be collected by the cleaners. However, each laboratory must also have a container for certain items which are not allowed to be put in the normal waste bins. In this special controlled waste container should be put:- all broken laboratory glassware, any sharp objects of metal or glass, all fine powders (preferably inside a bottle or jar) and dirty sample tubes or other items lightly contaminated with chemicals (but not any syringes or needles). Laboratory controlled waste containers must be emptied regularly and never allowed to overflow. Under no circumstances must any item of glass, sharp metal or fine powder ever be put in a normal laboratory waste bin. The tops must be removed from all bottles put out for disposal and there should be no detectable smell of chemials from any bottle put for disposal