# Guidelines for the Disposal of Chemical Waste

**1**) Chemical waste is of a variety of types. In general, wastes of different types should be segregated and not mixed. The following are the principal categories of chemical waste

- Organic Waste – nonhalogenated
- Halogentaed waste ($CH_2Cl_2$, $CHCl_3$, chlorobenzene, 1,2-dichloroethane, etc)
- Aqueous acid waste
- Aqueous bleach waste
- Solid waste (sodium sulfate, silica gel, filter papers)
- Sharp items (razor blade, disposable syringe needles, copper wire)
- Broken glass (pipettes, silica plates, broken glass)

**2**) DO NOT mix aqueous and organic wastes. A bottle which has two layers will have to be opened and have the aqueous and organic layers separated. This process is both messy and time consuming.

**3) DO NOT MIX ORGANICS WITH ACIDS (e.g., SULFURIC ACID WITH ETHER)!!! THIS CAN RESULT IN SUDDEN AND CATATROSPHIC EXPLOSION!!!**

**4**) Place clearly visible labels on all waste bottles so that waste types are not accidentally mixed. Waste labels are available from Billy in the stockroom and appear as illustrated below. If Billy does not have any labels at the time one is needed, a label form the attached page should taped onto the bottle. It is advisable to doubly label each bottle – one taped onto the wall of the bottle and one tied onto the neck of the bottle

**5**) Please keep solvent bottles capped, but not tightly. Keep the caps loose enough to vent any pressure that might build up. Pressure can build up if different substances react with one another in the waste bottle

**6) Waste should be stored in bottles from which the labels have been removed**. Labels are easily scraped off a glass bottle with a new razor blade. The purpose of label removal is too prevent accidental misidentification of a waste bottle for a bottle of good solvent.

**7**) Sharp items should be stored in a coffee can or similar type of container that is puncture resistant.

**8**) Before taking a full waste bottle to the stockroom, please check it with the magnet retriever to make sure that no magnetic stir bars are at the bottom of the waste bottle.

**9**) Full waste bottles/jars are to be taken to the stockroom and placed in the metal cabinet in the side room where solvents are stored.

# General Procedure for the Disposal of Thiols, Sulfides, Disulfides, Phosphines, and Cyanide ($^{-}$CN)

The following method is recommended for disposing of odiferous chemical waste, especially highly volatile thiols such as ethanethiol. In general, such waste materials will be in solutions of organic solvents and should ***not*** be poured down the sink. No solution of a highly toxic and odorous chemical should ever be disposed of in this manner, even if it is an aqueous solution.

Thiols, sulfides, disulfides, phosphines, and cyanide may be safely disposed of after oxidation to the respective sulfoxides, sulfones, phosphine oxides (or more highly oxidized phosphorus compounds), or isocyanate, $NCO^{-}$. This oxidation may be most easily performed using bleach solutions. Bleach may be purchased in the stockroom, and it is a good idea to keep a couple of bottles on hand in the lab.

**1**) When working with a volatile organic, ***always*** keep the sash of your fume hood at least one half of the way down. It is best to keep it closed as much as possible. The hoods are not designed to work when the sashes are up.

**2**) Never pour solutions of volatile chemicals. Use cannulas.

**3**) Do not use the above mentioned chemicals in large excess. A one percent excess should be sufficient.

**4**) The reaction of bleach with organics is exothermic. Therefore it is important to cool the material in an ice water bath before carefully adding the bleach in small portions. As a general rule, add at least one volume of bleach.

**5**) The oxidation reaction is slow! Let the solution stand in the hood for ***at least*** 24 hours or until no odor is detected.

**6**) The reaction of tetrathiometallates is even more exothermic, so be careful. Also, elemental sulfur is the final oxidation product, so keep adding bleach until a whitish slurry is obtained.

**7**) After complete oxidation, place the material in a dedicated waste bottle which is labeled “Bleach Solution,” and place the bottle in the waste solvent cabinet. Never put anything else in this bottle.

Please ask if you have questions.