

# Standard Operating Procedures for Using Stench Chemicals

## UCLA Department of Chemistry and Biochemistry

It is imperative that researchers carefully control their use of all malodorous substances to minimize the impact on other workers and our neighbors.

### Examples of Stench Compounds

A few classes of stench chemicals are listed below. Use of any amount of a chemical with an overwhelmingly bad smell (e.g. thiols, selenides, sulfides) must be carefully executed.

thiols (mercaptans)  
amines  
butyric acid

sulfides  
phosphines  
valeric acid

selenides  
isonitriles (isocyanides)

### Running Reactions

Extreme caution must be exercised when working with volatile, malodorous compounds. Only handle these compounds inside a fume hood to prevent release of noxious vapors into the local laboratory environment. Precautions must also be taken to prevent these vapors from being released within the fume hood and exhausted out of the building. In addition to affecting the outside environment, these vapors can be introduced into other buildings via air intakes and distributed to locations distant from the original laboratory source.

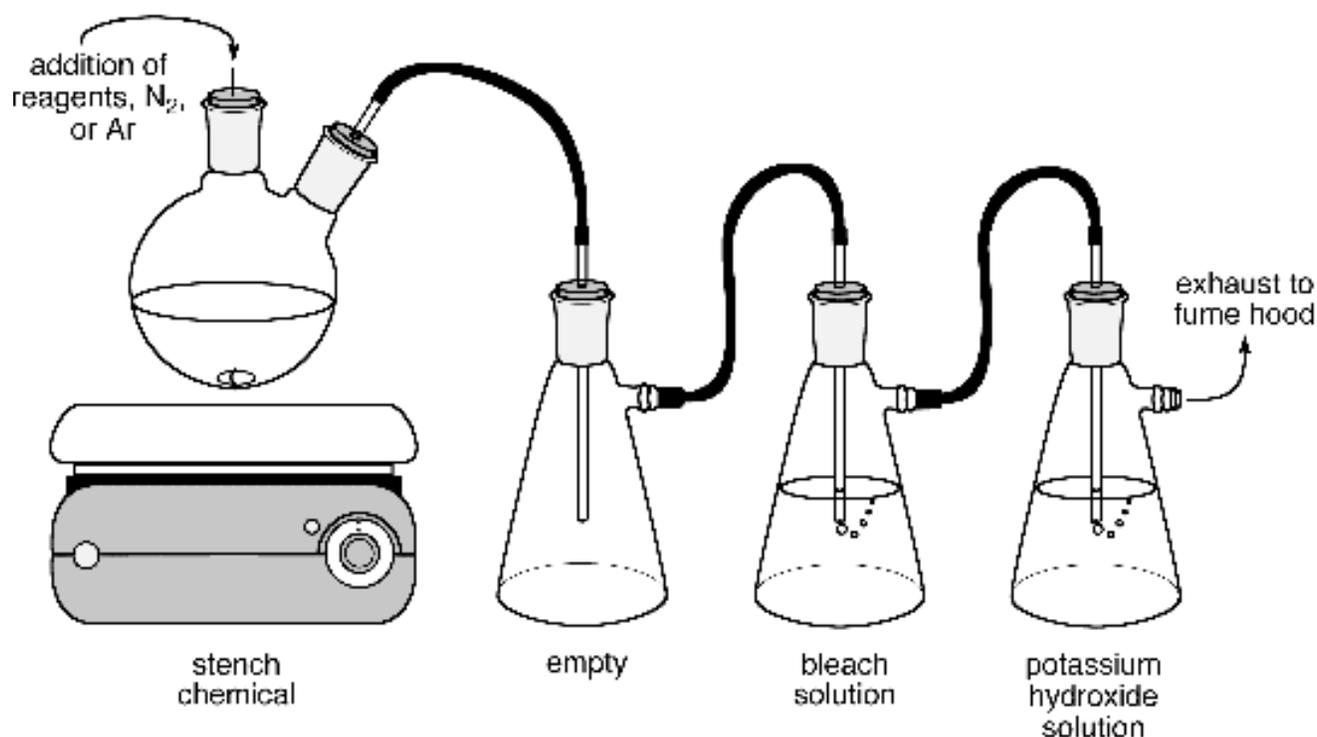
- 1) Use the minimum amount of stench chemical possible (avoid using excess).
- 2) Perform liquid transfers by using a syringe or cannula. Never pour or pipette solutions of volatile stench compounds.
- 3) Keep the hood sash down as low as possible.
- 4) A cold trap or a bleach trap should be employed to prevent vapors from exhausting into the fume hood.

### Bleach Traps

Thiols, sulfides, phosphines, and disulfides can be oxidized to less malodorous sulfoxides, sulfones, and phosphine oxides (or other more highly oxidized compounds) before venting to the environment. This oxidation is most easily accomplished using a bleach solution.

The diagram below shows the set-up for a typical bleach trap. The reaction is first vented into an empty trap, to prevent back flow, and then into a bleach solution. An excess (not a large excess) of bleach (Clorox bleach is 6.15% sodium hypochlorite by weight) should be used. The hydrochloric acid generated from the oxidation reaction is neutralized by connecting the bleach trap to a potassium hydroxide trap before venting to the fume hood. The tubes into bleach and base traps should be gas dispersion tubes for most efficient trapping. The oxidation reaction is exothermic, thus if a large amount of stench chemical is being oxidized

then cooling of the traps will be necessary to keep their temperature from rising.



### Solvent Evaporation

A cold-finger trap (cooled at least to  $-78\text{ }^{\circ}\text{C}$ ) must be used when evaporating solvent under reduced pressure when a stench chemical is present. The collection bulb must also be cooled. Inadequate cooling of the condenser and collection flask when using vacuum will result in release of noxious vapors via the vacuum pump exhaust. If a rotary evaporator is used, it should be placed inside a fume hood.

### Clean-up and Hazardous Waste Disposal

- 1) Tighten cap of stench chemical bottles and seal them with Teflon tape.
- 2) All glassware, syringes, cannula, septa, and other labware that came into contact with malodorous compounds that can be oxidized (e.g. thiols, disulfides, phosphines, etc.) should be rinsed and/or submerged in a bleach solution **IN THE HOOD** to oxidize all traces of the noxious chemical. The oxidation reaction can be slow, so soaking for 24 hours may be necessary.
- 3) If disposable items such as gloves, paper towels, and septa are malodorous, they should be enclosed in a zip-lock bag, placed in a wide-mouth plastic jar, labeled as hazardous waste, and disposed as hazardous waste.
- 4) The malodorous contents of a cold-trap should be carefully added to a cooled bleach solution and the glassware rinsed and/or submerged in a bleach bath **ALL IN THE HOOD**.
- 5) Bleach solutions should be combined into an appropriate container, labeled with a hazardous waste tag, and disposed of as hazardous waste. Potassium hydroxide solutions should be added to a separate container, labeled with a hazardous waste tag, and disposed of as hazardous waste.