

STANDARD OPERATING PROCEDURE: MINERAL ACIDS

PI(s): _____

Room & Bldg: _____

Department: _____

Date: _____

DESCRIPTION

A mineral acid is defined as a water-soluble acid derived from inorganic minerals by chemical reaction as opposed to organic acids (e.g. acetic acid, formic acid). Chemicals that fall under, but are not limited to, this SOP include:

- Hydrochloric acid (CAS No. 7647-01-0)
- Nitric acid (CAS No. 7697-37-2)
- Phosphoric acid (CAS No. 7664-38-2)
- Sulfuric acid (CAS No. 7664-93-9)
- Boric acid (CAS No. 10043-35-3)

USE & PROCEDURE

Attach the experimental protocol(s) that involve the use of mineral acid(s).

POTENTIAL HAZARDS

Corrosive – causes severe eye and skin burns; can cause digestive and respiratory tract burns

Irritant – eye, skin, respiratory tract, digestive tract

Additional Comments:

Nitric acid – strong oxidizer

Sulfuric acid – water reactive; strong inorganic acid mists containing sulfuric acid can cause cancer

ENGINEERING/VENTILATION CONTROLS

All operations involving concentrated mineral acids should be carried out in a chemical fume hood with the sash in the down position, between your chest and what you are handling in the hood.

If the hood's sash cannot be adjusted horizontally, protective eyewear is required (see "Recommended Personal Protective Equipment")

RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT

- Chemical splash goggles
- Face shield
 - Only applicable if not working in a fume hood or if hood's sash is not down.
- Gloves: nitrile, neoprene, or PVC (vinyl)

- Immediately replace with new gloves when splash occurs.
- Protective clothing (e.g. impervious sleeves, closed-toed impervious footwear)
- Recommended: Chemical resistant apron/smock/lab coat (rubber, neoprene or PVC), reusable or disposable.
 - Avoid using the traditional cotton-polyester white lab coat, which readily collects/absorbs compounds.

ADDITIONAL PRECAUTIONS

- When diluting, the acid should always be added slowly to water and in small amounts. Never use hot water and never add water to the acid. Water added to acid can cause uncontrolled boiling and splashing.
- Reaction with certain metals generates flammable and potentially explosive hydrogen gas.
- Avoid mixing nitric acid with organics. This can result in an explosion or fire.

WASTE

Acidic wastes should never be poured down the drain. Collect waste in an appropriate, labeled container with a secure lid. Inform Environmental Health and Safety when container is full or project is complete.

STORAGE

- Bottles of mineral acids should be stored together in an acid (corrosive) cabinet.
- Nitric acid, a strong oxidizer, should be stored separately in a chemically resistant secondary container within an acid cabinet. This could be a polyethylene, PYREX or Nalgene tray or pan. It can also be stored in its own acid cabinet.
- Mineral acids should be stored separately from oxidizing agents, organic materials, and combustible materials.
- Avoid storing ammonium hydroxide and strong mineral acids in the same cabinet.
- Containers of hydrochloric acid and sulfuric acid should be stored in secondary plastic trays to avoid corrosion of metal storage shelves due to drips or spills; containers of hydrofluoric acid should be stored in secondary containers made of polyethylene.

EMERGENCY PROCEDURES

Chemical Spill:

- For small spills, follow chemical spill response guidelines above. Don protective clothing and carefully apply acid-neutralization powder or liquid, whichever is most appropriate, to the spill. Allow time to neutralize, and then apply liquid absorbent pellets or powder.
- For a large spill, vacate the lab, deny further entry, and call EHS for assistance.
- For small spills, once the absorbent has been removed, wash the contaminated area with sodium bicarbonate and water.

