

Semiconductor Device Processing

NOTES ON HANDLING HYDROFLUORIC ACID

General Information:

Synonyms: Hydrogen fluoride
Descriptions: Clear, colorless, fuming corrosive liquid or gas
Formula: HF
Constants: Mol. wt. 20.01, mp: -92.3°C, bp: 19.4°C,
density: 0.987 (liquid)

Hazard Analysis:

Toxic hazard rating:

Acute local: Irritant 3; Ingestion 3; Inhalation 3.
Acute systemic: Ingestion 3; Inhalation 3.
Chronic local: Irritant 2.
Chronic systemic: Ingestion 2; Inhalation 2.

Toxic hazard rating code:

0: None
1: Slight
2: Moderate May involve both irreversible and reversible changes; not severe enough to cause death or permanent injury.
3: High: May cause death or permanent injury after very short exposure to small quantities.

Toxicology:

It is extremely irritating and corrosive to the skin and mucous membranes. Inhalation of the vapors may cause ulcers of the upper respiratory tract. Concentrations at 50-250 ppm are dangerous, even for brief exposures. Hydrofluoric acid produces severe skin burns which are slow in healing. The subcutaneous tissues may be affected, becoming blanched and bloodless. Gangrene of the affected areas may follow. (All of the above information was taken from Dangerous Properties of Industrial Materials by N. Sax.)

Always **wear eye protection, face shield and gloves** when using HF. **Work under the HF hood at all times.** Do not bring open containers or cotton swabs with HF out into the room. This applies equally to any other solutions containing HF. HF should be kept in polyethylene or Teflon containers, beakers and dishes **ONLY. No glassware is allowed in the HF hood.**

If gloves become wet or otherwise come into contact with HF, do not touch on any valves or switches. Have someone else do it.

If there is any doubt about skin contact with HF, flood area for several minutes (especially under fingernails). HF causes severe burns to skin and eyes that are not immediately painful or visible. Therein lies a substantial part of the danger.

It is not advisable nor permissible to work alone in the lab when handling HF.

CAUTION: The Hydrofluoric Acid or buffered hydrofluoric-acid etch is dangerous. Use utmost caution! A suggested procedure to follow is to wash or rinse your hands following the performance of an etch or when moisture that might even remotely contain HF is contacted in the HF etch area. If HF is contacted, immediately quench with water and use the ACID-AID that can be found on the shelf in the HF-etch room. Note the eye-wash sink in the laboratory.