

Ammonium Fluoride

Process:

Highly toxic mixture for etching Silicon Oxide with high selectivity to photoresist.

Materials:

Ammonium Fluoride and water for dilution, typically premixed.

Incompatible Materials:

Will slowly dissolve glassware. Mixing with acids will cause toxic HF outgassing.

Hazards:

Poor warning properties: harmful exposure and workstation contamination are initially very difficult to detect. It's also highly toxic and acutely harmful to nerves/bones. Ammonium Fluoride numbs the skin, so burns are typically not apparent until a day later. Watch very carefully for splashes because this anesthetic effect will prevent you from feeling the burn and reacting appropriately.

Exposure Actions: Do what's below, and then notify CNM2 staff within a few hours. For advice, call CNM2 staff.

Eyes: Hold eyes open in running eyewash station for 15 minutes and call 911 as soon as possible.

Skin: Remove splashed clothing, wash for 3 minutes, apply Calcium Gluconate gel and call 911.

Personal Protective Equipment:

Goggles, face shield, heavy chemical gloves (blue disposable Nitridex)¹, and heavy chemical apron. Ammonium Fluoride leaves persistent residues, so rinse gloves often. Keep Calcium Gluconate gel handy.

Acceptable Locations For Use:

Wet process stations 2, 3, 11, acid & base fume hood². If heated only acid & base fume hood.

Additional Process Notes:

If dilution is needed measure water, add Ammonium Fluoride, then stir³. Room temperature Ammonium Fluoride does not pose a vapor hazard. It's very rare to heat Ammonium Fluoride, though if you do expect fume hazard to approach that of room temperature HF^{4,5}. Ammonium Fluoride is transparent when wet so be sure to rinse your work station after use². Its residues form toxic, white crystals when dry that can persist for years. Ammonium Fluoride's pH reads just barely above 7, turning CNM2 provided pH strips a light yellow-green. This pH is slightly higher than CNM2's DI or tap water.

Disposal:

If heated allow to cool, then decant or aspirate to neutralizer. If the solution contains heavy metals or organics, dispose of the solution in the spent "Fluorides" bottle instead⁶.

*Additional SOPs available, see: 1. PPE Choice and Cleaning
5. Hydrofluoric Acid

2. Work Station Cleaning
6. Haz Waste Management

3. Pouring and Mixing

4. Hotplates