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 NCNC staff within a few hours. For advice, call NCNC 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 hood\(^2\). If heated only acid & base fume hood.

**Additional Process Notes:**
If dilution is needed measure water, add Ammonium Fluoride, then stir\(^3\). 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 use\(^2\). Its residues form toxic, white crystals when dry that can persist for years. Ammonium Fluoride's pH reads just barely above 7, turning NCNC provided pH strips a light yellow-green. This pH is slightly higher than NCNC’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 instead\(^6\).

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\(^1\) Additional SOPs available, see: 1. PPE Choice and Cleaning  
2. Work Station Cleaning  
3. Pouring and Mixing  
4. Hotplates  
5. Hydrofluoric Acid  
6. Haz Waste Management