

Phosphoric Acid

Process:

Phosphoric acid for Silicon Nitride (Si₃N₄) etch, cleaning solutions and others.

Materials:

Phosphoric Acid (85% wt), sometimes diluted with water.

Incompatible Materials:

Be cautious of splattering due to heating when etching bulk metals, combustibles, or materials that will easily oxidize. Use caution as other incompatibles exist.

Hazards:

Destructive on contact with human tissues. Burns take many minutes or hours to become apparent. Fumes from boiling baths are irritants to skin, eyes, and respiratory tissue. Leaves difficult to notice hazardous residues that persist for many months to years in a cleanroom environment. Boiling baths of Phosphoric acid (as sometimes used for Silicon Nitride etching) will often entrain Phosphoric acid in the steam, creating an enormous vapor and residue hazard. When the steam settles on a surface it remains as Phosphoric Acid residues.

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 15 minutes and seek medical aid if irritation persists.

Personal Protective Equipment:

Goggles, face shield, heavy chemical gloves (blue disposable Nitridex)¹, and heavy chemical apron. Phosphoric acid leaves invisible residues, so rinse gloves often.

Acceptable Locations For Use:

Wet process stations 2, 3, 8, 9, 11, 12, 13, acid & base fume hood². Baths hotter than 120C in acid & base fume hood.

Additional Process Notes:

Measure water if necessary and slowly add Phosphoric Acid to water, then stir³. Heat only after mixing is complete if greater than ambient temperature is desired⁴. Phosphoric acid is especially difficult to mix into water, so allow 20 seconds to completely mix. Phosphoric acid is transparent and difficult to completely rinse away with water, so be diligent when cleaning work station².

Disposal:

Allow to cool, then decant or aspirate to neutralizer. Heavy metal bearing solutions or bulk organics should instead be disposed of in the "Acids" bottle⁵.