

PAN: Phosphoric, Acetic and Nitric Acids

Process:

PAN for Aluminum Etch and some cleaning solutions.

Materials:

Phosphoric Acid (85% wt), Acetic Acid (Glacial), Nitric Acid (70%) and DI water in a 16:1:1:2 volumetric ratio.

Incompatible Materials:

No Solvents or other organic liquids as many explosive and toxic gas emitting incompatibles exist. Be cautious of splattering and brown toxic NO₂ outgassing when etching metals, combustibles, or materials that will easily oxidize. Use caution as many other incompatibles exist.

Hazards:

Destructive on contact with human tissues. Emits some harmful fumes. Certain metals and organics will cause dark brown toxic Oxides of Nitrogen to outgas. PAN leaves persistent hazardous residues. Has many dangerous incompatibles. Expect heating if mixing PAN into a spent chemical accumulation bottle, and never tightly cap bottles as pressurization and explosion will occur.

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 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. PAN leaves persistent invisible residues, so rinse gloves often.

Acceptable Locations For Use:

Wet process stations 3, 12, acid & base fume hood². If hotter than a simmer, only acid & base fume hood.

Additional Process Notes:

Start with 2 parts water, then pour in 1 part Acetic Acid, followed by 1 part Nitric Acid, and finally 16 parts Phosphoric Acid. Stir between each step to avoid splatter. Heat only after mixing is complete if greater than ambient temperature is desired⁴. Though PAN can turn brown, it's often transparent so be sure to rinse your work station after use². Never tightly cap bottles of spent PAN or risk explosion.

Disposal:

Allow to cool, then decant or aspirate to neutralizer. Heavy metal (or Aluminum) bearing solutions should instead be disposed of in the "Persistently Oxidizing Acids" bottle⁵. Never tightly cap spent oxidizer bottles. Instead, leave the cap ¼ to ½ turn from tight.

*Additional SOPs available, see: 1. PPE Choice and Cleaning
5. Haz Waste Management

2. Work Station Cleaning

3. Pouring and Mixing

4. Hotplates