UCDAVIS
COLLEGE OF ENGINEERING
Center for Nano-MicroManufacturing

Nitric Acid

Process:
Nitric Acid for metallic thin film etches, cleaning solutions and others.

Materials:
Nitric Acid (70% wt), sometimes diluted with water.

Incompatible Materials:
No Solvents or other liquid organics, which tend to form unstable explosive solids. Absolutely no metal powders as many explosive and toxic gas emitting incompatibles exist. Be cautious of splattering due to heating if etching bulk metals or combustibles. Mixing with Acetic acid requires special training[3]. Use caution as many other incompatibles exist.

Hazards:
Destructive on contact with human tissues. Burns take many minutes or hours to become apparent. Fumes will erupt from the bottle/baths, and are potent irritants to skin, eyes, and respiratory tissue. Leaves somewhat persistent hazardous residues. Has many dangerous incompatibles. Will occasionally emit a toxic brown gas called "Oxides of Nitrogen" or NO_2 when heated or mixed with metals or acids. When inhaled, NO2 will block your sense of smell so should leave the area immediately. Expect heating if mixing Nitric acid 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 or orange Trionic)[1], and heavy chemical apron. Nitric acid leaves invisible residues, so rinse gloves often.

Acceptable Locations For Use:
Wet process stations 3, 9, 12, 13, acid & base fume hood[2]. If heated, only acid & base fume hood.

Additional Process Notes:
Measure water if necessary and slowly add Nitric Acid to water, then stir[3]. Heat only after mixing is complete if greater than ambient temperature is desired[4]. Nitric acid is transparent so be sure to rinse your work station after use[2]. Never tightly cap bottles of spent Nitric Acid, which risk explosion. Though Nitric Acid is both acid and oxidizer store it with the Acids, preferably away from Acetic Acid.

Disposal:
Allow to cool, then decant or aspirate to neutralizer. Heavy metal bearing solutions should instead be disposed of in the "Persistently Oxidizing Acids" bottle[5]. 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 2. Work Station Cleaning 3. Pouring and Mixing 4. Hotplates 5. Haz Waste Management