

**UC DAVIS****COLLEGE OF ENGINEERING***Center for Nano-MicroManufacturing*

RCA1 (Base)

Process:

Cleaning of non-metallic substrates

Materials:

Water, Hydrogen Peroxide (30% wt), and Ammonium Hydroxide (29% wt) in a 5:1:1 volume ratio.

Incompatible Materials:

No Solvents or liquid organics, which occasionally form explosives in RCA1. Watch for splattering and thermal 'run away' when etching metals, combustibles, or oxidizable materials. The first sign of a runaway is an unexpected increase in bubbling, whence you should remove your sample. Use caution as many other incompatibles exist. Rinse wafers in DI water between each RCA step.

Hazards:

Destructive on contact with human tissues. Ammonia fumes will erupt from the bottle/baths, and are potent irritants to skin, eyes, and respiratory tissue. RCA1 heats considerably upon mixing and even more so during use, though typically won't splatter as a result. Expect still further heating if mixing RCA1 into a spent chemical accumulation bottle, and never tightly cap bottles as pressurization and explosion will occur. RCA1 is both a base and an oxidizer, so there are many dangerous incompatibles.

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.

Acceptable Locations For Use:

Wet process stations 2, 3, 8, 9, 11, and acid & base fume hood². If heated, only acid & base fume hood or dedicated RCA benches⁶.

Additional Process Notes:

Measure water, add Ammonium Hydroxide, mix thoroughly, add Hydrogen Peroxide, mix again and then heat if desired³. If using a dedicated RCA bath, you may add Hydrogen Peroxide after heating, but must be very cautious to avoid spatter^{4,6}. It's also ok to mix in the Hydrogen Peroxide and Ammonium Hydroxide in reverse order as some institutions suggest, though expect some splattering if you do. RCA1 is transparent so be sure to rinse your work station after use². Never store in closed container. To maximize effectiveness, only use dedicated Teflon 'RCA' labware.

Disposal:

Allow to cool, then decant or aspirate to neutralizer. If solution contains heavy metals, dispose in the 'Transiently Oxidizing Bases' bottle⁵.

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

2. Work Station Cleaning
6. RCA Baths

3. Pouring and Mixing

4. Hotplates