Silicon Substrate Cleaning

1. Simple Clean
    1. Removes organic contaminants
    2. Process
        1. Cover the surface of the wafer with Acetone.
        2. Thoroughly scrub the surface of the wafer with a swab.
        3. Rinse the wafer with IPA.
        4. Blow-dry the wafer with N_2 gun.
2. Photoresist Stripper
3. O_2 Plasma Etching
    1. O_2 plasma etching will remove organic films and residues. O_2 plasma etching can be done in the asher.
    2. Link to asher
4. Piranha Clean
    1. Removes organic materials (photoresist, oil, etc.)
    2. WARNINGS: Do not use Piranha clean on metals
    3. Process
        1. Mix 98% H_2SO_4 (sulfuric acid) and 30% H_2O_2 (hydrogen peroxide) in volume ratios of 2-4:1 (Always smoothly add acid into water or H2O2: The reaction is exothermic so ensure that the container can handle the heat. If you are not sure consult authorized personnel.)
        2. Heat to 100°C (Newly prepared mixture is boiling, no need to provide heating.)
5. RCA Clean
    1. Removes organic, oxide, and metallic contaminants
    2. Process
        1. Organic Clean: Removal of insoluble organic contaminants with a 5:1:1 H_2O:H_2O_2:NH_4OH solution (at 60~70°C).
        2. Oxide Strip: Removal of a thin silicon dioxide layer where metallic contaminants may accumulated, using a diluted 20:1 H_2O:HF solution.
        3. Ionic Clean: Removal of ionic and heavy metal atomic contaminants using a solution of 6:1:1 H_2O:H_2O_2: HCl (at 60~70°C).