Substrate Processing Procedure

Routine Cleaning:

If the wafer is new, rinse with acetone, IPA and de-ionized water, and blow dry with nitrogen.

Thorough Cleaning:

If the wafer is recycled and has contaminants on surface, follow the steps below.

1) Preliminary Cleaning:
   If the wafer has photoresist present on the surface, remove with an inorganic resist stripper such as Pirhana etch.
   a. **Preparation** – Add 7 parts sulfuric acid (98% H₂SO₄) to 3 parts hydrogen peroxide (30% H₂O₂)
   b. Immerse the wafers in pirhana at 100 – 130°C for about 10 minutes.
   c. Upon removal, vigorously rinse wafers in 18 – 23°C de-ionized water.


   A fresh mixture of H₂O:H₂O₂:NH₄OH (5:1:1 by volume) is prepared and heated to 70°C.
   a. **Preparation** – Add 75 ml DI water (H₂O), 15 ml ammonium hydroxide (28 – 30% NH₄OH) to a Pyrex beaker. Remove from hot plate and add 15 ml hydrogen peroxide (30% H₂O₂). The solution will bubble vigorously after a couple of minutes. At this point the solution is ready to use.
   b. Submerge wafer for 10 minutes.
   c. Rinse wafer in DI water for 1 minute.

   **Disposal** – Let the RCA SC-1 solution cool to room temperature. Pour the solution into a hazardous materials labeled waste container and place cap on the container.

3) Stripping of the Hydrous Oxide Film Formed During Prior Step (Modified from original SC-1)

   a. Submerge wafers for 10 seconds in BOE solution.
   b. Rinse wafer in DI water for 30 seconds.

4) Desorption of Remaining Atomic and Ionic Contaminants (SC-2)

   A fresh mixture of H₂O:HCl:H₂O₂ (6:1:1 by volume) is prepared and heated to 70°C.
   a. **Preparation** – Put 90 ml of DI water in a Pyrex beaker. Carefully add 15 ml HCl and then heat the solution to 70°C on a hot plate. Remove the solution from the hot plate and add 15 ml of H₂O₂ (30%). The solution will bubble vigorously after a couple of minutes at which point it is ready for use.
   b. Submerge wafers for 10 minutes.
   c. Rinse wafers in DI water 30 seconds.
**Disposal** – Let the RCA SC-2 solution cool to room temperature. Pour the solution into a hazardous materials labeled waste container and place cap on the container but DO NOT tighten it to allow any gases that build up to escape.

**Dehydration Bake Step:**

1) Dehydration bake temperatures of 150 – 200°C liberate surface water molecules while temperatures at approximately 400°C evolves loosely held water of hydration.
2) Allow wafer to return to ambient temperature prior to resist coating.

**Surface Modification:**

If the surface is hydrophilic (e.g., glass or silicon dioxide), HMDS can change it to hydrophobic.

1) Drop 3-5 droplets of HMDS onto substrate.
2) Close the fume hood.
3) Spin coat it at 3,000 rpm.