Photolithography

User Guide

NFR-014 Negative PR Vertical Wall Process

Process Set-Up

1. Turn Thermolyne digital hotplate ON (Rm 201 K) and set temperature to 110˚C. Once set point is reached, verify temperature measures 90˚C +/- 2C˚ using Omega HH508 digital thermometer/probe.

2. Turn on DI Water in service bay (Rm 201 D).

3. Turn Quintel Q-4000 mask aligner vacuum ON. The vacuum switch is located on the back wall to the left of mask aligner. If the HTG mask aligner in room 201 H is used, verify vacuum is at least 20 in. Hg as indicated on the vacuum gauge located behind the HTG mask aligner.

4. Turn mask aligner power ON and verify UV lamp is operational. Measure the UV intensity using the Quintel Vari-Wave II meter prior to exposure. Calculate exposure time using the following:
Exposure Time (seconds) = Exposure (mJ/cm^2)/Intensity (mW/cm^2)

5. Turn exhaust to spinner bowl (room 201 K) ON by connecting vacuum plug to power outlet on front left bottom of exhaust hood.

6. Locate JSR NFR-014R photoresist, PD 523AD developer solution, and Fisher disposable polyethylene pipettes.

Process

Spin Coat (Headway Spinner - Rm 201 K) Test spin for speed before applying photoresist and adjust if necessary. Apply JSR NFR-014R resist using a disposable pipette onto wafer. Spin @ 3K RPM for 60 seconds.

Soft Bake on hotplate @ 90˚C (set point = 110˚C) for 90 seconds.

Expose (HTG or Quintel) Insert proper mask into exposure system, chrome side down. Expose at 80 mJ/cm^2. Set exposure time based on intensity calculation (See setup procedure for calculation). Align to previous pattern if necessary.

Post Exposure Bake on hotplate @ 90˚C (set point = 110˚C) for 90 seconds

Develop Immerse wafer(s) into developer solution PD 523AD, full strength for 60 seconds with constant agitation (one swish per second). Dispose of developer solution once develop is completed. Rinse in DI H_20 for 5 minutes and transfer to cascade rinse tank in room 201 J. Rinse wafers until resistivity is >15 MW. Transfer wafers into STI Semitool spin dryer and press START. **Note:** Use 1000 mL PD 523AD developer for 1-3 wafers, 2000 mL PD 523AD developer for 4-6 wafers, etc.

Inspect pattern. Proceed to next step if OK. Strip photoresist and return to spin coat if unacceptable.

Hard Bake Bake in convection oven for 20 minutes @ 90˚C. **Note:** this is optional if film is thin (1-2Å).

Etch using the appropriate etch for the material to be etched.

Inspect for completeness of etch. Etch for additional time if necessary.

Strip Photoresist using either standard single use Piranha solution or CARC Resist Remover solution.

User Guide adapted by TJ LaFave
updated April 27, 2004 (lafatim@iit.edu)