

Experiment 2-X

Objective: To observe and learn the process of Spin-coating in the laboratory.

Theory: Spin coating is a highly efficient method for depositing uniform thin films of materials, such as positive photoresist, onto flat substrates like silicon wafers. In spin coating, a small amount of liquid photoresist is deposited at the centre of the substrate, which is then rapidly rotated. The centrifugal force spreads the resist across the surface, creating a thin, even layer. The thickness of the film is primarily controlled by the spin speed and the viscosity of the photoresist.

Positive photoresist is light-sensitive and undergoes a chemical change when exposed to UV light, making the exposed regions more soluble in developer solution. This property allows for precise patterning in photolithography, commonly used in semiconductor manufacturing, microelectronics, and MEMS. The objective is to create a high-quality resist layer, free of defects, with the desired thickness. After spin coating, the substrate undergoes a "soft bake" to evaporate solvents, stabilize the film, and improve adhesion. The parameters of the spin coating process are carefully adjusted based on the photoresist and substrate properties to achieve the required film thickness and uniformity.

Materials:

- 1. Positive photoresist**
- 2. Silicon wafer or glass substrate**
- 3. Spin coater**
- 4. Dropper or pipette**
- 5. Acetone, IPA (Isopropyl Alcohol) for cleaning**
- 6. Hotplate**
- 7. Nitrogen gas blower or air gun**
- 8. Nitrile gloves**
- 9. Tweezers**

Procedure:

1. Clean the substrate with acetone or IPA, and dry using nitrogen gas.
2. Secure the substrate onto the spin coater chuck.
3. Apply a few drops of positive photoresist onto the substrate.
4. Spin at 3000-4000 rpm for 30-60 seconds to achieve the desired thickness.
5. Perform a soft bake on a hotplate at 90°C for 60 secs.
6. Inspect the substrate under a microscope for uniformity and defects.

Observations:

PR name	Spin coating time	speed	thickness	Soft bake time	Softbake temperature

Other observations involved in this experiment will be informed at the time of the experiment

Result: