

Sample Preparation for Wet and Dry Etching

In this experiment, you will use four Si wafers with SiO₂ layers and patterned photoresist (SPR1813) on them. These wafers should be prepared during the oxide growth and photolithography experiments. You will split each wafer into four quarters, which will yield the total of 16 samples. These samples will be used as follows:

- 8 samples for wet etching of Si by KOH (SiO₂ acts as a mask for Si).
- 2 samples for wet etching of SiO₂ by BOE (photoresist acts as a mask for SiO₂).
- 3 samples for dry etching of Si (photoresist acts as a mask for Si).
- 3 samples for dry etching of SiO₂ (photoresist acts as a mask for SiO₂).

Preparation of Samples for Wet Etching by KOH (Requires 2 Wafers)

To prepare samples for etching of Si by KOH, it is necessary to remove SiO₂ from areas not covered by photoresist (PR):

1. Take two wafers (**before** you split them into quarters).
2. Immerse a wafer in BOE (6:1) in a Teflon beaker for 2 minutes to etch SiO₂ not covered by PR.
3. Take the wafer out of the Teflon beaker and rinse it in DI water. Use the nitrogen gun to blow dry the wafer.
4. Use acetone to strip the PR from the wafer and then rinse the wafer with isopropanol and DI water. Use the nitrogen gun to blow dry the wafer.
5. Measure the step height of the etched SiO₂ by Dektak profilometer. Compare this value with the oxide thickness obtained earlier by Filmetrics. Record the pattern profile of SiO₂ etched by BOE.
6. Cut or split the two wafers into four quarters each and set them aside for experiments on wet etching of Si using KOH.

Preparation of Samples for Dry Etching of Si (Requires 1 Wafer)

1. Cut a wafer into 4 quarters.
2. Set one of these quarters aside for dry etching of SiO₂.
3. Etch the other 3 quarters with BOE using the steps 2-3 from the previous section. These quarters will be used for dry etching of Si. Do not remove the photoresist prior to dry etching.

Remaining Samples

1. Cut the remaining wafers into 4 quarters.
2. Two of these quarters will be used for wet etching by the BOE and two other quarters will be used for dry etching of SiO₂.