

TMAH Standard Operating Procedure

1. Take a 1L glass beaker, wash it and fill DI water in it upto (300-400ml).
2. Cover the hot plate of the TMAH heater with aluminium foil.
3. Switch on the TMAH heater with the temperature sensor incorporated.
4. Set the required temperature to 90°C (It will depend on your recipe from 80°C - 90°C).
5. Place the glass beaker on it with the temperature sensor dipped in the water.
6. Let it be heated to 90°C, till then prepare your samples for etching.

Preparation of TMAH solution

7. Take the TMAH glass vessel and wash it nicely with DI water.
8. Measure TMAH solution (25%) from a measuring cylinder according to the requirements and put it in TMAH glass vessel.
9. Add DI water and IPA (according to your process and requirements).

Preparation of sample for etching (for bulk etching with SiO₂ as mask)

10. Etch the oxide completely by putting it in BHF so that the Si is exposed (the etch rate of oxide in BHF (5:1) is 100nm/min).
11. Strip PPR from the sample by dipping it in acetone.

Etching process

12. Place the sample in a clean quartz boat (if you want to do vertical etching).
13. Place the quartz boat inside the TMAH vessel (for vertical etching) or place the sample directly inside the TMAH vessel (for horizontal etching).
14. Cover the lid of the TMAH vessel and place it in the glass beaker which was kept at 90°C.
15. Make sure that the water level in the glass beaker is above the TMAH solution of the TMAH vessel.
16. Place a condenser carefully on top of the lid of TMAH vessel by clamping it to a retort stand.
17. Connect one end of the tube of condenser to the tap water and place the other end in a sink.
18. ON the tap water and set it in such a way that from the other end there is a flow of water dropwise.
19. Carry out the etching process for the required time (fine bubbling from the surface of the sample indicates the etching process).

After etching process

20. Turn off the heater and tap of the condenser.
21. Carefully remove the condenser from the top of the TMAH lid.
22. Drain out the water completely from the condenser before placing it in its place.
23. Carefully take out the TMAH vessel from the glass beaker, open its lid and take out the sample.
24. Dip the sample in IPA to prevent stiction problem.
25. Dry the sample using N₂ gun.
26. TMAH solution should only be disposed when it is cooled.

27. Wash the TMAH vessel and all glassware properly with DI water before keeping it in its place.
28. Disconnect the temperature sensor from the heater and clean it with IPA soaked lint free properly.
29. Remove the aluminium foil from the hot plate and clean it with IPA soaked lint free properly. Unscrew the clamp from the heater and place it properly.
30. Make the log book entry.

Precautions

31. For long duration etching process the water level in the beaker should be monitored during the process. If it goes below the TMAH solution level then add slight amount of water to maintain its level above it.
32. Extreme precaution should be taken while handling BHF & TMAH. Usage of hairnet, face mask, apron and nitrile gloves are necessary while handling the above chemicals.
33. The glassware should be handled very carefully including condenser, TMAH glass vessel, beaker and petridishes.
34. While opening the lid of the TMAH vessel (after etching process) the gases should not be inhaled as it is very harmful.
35. Users violating any of the policy and not taking the above mentioned precautions will be strictly dealt with including suspension from the lab.