

TMAH & KOH FAB MEASUREMENTS

BACKGROUND

TMAH (Tetramethyl Ammonium Hydroxide) and KOH (Potassium Hydroxide) are critical chemicals in silicon wafer etching and cleaning process. In the past pH measurements and other methods were used in an attempt to determine the concentration of these chemicals in wet benches. However, these methods had only limited success in determining the exact chemical concentration of each base. The best method for measuring exact chemical concentrations remains acid/base titration. The CHIPChem analyzer automates this technique for these measurements.

ANALYZER SETUP

A South Korean semiconductor fab installed a CHIPChem analyzer for wet-chemical measurements of KOH and TMAH. The analyzer was able to test each of the separate baths many times every hour. Both KOH and TMAH were measured with acid/base titration. Each of these titrations was done using a glass pH electrode. The titrant in both cases



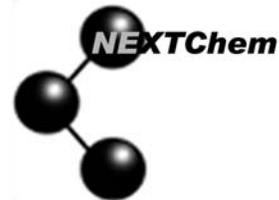
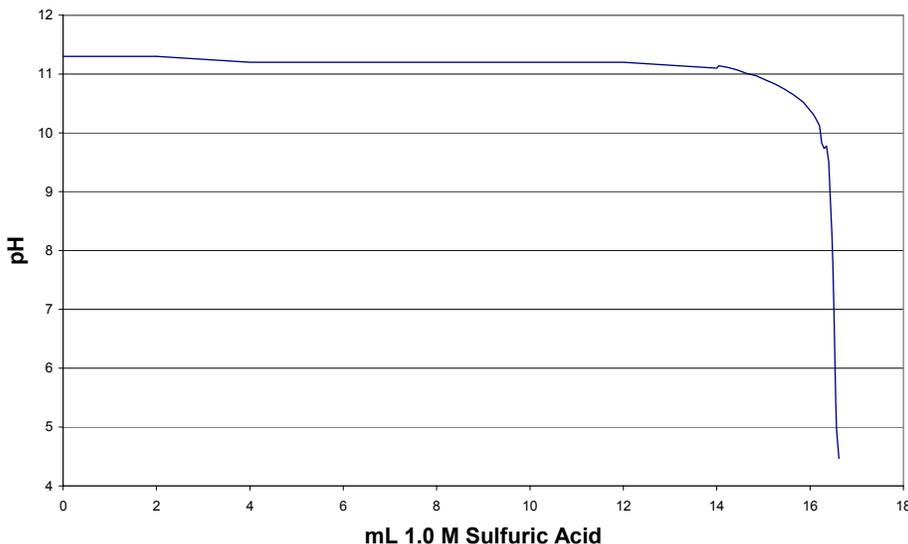
was H_2SO_4 (sulfuric acid). The analyzer collected each sample with a 6-port micro dilution sample system. This system can be configured with various volumes between (0.25 mL – 2.0 mL). The reproducible collection of very small samples greatly simplifies the analysis of each sample. All the wetted surfaces of the sample system are PFA teflon. The enclosure was also made from white polypropylene and includes a spill drain as well as an exhaust port. The wet bench manufacturer also supplied the CHIPChem with a wheeled reagent enclosure. The analyzer communicated with the end-user's PLC via a serial Modbus

connection. This connection allows for complete data transfer as well as the capability to monitor the operation of the analyzer. The CHIPChem also has analog current outputs (4-20 mA). In addition, the CHIPChem can have an Ethernet connection for remote observation and control of the analyzer from a PC outside the fab.

ADVANTAGES

- 1) Lab Accuracy On-line
- 2) Reliable Measurements
- 3) Rapid Measurements
- 4) Improved Chemical Control
- 5) Improved Wafer Quality

TMAH Titration



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