

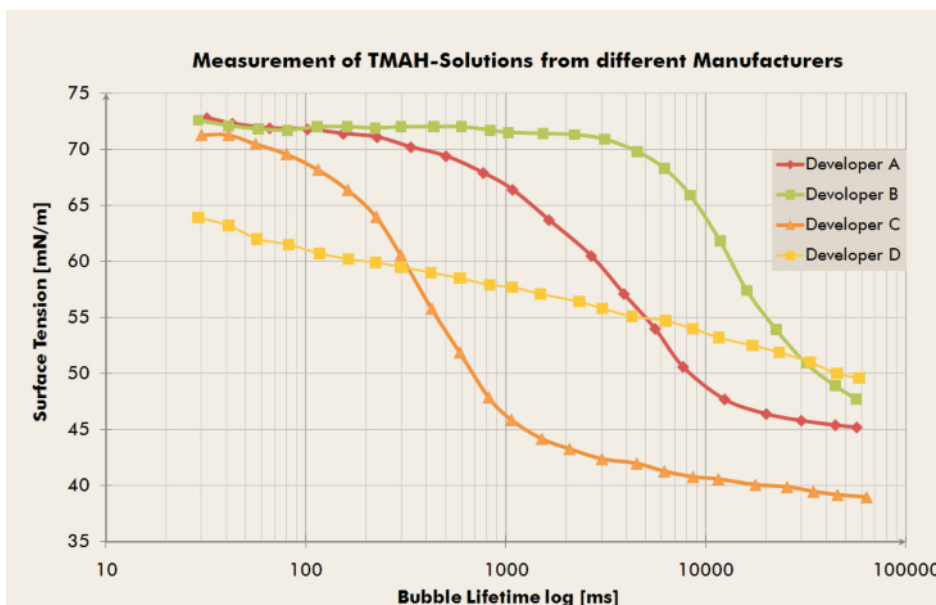
Precise Control of the Surface Tension of TMAH-Solutions

Tetramethylammonium hydroxide-solutions (TMAH) are used as CMP pre-cleaner (chemical mechanical polishing) in the wafer production or as developer in lithographic processes at semiconductor devices. In order to achieve a complete and even wetting of the wafer's surface with the TMAH-solution, surfactants are added to this solution to reduce the surface tension.

This is required for ensuring a constant and surface-geometry independent etching process. Here, the dynamic surface tension (time-dependent wetting behaviour) is very important concerning its influence on the layer-thickness homogeneity and conformity. Static measurements such as the plate and ring method are not appropriate for this kind of analysis because they only measure the static surface tension instead of the dynamic surface tension. Also, the devices used for these methods have to be cleaned after a measurement in a very complex way causing a high time input.

SITA Messtechnik GmbH offers different solutions for monitoring the surface tension in bath formulations according to different fields of application. All tensiometers are based on the bubble pressure method and allow a measurement of the surface tension from a highly dynamic up to a quasi-static range.

The SITA DynoTester, a very flexible and light-weight hand-held tensiometer, is the most suitable measuring device for a general quality control. Measurements can be carried out within a short time on-site and test results can be compared immediately with required values.



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Therefore, the SITA DynoTester allows easy and quick random analyses of the TMAH-solution with regard to the wetting ability. The SITA DynoTester is very user-friendly, so there is no expertise necessary in order to operate the device. All functions of the measuring instruments are available directly by pressing the appropriate buttons.

In case of high TMAH-solution requirements and a needed permanent monitoring of the test results, SITA Messtechnik GmbH recommends individual solutions of the process monitoring system called SITA DynoLine.

This system is directly integrated in the process, measures the surface tension at regular intervals and compares data within defined ranges automatically. The data storage has a capacity of at least one year. In case that long-term data storage is necessary, there is an option of transferring data via a serial port to the computer.

Operating tensiometer of SITA Messtechnik GmbH allow a reliable monitoring of the bath's quality in order to develop a good basis for obtaining a high quality in developing and cleaning processes.

Furthermore, an overdose of surfactants can be avoided leading to an additional reduction in costs.

