

Monitoring the surfactant concentration when cleaning wafer carriers

Product: SITA DynoTester+, SITA clean line ST
Industry: Semiconductor technology
Measuring principle: Measuring the dynamic surface tension

The cleanliness of the discs plays a decisive role in the production and treatment of silicon wafers. However, surface treatment processes of wafers cause contamination, which must be removed in the subsequent cleaning process. To meet the high requirements, the cleaning process must fulfil two main conditions:

- The concentration of the cleaner has to be sufficient in order to achieve the required cleaning result.
- No surfactants may remain on the wafers after the last rinsing process, as these have a negative effect on the subsequent processing steps.

Without monitoring the surfactant concentration in the cleaning and rinsing processes, experience has shown that the surfactants are usually overdosed for safety reasons. They then have to be removed again with increased rinsing effort. This results in an over-concentration of surfactants in the rinses, which in turn has a negative effect on the rinsing performance.

Dynamic surface tension

By measuring the surface tension, an optimal surfactant concentration can be determined for the respective cleaning step and constantly monitored during production. The tensiometers allow tight control of the surfactant concentration within the optimum range. This leads to lower surfactant consumption and thus to a reduction in the amount of surfactant carried over into the rinsing baths.

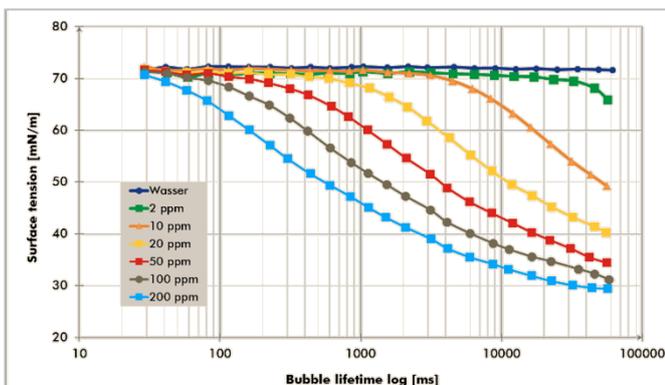


Figure 1: Dynamic surface tension for different concentrations of a cleaning surfactant

This process can also be reliably monitored by checking the residual surfactant content in the last or penultimate rinsing stage. The selection of a suitable cleaner is also

made easier by determining the dynamic surface tension with a bubble pressure tensiometer. Surfactants with higher dynamics and lower surface tension generally have a better effect.

SITA Tensiometer

The SITA DynoTester+ is used for random measurements to monitor the cleaning and rinsing baths. The mobile tensiometer easily measures the current surface tension of the respective bath to test whether the surfactant concentration corresponds to the target values. If this is not the case, the user can react accordingly.



Figure 2: SITA DynoTester+

For reliable and functionally safe process monitoring, the customised inline solution SITA clean line ST is used for automated monitoring and control tasks as well as their documentation. The surface tension of the respective bath is measured continuously and compared with the corresponding target values.