

Quantitative Analysis of Oxygen in Silicon Wafers

Background / Challenges - Surface contamination leads to the formation of an oxide film.

Background

The concentration of oxygen in silicon wafers has a significant impact on their electrical resistance. Therefore, it is crucial to control the concentration of oxygen, even in extremely small amounts, in silicon wafers. However, a challenge arises when analyzing highly doped single crystals. Due to their unique properties and high doping levels, the analysis of oxygen in these samples becomes more difficult. The presence of impurities and dopants can interfere with the accurate measurement of oxygen concentration using FT-IR spectroscopy.

Challenges

In actual samples, oxygen is present on the surface in the form of an oxide film, and the presence of this oxygen is a factor in measurement error of the amount of oxygen in the sample. To remove the oxide film, cleaning with a chemical solution is required but the sample is exposed to the atmosphere when it is measured, an oxide film is formed again after cleaning, which is difficult to remove.

Solution from HORIBA

EMGA-Pro/Expert O/N/H Analyzer

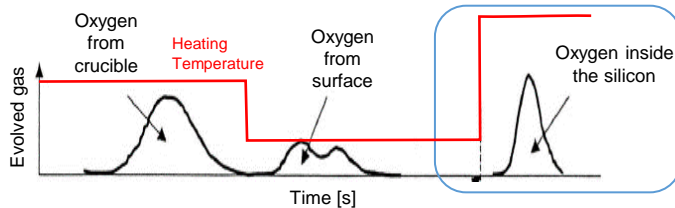
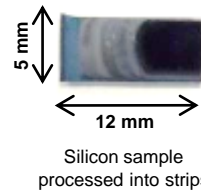


Testimonial from a wafer manufacturer

"Extremely small amount of oxygen in the wafer needed to be accurately analyzed in the order of ppm, within a few minutes."



The EMGA allows for quantitative analysis by controlling the heating temperature, and this technology can distinguish surface oxygen from internal oxygen.



	Oxygen (ppm)
1	11.91
2	11.69
3	11.58
4	11.64
5	11.26
Ave	11.62
SD (ppm)	0.23

Achieves stable analyses

"Transfer Vessel" - Optional jig for oxidizable samples

For not only silicon wafers, but also other samples that may easily react in an oxidizing atmosphere, we offer an option that allows the sample preparation in an inert gas atmosphere, and then isolates the sample from the atmosphere until it is loaded into the analyzer.



Portable holder



Inside a glove box

Inert Gas Atmosphere

3 Steps for using the Transfer Vessel (Portable Holder)

1. Insert the sample into the portable holder.
2. Set the portable holder in the sample feed section of the analyzer.
3. Operate the portable holder to feed the sample into the analyzer



[Product Website](#)



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