CR-288
Concentration Monitor
Implementations

The CR-288 concentration sensor features materials and design compatible with ultrahigh purity.

Contents

Realized Performance Data:

ST-250, EKC-265 resolution:

± 0.005% by weight

BEOL (Back-End-of-Line): ST 250 and EKC265™

Summary: CR-288 enables real-time, in-line, and highly precise monitoring of ST 250 and EKC265™* in back-end-of-line (BEOL) surface preparation applications for SEMI. It offers significant precision and lower product maintenance over near infrared (NIR) monitoring, and easily surpasses the concentration range limitations of monitoring by conductivity.

Business Need: ST 250 and EKC265 are typically mixed with water. Improving process efficiency depends on controlling the concentration of chemicals while water is consumed during processing.

Effective control of ST 250 and EKC265 concentrations:

- Increases product yield because there is less post dry etch cleaning
- Increases wafer throughput
- Reduces chemical costs and waste creation

CR-288 Benefits

CR-288 offers multiple benefits over other test methods, including near infrared (NIR) sensors and conductivity. Specifically:

- Higher resolution and shorter response time
- Monitors the entire concentration range
- Simpler to calibrate
- Lower operating cost
- Lower equipment cost
- Virtually maintenance-free: Requires no annual lamp replacement, which is common in NIR

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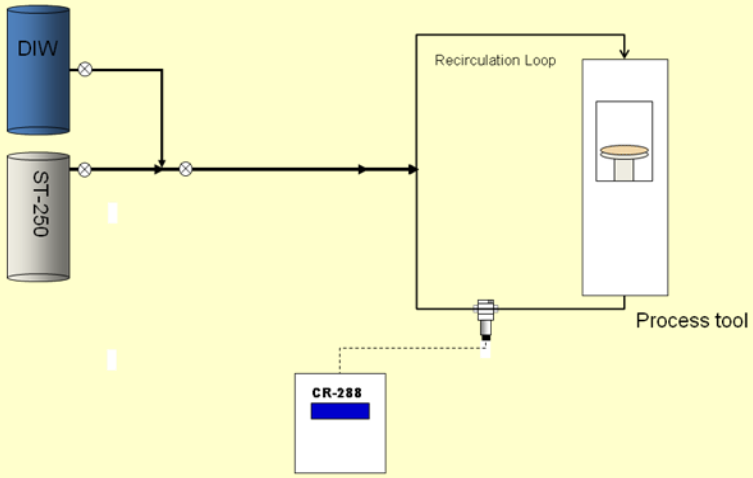
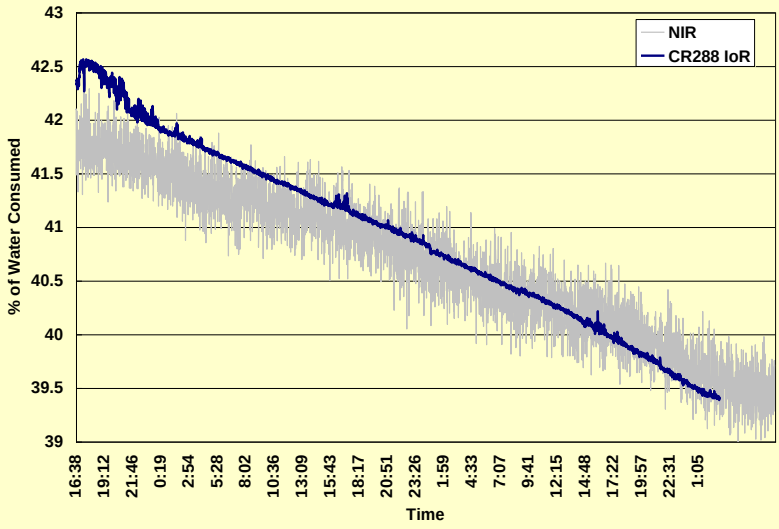
Implementation Diagram: ST-250

ST-250 and Water Concentration Continuous Monitoring



This figure shows a typical one sensor configuration monitoring concentration of di-ionized water (DIW) and ST-250 during BEOL. Concentration data can be used to control the precise addition of water as it is consumed during use.

Case Study: CR-288 Outperforms NIR



This data shows the comparison of a competitor's NIR (gray) sensor to the Jetalon CR-288 (blue). The percentage of water consumed during wafer processing is plotted as a function of time.

CR-288 has 10X better signal to noise and faster response time (1 sec as compared to >3 sec).

*EKC 265 is a trademark of the DuPont Corporation.

Case Study: CR-288 Replaces Conductivity

Conductivity cannot correctly measure EKC265 in solution because EKC265 is non-conductive.

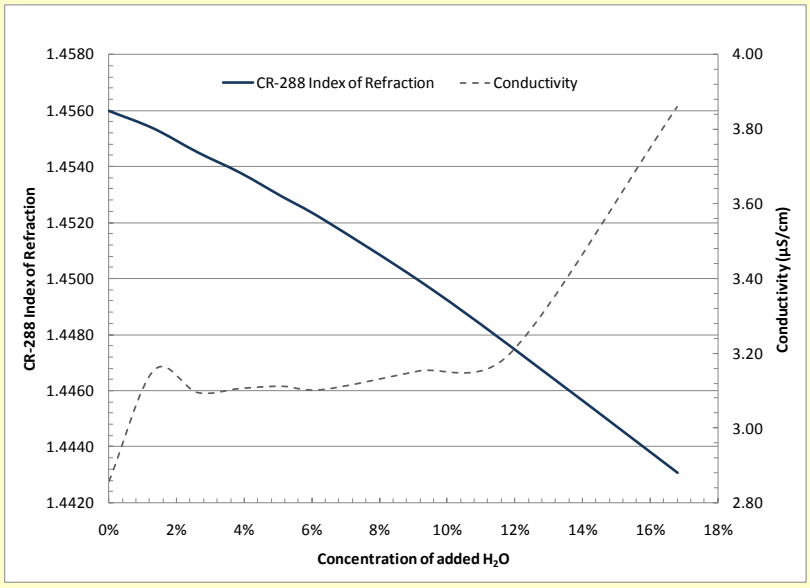
CR-288 offers continuous precision where conductivity cannot. Conductivity cannot correctly measure EKC265 in solution because EKC265 is a non-conductive chemical.

This plot compares measuring EKC265 in solution by conductivity and by CR-288 (IoR). This plot shows CR-288 IoR compared to a conductivity sensor output, both plotted as a function of time. The x-axis is percentage of water added to the EKC.

Note that CR-288 measures EKC265 correctly throughout the process.

The conductivity sensor is completely insensitive to the changes in concentration. It is only once the water concentration reaches a high enough level that the conductivity sensor can measure anything at all.

CR-288 inherently outperforms conductivity in this critical metric.



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