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New CD-Measurement SEM for Ultra-Fine Patterns

--Semiconductor Metrology System Offering High Resolution,
High Accuracy and High Throughput--

Hitachi High-Technologies Corporation (President: Masaaki Hayashi) has recently launched the CG4000, a new CD-SEM*1 for leading edge ultra-fine semiconductor devices. Innovating the existing platform of the S-9000 series, it has achieved sub-nano-level measurement precision as well as high-resolution, high-accuracy metrology repeatability and high throughput.

In the semiconductor industry, the design rule is continuously shrinking year by year. 65-nm (DRAM half pitch) level production is now a commercial reality and is moving forward to the next generation of 45-nm, and further down to 32-nm. To keep up with the development, CD-SEM is demanded to cope with those stringent requirements for the process control.

Incorporating a new sturdy platform which withstands harsh environment conditions in the production line, the CG4000 has achieved higher metrology accuracy and can realize a higher automation rate. As a result, it dramatically improves throughput and measurement stability over a long period of time.

The CG4000 also offers new advanced functions for the process applications. For example, a high-accuracy averaged CD (ACD) metrology function helps boost the repeatability and throughput. A line edge roughness (LER)*2 measurement function that has been promoted to be the industry standard contributes to the process monitoring.

Hitachi High-Technologies, as a leading role player in the metrology, is proud to offer the new CG4000 for the customer satisfaction.

Main features

1. High resolution, high-accuracy metrology repeatability
2. High-accuracy averaged CD (ACD) metrology function
3. Industry standard line edge roughness (LER) metrology function
4. Improved operability and automated maintenance function



The CG4000, CD-measurement system

***1 CD-SEM: Critical Dimension (CD)-SEM**

A scanning electron microscope (SEM) for measuring the microscopic circuit pattern on semiconductor wafers. This measuring system is used in the inspection processes of semiconductor device development and production lines and plays a vital role in process yield control.

***2 LER: Line Edge Roughness**

Refers to the variation (roughness) in resist pattern edges. Because the roughness of the gate pattern affects transistor characteristics, it is necessary to accurately measure that roughness.

Main specifications

| | |
|----------------------|--|
| Resolution | 1.8 nm (Accelerating voltage: 800 V) |
| Accelerating voltage | 300 - 1, 600 V (10V steps) (200 - 2,000 V: Option) |
| Repeatability | ±1% or 0.3 nm (3σ) max. (Sample used: Hitachi standard wafer) |
| Wafer size | 300 mm (200 mm) |

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