Connective Industries

Healthcare/Measurement & Analysis

May 28, 2026

Healthcare, Measurement Analytical Systems

1. Empowering Semiconductor Diversity with Small-Wafer Metrology SEM

With the growth in AI markets, energy consumption in data centers is increasing. To solve this issue, counter measures for energy-saving measures are crucial. This has led to growth in the market for power devices and optical communication devices manufactured using wafers with a diameter of 200 mm or less. To provide next-generation devices, manufacturing and measurement equipment able to handle various wafer sizes and new substrate materials play an important role.

To meet this demand, Hitachi High-Tech has developed the new CS5000 critical dimension metrology scanning electron microscope (SEM) in 2025. The CS5000 can handle wafer sizes from 75 mm to 200 mm, wafer thicknesses from 200 µm to 1100 µm, non-silicon materials such as GaAs, transparent wafer and insulating substrates. Hitachi High-Tech entered the semiconductor metrology market in 1984 during the 200-mm-wafer generation. Since then, it has retained its place as an industry leader, having shipped over 6,000 metrology SEM units*[1].

The CS5000 has implemented superior electron beam technology developed for cutting-edge 300-mm-wafer metrology SEMs to provide high resolution, reproducibility, stability, and significantly improved operability, thereby providing high performance and user-friendly operation.

*1. As of the end of November 2025, based on research by Hitachi High-Tech Corporation

[1] CS5000 Critical Dimension Metrology SEM for Small-diameter Wafers

2. World's First Fully Automated Mass Spectrometry for In Vitro Diagnosis - cobas i601 analyzer

Mass spectrometry in clinical laboratories provide high specificity and sensitivity testing results, such as endocrinology and Therapeutic Drug Monitoring (TDM). However, the testing process has required a large amount of manual work, from sample preparation to processing of results data. Due to its high complexity, mass spectrometry for IVD has been limited and has only been offered by specialist laboratories which require highly qualified laboratory staff.

The cobas* i601 analyzer is the first clinical analyzer in the world*[1] to fully automate the mass spectrometry process for IVD testing, encompassing its requirements for complex and specialized sample preparation and the post-processing of results data. As a single integrated analyzer that can handle the end-to-end process of sample preparation,

separation of the material for analysis, mass spectrometry measurement, and data analysis, the cobas i601 analyzer has a high processing capacity and provides a dramatic improvement in workflow efficiency. As a fully automated system, the cobas i601 analyzer enables mass spectrometry to be performed without specialist knowledge and delivers consistent results that are not dependent on the laboratory staff.

Whereas mass spectrometry was restricted in the past to specialist laboratories, the cobas i601 analyzer allows large numbers of customers to integrate mass spectrometry into routine testing, contributing to improved quality-of-life (QoL) for patients.

(Hitachi High-Tech Corporation)

* See the list of “Trademarks.”

*1. Based on research by Hitachi High-Tech Corporation

[2] cobas i601 Analyzer for In Vitro Diagnosis

3. LABOSPECT GA-5 PCR Testing System

Clinical testing laboratories at hospitals are being called on to improve the speed and efficiency of genetic testing for infectious diseases. In partnership with the Italian company ELITechGroup S.p.A., Hitachi High-Technologies Corporation has released the LABOSPECT GA-5 polymerase chain reaction (PCR) testing system, which features continuous sample and reagent loading as well as random-access capabilities. When used together with ELITech’s extensive range of reagents, the testing system can perform up to 24 tests at a time.

The main features are as follows.

(1) Fully automated PCR testing
Full automation of all steps from nucleic acid extraction after sample loading to PCR and results output ensures reliable testing quality that is not dependent on the skills of the operator.
(2) Continuous loading of samples, reagents, and consumables
The ability to prioritize urgent samples or add reagents or consumables during testing provides operational flexibility.
(3) Random access
The ability to regulate the temperature of multiple PCR wells independently means that the system can perform multiple tests simultaneously, with efficient processing of samples regardless of the order in which they were loaded.

Plans include progressively acquiring certification to manufacture and market a wider range of in-vitro diagnostic agents for PCR reagents. Hitachi also intends to pursue innovation in hospital testing workflows with a view toward future integration with digital solutions.

(Hitachi High-Technologies Corporation)

[3] Hitachi LABOSPECT GA-5 PCR Testing System

4. Hitachi High-Tech’s Approach to the Particle Therapy Business

Hitachi High-Tech is actively promoting its particle therapy business with the aim to "create a society without fear of cancer."

Hitachi High-Tech has received an order from Tokyo Metropolitan Hospital Organization for a proton therapy system to be installed at Tokyo Metropolitan Cancer and Infectious Diseases Center Komagome Hospital. The contract was signed on June 30, 2025. The new facility will feature a compact layout, including one accelerator system and two rotating gantry treatment rooms. The new proton therapy facility is scheduled to begin operations in fiscal year 2030.

In addition, the proton therapy system delivered through the University of Tsukuba Hospital Proton Therapy Facility Development and Operation Project (“the Project”) has commenced treatment at the Proton Beam Therapy Center, University of Tsukuba Hospital (“University of Tsukuba”) as of September 29, 2025. This project involves the first renewal of a proton beam therapy facility in Japan. The facility is equipped with a complete proton beam cancer treatment system including an accelerator and two rotating gantry treatment rooms, and the design, construction, operation, maintenance, and management of the proton beam facility follows the Private Finance Initiative (PFI) model. Furthermore, it serves as a model case for facility renewal within a limited site space. Hitachi High-Tech will continue to support the operation of the facility as a partner of the University of Tsukuba, a leader in cancer treatment innovation, for the next 20 years.

[4] Rendering Image of Proton Therapy Facility at Tokyo Metropolitan Cancer and Infectious Diseases Center Komagome Hospital

5. iACE mini Automated Cell Culture Equipment Accelerating Uptake of Immunotherapy

The development of cell-based therapies such as T-cell therapies that use chimeric antigen receptor (CAR) or T cell receptor (TCR) T-cells is an active area of work in the field of immunotherapy and they have demonstrated a high degree of efficacy for conditions like blood cancer or autoimmune disease. In addition to research and development on the generic structure of CAR or TCR cells, the development of technologies for ensuring reliable quality is likewise important if these therapies are to find clinical applications.

Hitachi High-Tech developed the iACE mini automated cell culture equipment to be a bridge between the research and development stage and chemistry, manufacturing and control (CMC) development. It automates the CAR-T cell manufacturing steps of cell seeding, culturing, culture medium sampling, supernatant recovery, and cell harvesting. This involves maintaining the culturing environment by manual culturing to ensure quality and automating the manufacturing process. It has been demonstrated that automatic culturing of T cells using the iACE mini delivers performance indicators that match those for manual culturing, including for T cell composition ratio, growth rate, survival rate, and purity level. By speeding up the development of new cell therapy medicinal products and promoting wider use of immunotherapy, the iACE mini is helping to create a society without fear of cancer.

(Sales commenced: October 2025)

[5] iACE mini Automated Cell Culture Equipment

6. SU9600 Ultrahigh-resolution Field Emission SEM

Rising demand for AI is creating a need for the precise and more efficient imaging of fine structures in the research and development of semiconductors and high-function materials. Accelerating the speed of development in the wafer process stage of semiconductor manufacturing is of particular importance and this requires working through a number of different processing conditions in the early stages of development to rapidly identify ones that satisfy the performance requirements. This in turn is increasing demand for precise cross-sectional measurement with high throughput and the analysis of large quantities of data.

Acknowledging these needs, Hitachi High-Technologies Corporation developed the SU9600 ultrahigh-resolution field emission SEM, which delivers a world-leading level of backscattered electron image resolution for a general-purpose scanning electron microscope (SEM) (0.4 nm when using a 30-kV acceleration voltage) and features an enhanced scanning function for higher observation efficiency. Sales of the SU9600 commenced in 2025. In addition to using Hitachi platform technologies for precise measurement and stability, the SEM also uses automation support software that Hitachi developed in-house to reduce workloads and make the task of observation more efficient. By doing so, it is supporting the research and development of next-generation semiconductors and high-function materials. It is also proving useful in academia, providing analysis functions that support a wide variety of observation needs.

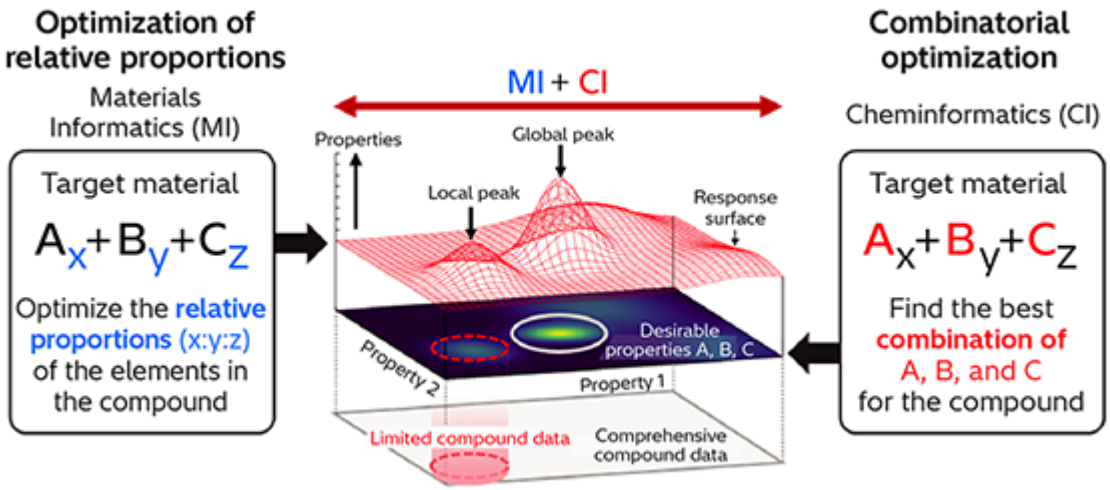
[6] SU9600 Ultrahigh-resolution Field Emission SEM

7. Use of AI for Materials Search

Hitachi has conducted a trial to assess the gains in development efficiency*1 from the use of cheminformatics (CI) and materials informatics (MI) in the development of thin metal films for electronic devices. CI and MI both make use of AI for materials search. The results indicated that use of this technology makes the work more efficient, with a reduction in development workloads of more than 80%.

MI involves the use of AI to extract information about materials (such as their composition or relative proportions) from a portfolio of past experimental data. CI, meanwhile, is available as a service exclusive to Hitachi High-Technologies that uses a proprietary database based on patents and other public data to help identify the best materials for development. The trial demonstrated that combining the MI and CI capabilities of Hitachi High-Technologies could make development work more efficient by significantly reducing literature surveys and exhaustive-search experiments based on experimental design, and that this is also true for the development of new materials for which no past experimental data has been collected. In the future, Hitachi intends to offer this process as a service to help make materials development more efficient for customers.

*1. Awarded a technical achievement award from the Society of Materials Science, Japan in May 2025. Also received a poster award from the Japan Institute of Electronics Packaging in September 2025.



[7] Combined Use of CI and MI