

Utilizing materials informatics to reduce development processes by 80%

Materiality3 Action Target1

Action Plan 1 Provide material development solutions that accelerate development speed and contribute to the development and provision of new materials

Key words

Materials informatics

AI

Drug discovery

Proposal to shorten materials development time globally through the use of materials informatics and our strengths

The manufacturing industry in particular has been using MI (materials informatics) to improve the efficiency of materials development. MI makes it possible to obtain optimal solutions in minimal time by having AI (artificial intelligence) learn the necessary information from vast amounts of experimental and materials data.

MI can thus significantly shorten the time required to search for material formulation ratios and manufacturing conditions, which was previously conducted based on intuition and experience. Furthermore, reducing the experiment performed contributes to the lowering the environmental impact such as CO₂ emissions. Hitachi High-Tech's strength lies not only in its ability to propose MI solutions, but also to link numerical and image data with analytical and measuring instruments. The Company is also adept at making global proposals that leverage the knowledge it has cultivated as a trading company of advanced materials as well as its extensive customer base.

Contributing to the early commercialization of new drugs in addition to promoting DX in global materials development

● Contributing to the improvement of Taiwan's industrial technology standards

In FY2023, Hitachi High-Tech began collaborative creation on the MACSiMUM, an AI and machine learning platform operated by Industrial Technology Research Institute (ITRI), the largest industrial technology research and development organization in Taiwan. Hitachi High-Tech will support the acceleration of DX in materials development for manufacturing companies in Taiwan, as well as the development of new technologies and the promotion of innovation, while contributing to the improvement of industrial technology standards in the country.

● CI (Chemicals Informatics)* and MI, which greatly reduce the processes required for materials development

Hitachi High-Tech conducted verification experiments in the development of metal thin film materials used in electronic devices. Hitachi High-Tech was able to demonstrate that it is possible to conduct efficient R&D work by reducing the number of development processes by more than 80% compared to conventional methods through the selection of optimal compounds using CI and search for the optimal ratio of metal elements and optimal conditions for the manufacturing process using MI.

● Accelerating drug discovery R&D and contributing to swift practical application

Since 2023, Hitachi High-Tech has been conducting joint research aimed at improving the efficiency of the development of small molecule drugs that inhibit the action of proteins that cause cancer. The Company aims to improve the development of small molecule drugs in terms of a more efficient process, faster time scales and higher success rates, which will contribute to the development and early commercialization of new drugs.

Contributing to a circular economy

As a new initiative, Hitachi High-Tech is collaborating with Hitachi, Ltd. and Sekisui Chemical Co., Ltd. to commercialize a recycled materials marketplace that will promote the use of recycled plastics and other materials derived from waste materials. The initiative is scheduled to include a matching support function that leverages MI technology. Demonstration tests have already been completed, and the partners will work to develop a system to support the promotion of the use of recycled materials toward the realization of a circular economy and a sustainable society.

*Hitachi High-Tech's original service that supports the selection of optimal compounds for development by using AI technology with public data such as patents and its proprietary database.

* Hitachi High-Tech's proprietary service that leverages AI technology to support the selection of the optimal compounds for development by utilizing public data such as patents and an original database.

