

Informatics-based materials engineering and process optimization

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1. Background

As the world moves toward a decarbonized society and circular economy, increasing attention is being placed on eco-friendly materials, smart factories, and recycling. In this context, Hitachi High-Tech has positioned its environmental business as a new core pillar, offering seamless solutions by leveraging its measurement technologies and trading company functions. In particular, the company supports growing markets by utilizing informatics to drive innovation in materials development, manufacturing, and inspection processes.

2. What is Informatics?

Informatics is a development approach that leverages information science and AI to efficiently derive optimal solutions, significantly reducing the number of experiments compared to traditional trial-and-error methods. As a result, it helps lower CO₂ emissions, raw material usage, transportation, energy consumption, and waste, contributing to both environmental impact reduction and shorter development timelines. This enables the earlier market launch of eco-friendly materials, making informatics a key method for driving innovation in materials development.

3. Effect of Informatics performances and their Examples

Informatics offers numerous benefits, including the following:

I. For challenges requiring time and cost reduction, complex condition settings such as forward and inverse analysis can significantly reduce the number of experiments and associated costs while improving product quality.

II. For issues where quality assessment based on images depends heavily on individual judgment, informatics supports image analysis, enabling high-precision automated inspection systems that enhance development efficiency and stabilize evaluation skills.