Innovation

Driving R&D to Open Up New Future Potential

Becoming a genuinely development-driven company

We are strengthening R&D in our quest to become a genuinely development-driven company. Innovative R&D plays an important role in reinforcing our competitiveness at the global level. Accordingly, in April 2017, we established our Corporate Research Lab, the Global Research & Innovative Technology center (GRIT), to spearhead medium- to long-term R&D topics focusing on advanced materials. In these and other ways, we have been working hard to enhance our R&D system with a view toward the next generation. By emphasizing innovative R&D and new business creation, we will expand organic growth to deliver sustained growth and contribute to society.

Carrying out new business creation from medium- to long-term perspectives

Creating new businesses is a key prerequisite to achieving improved profitability and steady business expansion at the global level. Due to advancements in chemistry and technologies, moreover, materials handled by Hitachi Metals are constantly threatened by the sudden appearance of alternative materials. For example, in the automotive sector, where weight reduction is a major priority, various materials may emerge to replace conventional cast iron, such as aluminum-based composite materials and carbon nanotube-reinforced aluminum alloys.

For new business creation, therefore, we examined the various threats and opportunities in each business field and identified medium- to long-term R&D themes, envisaging the next 10 to 20 years. We have set 15 specific topics—including metal materials, additive manufacturing, composite materials, new magnets, composite materials and multiple materials, aluminum conductors and compound conductors—and we will expedite innovation in the fields of automobiles, railways, aircraft, and energy. From fiscal 2016 through fiscal 2018, we plan to invest ¥12 billion in R&D aimed at new business creation.

Medium- to long-term R&D topics concentrated on threats and opportunities (examples)

Company	Current products	Development theme (based on perceived threats)
Metal Materials	Mold materials	Additive manufacturing
	Aircraft- and energy-related materials (ultra heat-resistant steel)	Composite materials
Magnetic Materials	Neodymium magnets	New magnets
Functional Components	Cast iron (NM)	Composite materials and multiple materials
Cable Materials	Copper wire	Aluminum conductors and compound conductors

Targeting innovation through a revolutionary research system

Under our current system, in which each internal company has its own research laboratory, we have consistently created products with distinctive characteristics unique to Hitachi Metals that meet the needs of customers. To realize new, high-performance materials with future potential, however, it is important to conduct cross-organizational R&D that transcends internal company lines.

In addition to leading-edge research sourced from perceived threats and opportunities, our new GRIT, established in April 2017, will actively spearhead cross-organizational R&D that goes well beyond internal company boundaries. It will also expedite open innovation through close collaboration with external institutions, such as Hitachi, Ltd. and universities. Moreover, we are positioning GRIT to fulfill an important mission as a place to foster research personnel. For this reason, we will accelerate exchanges with exceptional engineers around the world in an open environment to create innovations never seen before.

TOPICS

Open innovation initiatives

Establishing NIMS–Hitachi Metals Next-Generation Materials Development Center

In July 2016, we established NIMS–Hitachi Metals Next-Generation Materials Development Center in collaboration with the National Institute for Materials Science (NIMS), and started research into practical applications for next-generation ultra heat-resistant alloys. Using this research to develop metal materials for aircraft engines and gas turbines will help reduce CO_2 emissions and conserve resources.

Signing ceremony

Participation in IBM research consortium

Hitachi Metals participates as a founding member in the IBM Research Frontiers Institute, a research consortium established by IBM Corporation in 2016. The institute promotes research into materials development methods using neuromorphic computing*1 and other cognitive technologies*2, as well as MI*3, and is targeting dramatic progress in advanced materials research and development.

*1 Neuromorphic computing: The use of computers to process signals in a way similar to that of the cranial nerve.

*2 Cognitive technology: Technology that extracts and analyzes relevant information from huge amounts of data, learning from such information and past experiences to support human decision-making and actions.

*3 MI (materials informatics): Scientific method for solving various problems concerning matter and materials science by utilizing a vast and diverse amount of data related to computer science and the physical and chemical properties of matter and materials.

Patent Office Commissioner Prize received

Hitachi Metals received a Patent Office Commissioner Prize of the FY2016 National Invention Awards, hosted by the Japan Institute of Invention and Innovation, for its invention of a method for manufacturing maraging steel. Maraging steel is a type of steel with both high strength and high toughness. Hitachi Metals developed a technology for controlling to an extremely fine degree the inclusions generated in the steel ingot melting process, leading to dramatic improvement in maraging steel's fatigue strength.

CVT belt materials

Award ceremony

Tackling disruptive innovation with open environments and free-thinking research

Kenichi Inoue
Head of Global Research & Innovative Technology center, Technology, Research & Development Division; General Manager of Strategic Innovation Department

After in-house brainstorming, we decided on the name "Global Research & Innovative Technology center (GRIT)" for our new Corporate Research Lab. In English, "grit" means "fighting spirit and enthusiasm that prevail against all odds, the power to persevere," which embodies the philosophy of the new laboratory.

One attribute that greatly differentiates Hitachi Metals from other companies is the diversity of the materials it handles, resulting from its proactive development of materials other than metals. The medium- to long-term R&D topics for new business creation that we have launched are unlike those of other companies, and we will promote them without excluding any possibility.

Commitment is the key part of R&D. Simple images that anybody can conceive of and develop will inevitably be created by somebody. The goal of our R&D efforts is to provide impressive benefits to people, society, and the environment. Human beings are greatly interested in, and concerned about, what they can easily visualize 10 and 20 years down the road, which is where the real seeds of innovation lie. I am aware that my mission as head of the center is to create an environment and provide motivation for uncovering these seeded ideas. I also believe in the importance of integrating the technologies of our internal companies. In addition to cross-organizationally mixing the technologies of all companies, we will actively incorporate MI and AI* techniques to innovate our process technologies.

Other important missions of GRIT are the exchange of researchers and personnel development. In the new facility, we will emphasize a collaborative environment, including bringing together the Advanced Materials Development Department and the Process & Machine Development Department, while encouraging the growth of researchers through exchanges in open forums. Moreover, we plan to expand overseas operations in the next five years. In addition to quickly catching up with global trends, we hope to deepen exchanges and collaborations with overseas researchers who have different ideas and approaches.

*AI: artificial intelligence

Profile

Joined Hitachi Metals in 1993 and assigned to the Metallurgical Research Laboratory. Involved in the development of surface treatment (coating) technologies, which attracted attention of mold manufacturers and automakers. Launched the full-scale surface modification business in 2005 with the establishment of the Surface Modification Center (current name: Solution and Engineering Center in the Specialty Steel Company, Yasugi Works). Appointed General Manager of Technology at High-Grade Metals Company (current name: Specialty Steel Company) in 2016. Assigned to lead GRIT in 2017.