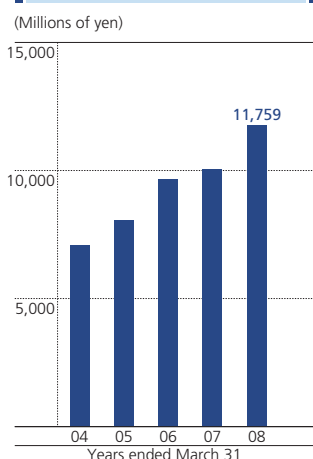


Research and Development Activities

R&D expenditures



The Nippon Mining Holdings Group deals with natural resources, materials and energy. Reflecting this, the Company Group's vision for its technology and development is to contribute to the sustainability of the earth's resources, energy and materials and to the sustainable growth of the Company Group through increased competitiveness. Each company in the Company Group is striving to strengthen its technological and development capabilities to achieve this vision.

In order for the Company Group to continue to grow in an environment characterized by increasingly fierce competition and to develop innovative technology, we must strengthen and enhance technology of each company in the Company Group and development foundations. In addition to aggressively pushing forward the technological development capabilities of individual companies, we must also actively maintain a Groupwide foundation for technological R&D.

Moreover, we must not only pursue developments in the fields where we are already active but also strengthen our technological and business development capabilities to open up areas that will enable us to achieve sustainable growth and development in the future. This includes fields with close links to and offering substantial synergies with our current operations, such as distributed energy, environmental conservation and recycling, and automotive related.

Petroleum Business

The Japan Energy Group's major areas of business are energy and the environment, and the Company Group is conducting R&D and developing new business opportunities in the fields of petroleum refining technology and petroleum and petrochemical products.

In the area of petroleum refining technology, the Company Group is carrying out R&D to rationalize and increase efficiency and innovation in the refining process, innovate in-facility maintenance and monitoring technologies and heighten efficiency in production processes for petrochemical base materials and lubricants.

In the area of product development, the Company Group is conducting R&D for quality design and production technology for fuels with a low impact on the environment. This includes research into ethyl tertiary-butyl ether as a bioethanol gasoline additive. Elsewhere, the Mizushima Refinery is testing technology to reprocess cracked oil from waste plastic.

The Company Group is also creating new business opportunities through its R&D into clean energy, such as fuel cells and hydrogen energy, and into environment-related technologies. It is participating in the Japanese government-sponsored testing of stationary fuel cells toward the commercialization of home-use fuel cell systems modified for use with liquified petroleum gas (LPG). It is also pushing forward with R&D for the development and commercialization of fuel cell technology. Furthermore, from July 2007, at Funabashi City in Chiba Prefecture, it began management of a portable hydrogen station for fuel cell vehicles.

For fuel cell systems modified for use with kerosene, the Company Group is developing a new method of desulfurizing kerosene through a low-temperature system, a reforming catalyst and a high-efficiency reformer to manufacture hydrogen from kerosene. Moreover, it is developing technology to store, transport and supply hydrogen using organic hydride and membrane separation technology for hydrogen enrichment and is conducting research into methods of utilizing a dispersant for oil spills and a biosurfactant-based technology with oil-cleansing properties for cleaning oil-contaminated soil. This technology uses a surface active agent derived from microorganisms and is therefore highly biodegradable and environmentally friendly.

The Company Group is working to increase revenues in its development businesses that are now entering their growth phase, such as cell culture related products.



Research and Development Activities

Metals Business

The Nippon Mining & Metals Group is realizing its corporate philosophy—"Innovation in the productivity of resources and materials"—through our broad range of technical development activities encompassing mining to electronic materials, in order to contribute to the efficient utilization of natural resources, and help lower the environmental burden, including the prevention of global warming.

In our resource development and copper smelting and refining businesses, the Company Group are progressing research toward the practical application of our hydro-metallurgical refining process, based on our original method, the Nikko Chloride Process. Further, BioSigma S.A., a joint venture company established with the Chilean national copper company, Codelco, is continuing its research into biomining using microorganisms. It is coordinating its R&D with Technology Development Group of Nippon Mining & Metals on practical application of biotechnology to mining. In addition, they are collaborating on developing bioleaching technology for heap and dump leaching of low-grade primary sulphide copper ores.

In January 2008, BioSigma S.A. signed an agreement for joint research with the Institute for Advanced Biosciences at Keio University to strengthen and expand the scope of its biotechnology R&D, for early practical use of the technology.

In our environment and recycling services business, the Company Group is conducting R&D into various areas, including the recovery of valuable resources from recycled materials, such as waste office appliances, and the recovery of valuable metals other than copper and platinum metals from the copper smelting and refining process.

Founded on our purification and metal structure and orientation control technologies, our electronic materials business is pushing forward with developments for highly functional surface treatment agents for use in top-end applications, rolled copper alloy foil which is used as wiring materials on printed wiring boards, and electro-deposited copper foil applied on fine pitch printed circuit boards.

The Company Group is working to develop products and technologies indispensable to the next-generation electronic devices. Our R&D activities include developments of various sputtering targets for the next-generation semiconductors and for perpendicular magnetic recording media realizing high recording density. Also, our expertise on single crystal technology helps us develop compound semiconductor materials.

Furthermore, using microstructure control technology, rolling process technology that we have uniquely developed and evaluation technologies tailored to each customer needs, the Company Group is continuing to develop highly functional copper alloys with high mechanical strength, excellent bend-formability and high electrical conductivity.

