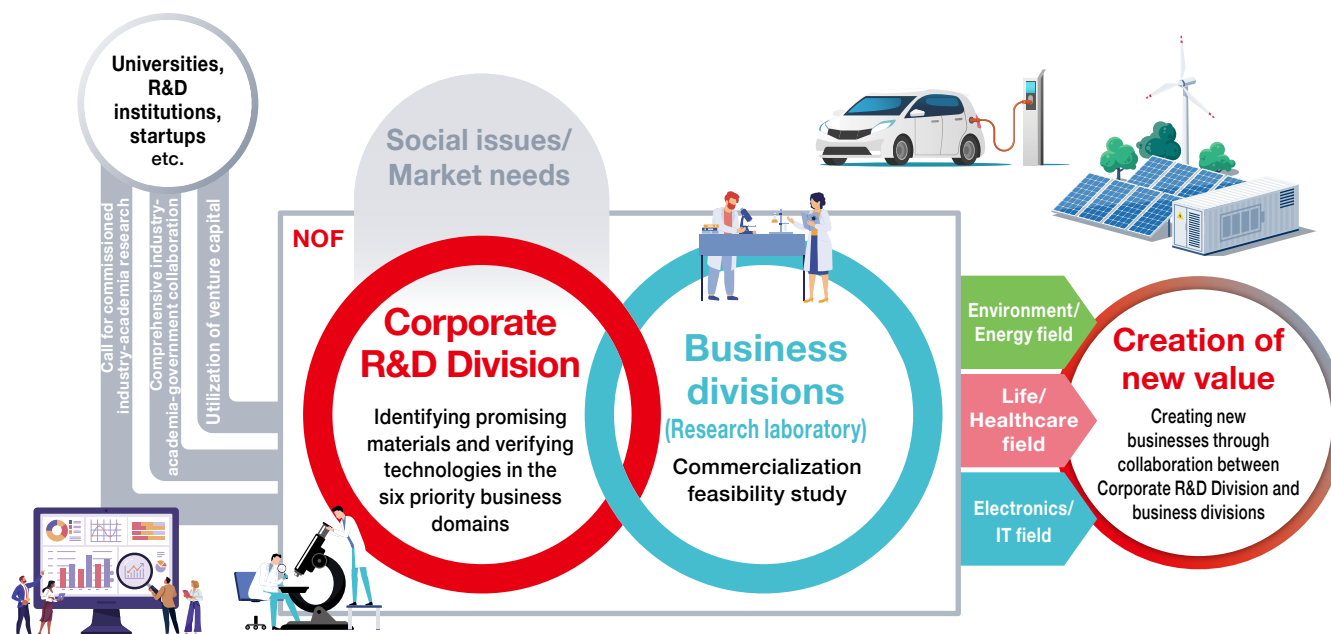


Research and Development to Create New Value

Accelerating R&D toward the business domain expansion stage

To achieve the 2028 Mid-term Management Plan's "business domain expansion" stage, the NOF Group is promoting open innovation through external co-creation, such as open calls for industry-academia commissioned research and comprehensive industry-academia-government collaboration.

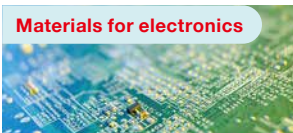


Under "NOF VISION 2030," the NOF Group set a goal of "accelerating the development of new products and technologies through strategic investment toward the three prioritized business fields." To achieve this, we have selected six priority business domains based on our basic strategy of creating new businesses in growth market by introducing new technologies with market advantages, with a focus on co-creation with startup companies and comprehensive industry-academia

collaboration. The Corporate R&D Division captures social issues and market needs, and promotes R&D centered on these six domains through industry-academia-government collaboration and co-creation with venture capital firms (VCs). At the stage of considering practical application, we also collaborate with the Divisions to create new businesses aimed at the three prioritized business fields.

In April 2024, the Company jointly established the

Six fields in priority business domains

Pharmaceutical materials  We will advance further R&D with the DDS materials that are our strength, to contribute to advanced medical treatments such as gene therapy.	Materials for medical care and medical devices  We aim to commercialize chemical materials for entry into this field, in response to the growing needs for regenerative medicine.
Functional chemical materials  We will promote initiatives for a sustainable society, including the production of raw materials for chemicals made from biomass.	Functional food materials  We are studying and developing health food ingredients intended to provide benefits related to beauty, lifestyle-related diseases, immune function, and brain function.
Materials for electronics  We are working together as a team toward the commercialization of new materials for fields such as semiconductors and next-generation communications.	Materials for automobiles  We are developing materials that contribute to further performance improvements in rechargeable batteries for electric vehicles (EVs).

NOF-AIST Smart Green Chemicals Collaborative Research Laboratory, with the AIST Group (National Institute of Advanced Industrial Science and Technology and AIST Solutions Co.). We are developing environmentally conscious chemicals and manufacturing processes by integrating the NOF Group's proprietary technologies with the catalyst technologies and bio-manufacturing technologies of the AIST Group.

Research and Development to Create New Value

Co-Creation with External Partners: Implementation of the “Industry-Academia Commissioned Research Open Innovation Program 2025”

We are actively promoting open innovation activities in line with our vision of co-creating new value through the power of chemistry.



Electronics/IT field

Selecting three technologies from five topics in the electronics/IT field

The “Industry-Academia Commissioned Research Open Innovation Program” is a project aimed at jointly developing and commercializing new technologies and products with organizations and other entities selected through an external open call to collaborate with NOF. In FY2025, proposals were solicited for themes related to the “electronics field.”

With the support of ABeam Consulting Ltd., we implemented this project for five research topics— (1) Thermal control, (2) Solar cells, (3) Displays, (4) Semiconductors, and (5) Rechargeable batteries — which are expected to undergo future market growth and have the potential for utilization of NOF technologies, and received many applications from domestic and international universities, research institutions, and startups.

As a result of careful screening from perspectives such as the potential for commercialization at NOF, technological superiority, and contribution to social issues, we selected technologies from Utsunomiya University, Institute of Science Tokyo, and National Institute for Materials Science. We will provide research funding to the selected applicants, pursue research toward social contribution over a period of one year, and aim for future business creation.



Selected applicants (in Japanese syllabary order)



Medical care and medical devices

Cell cryopreservation solution contributing to regenerative medicine and cancer treatment research

Demand for preservation methods that do not lead to cell damage

Against the backdrop of an aging population and an increase in chronic diseases, the needs for regenerative medicine are expected to continue expanding in the future. With regenerative medicine, “cryopreservation” technology for the stable preservation of cells is essential in processes ranging from cell collection to culture and tissue regeneration. The global market for cell cryopreservation agents is projected to grow at a compound annual growth rate of 8.6%* from 2025 to 2033. Culture methods include suspension cultures, 2D cell cultures, and 3D cell cultures; NOF focuses on preservation solutions for “2D cell cultures” suitable for cancer cell lines and for “3D cell cultures,” which is closer to the in-vivo environment. While a high market growth is expected for 3D cell cultures, it is difficult to freeze and thaw



* Source: Grand View Research report “Cell Freezing Media Market”.

cells without damaging them, and this requires advanced preservation technology that does not impair function.

Confirmed effects even in iPS-derived cardiomyocytes

In various tests of 2D cell cultures, conventional cell cryopreservation involved freezing cells in suspension, which presented problems such as the effort required to seed and proliferate cells on culture plates for each experiment, and variability in cell conditions. Our developed product, the cell cryopreservation solution “POCEROY® CR2 series,” enables cryopreservation in a state where cells are adhered to the culture plate. This not only significantly improves cell viability but also reduces the required man-hours and enables mass preservation. Given that they can be frozen on the culture substrate, the required number of plates can be thawed and used. Excellent preservation effects were verified with this preservation solution for established cell lines, mesenchymal stromal cells, iPS cell-derived cardiomyocytes, and others. We also developed the “POCEROY® CR3 series” for 3D cell cultures. In application experiments on iPS cell-derived cardiac spheroids, we verified that beating was maintained after freeze-thawing.

Focusing on talent development to create the future NOF Group

I believe that the role of the Corporate R&D Division is not only to solve current customer issues, but also to look ahead to the future of the entire NOF Group and determine the direction of management from a technological perspective. To fulfill that role, it is essential that each and every person in the Corporate R&D Division possesses the spontaneity to think for themselves and act proactively. Going forward, we will focus on internal education that maximizes individual growth. We want our employees to become people who go beyond passive learning, demonstrate leadership, and engage in continuous self-development. To create a future NOF Group that continues to grow together with society, we will continue to take on the challenge of creating new value, armed with the high-level expertise of individual researchers and the collective strength of the organization that brings them together.

Eui-Chul Kang

Director and
Executive Operating Officer
General Manager of
Corporate R&D Division,
Doctor of Engineering

