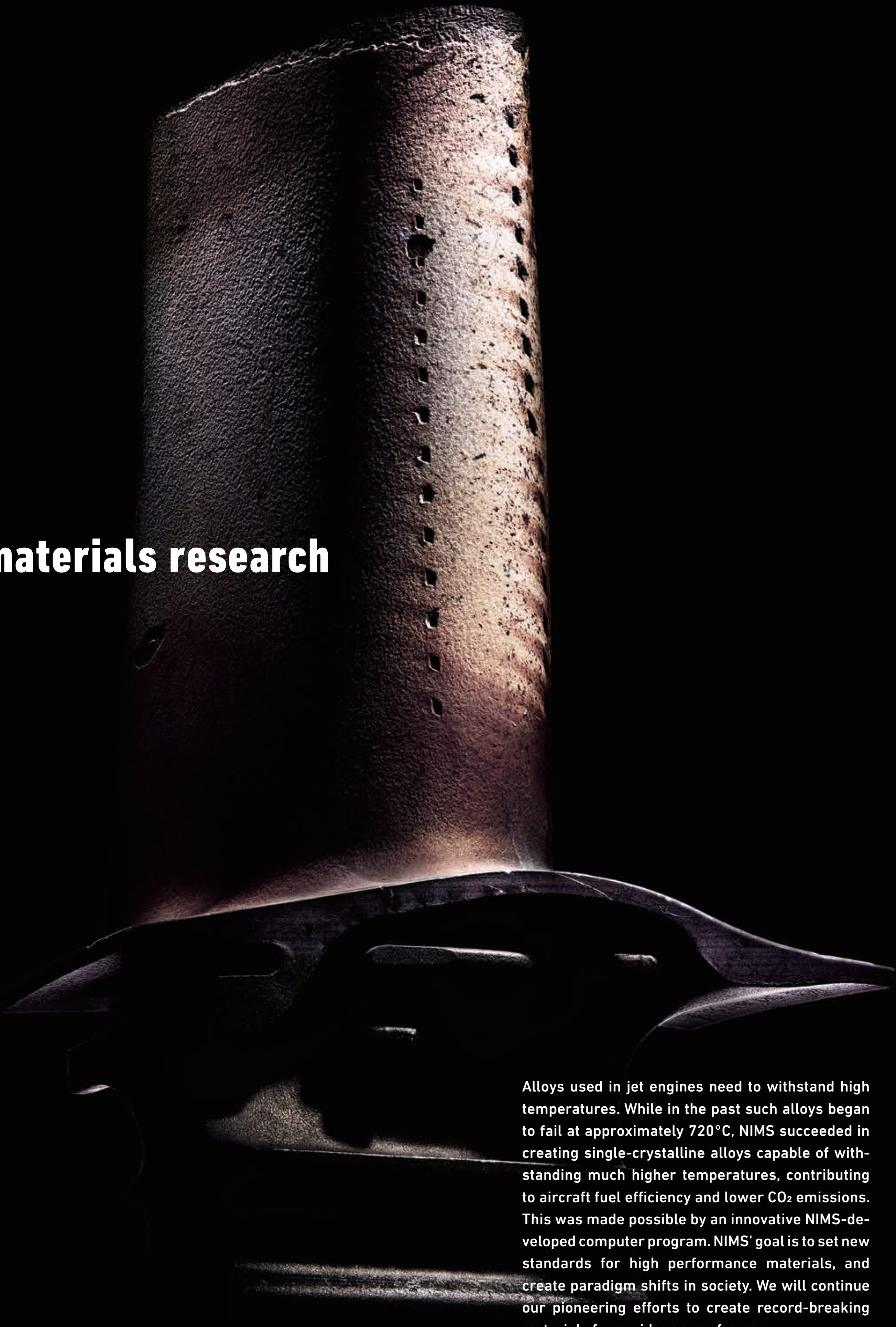
NIMS

National Institute
for Materials Science

Fostering paradigm shifts

through materials research



Alloys used in jet engines need to withstand high temperatures. While in the past such alloys began to fail at approximately 720°C, NIMS succeeded in creating single-crystalline alloys capable of withstanding much higher temperatures, contributing to aircraft fuel efficiency and lower CO_2 emissions. This was made possible by an innovative NIMS-developed computer program. NIMS' goal is to set new standards for high performance materials, and create paradigm shifts in society. We will continue our pioneering efforts to create record-breaking materials for a wide range of purposes.

01

NIMS in Figures

Statistics show excellence

Ranked 1st

Most influential in Japan

Greatly outperforming other organizations in number of research paper citations

The number of citations is a clear indicator of a research organization's influence in its field. Recent surveys show that NIMS-authored papers have been cited more than those of any other Japanese materials science organization. NIMS has also risen to third in the chemistry and physics categories.

Japan's top 10 materials science organizations in terms of research paper citations

Ranking	Organization	No. of citations	Proportion of citations
1st	**NIMS**	**157**	**2.4%**
2nd	The University of Tokyo	76	1.5%
3rd	Tohoku University	53	0.8%
4th	National Institute of Advanced Industrial Science and Technology (AIST)	51	1.3%
5th	Kyoto University	38	1.0%
6th	RIKEN	32	2.8%
6th	Kyushu University	32	0.9%
8th	Waseda University	27	2.6%
9th	Tokyo Institute of Technology	20	0.6%
10th	Hokkaido University	19	0.8%

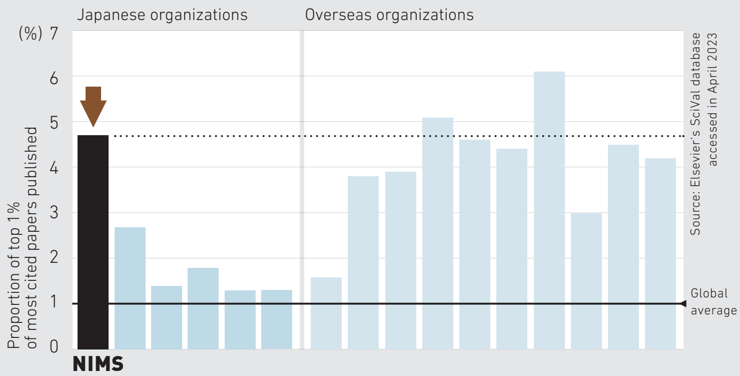
Source: 2023 Japanese research institution rankings by number of high impact papers, Clarivate Analytics Japan Ltd.

Proportion of top 1% most cited papers

Comparable to the world's top research institutions

Research papers published by NIMS have had significant influence both domestically and globally, accounting for 4.5% of the top 1% of cited papers published worldwide. This percentage is comparable to those achieved by the world's most prestigious universities, indicating the high standard of NIMS papers.

Proportion of the top 1% of most cited papers published by various research organizations around the world (average between 2016 and 2022)



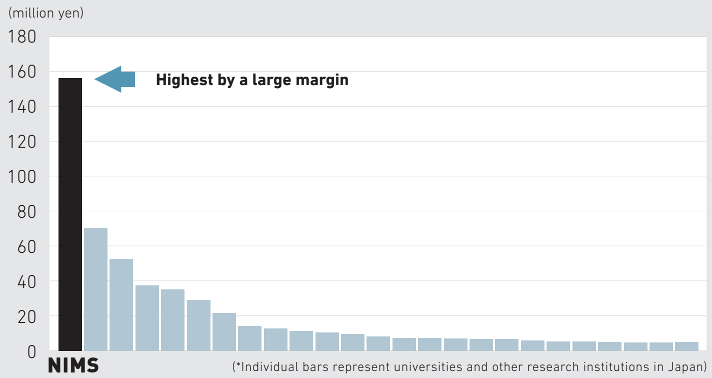
Ranked  st

By far the highest patent revenue in Japan

Generates the highest patent revenue per 100 researchers in Japan

NIMS has patented numerous innovative materials, such as sialon phosphors for white LEDs (see p.11) and high-heat-resistance alloys for aircraft engines, resulting in practical applications. NIMS has generated by far the largest amount of patent revenue per 100 researchers among Japanese research organizations.

Patent revenue per 100 researchers by research organization in FY2021



Source: FY2021 university technology transfer survey, University Network for Innovation and Technology Transfer (UNITT)

Foreign nationals account for **35** % of NIMS researchers

NIMS partners with **33** overseas universities

Attracting researchers from around the world

NIMS offers intercultural educational opportunities to students

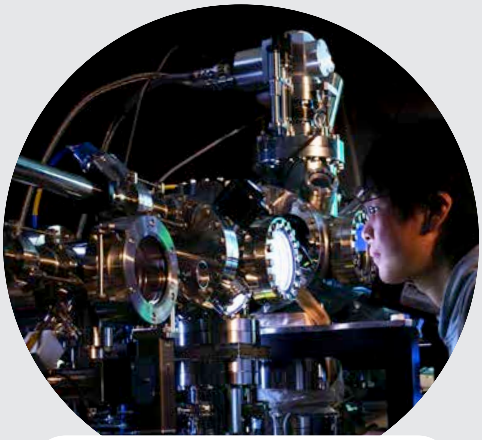
NIMS attracts global materials researchers with its unique environment. Over 30% of its researchers are foreign nationals. Many university students from Japan and other countries join NIMS by way of Joint Graduate School Program or International Cooperative Graduate Program to carry out their own research projects.

Overseas NIMS partner universities (as of June 2023)

- Norwegian University of Science and Technology
- University of Twente
- University of Caen Normandy
- University of Rennes
- Charles University
- Université Grenoble Alpes
- Technische Universität Darmstadt
- Warsaw University of Technology
- University of Pardubice
- Moscow State University
- Budapest University of Technology and Economics
- Indian Institute of Technology Guwahati
- Indian Institute of Technology Varanasi
- Indian Institute of Technology Hyderabad
- Indian Institute of Technology Madras
- Anna University
- Chulalongkorn University
- Universiti Kebangsaan Malaysia
- Universiti Teknologi Malaysia
- Institut Teknologi Bandung
- Seoul National University
- Korea University
- National Taiwan University
- National Tsing Hua University
- National Cheng Kung University
- National Yang Ming Chiao Tung University
- The University of the Philippines
- Institute of Materials Science (VAST)
- Flinders University
- University of Waterloo
- Northwestern University
- The University of Tennessee
- Georgia Institute of Technology

State-of-the-art research equipment enables in-depth investigation

Materials research is supported by experimental equipment with excellent performance.
NIMS has a wide array of leading-edge equipment—including some very rare, valuable instruments—enabling it to offer one of the best materials research environments in the world.



Three-dimensional atom probe

External use, including collaborative research, over the last 10 years:

More than
100 cases

Number of research articles in which the system was used to analyze materials:

309 articles

These articles were cited more than 15,000 times.

30,000-ton press

Number of coauthored article published with samples prepared by the press between FY2010 and FY 2023:

More than
2,000 articles

Number of material samples prepared per year using the press (average between FY2018 and FY2022):

More than
100 samples

NIMS' specialty equipment

Magnetic refrigeration system for hydrogen liquefaction

This system cools and liquefies hydrogen by moving magnetic materials in and out of the magnetic field produced by a superconducting magnet. Highly efficient hydrogen liquefaction is achieved by using a mechanism that provides a magnetic field change with little heat generation.

Electrochemistry smart lab

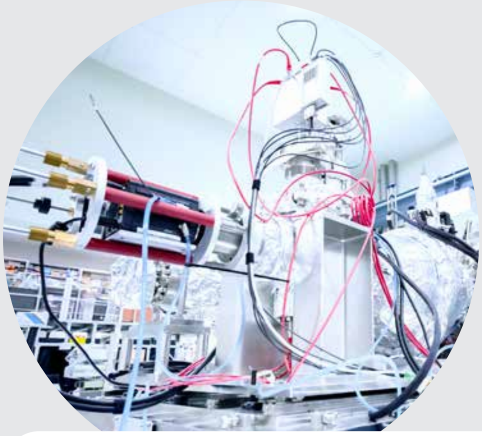
This lab is equipped with automated high-throughput robotic technologies that prepare and evaluate electrolytes 100 times faster than human technicians, giving it the ability to generate large amounts of data.

Cluster deposition system to form magnetic heterostructures

This system combines several different film deposition technologies to automatically and quickly fabricate high-quality magnetic tunnel junction devices for use in hard disk drive magnetic heads, magnetoresistive memory and other technologies.

Battery research platform analysis suite

These instruments include a leading-edge electron microscope vital to next-generation rechargeable battery R&D, photoemission spectroscopes capable of hard x-ray and near ambient pressure measurements and a high-performance x-ray absorption spectroscope.



Spin-resolved photoemission microscopy

The measurement speed compare to the conventional ones:

10,000
times faster

The number of organizations in Japan that have the same level of performance as these spectrometers.

2 **organizations**

Aberration-corrected transmission electron microscope

This microscope has the spatial resolution to allow observation of atomic-level structures, enabling analysis of chemical elements and chemical bonding states and assessment of samples' physical properties through direct visual observation of the magnetic domain and other structures.

Fully-equipped NIMS Open Facility

Various cutting-edge equipment such as 1500t forging simulator and advanced electron microscopes is available in NIMS.

Contact us
if you want to:

- use cutting-edge equipment
- know how to use NIMS facilities
- consult with experts on research equipment

From manufacturing to state-of-the-art electron microscopy. NIMS provides a range of helpful research support.

https://www.nims-open-facility.jp

A

C

B

D

COLUMN

NIMS research changes the world

The electrical products, machines and civil infrastructure vital to our lives
—such as lighting devices, roads, bridges, buildings and cars—
are all composed of materials.
NIMS researchers have produced a number of world-changing and now-ubiquitous materials as Japan's national materials research specialists.

Sialon phosphors: a revolutionary lighting technology

A

Light-emitting diodes (LEDs) are very energy-efficient lighting devices. Early white LED bulbs were able to generate white light when their blue LED chips were coated with a yellow phosphor. However, their blue-tinged white light made them unpopular for use in lighting fixtures. A red phosphor was needed to generate natural white light, but it had yet to be invented. NIMS tackled this issue and succeeded in developing a red sialon phosphor, enabling LEDs to emit natural white light. Today, these white LEDs are commonly used in lighting fixtures around the world. Sialon phosphors are also used in liquid crystal displays, enabling them to generate vivid images. The sialon phosphors NIMS developed have revolutionized lighting technologies and become a global standard.

B

FMS alloy seismic damper: protecting high-rise buildings from major earthquakes

When the Great East Japan Earthquake occurred, long-period ground motion was widely reported by media outlets as far from the epicenter as Osaka, causing skyscrapers to sway for long periods of time. To prevent this, many new buildings are equipped with metallic seismic dampers. However, once a building experiences a massive earthquake, the performance of its dampers degrades, requiring them to be replaced through extensive civil engineering work. NIMS has developed a durable alloy highly resistant to the fatigue caused by repeated deformation. This alloy has a unique external stress absorption mechanism, giving it a fatigue durability 10 times that of conventional damper materials. Because of these advantages, the alloy has been integrated into seismic dampers which require no maintenance or replacement. This is an example of NIMS' efforts to protect buildings from major earthquakes.

HAMR media: ultrahigh-density recording technology vital to an advanced information society

C

Data centers around the world store huge amounts of digital information primarily using hard disk drives (HDDs). According to one estimate, these data centers will account for 10% of total global power consumption within a decade. More energy-efficient, higher-density data storage technologies are therefore needed. NIMS succeeded in developing the world's first HAMR (heat-assisted magnetic recording) media—an ultrahigh-density recording technology—using a new FePt material. HAMR HDDs are already in practical use, supporting our advanced information society.

Bismuth-based superconductor: a potential key to significantly more efficient power transmission

D

The 1988 discovery of a bismuth-based superconducting material by the National Research Institute for Metals (a predecessor of NIMS) surprised the global scientific community. The electrical resistance of superconducting materials abruptly drops to zero when they are cooled to their critical temperatures. In 1986, scientists in Switzerland jointly discovered a material capable of superconductivity at 35 K (-238°C)—a temperature significantly higher than previously known critical temperatures. They won the Nobel Prize in Physics for this discovery. Although a number of different high-temperature superconductors have since been discovered, the bismuth-based superconductor NIMS developed is different in chemical composition and has a very high critical temperature of over 100 K (-173°C), suggesting that superconductivity could occur at temperatures higher than previously assumed. This bismuth-based superconducting material may enable the development of resistance-free power transmission cables and very powerful electromagnets. Testing is underway to put it into practical use.

02

NIMS in Research

Managing seven research centers and three platforms

NIMS research centers

NIMS works continuously to optimize its organizational structure and more effectively generate R&D results that meet social needs.

Organization Chart

President

- Advisory Board
- Auditor

- Executive Vice President
- Fellow / Distinguished Fellow / Fellow Emeritus
- Senior Vice President
- Executive Advisor to the President
- Special Assistant to the President

- Auditor Office
- Management and Planning Office
- Audit Office
- Compliance Office
- Cross-ministerial Strategic Innovation Promotion Program Office



- **Research Center for Energy and Environmental Materials (GREEN)**
  - Battery and Cell Materials Field
  - Hydrogen Technology Materials Field
  - **Battery Research Platform** ◎
  - Center for Advanced Battery Collaboration
  - Administrative Office
- **Research Center for Electronic and Optical Materials**
  - Functional Materials Field
  - Optical Materials Field
  - Administrative Office
- **Research Center for Magnetic and Spintronic Materials**
  - Magnetic Functional Device Group
  - Magnetic Recording Materials Group
  - Spintronics Group
  - Spin Physics Group
  - Spin Caloritronics Group
  - Nanostructure Analysis Group
  - Spin Theory Group
  - Green Magnetic Materials Group
  - Digital Transformation Initiative Center for Magnetic Materials
  - Administrative Office
- **Research Center for Structural Materials**
  - Materials Manufacturing Field
  - Materials Evaluation Field
  - Administrative Office
- **Research Center for Materials Nanoarchitectonics (MANA)**
  - Quantum Materials Field
  - Nanomaterials Field
  - Administrative Office
- **Research Center for Macromolecules and Biomaterials**
  - Biomaterials Field
  - Macromolecules Field
  - Administrative Office
- **Center for Basic Research on Materials**
  - Advanced Materials Characterization Field
  - Data-driven Materials Research Field
  - Administrative Office
- **International Center for Young Scientists**

- **Research Network and Facility Services Division**
  - **Materials Fabrication and Analysis Platform** ◎
  - **Materials Data Platform** ◎
  - Central Hub of Advanced Research Infrastructure for Materials and Nanotechnology
  - Data Transformation Initiative Subcommittee Administrative Office
  - Administrative Office
- External Collaboration Division
  - Intellectual Property Office
  - Industrial Collaboration Office
  - Startup Support Office
- Division of International Collaborations and Public Relations
  - Academic Collaboration Office
  - Public Relations Office
  - International Support Office
- Human Resources Division
  - Human Resources Development Office
  - Personnel Office
- Administration and Safety Management Division
  - General Affairs Office
  - Facilities Planning and Management Office
  - Safety Management Office
- Finance Division
  - Accounting Office
  - Procurement Office
  - Competitive Funds Administration Office
- Information Infrastructure Management Division
  - ICT Promotion and Infrastructure Office
  - Information Security Office

※ ● : Research centers and divisions
◎ : Platforms

Solving social problems through research and development

Finding potentially groundbreaking technologies and bringing them into practical use

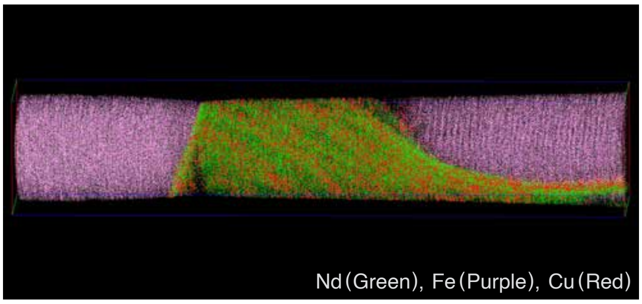
Research Center for Energy and Environmental Materials (GREEN)

GREEN is fully committed to basic research and development regarding battery and hydrogen-related materials to promote the use of renewable energy. Our R&D in the battery and cell materials field investigates novel and better materials for solar cells and batteries. Especially, we focus on batteries with the potential to exceed the performance of existing Li-ion batteries such as advanced Li batteries and all-solid-state batteries. In another field of hydrogen technology materials, we are developing hydrogen production catalysts to achieve more stable hydrogen utilization, and also establishing an original magnetic refrigeration system capable of liquefying hydrogen to improve hydrogen storage and transportation efficiency. Furthermore, GREEN has been serving as a hub for JST-funded Advanced Battery Collaboration R&D projects conducted jointly with the industrial, public and academic sectors across Japan to create and introduce groundbreaking batteries.

Research Center for Electronic and Optical Materials

Electronic and optical materials have been the driving force behind social development. Innovation in materials is eagerly awaited for the sustainable development of society. Our center develops a wide variety of materials, including semiconductor devices for next-generation communications that operate under severe environments such as high voltage, high temperature, and high speed, phosphors for video equipment that connects cyberspace and real space, and single crystals for lasers. Through these efforts, we will take on the challenge of transforming social systems. At the same time, we will work to improve the sensitivity and reliability of sensor materials that will enhance the safety and security of society, and to develop materials that take resource recycling into consideration. In addition, we will collect the knowledge gained in the process of developing these materials as data and contribute to the construction of the NIMS data platform.

Research Center for Magnetic and Spintronic Materials (CMSM)



Magnetic materials and spintronic devices are indispensable in making society more sustainable. Well-known examples include permanent magnets used in electric vehicle motors and magnetoresistive materials/devices used in magnetic recording. CMSM has been conducting a wide variety of basic research with the aim of dramatically improving the performance of these materials/devices and identifying new applications for them. Our recent research activities have also focused on how magnetism interacts with heat and light, respectively. We will build on the results of these projects by researching "green magnetic materials (e.g., heavy-rare-earth-free permanent magnets and magnetic refrigeration materials)". We will also investigate new materials/devices vital to the development and introduction of next-generation data storage devices and magnetic memory devices. In addition, CMSM will serve as a hub for MEXT-funded DXMag projects aiming to develop new data-driven research techniques.

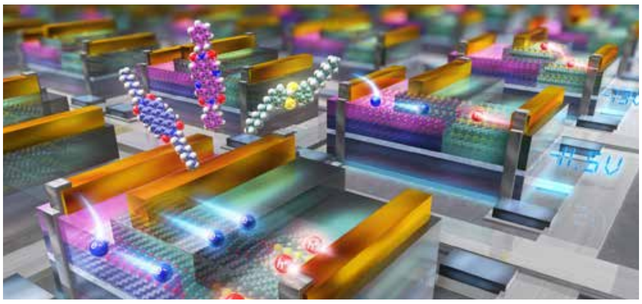
Research Center for Structural Materials (RCSM)

Structural materials physically support various types of social infrastructure that need to function stably for decades. RCSM develops high-performance structural materials and related technologies vital to civil infrastructure, transportation equipment and energy production-related technologies. These include quake-resistant materials used to protect buildings, bridges and other structures from major earthquakes, high specific strength materials essential to the development of lightweight aircraft and highly heat resistant materials needed to improve jet engine efficiency. In addition, RCSM contributes to the development of hydrogen-related infrastructure by creating materials resistant to cryogenic conditions and makes society safer and more secure by improving the techniques used to evaluate materials' physical properties and estimate their service lives.

Basic research leading to technological innovation

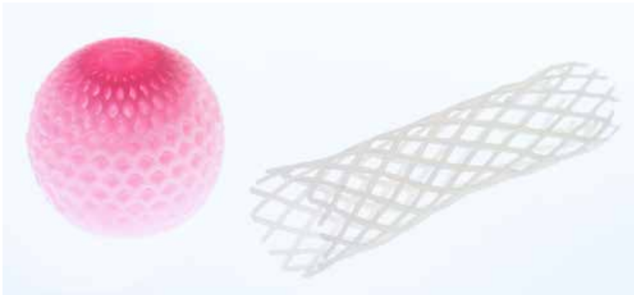
Pioneering future society by exploring new functions and new areas of materials science, innovative techniques for advanced measurement, analysis and data-driven research

Research Center for Materials Nanoarchitectonics (MANA)



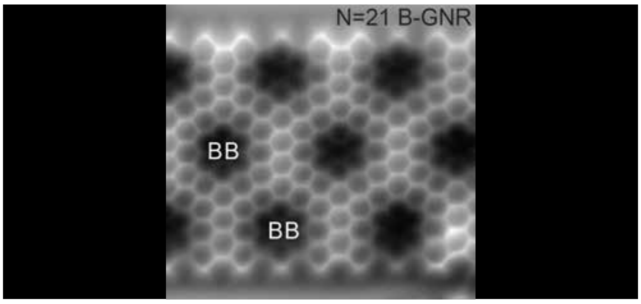
Nanoarchitectonics—nano-sized architectural technology—enables the creation of new materials with novel functions through precision synthesis and integration of nano-scale components. MANA—established as a result of the World Premier International Research Center Initiative (WPI)*—will continue to pursue a bottom up approach in basic research to finding effective nanoarchitectonic materials. For example, we are exploring new materials by controlling nano-interfaces and defects, and also, exploring new properties and establishing new principles through dimensional control of nanomaterials. In addition, we are working to develop quantum materials—one of NIMS' priority research areas—to meet growing demand for quantum technologies. Through these activities, we aim to create new materials with novel working principles.

Research Center for Macromolecules and Biomaterials



In accordance with NIMS' Fifth Medium-to-Long-Term Plan, this Center has been newly organized by a group of researchers with expertise in polymeric materials and biomaterials to research and develop revolutionary soft polymeric materials and biomaterials useful in improving social wellbeing. We will use advanced techniques to synthesize these organic materials while controlling their responsiveness to external stimuli and evaluating their physical properties. We will also develop fundamental technologies needed to produce polymeric materials with desired characteristics. NIMS has previously developed technologies for designing organic, inorganic, bio- and hybrid materials. We will use and improve these technologies to create materials for next-generation medical technologies capable of exhibiting intended functions in response to targeted biological phenomena.

Center for Basic Research on Materials (CBRM)



This new organization consists of experts in materials characterization and data-driven materials design. The center conducts basic research applicable to a wide range of materials to significantly increase R&D efficiency. We are developing advanced materials analysis techniques that can characterize material properties at the atomic level. These will be multiscale and operando measurement techniques that can measure the behavior of materials in working devices. We are also developing advanced data-driven analysis and high-throughput data collection techniques. We will provide the Repository of various materials information by connecting different types of databases.

Fig. Kawai, S. et al. Atomically controlled substitutional boron-doping of graphene nanoribbons. Nat. Commun. 6:8098 doi: 10.1038/ncomms9098 (2015).

*MANA was founded in 2007 as a consequence of the MEXT-led World Premier International Research Center Initiative (WPI). Since completing the 10-year WPI program, MANA has continued to serve as an international research center in its capacity as a WPI academy center.

NIMS as a research hub

Forming networks of materials researchers to facilitate collaboration and information sharing

Battery Research Platform

This state-of-the-art, shared facility is equipped with virtually all of the tools needed to perform a full range of next-generation battery R&D, including prototyping and characterizing test cells, safety evaluation and structural analysis at the nano-device levels. This unique, one-stop, world-class research facility is located in NIMS' NanoGREEN Building.

Materials Fabrication and Analysis Platform

This platform makes NIMS' leading-edge materials fabrication, analysis and characterization instruments available for use by a wide range of researchers from the industrial, academic and public sectors, supporting their R&D. Engineers with technical development expertise are available to help users operate large, sophisticated equipment and solve research problems.

Materials Data Platform

This platform offers ample support to scientists engaged in data-driven materials research by allowing them to use DICE, a multifunctional system capable of efficiently collecting and aggregating materials data and processing it into user-friendly formats. DICE consists of several functions, including MatNavi, one of the world's largest materials databases; RDE, a system capable of properly structuring and aggregating research data and making it available for shared use; MDR, a repository of materials-related data from scientific literature; pinax, an analytical system equipped with AI functions; and MInt, an integrated platform designed to facilitate research collaboration between the industrial, academic and public sectors. Users of DICE's data services can carry out more sophisticated materials development faster and more efficiently.

COLUMN

NIMS' data strategies

Creating a data platform

Collecting, aggregating and utilizing materials data

The adoption of data-driven techniques in materials development enables fast, efficient identification of potentially promising materials. Compiling large amounts of high-quality data is crucial to the effectiveness of these techniques. To achieve this, NIMS has been constructing a materials data platform called DICE.*1 DICE is a user-friendly data ecosystem capable of performing a series of functions: efficient data collection and aggregation in user-friendly formats, graphic representation of data and data analysis using advanced AI techniques.

In the mid-2010s—the dawn of data-driven materials development in Japan—NIMS was one of the first organizations to begin experimentally incorporating data science into materials research. NIMS has since developed and improved its materials data platform by creating and incorporating methods for continuously collecting materials data generated at research labs and databases. This platform performs a succession of data generation and aggregation functions to make data more useful to researchers. A major effort to expand this platform has begun in collaboration with universities and other research organizations across Japan. This new project is funded by the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT).

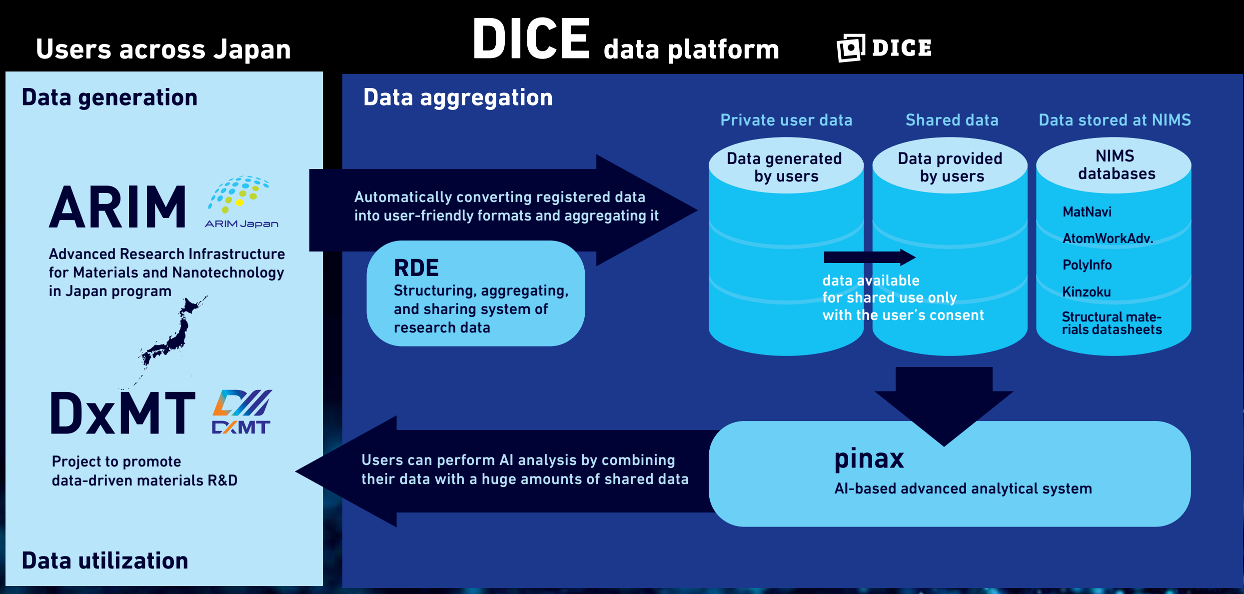
MEXT envisions developing a materials DX platform via three interrelated projects: the ARIM Japan (Advanced Research Infrastructure for Materials and Nanotechnology in Japan) program to generate materials data, DICE to aggregate it and finally the DxMT project to demonstrate the effectiveness of data-driven research that uses data. In these projects, NIMS serves as a "core data center," contributing to the progress of individual projects and leading efforts to develop infrastructure capable of efficient and secure collection and sharing of data generated by universities and other research organizations across Japan. As part of this effort, NIMS has added various features to DICE.

The Research Data Express (RDE) system is a new DICE feature rolled out in January 2023. This innovative system is able to automatically collect data and metadata generated by lab instruments located anywhere and standardize it into user-friendly formats before it is aggregated by DICE. This is a groundbreaking achievement—materials data was previously collected in inconsistent formats, making it difficult for others to use. The RDE system is accessible to any laboratory. Users need only register the data they intend to transmit to DICE online. Other DICE features are being developed, including an AI system capable of analyzing data aggregated by DICE in many different ways.

As with materials, the true value of data is in its use. The objective of the DxMT project, which fully launched in FY2022, is to popularize data-driven materials research across Japan by promoting digital transformation (DX) in five areas of materials research through full utilization of DICE. A NIMS-led committee consisting of five representative organizations, DxMT centers, was established to coordinate these activities. In addition, NIMS will promote DX through the DxMT project by identifying features common to different types of materials—a challenging effort—and demonstrating that data collected from one type of material can be useful in researching other types of materials.

NIMS leads efforts to develop the materials DX platform—a potential source of breakthroughs and innovations—through the mutually complementary DxMT, DICE and ARIM Japan projects.

*1 DICE (Digital Innovative Collaborative Ecosystem for materials) was developed by the Materials Data Platform Center (CPFC), part of the Research and Services Division of the Materials Data and Integrated System (MaDIS), during the implementation of NIMS' fourth medium-to-long-term (MTLT) plan from FY2017 to FY2022. DICE was released to the public in June 2020. With the launch of the fifth MTLT plan, CPFC was transferred to the Research Network and Facility Services Division (RNFS) and reorganized under the name "Materials Data Platform" (DPF). It continues to operate and update DICE.



03

Collaboration with major industrial firms

NIMS in Society

Working with industry and global organizations through diverse programs

◯ Industrial Collaboration Center

In line with NIMS' slogan, "The true value of materials is in their use," NIMS is committed to supporting the industrial sector through strategic, continuous collaboration with industrial firms based on its medium-to-long-term roadmap. NIMS has been developing next-generation technologies in collaboration with internationally famous companies like SoftBank and L'Oréal Japan.

Collaboration center examples

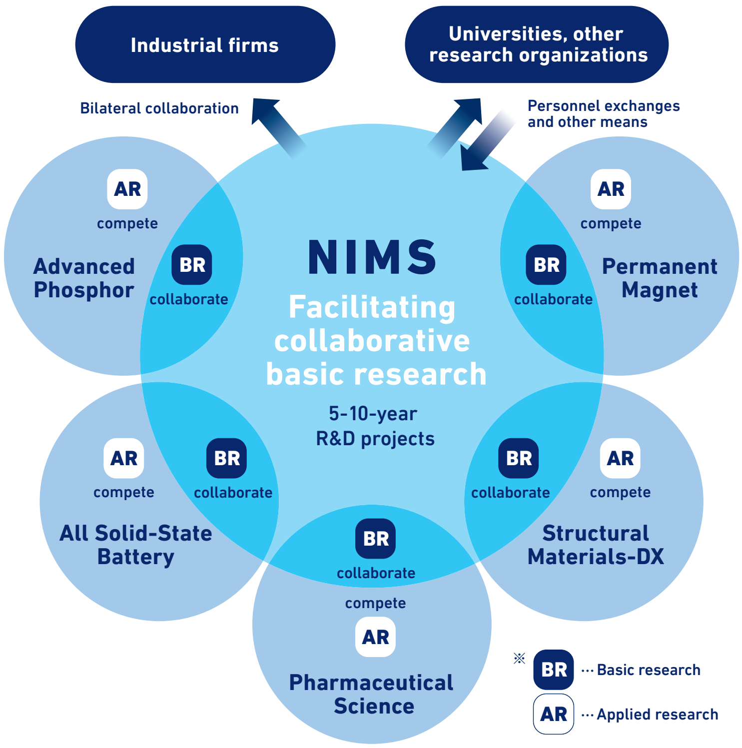
- TOYOTA-NIMS Collaboration Center
- NIMS-DENKA Center of Excellence for Next Generation Materials
- SAIT-NIMS Innovation Center
- MCC-NIMS Center of Excellence for Next-generation Functional Materials
- Softbank-NIMS Advanced Technologies Development Center
- L'ORÉAL-NIMS Materials Innovation Center for Science and Beauty
- Saint-Gobain CNRS NIMS International Collaboration Center
- Mitsubishi Materials-NIMS Center of Excellence for Materials Informatics Research
- WD-NIMS Center for Storage Frontier
- LSTC Semiconductor Materials Research Lab

◯ Materials Open Platform (MOP)

NIMS-led, industry-specific MOP frameworks enable rival companies in the same industries to work together to achieve common goals, thereby fostering innovation. MOPs have been launched in several industries.

MOP examples

- MOP for Advanced Phosphor
- MOP for Permanent Magnet
- MOP for All Solid-State Battery
- MOP for Structural Materials-DX
- MOP for Pharmaceutical Science



A wealth of diversity

About 35% of NIMS researchers are foreign nationals, making NIMS a culturally and linguistically diverse research institute.

NIMS' Research Center for Materials Nanoarchitectonics (MANA) and International Center for Young Scientists (ICYS) are particularly rich in diversity. They actively support the efforts of outstanding international researchers to exchange new ideas and conduct advanced research.

The Research Center for Materials Nanoarchitectonics (MANA) supports the activities of researchers from diverse nationalities—including student researchers—by building a culture of friendly interaction.

The International Center for Young Scientists (ICYS) gives talented young researchers a chance to pursue independent research projects—many leading to outstanding results.

High-quality education and training programs for young researchers

In addition to Japanese students, NIMS attracts many international students, despite the fact that it is not a university. NIMS has made an international name for itself for its commitment to cultivating young talent.

Many students join NIMS by Joint Graduate School Program or International Cooperative Graduate Program, where they conduct advanced materials research under the guidance of NIMS researchers.

Advantages of the NIMS Joint Graduate School Program

This program enables student researchers pursuing graduate degrees at universities in partnership with NIMS to carry out their research at NIMS as part of their graduate curricula. NIMS senior researchers support these students' advanced research activities through close involvement in studies specific to the students' academic majors.

Some student researchers at NIMS are foreign nationals seeking doctoral degrees mid-career. NIMS offers educational environments that encourage students like this to learn from collaborators with different nationalities, languages and scientific expertise/experience.

In addition, NIMS has a Graduate Research Assistantship Program to financially support qualified graduate students with a stipend, allowing them to concentrate on their research without financial concerns. Outstanding students enrolled in the NIMS Joint Graduate School Program may continue to receive this assistance from admission to graduation.

COLUMN

Changing the world through creative approaches

Effort distribution of NIMS' researchers

50% Independent research

50% The Mission of NIMS

Independent research:

a driving force behind NIMS' research capabilities

To promote its ability to produce revolutionary research results, NIMS allows its researchers to allocate 50% of their time and effort (i.e., 50% of their annual working hours) to independent research in pursuit of their personal research interests. Researchers who improve their research capabilities through independent research are likely to make great contributions to NIMS' missions.

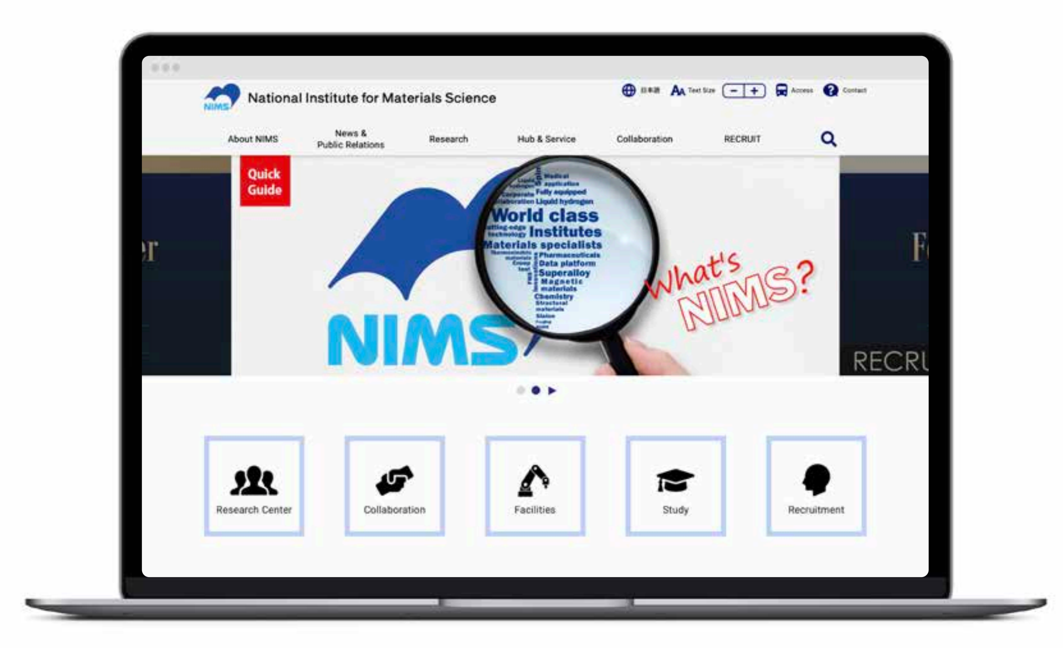
More about NIMS

Official NIMS website

https://www.nims.go.jp/eng/index.html

NIMS

One-stop NIMS-related information source, including information on its organizational structure and functions, latest R&D achievements, collaboration with private companies, research equipment available for shared use, upcoming events and links to videos on intriguing scientific phenomena and discoveries.



SAMURAI: NIMS Researchers Directory Service

https://samurai.nims.go.jp

NIMS samurai

Profiles of NIMS researchers and engineers

SAMURAI
NIMS Researchers Directory Service

Materials Revealed!

https://www.youtube.com/@NIMSJapan

NIMS Youtube

NIMS YouTube channel intended to convey the wonder of science mainly through materials research

NIMS NOW International

https://www.nims.go.jp/eng/publicity/nimsnow/index.html

NIMS NOW

Newsletter that reports the latest research activities at NIMS

NIMS data

Executive

President
Kazuhiro Hono

Executive Vice President
Toshihiko Kamada

Executive Vice President
Takashi Taniguchi

Executive Vice President
Nobutaka Hanagata

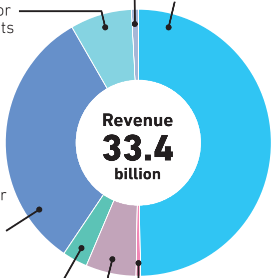
Auditor
Shunichi Arisawa

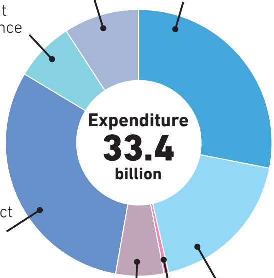
Part-time Auditor
Atsuko Osanai

Senior Vice President
Wataru Okabe

Executive Advisor to the President
Takayoshi Sasaki

Financial Data FY2023





[Japanese Yen]

Personnel by Classification

	Status	Number of Staff	Number of Female Staff (included)	Number of Foreign Staff (included)
Executive		6	1	0
Permanent Employee	Researcher	372	37	50
	Engineer	79	17	0
	Administrative Staff	107	34	0
	Subtotal	558	88	50
Fixed Term Employee, etc.	Researcher (fulltimer)	205	33	120
	Graduate Student	132	36	83
	Other	665	445	31
	Subtotal	1,002	514	234
Total		1,566	603	284
Percentage			39%	18%

[Apr. 1, 2024]

History

1956 Jul. Establishment of National Research Institute for Metals
1966 Apr. Establishment of National Institute for Research in Inorganic Materials
1972 Mar. National Institute for Research in Inorganic Materials relocated to Tsukuba
1979 Mar. NRIM opens Tsukuba Office, three research departments relocated
1995 Jul. National Research Institute for Metals relocated toTsukuba
2001 Apr. Establishment of NIMS by merger of National Institute for Research in Inorganic Materials and National Research Institute for Metals. Start of First Five-year Plan
2004 Apr. Start of Doctoral Program in Materials Science and Engineering of Graduate School of Pure and Applied Science, University of Tsukuba
2006 Apr. Start of Second Five-year Plan
2007 Oct. Establishment of International Center for Materials Nanoarchitectonics (MANA) -World Premier International (WPI) Research Center-
2009 Nov. Establishment of Global Research Center for Environment and Energy based on Nanomaterials Science (GREEN)
2010 Dec. Establishment of Center of Materials Research for Low Carbon Emission (CMRLC)
2011 Apr. Start of Third Five-year Plan
2012 Apr. Establishment of Research Center for TIA Nano-Green Open Innovation (renamed to NIMS Open Innovation Center)
2012 Aug. Establishment of Elements Strategy Initiative Center for Magnetic Materials (ESICMM)
Establishment of Center for Nanotechnology Platform
2014 Oct. Establishment of Research Center for Structural Materials (RCSM)
2015 Apr. The Independent Administrative Institution (IAI) system reestablished as the system of the National Research and Development Agency.
2015 Jul. Establishment of Center for Materials Research by Information Integration (cMi^2)
2016 Apr. Start of Fourth Seven-year Plan
2016 Oct. Promoted to a Designated National Research and Development Institute
2017 Apr. Establishment of Research and Services Division of Materials Data and Integrated System (MaDIS)
2021 Jun. Establishment of Advanced Battery Collaboration
2022 Nov. Establishment of Digital Transformation Initiative Center for Magnetic Materials (DXMag)
2023 Apr. Start of Fifth Seven-year Plan

www.nims.go.jp

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