



Michinari Hamaguchi

Graduated from Nagoya University Graduate School of Medicine, 1980. After working as a Molecular Oncology researcher at Rockefeller University in 1985, he became president of Nagoya University in 2009, and Proposed internationalization of the university to dramatically expand research capabilities. Currently president of Japan Science and Technology Agency since 2015.

One of the common languages for achieving SDGs* is Science and Technology. As a director of the National Research and Development Corporation's Japan Science and Technology Promotion Organization (JST), Mr. Michinari Hamaguchi is a member of the National Research and Development Corporation (JST), who promotes close partnerships with universities, research institutes, industry, etc. inside and outside Japan and contributes to the sustainable development of society.

In the late 1960s, I enrolled at Nagoya University School of Medicine. At that time, the class was sealed off due to a university conflict, and there were no lectures. That continued for almost a year, but I read a lot of books. Among my reading was the American philosopher Hoffer's phrase "Misfits, (people who can not fit into society or organization) can create the next era". I was greatly impressed by the phrase, and it was to influence my future.

After graduating from university, I worked as a surgical trainee at a local hospital, but retained this sense of being a misfit. I chose the path of basic research rather than become a medical doctor. I went to the US and joined the Rockefeller University laboratory to focus on oncogene research. After returning to Nagoya University, and after teaching, I became a director of medicine and then a university president. Even then, I still had a sense of being a misfit. In order to bring society and organizations closer to what they should be, as a medical director, I strove for structural reform. As president of Nagoya University, I advocated internationalization of the university, called for becoming the center of Asia, and focused on establishing the first overseas graduate school (doctoral course) at a domestic university.

As part of this work, in order to solve the poverty problem in Cambodia, we set up efforts such as dairy farming. In retrospect, these activities were exactly in

line with SDGs, the goal being to achieve sustainable growth for the challenges facing the world. My experience then is the basis for the policies and activities at JST now.

Even prior to the adoption of the SDGs in September 2015, JST had already been engaged in various activities for solving SDG issues. One of them was the Tohoku support following the Great East Japan Earthquake that occurred in March 2011. We have promoted a project connecting local small and medium enterprises and businesses in traditional industries together with teachers from universities (supporting 250 companies). While making the best use of various human resources networks, outside existing society or organization structures, we are promoting discussions that are rooted in what we want to be.

In international activities, we are promoting the "Global Science and Technology Cooperation Program (SATREPS)" with the National Research Institute for Medical Development (AMED) and the Japan International Cooperation Agency (JICA). In addition to the traditional methods of applying science and technology, Japanese universities and developing countries cooperate with each other to carry out joint research for development and application of new technologies. I have realized through this work that science and technology are a common language that spans the goals set out in SDGs.

Among Nippon Paper Industries' activities, I am focusing on new materials such as cellulose nanofibers and Minerpa. How can new technology unique to Japan and not environmentally harmful be developed as a common language for solving issues to achieve the SDGs, and then evolve the real world?

I look forward to that future.

*"Sustainable Development Goals (SDGs)" adopted by the UN General Assembly in 2015. For details, please refer to "SDGs and Minerpa" inside.

Marunuma Highlands Tree Planting 2017

The Nippon Paper Group held Marunuma Kogen Planting 2017 on Saturday, May 27. Blessed with refreshingly sunny weather on the day, approximately a hundred participants from our group and Nippon Coca-Cola planted about 1,000 seedlings, of 6 species, on land in the Nikko National Park, (in the group's forests area).



Each sapling was carefully put in place



Soon, many trees had been planted

EDITOR'S NOTE

I met Dr. Hamaguchi, President of JST, who focuses on SDGs. SDGs are often thought to be global or to apply to developing countries, but they can also be used as goals within Japan. In the process of realization, each person can create a more satisfying society.

This volume looks at Nippon Paper's new materials, development of new technology is one of the goals set by the SDGs. Science and technology have both positive and negative effects on the environment and society, depending on how they are used. It is therefore important to steer the development of new technologies towards realizing a sustainable society.

Keiko Fujita

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紙季折々

Shiki Oriori



Wood gives birth to a new material

We have developed a new material that gives wood fiber the properties of minerals

"Minerpa", developed by Nippon Paper Group, is a new material, a hybrid of inorganic compounds from minerals and wood fiber. The name combines "Mineral" and "Pulp", together with a reference to the Greek Goddess "Minerva" whose symbol is an owl.

Using our own proprietary process, we have been able to produce fibers with very high mineral content. We are now developing Minerpa to provide useful, safe and environmentally friendly materials.

In this issue, we are proud to introduce Minerpa!



Shaping the Future with Trees



We developed a hybrid fiber of wood fiber and mineral, Minerpa

Wood gives birth to a new material

The Nippon Paper Group is a comprehensive biomass company, and as such develops and supplies various wood and wood-based products. Our researchers looked at inorganic mineral compounds and discovered that, by “highly blending” minerals in wood fibers, we were able to create a completely new material which we call “Minerpa”. Like wood fiber, it can be processed into various forms, but it also has new advanced mineral properties. We continue to develop new uses and possibilities for Minerpa to meet society’s needs.

POINT 2

Forming various shapes unique to wood fiber

For example, by processing Minerpa into sheet form, minerals can perform the functions of paper (write, wrap, wipe, etc.).

POINT 3

The combination of properties and shape is infinite

By selecting the type of mineral and the shape to be produced, we can create Minerpa products with various functions. Minerpa will enable us to provide products that are more comfortable, safer and more environmentally friendly.



Voice from the Development Leader

Nippon paper industries
R&D department
Senior Research Manager



Shisei Goto

Minerpa is a new material that fully mobilizes the Group's technologies and knowledge. We are now looking at how this new material can be applied to society's needs

Previously, minerals have been used as fillers and pigments in paper and paperboard. In order to reduce the weight of paper, attempts have been made to increase mineral content, but at most it was around 20%.

Our unique technology has enabled us to make a new high mineral content material. Originally developed for non-chemical deinking of waste paper, it is now applied to the making of Minerpa. We make full use of our paper making, pulp processing, and inorganic synthesis technologies, to create this new material, Minerpa.

We are now focusing on application development. We believe that there are many potential uses unique to Minerpa, and we hope to work with people in various industries to develop Minerpa while listening to customer and society voices.

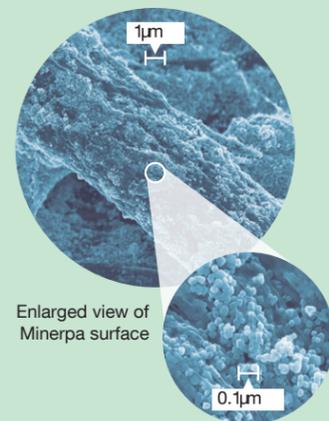
Raw material ▶ Wood Fiber



Minerpa is based on wood fiber, a renewable raw material. Paper pulp can be used as it is, chemical or mechanical pulp, or can be used for papermaking

※ 1μm=1/1000mm

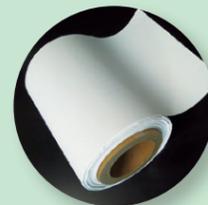
Mineral Hybrid Fiber



Enlarged view of Minerpa surface

Fine mineral particles are attached densely on the wood fibers

Sheet



Molded



Board



Possibilities for the future: the main applications of Minerpa

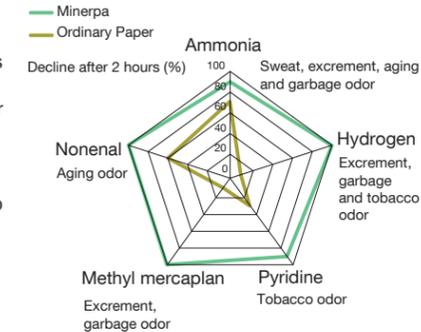
We will promote further application development with our partners in various industries

Comfortable Life: Deodorant x Sheet

(Absorption of various odor components)

When Minerpa with deodorant and antibacterial properties is formed into sheets, it adsorbs various odor components.

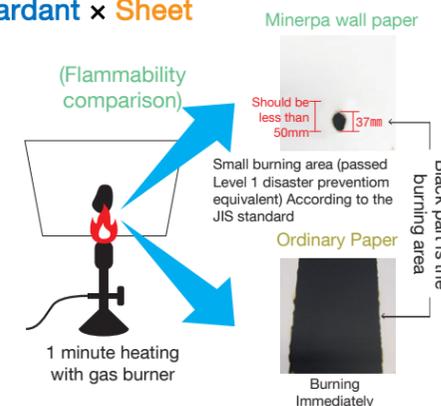
This is an area where demand is expected to increase in the future as hygiene awareness rises.



Safe Living Environment: Flame Retardant x Sheet

Combination of flame retardant minerpa and sheet form.

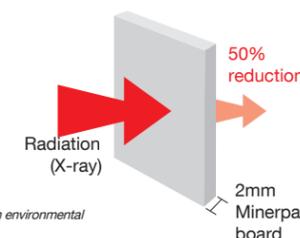
As flammable paper becomes hard to ignite, it can be used as flame retardant wallpaper.



Environmentally Friendly Material: X-ray Shielding x Board

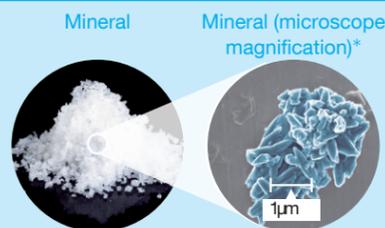
(X-ray protection)

Combination of minerpa with X-ray shielding properties and board. It can be expected to replace conventional lead boards.*



*Lead is subject to global regulatory pressure, due to its high environmental negative impact, and alternatives are being sought.

Raw Material ▶ Mineral



Minerals are inorganic compounds. Most of them exist in nature as components of rock. We have been able to increase the mineral content in wood fiber materials by our own technology methods.

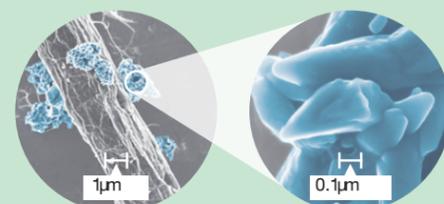
*minerals are colored light blue for illustration only

POINT 1

Make the properties of minerals as they are

Because of the high blend of minerals with various properties such as deodorizing and flame retardancy, Minerpa can be made with functions that wood fiber alone can not achieve.

Minerals are blended in ordinary paper as well



Large mineral particles, which break away easily

Minerals are also used in ordinary paper (for whitening for example). However, conventional methods have not been able to achieve high mineral content in wood fibers.

SDGs* and Minerpa

The development of the new material Minerpa is related to the following SDG goals.

- Goal 9: Industry, Innovation and Infrastructure** - Promotion of Innovation. To build a sustainable society, we need to develop new technologies. Minerpa is a new material that adds new value to wood fibers.
- Goal 12: Responsible Consumption and Production** - Management of chemicals in the products and waste, promotion of recycling. There is a need to develop products that minimize adverse effects on human health and the environment, such as Minerpa radiation shields to replace lead.

* For SDGs, please refer to the following Shikioriori http://www.nipponpapergroup.com/csr/Vol24_contents.pdf