NEWS RELEASE

国立大学法人 岐阜大学 National University Corporation Gifu University

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Fiber produced by using the only technology in the world

Gifu University produced "skin-friendly fiber containing vitamin C" in collaboration with local companies and public research institute (5 companies and 1 prefecture).

The University exhibits the product samples at MESSE NAGOYA 2014.

National University Corporation, Gifu University (Address: 1-1 Yanagido, Gifu City, Gifu, President: Hisataka Moriwaki) releases the news that Gifu University became the only university in the world to succeed in the development of the nano porous fiber using the crazing mechanism (*1). Gifu University has developed the fiber products using this technology in collaboration with fiber manufacturers in Gifu Prefecture, and the University exhibits the product samples at MESSE NAGOYA 2014 from Wednesday, Nov. 5 to Saturday, Nov. 8.

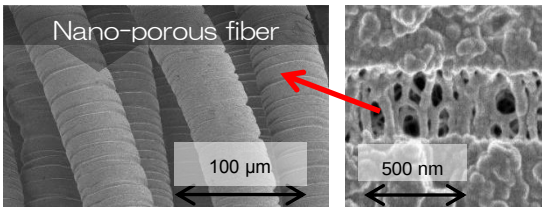
■What is made possible with this technology?

By applying this technology to fiber products, the production of skin-friendly shirts containing vitamin C or tannin and socks made by antibacterial and antibromic fiber becomes possible. In the conventional technology, it was difficult to be achieved. Furthermore, the effects can last longer because of its fastness.

*1 What is crazing?

Crazing is the phenomenon forming a nano porous structure immediately before plastic is broken. Plastics are usually designed to restrain whitening phenomenon generated by crazing. However, Gifu University developed a unique technology to take advantage of the crazing. The region formed by crazing is called a craze.

Images are electron micrographs of nano porous fiber.
Left image: The striated appearance is the craze generated in fiber.
Right image: The nano porous structure of the inside craze.



■Features of nano porous fiber using crazing mechanism

- The nanopore size of fiber can be changed freely even after the production. Its features are as follows:
- Volatile and heat-labile materials, which are difficult to be contained, can be physically packed in the void (enzyme, vitamin, etc.).
- It releases chemicals and does not let water in when changing the size of void. It is long-lasting and washable.

■Comparison with the conventional technology

- Fiber is more durable than the one with coating.
- Unlike kneading, high heat is not applied and functions can be added at the post-processing stage.

We spend about one-third of our life sleeping, but 97 percent we are in contact with fiber. Fiber is an artificial material having contact with our skin for the longest time.

—We pursue the goal to bring relief to our life gently and slowly by the long-term partner (=Fiber).—

■Exhibitions at MESSE NAGOYA 2014

MESSE NAGOYA 2014 takes place from Wednesday, Nov. 5 through to Saturday, Nov. 8. Gifu University exhibits the sample of nano porous fiber products using crazing mechanism. The samples include sheets that are made by functionally-different fibers for each season.

Exhibitions at MESSE NAGOYA 2013⇒

Spring: Skin-friendly fiber containing vitamin C	Summer: Cooling fiber containing menthol
Fall: Antibacterial and antibromic fiber containing tannin	Winter: Thermal fiber containing the component of capsicum and ginger

■Nano porous fiber using crazing mechanism

Using crazing mechanism, the pore of nano porous fiber controlling destruction can be closed as if packing materials into a nano-sized bag and tying the bag closed. This method enables to pack the materials into nano space as it is. It was impossible to achieve with the conventional technology. Natural materials can be packed without losing any component due to heat and volatilization. Also, breaking down greasy dirt on the fiber containing lipase is possible without washing lipase off with water. With this technology, chemicals can be added to fiber after its production like coating, and the chemicals become like kneading into the fiber because it penetrates deep into the fiber. The chemicals cannot be taken off with a scratch.

Right image: This is woven polypropylene fiber which is known as non-dyeable. When washing the fabric after soaking the whole thing in stain solution, the color of its porous fiber portion only remains. The color doesn't wash out even if washing many times.

Right image: Nano porous fiber is interwoven in white parts of the socks. It has natural scent of wood by Hinokitiol (the component of Japanese cypress) and bactericidal effects. The scent lasts even after 2 years of production.

■Nano porous fiber development story

By controlling and purposely generating the craze that is normally designed to restrain, Gifu University succeeded in the technology transfer into privacy film and micro bubble generator (The NAC Co.,LTD. has a booth for the micro bubble generator at MESSE NAGOYA 2014). Aiming at applying the technology to the local fiber business which is in a technologically slump, Gifu University Research Group for the Practical Use of Nano Porous Fiber by Craze Processing was organized and started its activities in 2011. Since then, Gifu University has promoted joint research and development with some fiber manufacturers in Gifu Prefecture.

At the stage of 2012, Gifu University manufactured the first sample but the production of fiber was erratic due to lack of understanding of fiber characteristics. As the result, the University failed in the commercialization. At the stage of 2013, it was shifted to slit fiber which cuts a film fine, and that made the fiber production easier. However, Gifu University gave up the commercialization again as knitting and weaving were difficult in addition to the expensive cost. In this year, the University had a breakthrough and succeeded at collaborative development with film makers. That enabled the use of new crazing film. In consequence of the research and development, Gifu University had the prospect of its production if receiving an order, and the product samples are exhibited at MESSE NAGOYA 2014.

Top priority of future tasks is verifying durability and safety of the product, and the University makes every effort to contribute to regional development through collaboration with enterprises in Gifu Prefecture.

■Gifu University Research Group for the Practical Use of Nano Porous Fiber by Craze Processing

Gifu University Research Group for the Practical Use of Nano Porous Fiber by Craze Processing, which is led by Associate Prof. Akiyoshi Takeno of the Faculty of Engineering, consists of Gifu University, Industrial Technology Center, Gifu Prefectural Government, Kamiya Material Gifu Co.,Ltd., Miwamasaknit Co.,Ltd., Asahi Orimono Co.,Ltd., Toyoseni Co.,Ltd., Yagikuma Co., Ltd. and others.

The Research Group utilizes the achievements of Regional Innovation Strategy Support Program (“Tokai Region Nanotechnology Manufacturing Cluster” ended in 2013) supported by the Ministry of Education, Culture, Sports, Science and Technology. Also, the Research Group manufactures samples and exhibits them with the aid from Gifu Research & Development Foundation.

■Overview of the University

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