

The Leading Edge of Research and Technology

Japan Vilene is committed to the development of products and technology that are designed to improve the environment and help people stay fit and healthy. This feature outlines initiatives undertaken by the Central Research Laboratory and departments involved in development.

Central Research Laboratory

The main role of the Central Research Laboratory is to develop next generation technology for Vilene from a medium- to long-term perspective. Development is based on the principles of "environmentally beneficial products" and "effectively harnessing fiber surfaces."

1. Environmentally beneficial products

The development of environmentally beneficial products can be divided into two categories, namely minimizing emissions of environmentally harmful substances and recovering environmentally harmful substances.

We primarily develop a range of battery materials, including separators for lithium ion secondary batteries and materials for fuel cells, in the former category, and filter materials such as liquid filtration materials in the latter. As a result of development activities last year, we exhibited new ion conductive membranes at the International Hydrogen & Fuel Cell Expo and made a successful start to joint development in partnership with our customers.

Having developed cartridge filters for micro liquid filtration using nanofiber nonwoven fabrics from a comprehensive standpoint, incorporating processing as well as the development of filter medium, we have established basic technology exclusive to Vilene and started to provide our customers with samples.

2. Effectively harnessing fiber surfaces

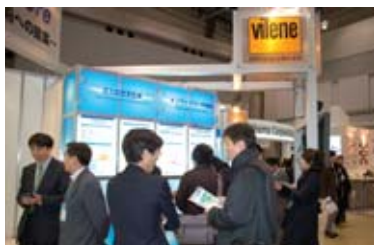
We divide the development of technology based on the principle of effectively harnessing fiber surfaces into two categories, namely increasing the area of fiber surfaces using finer fibers and adding functionality to fiber surfaces. In terms of finer fibers, we seek to

merge the new sol-gel method with electrospinning technology to enable continuous production of high purity silica nanofibers in addition to organic nanofibers.

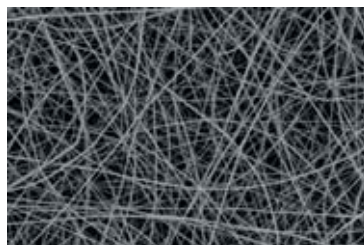
We are currently working in conjunction with Kyushu University and the Fukuoka Industrial Technology Center on the basic development of reactors for use in biodiesel fuel production as one of the areas of applications for silica nanofibers, which have already earned high acclaim and have been heralded as a promising technology for the future by The Chemical Daily and numerous other newspapers. In terms of adding functionality to fiber surfaces, meanwhile, we are investigating applications in relation to filters and electric materials, using technology to fix functional particles onto fiber surfaces, and have started to provide our customers with test samples.

3. Stepping up collaboration with external research institutions

We continued to actively engage in joint development with external research institutions. In particular, we successfully developed new inorganic nanofibers and a range of metallic oxide nanofibers as part of the Collaborative Innovation Center for Nanotech FIBER (NanoFIC) at Shinshu University, a program subsidized by the Ministry of Education, Culture, Sports, Science and Technology.



Fuel cell exhibit at the 2009 Hydrogen & Fuel Cell Expo



Silica nanofibers



Cartridge filters

Technical Research

The following section outlines research into three of the company's many technologies that are set to provide the basis for important products now and in the future.

1. Health support technology

As part of measures to protect against new strains of influenza, we have developed particulate respirators compliant with N95 standards set out by the National Institute for Occupational Safety and Health (NIOSH) and have received glowing feedback from customers regarding their outstanding performance. We are also working with Tottori University to develop air filters capable of deactivating the avian influenza virus, and have successfully identified a highly effective deactivating agent. We are pushing ahead with research on the basis that the same technology will also prove effective against avian flu amidst fears of an international epidemic.

Although we already have a large share of the market thanks to our stretch backing materials for hot and cold compresses, recently we have also been developing plaster backing materials compatible with knitted plasters, which have been picked up by a number of pharmaceutical manufacturers. Whereas a great deal of attention is being focused on pharmaceutical tape, in which medication is absorbed through the skin to avoid the risks associated with formulating full body, orally ingested drugs, we are currently working with pharmaceutical manufacturers to develop base materials, harnessing our unique technology to considerable acclaim.



V-1003N particulate respirator



Power supply battery



Ni-MH battery for HEV



VOC ozone filters

2. Technology to reduce CO₂ emissions

Having developed separators with ultrafine and other special fibers and helped to improve the performance and reliability of nickel-metal hydride (Ni-MH) batteries, we have secured an overwhelming share of the market for Ni-MH battery separators for use in hybrid electric vehicles (HEV), which have been thrust into the spotlight the world over as eco-friendly vehicles capable of effectively reducing CO₂ emissions.

Highly popular cars such as Toyota's New Prius and the Honda Insight all use Ni-MH batteries (The Nikkei Business Daily, April 2).

3. Technology to clean water and the air

A worldwide shortage of clean water has prompted the development of technologies capable of obtaining purified water from sources such as salt water and waste water. Nonwoven fabrics developed by Japan Vilene have been introduced as supports for microfiltration (MF) membranes, one of the components used in such processes. We also supply filters and systems designed to create clean spaces. We have developed filters that strike a balance between flame retardant and eliminating substances such as ozone odors produced by office equipment and volatile organic chemicals (VOC) and have received glowing feedback from customers.