

Trends in Japan

Sci-tech

Japan is synonymous with groundbreaking inventions and scientific breakthroughs. From trains to robotics to fabrics to the increasingly important field of environmental technology, Japan leads the world. Be the first to discover the future of science and technology.

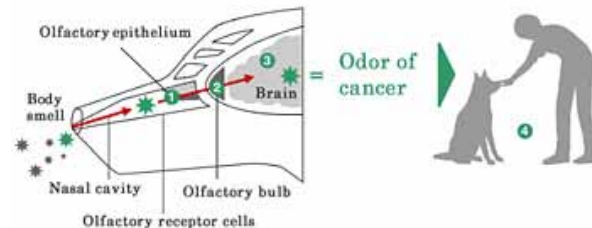
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Japan's Science of Odors

Can Odors Help Humanity?



Imai Makoto from Shiga University of Medical Science won the Ig Nobel Prize in 2011 for the development of a wasabi fire alarm and is seen here joyfully displaying the award plaque above his head.



How a dog detects cancer. When sniffing the breath or body smell of a cancer patient, the odor molecules interact with receptors located on the dog's olfactory receptor cells in the olfactory epithelium (1) to release chemical signals. The signals are transformed into electrical impulses and transmitted to the olfactory bulb (2) and then to the brain (3). The dog recognizes it as the "odor of cancer" and then indicates the positive detection of such (4). (Illustration: Seems Inc.)



A cancer detection dog. The dogs were able to identify colorectal cancer patients with an accuracy rate of over 90%. (Cooperation: Kyushu University)

When people consider odor, they have few pleasant thoughts. But in Japan today, scientists are conducting advanced research into the amazing benefits of using odor to prevent danger and detect disease.



When a fire is detected with the smoke detector (left), signals are transmitted immediately to the smell spray device (right), and it then sprays the pungent smell of wasabi, which is powerful enough to wake people up, even from a deep sleep. (Photo: Seems Inc.)



The wasabi rootstalk has a strong, pungent flavor similar to that of horseradish; it is grated into a paste and used as a condiment in dishes such as sushi and sashimi. ©AFLO

Cutting-edge Technologies Enhance the Expression of Beauty

Technological advances in the traditional weaving and knitting industry have revolutionized the creation of modern-day cloth and fabric, helping to generate an array of astonishing new designs, composition and quality.



Nishijin-ori brocade. Mass production is now possible with a mechanized method, in which the design is processed with a computer and rendered in the final product. ©AFLO

Scarf created with the soft and world's thinnest Amaike Super-Organza fabric, achieved through the prowess of advanced technology.
(Cooperation: Amaike textile industry Co., Ltd.)



Knitting machine capable of creating sweaters three dimensionally into the shape of the final product.
(CG-rendered image, cooperation: Shima Seiki Mfg., Ltd.)



Shirts made with PHOTOTEX, in which the photographic image is reproduced with superfine threads. Examples from the collection at the Metropolitan Museum of Art in New York City.
(Cooperation: Orimoto Yamakuchi)



A knitwear design is created with computer (1), tested on a three-dimensional virtual model (2) and rendered exactly in the final product (3). The machine enables the production of items shaped exactly to the designer's image. (Cooperation: Shima Seiki Mfg., Ltd.)

The Japanese Bolt

Supporting the World

Japanese industrial development has been sustained over the years by small, innovative, hard-working manufacturers. Today, major engineering firms around the world also rely on this advanced expertise.



Left: Hardlock nut that "never comes loose."
(Cooperation: Hardlock Industry Co., Ltd.)



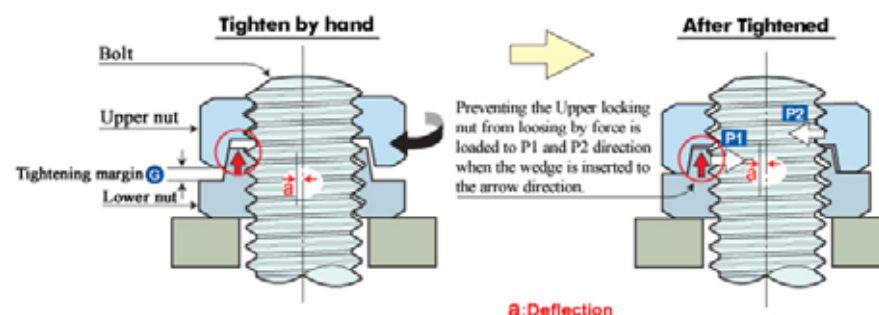
Right: There's a wide range of products in the Hardlock nut lineup, developed through constant improvements.
(Cooperation: Hardlock Industry Co., Ltd.)



Hardlock nuts are also used in LNG supertankers and other large vessels.
(Photo: AFLO)



A train on the British National Rail. This was the first high-speed railway overseas to adopt Hardlock nuts on a full scale
(Photo: AFLO)



How the edge works in the Hardlock nut (Illustration: Hardlock Industry Co., Ltd.)



The Seto Ohashi bridge, which accommodates an expressway and a railway, is also constructed with Hardlock nuts. (Photo: AFLO)

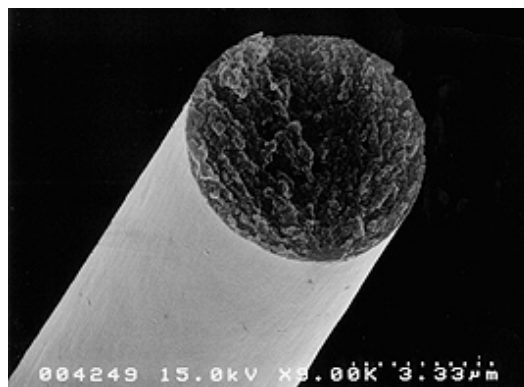


Hardlock nuts are used in many applications, including Tokyo Sky Tree, the 634-meter-high structure that has become the world's tallest freestanding broadcast tower.
(Photo: AFLO)

A Dream Material Developed over 40 Years by Japanese Companies

Carbon fiber technology, developed in Japan decades ago, has come into the limelight for use in a growing array of lightweight, cutting-edge applications.

The Boeing 787—the first time for most of the body of an airplane to be constructed with carbon fibers, achieving significant weight reduction. (Cooperation: All Nippon Airways Co., Ltd.)



A carbon fiber captured with an electron microscope. It is about 5–7 μm in diameter ($1\mu\text{m} = 0.001\text{ mm}$), which is much thinner than a hair. (Cooperation: Toray Industries, Inc.)



24,000 carbon fibers are bundled into a string form called "tow." The photo shows a reel of tow for shipping. (Cooperation: Toray Industries, Inc.)



Left: An electric vehicle utilizing carbon fibers. The body is made of carbon fiber composite materials to realize remarkable reductions in body weight. (Cooperation: Toray Industries, Inc.)



Right: Carbon fiber is an essential material for fishing rods and other sports equipment today. ©AFLO